

**Consultancy for Contemporary Used Oil Audits in Selected
Pacific Island Countries**

**Report for the State of Kosrae
Federated States of Micronesia**

**Prepared for the Secretariat of the Pacific Regional
Environment Programme (SPREP)**

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Executive Summary

This report covers the State of Kosrae component of a project involving used oil audits in selected Pacific Island countries. The objective of the audits is to establish volumes of lubricating, hydraulic and transmission oils imported annually into each country and the volumes of used oil produced, stored or otherwise disposed. The work has been carried out by Contract Environmental Ltd under a contract to the Secretariat of the Pacific Regional Environment Programme (SPREP), with funding provided by the Global Environment Facility. Most of the information required for the audit has been obtained in a country visit undertaken by Martyn O’Cain from 23 June to 30 June 2014 and was organised through the local Kosrae Island Resource Management Authority (KIRMA).

Used Oil Production

The total quantity of lubricating oils imported into Kosrae in 2013 was about 22,335 litres and it is estimated that approximately 50% of that will end up as used oil. In addition small amounts of the 4.4 million litres of diesel imported into Kosrae ends up in the used oil stream. Other used oil components come from diesel waste, small amounts of hydraulic and transmission oils, brake fluid and vegetable oil. It is therefore estimated that about 12,000 litres of used oil is produced per year. Certainty estimates for the estimated volumes are given at the end of s4.

Used Oil Collection and Disposal

There are no private used oil recovery companies in Kosrae. There is no formal used oil collection point in Kosrae. Oil is stored at the location where it was generated or in large storage tanks at Kosrae Utilities Corporation. Any disposal of used oil on Kosrae is not governed or managed by either the private sector or a government agency.

Based on the volumes of used oil that are being generated and the figures showing what is being stored and stockpiled there is confidence that used oil is not being disposed of unlawfully in significant quantities.

There are no oil reuse options available in Kosrae at this stage however two government organisations have a combined application with the Japanese Embassy in Pohnpei for assistance in purchasing an incinerator that can burn used oil. If the application is not successful then the best management option is for the used oil to be collected and exported off shore.

National Instruments

KIRMA does provide limited governance over the management of used oil. The most prescriptive regulations are the Regulations for Development Projects and the Pollution Regulations.

A draft solid waste management plan covers a number of different waste streams. It is a discussion document that addresses a number of concerning issues including the management, monitoring and enforcement of used oil being collected on Kosrae.

Recommendations

Based on this audit of used oil in Kosrae State the following recommendations are offered:

- Support the application to the Japanese Embassy in Pohnpei for assistance to fund an incinerator that can burn used oil.

- Establish a robust set of regulations for managing, monitoring and enforcing the handling, storage and disposal of used oil on Kosrae.
- Establish a specifically designed centralised collection point within Kosrae. This will include establishing an environmentally secure collection facility that is bunded, covered and monitored to ensure the entry and exit of used oil is correctly managed. The location should be well considered so that it complements any potential future reuse options that may be established.
- Establish a formal procedure for collecting, managing and disposing of used oil at the centralised collection point.
- Investigate a 'user pay' system for collecting used oil to help offset the costs for setting up and running the collection process. This may be coupled with leasing the collection and delivery of used oil to the private sector. A designated oil recovery company is motivated to ensure all used oil is managed correctly if the costs are realistic and provide value.
- Establish suitable time frames for exporting the collected oil to an offshore facility given that the estimated amount of used oil being generated each year is now available. This includes executing tender contracts within a timely manner.
- Independent scrutiny of tendering contracts for the export of the used oil. Consideration should be given to the reputation and professionalism of the appointed contractor. Such things as ensuring they have appropriate ships for carrying the oil; they have good history within the industry; they have guaranteed contracts with an approved treatment facility and that they will guarantee stewardship of the product once it has left Kosrae.
- Consider re-use options on Kosrae. A possible re-use option would be to establish a waste to energy system at the existing power station. Briefly, this would involve establishing a suitably sized burner capable of being fuelled by used oil. Connect an electricity generating turbine that recovers the energy generated by the oil combustion. Connect the turbine to the main power grid which will supplement the existing power production. A feasibility study may be required to establish whether or not enough used oil is generated to warrant such a system. Such a system should be considered if the application to the Japanese Embassy is successful.

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1. Introduction

1.1 Purpose

This report covers the State of Kosrae component of a project involving used oil audits in selected Pacific Island countries. The objective of the audits was to establish volumes of lubricating, hydraulic and transmission oils imported annually into each country and the volumes of used oil produced, stored or otherwise disposed. The work was carried out by Contract Environmental Ltd under a contract to the Secretariat of the Pacific Regional Environment Programme (SPREP), with funding provided by the Global Environment Facility. Most of the information required for the audit was obtained in a country visit undertaken by Martyn O’Cain from 23 June to 30 June 2014 and was organised through both the Office of Environment & Emergency Management of the Federated States of Micronesia and the Kosrae Island Resource Management Authority (KIRMA).

1.2 Scope of Work

A copy of the Terms of Reference for this work is given in Appendix 1. It lists the following tasks:

- a) *Establish and document national oil import/generation volumes and rates for the last 3 years ideally 2011, 2012 and 2013;*
- b) *Establish national used oil production rates for the last 3 years ideally 2011, 2012 and 2013;*
- c) *[Prepare an] Oil Audit Balance for the last 3 years ideally 2011, 2012 and 2013;*
- d) *Document and summarise existing national used oil management procedures; and*
- e) *Document and summarise existing national used oil management instruments.*

1.3 Report Content and Layout

Section 2 of this report provides details of the annual oil imports to Kosrae, based on the data obtained from the Customs Department and from companies that import directly into Kosrae (FSM Petroleum Corp, Ace Hardware).

An estimate of used oil generation rates and volumes is set out in Section 3 and Section 4 and contains the overall audit balance, including an assessment of uncertainties in the data.

Section 5 provides information on existing storage facilities for used oil and current stockpiles; current reuse or disposal methods; and an assessment of possible future alternatives. Information on the current shipping costs to the nearest main port is also covered here.

Section 6 sets out the details of the relevant national instruments for used oil management.

Section 7 provides some overall discussions and recommendations, and is followed by the following 3 appendices:

- A copy of the TOR is given in Appendix 1;
- The organisational details for the country visit and a list of contacts are given in Appendix 2;
and
- The relevant KIRMA regulations and for managing used oil are given in Appendix 3. The draft Solid Waste Management Plan is also included in Appendix 3.

2.0 Oil Imports

2.1 Information Provided by the Kosrae Customs Department

The following data in Table 1 have been obtained from the Customs Department for 2011, 2012 and 2013.

Table 1 - Oil Import Data for Kosrae State (2011-2013) as provided by Customs Department

Type of Oil	2011 (litres)	2012 (litres)	2013 (litres)	3-Year Average (litres)
Various Oil Types	227	14,504	5,836	6,855
Diesel	4,941,440	3,645,610	4,586,202	4,391,084

The figures provided by the Customs Department raise concerns as to the accuracy of how the imported oil is being recorded. There are significant differences in each of the three years for which data has been provided. These differences do not appear to be realistic, indicating that importers or Customs staff are not categorising the oil correctly.

2.2 Additional Information on Imports

Table 2 shows the data that has been collected from individual importers of oils that include but are not limited to lubricating oil, hydraulic oil, transmission fluid and two-stroke oil.

Table 2 – Lubricating Oil Import Data for Kosrae (2013) as Provided by Importing Companies

Company	2013 (litres)
FSM Petroleum Corp.	14,923
Ace Hardware	7,412
Total	22,335

The 2013 Customs data represents about 26% of what the importing companies have indicated they brought in to the State for the same period.

2.3 Cost and Price Information

The following price information for lubricating oil was obtained from CTSI Logistics Ltd.

Item	Wholesale Price
Lubricating oil, 208 litres	\$378 - \$499
Lubricating oil, 20 litres	\$46 - \$55
Lubricating oil, 1 litre	\$3.30

Note these costs include freight and customs duty of 4%

The Yap power company advised that their current costs for diesel fuel ranged between \$1.16 and \$1.33 per litre from January 2012 to June 2014. Similar costs are expected throughout the Federated States of Micronesia.

3.0 Used Oil Production

The information collected on the production of used oil in Kosrae was obtained by visiting many companies and operations that could potentially generate used oil. Individuals at each location were asked specifically how much used oil their operation generated over a set period of time. The information was provided verbally as very few operators kept detailed written records. The information was usually provided as drums per month which was then extrapolated to litres per year. The volumes of used oil identified at each locality are included in the contacts list attached as Appendix 2.2.

3.1 Used Oil Recovery by Vehicle and Machinery Servicing

Eighteen sites were visited that maintained or serviced vehicles either for their own use or for off site customers. The businesses and organisations that were visited included auto repair shops, construction companies, oil supply depots and air and sea port terminals.

The annual volume of used oil generated by these businesses is calculated to be 5,365 L/yr

3.2 Used Oil Recovery from Ship and Boat Servicing

Two sites were visited that maintained, repaired or serviced engines associated with boats. The businesses that were visited included a small engine repair shop associated with the State Fisheries and Marine Division and a commercial operation known as the Luen Thai Ship Repair Services.

The annual volume of used oil generated by these businesses is calculated to be 380 L/yr.

It was established that the service and maintenance of small marine craft is predominantly undertaken by the owners.

Kosrae does not have the facilities nor the capability to accept used heavy fuel oil from visiting ships. Boats visiting Kosrae are mainly cargo ships providing necessary supplies to the Island.

3.3 Used Oil Recovery by Power Stations and Small Generators

Large power generators often use heavy fuel oil as their operating fuel. In Kosrae all the generators that were inspected used diesel as the fuel source. Therefore any used oil that is being generated at these sites is from the use of lubricating oil for running and maintaining the generators.

3.3.1 Small Generators

The power supply on Kosrae is considered reasonably stable and reliable therefore the use of private generators is not common. No industry or private company was identified as using generators on a full time basis or operating off the main power grid. Information from two sites (Kosrae Hospital and Kosrae Telecommunications) confirmed that the use of generators was limited and they were primarily maintained for emergency use only. The hospital stated that all maintenance and servicing, including vehicles, was outsourced.

The annual volume of oil generated by these operations is calculated to be approximately 55 L/yr.

3.3.2 Kosrae Utility Corporation (KUC)

The Kosrae Utility Corporation (KUC) is located in Lelu.

Oil collected from the maintenance of the diesel generators at KUC is stored in one of three 19,000 L tanks which are located on the property. The tanks are currently sound but ageing and will not be suitable for the storage of used oil for very much longer. Figure 1 shows the tanks at the time of the investigation.

The annual volume of used oil generated by KUC is estimated to be 2,500 L/yr.

Figure 1 – Used oil storage tanks at KUC



3.4 Used Oil Recovered from Outer Islands

There are no outer islands associated with Kosrae State.

3.5 Survey Allowance

It would be unrealistic to assume that this audit is without inaccuracies and incomplete data. It is accepted that there are businesses and companies that generate used oil but were not visited as part of this audit. Such operations would also include individual vehicle owners that carry out their own maintenance and repair. It is unknown how many of these operations there are. Therefore a 10% allowance has been applied to the total volume of used oil that has been determined from visiting individual sites.

4.0 Oil Audit Balance

4.1 Theoretical Used Oil Production Rates

An estimate can be made of the quantities of used oil produced based on the information provided in the previous section.

Waste oil from lubricating oil:

The total annual quantity of lubricating oil imported is approximately 22,335 litres, based on the 2013 figures provided by the importing companies. The private import company data has been used instead of the Customs data as it is felt that there are discrepancies in the way the Customs information is collected and recorded that could lead to an under estimation of the actual volume.

Typically about 50%¹ of 22,335 litres being imported would be burnt and 50% would contribute to the total used oil produced. The estimate of used oil from lubricating oil is therefore **11,167 litres**.

Waste Oil from Fuel Oil used by Power Stations

The generators operating in Kosrae use standard diesel to produce the country's power supply. No used oil is generated from the ignition process however it is generated from the lubricating oil that is required to run and maintain the engines.

Waste Oil from Ships

FSM is not a member of the International Convention for the Prevention of Pollution from Ships (MARPOL) therefore it is not expected to accept used oil from visiting ships. It is our understanding that none of the Federated States of Micronesia accepts used oil from visiting ships. On-site observations confirmed that each of the states do not have the facilities at the docking ports to accept, handle or dispose of such a product in the quantities that would be generated.

Waste Oil from Diesel and other Sources

Diesel and other products (e.g. solvents, mineral turpentine, grease, hydraulic oil, cooking oil, etc) also contribute minor amounts to the used oil stream at say 0.01%¹ of the figures that are available from the Customs Department, i.e. **439 litres/year**.

The above figures are summarised in Table 3 below:

¹ These figures have previously been accepted by SPREP based on earlier used oil audits

Table 3 – Theoretical Used Oil Production in Kosrae

Source of Used Oil	Estimated Quantities (litres/year)
Lubricating Oil	11,167
Waste from Diesel and Other Sources	439
TOTAL	11,606

4.2 Actual Used Oil Production Rates

The used oil being collected on Kosrae by auto repair shops, heavy plant and machinery operators, generator operators and boat maintenance operations is generally being mixed without any record of what waste stream it is being generated from. No operators were able to indicate the quantities of used oil generated from the different oil products. Therefore for the purposes of this report used lubricating oil, hydraulic oil, transmission oils, grease, and diesel 'slops' are considered as the total used oil generated.

Table 4 – Actual Waste Oil Collection in Kosrae

Source of Used Oil	Actual Quantities (litres/year)
Vehicle and machinery servicing	5,365
Ship and boat servicing	380
Small generators	55
KUC Power Station	2,500
Sub Total	8,300
Survey Allowance (10%)	830
TOTAL	9,130

4.3 Used Oil Balance

There is a 21% difference between the theoretical oil production rates and the actual oil production rates as determined from interviewing individual businesses. The discrepancy may be due to any of the following:

- The theoretical assumption that 50% of the oil would be burnt during a normal life cycle may be under estimated;
- The contribution of diesel slops to the waste stream may be too low;

- The 10% survey allowance is not high enough;
- An under estimate by the individuals that were interviewed regarding the actual amount they expect to generate each year; and
- A combination of some or all of the above.

4.4 Certainty Assessment

The confidence levels for each component of the audit balance are summarised below:

- The data for lubricating oil imports can be taken as having a **medium to high level of confidence**. The audit has used the data provided by the import companies for 2013 rather than the Customs data. The reason being that there seems to be an element of subjectivity when describing the type of oil that is being imported under the Customs data system. There is significant scope for data to be missed or categorised incorrectly. The importing companies provided the data directly from their yearly accounts; and
- The figure for total used oil produced can be taken as having a **medium level of confidence**. The data is reliant on the accuracy of the people that were interviewed at each of the locations and that at least 90% of the used oil generators were visited.

5.0 Current Storage and Disposal Practices

5.1 Existing Storage Facilities and Current Stockpiles

5.1.1 Specific Used Oil Storage Facilities

There is no specialised oil recovery company based in Kosrae nor is there a designated area where used oil can be safely left and stored by individuals or companies. Currently in Kosrae used oil is mostly being stored at the site where it is being generated. Used oil is being stored in drums, plastic pails and the original quart bottles.

The only bulk storage tanks currently available to store used oil are at the power company. The power company indicated that they did not accept used oil from outside organisations for security and liability reasons however a number of local companies confirmed that they do take their waste oil to the power company where it is being stored in the tanks shown in Figure 1.

5.1.2 Current Stockpiles

Twenty two individual sites were visited as part of the used oil audit. At each location the volume of used oil that was being stockpiled on the site was recorded and photographed. The total volume of used oil recorded at the time of the audit was 43,347 L. This figure is likely to be slightly underestimated as it is accepted that not every container holding used oil was inspected by the project representatives. Similar to the survey allowance described for the used oil generation an increase of 10% would be considered realistic.

Therefore the total volume of used oil stockpiled on Kosrae is 47,682 L.

The volumes stockpiled at each location are included in the contacts list attached as Appendix 2.2.

Very few of the sites that were visited had well-managed storage facilities that included bunds and weather protection. The drums and containers were poorly managed and exposed the local environment to significant risk from the uncontrolled release of used oil.

It is important to note that the Department of Transportation and Infrastructure indicated that they have a 7,500 litre tank full of used oil that is located away from the site. The oil has been in the tank for approximately two years. The project representative asked about visiting the tank however it was explained that it is in a location that would require an excavator to clear an access track.

It was also identified that L & H Scrap Metal has approximately 1,450 litres of former transformer oil stored in two tanks at their location. It is understood that the transformer oil is of an age that did not include PCBs however it cannot be confirmed how well the transformer containers were cleaned out prior to the new transformer oil being placed in it. This raises the possibility that the new oil could potentially be 'contaminated' by residual PCBs left in the original container.

The scrap metal operator and the local KIRMA representative were informed that the oil should not be moved or mixed with any other oils until the substance has been tested for PCBs. The KIRMA officers were going to explore the available options for testing the oil. No further information is available as to the outcome of the testing.

5.2 Current Reuse or Disposal Methods

Currently there are no heavy or light industry options on Kosrae that are capable of utilising the Islands' used oil. The hospital runs a diesel fuelled incinerator for the destruction of medical waste. This investigation did not explore the option of converting or modifying the incinerator so that used oil can be used.

L & H Scrap Metal utilises used oil that it collects from abandoned vehicles as lubricating oil for their own plant and machinery. While this practice can be considered a reuse option on Kosrae the amount being reused will not have a significant impact on the amount being generated.

It was discovered however that the Department of Transportation and Infrastructure and the Kosrae Utility Corporation were jointly applying to the Japanese Embassy in Pohnpei for funding assistance to purchase and set up an incinerator that can be used to burn used oil. Such an incinerator, if designed to the appropriate capacity, could utilise the full amount of used oil being generated on Kosrae. During the preparation of this report, the project representative was approached by the Japanese Embassy in Pohnpei asking for information regarding current used oil generation and collection methods in Kosrae. The outcome of the application is still pending.

In the absence of any specific industry that is capable of using used oil as fuel for generators or incinerators, the only available option for the disposal of used oil from Kosrae, at the time the audit was undertaken, is to have it taken offshore and disposed of at a facility that has the capability to treat the product to a standard where it can be reused elsewhere.

It is important to note that a draft Solid Waste Management Plan prepared for Kosrae stated that over 75,600 litres of used oil has been shipped to Nauru in previous years. This was for use in the phosphate processing plant and is unlikely to be a viable option for the current stockpiles.

5.3 Assessment of Possible Future Alternatives.

Future alternatives are limited on Kosrae given the absence of any significant light or heavy industry. However it was encouraging to establish that local government agencies have applied for funding assistance to purchase a specific used oil fuelled incinerator. As discussed in Section 5.2 the project representative has been approached by the funding organisation for information on the used oil situation in Kosrae.

The information that was provided included support for any initiative that would provide Kosrae with an opportunity to manage their used oil stocks in a better way than is currently being implemented. They were also asked to consider and possibly implement:

- A formalised collection system at a central location. The most likely site is at the power station.
- The collection point should be designed to protect used oil being stored prior to being used in the incinerator
- That any incinerator installed is capable, or could be upgraded in the future, to supporting a waste to energy process.

It is acknowledged however that a feasibility study may be required to establish whether or not enough used oil is generated to warrant a waste to energy system. It is also acknowledged that these systems are reasonably 'high tech' and carry significant risk if not managed or used correctly. Assistance in training and maintaining such equipment would have to accompany any reuse initiatives.

5.4 Administration of Used Oil Exports

The Federated States of Micronesia and therefore the State of Kosrae is a party to both the Basel Convention and Waigani Convention. As such, Kosrae may export used oil to other countries that are parties to the Basel and/or the Waigani Conventions.

5.5 Current Shipping Costs

There were no export companies identified in Kosrae that could manage the export of used oil from the Island however CSTI Logistics in neighbouring FSM States estimated the cost to ship a 20 ft container to the Philippine's at around US\$2,500 - \$3,000. The estimate excludes:

- Bladder/drum costs
- Basel Convention consent costs
- Insurances
- Wharf costs
- Custom costs

6.0 Relevant National Instruments

6.1 Relevant National Legislation and Regulations

The Kosrae Island Resource Management Authority provided two state regulation documents that help to control the management of used oil.

Regulations for Development Projects require a development review permit to be issued before works can commence. Part 3 (3.1)(f) requires certain criteria regarding the use, handling or disposal of toxic or hazardous chemicals, pesticides, petroleum, oil and other lubricants to be considered before a permit will be issued.

The Pollution Regulations define hydrocarbons as a pollutant *“that when present in the air, land or water, are or may be harmful or injurious to human health, welfare or safety; to animal or plant life, to property, or which may unreasonably interfere with the enjoyment of life or property”*.

Part 3 Definitions describes ‘serious pollution’ as *“resulting from the release of 50 gallons or more of a hydrocarbon from one location or by one person or entity within a 24 hour period”*.

Part 8 (a) of the document refers to ‘Rights of Entry and Enforcement’. *“For purposes of enforcing the provisions of these regulations, KIRMA is authorized to enter, at any time, any premises, to obtain information, inspect for the presence of pollution or pollutants, inspect and copy records, and to take samples of land, water, air or any hydrocarbon, liquid or solid waste or pollutant”*.

The relevant KIRMA Regulations are attached as Appendix 3.

6.2 Relevant National or State Programmes and Policies

KIRMA provided a draft solid waste management plan that among other types of waste, covers used oil. It is a discussion document that addresses a number of concerning issues including the management, monitoring and regulation enforcement of used oil being collected on Kosrae.

The document highlights that there is no system in place for collection and storage, or treatment/exportation of waste oil.

The draft plan is also attached as Appendix 3.

7.0 Discussion and Recommendations

7.1 Used Oil Generation

The quantity of lubricating oil imports into Kosrae was about 22,335 litres for 2013 and it is estimated that approximately half that would end up as used oil. In addition small amounts of the 4.4 million litres of diesel and other oil-based products imported into Kosrae would end up in the used oil stream.

All the oil generated is collected from the maintenance of vehicles, boats or generators. Kosrae does not have the facilities to collect and purify used fuel oil from visiting ships.

There are no established companies in Kosrae that recover used oil from the businesses and companies that generate the used oil as part of their day-to-day operations. Used oil that is generated is currently being stored on the premises where it is being generated, delivered to the large storage tanks owned by KUC or given to 'locals' for pesticide control, lantern fuel or for the lubrication of concrete block moulds, to name but a few examples.

The amount being generated is estimated to be between 9,000 and 12,000 L/year while at the time the investigation was undertaken it is estimated that less than 47,700 L of used oil is currently stored on Kosrae. 28,350 litres is stored at KUC while 7,860 L is being stockpiled at the Department of Transportation & Infrastructure. The balance of about 7,137 L is stockpiled at multiple locations.

There is approximately 4.5 years of accumulated used oil stockpiled on Kosrae.

7.2 Used Oil Collection

As discussed in Section 5.1.1 there is no established oil recovery company operating in Kosrae nor is there any formal centrally located collection facility for used oil. Currently used oil is collected in drums or other various containers and stored on the premises where it originated or within the tanks located at the KUC compound. The manner in which the oil is being stored is not environmentally protective with many of the storage containers exposed to the elements.

Currently there is an estimated 47,682 L stockpiled on premises around Kosrae. This poses a potential significant environmental risk. There are no existing viable reuse options available due to the absence of suitable industries on Kosrae.

It has been established that local government organisations have applied to the Japanese Embassy for assistance to finance the purchase and establishment of an incinerator for burning used oil. The outcome of the application is unknown at the time of writing this report however it has been suggested that if an incinerator is established then it should be accompanied by a formalised and centralised used oil collection system.

7.3 Used Oil Management

The volumes of used oil that are being generated and those that have been identified in stockpiles do indicate that businesses on Kosrae that produce used oil are generally collecting and storing it. The only evidence of used oil being disposed of in an uncontrolled manner are the second hand stories regarding locals requesting it from businesses for pest control, using it as a lubricant when making concrete blocks, lantern fuel and so on.

The main issue to surface from the investigation undertaken on Kosrae is the lack of environmental management being implemented by businesses generating and storing used oil. This is a natural consequence of Kosrae not having a centralised and well managed collection point established on the Island. Figures 2 and 3 show examples of how some local businesses are storing used oil drums.

Figures 2 and 3 – Stored used oil drums in Kosrae



Establishing a centralised collection point will require due consideration particularly regarding the location. Four possible sites were identified.

Power Plant (KUC)

The power plant is an obvious location for establishing a used oil collection point. It has the space to support such an initiative.

It was encouraging to hear that the power plant was involved in the application for an incinerator that can be used to burn used oil. If the application is successful then it is a logical conclusion that a formal collection point would be at the same location as the incinerator.

If a burner suitable for accepting used oil from all over the island is not available then the location of the power plant may not be suitable for collecting and storing used oil on the basis that it is some distance from the port. If the excess oil is to be exported off the island then it would need to be transported to the dock.

Port Area

The port area was not specifically investigated with regard to establishing a centralised collection point however there did appear to be plenty of space available. This would need to be confirmed with port management.

A location at the port would assist with exporting the oil off the island if this is what is required, particularly in the short term. Any port security issues regarding access would also need to be discussed with port management.

The availability of a large storage tank located within the port area was not explored however this could also be discussed with port management.

FSM Petroleum Corporation tank farm

The FSM PC tank farm is located alongside the main wharf and immediately adjacent to Kosrae international airport. If FSM PC were in a position to assist with providing a large storage tank then the site would be ideal for establishing a centralised collection point. It is acknowledged however that FSM PC is a private company and therefore they may not wish to be involved in any used oil management initiatives due to limited infrastructure for such a product as well as access, health and safety, security and/or liability concerns.

The local landfill was considered as a location for collecting used oil however comments from the local KIRMA office indicated that it would not be suitable.

KIRMA does have capacity within its current regulations to enforce safe and effective storage of used oil on the island however it is unknown how effective compliance and enforcement of such regulations are.

With regard to the management of used oil at a state level, the findings of this report do suggest that collecting it and exporting it offshore is the most appropriate way to manage the product in the foreseeable future if the application to the Japanese Embassy is unsuccessful.

The most urgent aspect associated with the short and long term management of used oil on Kosrae is to establish a formal, well designed centralised collection point. Coupled with establishing a collection point is the requirement to raise the awareness of the producers of used oil to the potential adverse effects that the product can have on the environment if it is not properly managed. This can be delivered via various media outlets and through KIRMA.

The following table provides a summary of the key information collected in the survey:

Table 5: Summary of Key Information on Waste Oil for Kosrae

ANNUAL OIL IMPORT VOLUME 2013 (LITRES/YEAR)	ANNUAL WASTE VOLUME ESTIMATE (LITRES/YEAR)	CURRENT STOCKPILE OF WASTE OIL ESTIMATE	ORGANISED COLLECTION BY?
22,335 litres/year	9,000 – 12,000 litres/year	43,347 litres	Nil
DIRECT CONTAINER SHIPPING ROUTE TO PHILIPPINES?	SHIPPING COSTS (APPROX. FOR A 20FT CONTAINER)	CURRENT REGULATORY DRIVERS?	PARTY TO BASEL/WAIGANI?
Yes	US\$2,500 - \$3,000 (excludes wharf fees, insurance etc)	Limited	Yes/Yes

7.4 Recommendations

Based on this audit of used oil in Kosrae State the following recommendations are offered:

Short to medium term:

- Support the application to the Japanese Embassy in Pohnpei for assistance to fund an incinerator that can burn used oil;
- Establish a robust set of regulations for managing, monitoring and enforcing the handling, storage and disposal of used oil on Kosrae;
- Establish a specifically designed centralised collection point within Kosrae. This will include establishing an environmentally secure collection facility that is bunded, covered and monitored to ensure the entry and exit of used oil is correctly managed. The location should be well considered so that it complements any potential future reuse options that may be established;
- Establish a formal procedure for collecting, managing and disposing of used oil at the centralised collection point;
- Investigate a ‘user pay’ system for collecting used oil to help offset the costs for setting up and running the collection process. This may be coupled with leasing the collection and delivery of used oil to the private sector. A designated oil recovery company is motivated to ensure all used oil is managed correctly if the costs are realistic and provide value.
- Establish suitable time frames for exporting the collected oil to an offshore facility given that the estimated amount of used oil being generated each year is now available. This includes executing tender contracts within a timely manner; and
- Independent scrutiny of tendering contracts for the export of the used oil. Consideration should be given to the reputation and professionalism of the appointed contractor. Such things as ensuring they have appropriate ships for carrying the oil; they have good history within the industry; they have guaranteed contracts with an approved treatment facility and that they will guarantee stewardship of the product once it has left Kosrae.

Long term:

- Consider re-use options on Kosrae. A possible re-use option would be to establish a waste to energy system at the existing power station. Briefly, this would involve establishing a suitably sized burner capable of being fuelled by used oil. Connect an electricity generating turbine that recovers the energy generated by the oil combustion. Connect the turbine to the main power grid which will supplement the existing power production. A feasibility study may be required to establish whether or not enough used oil is generated to warrant such a system. Such a system should be considered if the application to the Japanese Embassy is successful.

It is acknowledged that the implementation of some of these recommendations will require significant financial capital that is unlikely to be readily available. Funding from an outside agency would more than likely be required. It is also acknowledged that these systems are reasonably 'high tech' and carry significant risk if not managed or used correctly. Assistance in training and maintaining such equipment would have to accompany any reuse initiatives.

Appendix 1: Copy of the Terms of Reference

Summary

Completion of contemporary used oil audits in Cook Islands, FSM, Kiribati, Marshall Islands, Nauru, Niue, Palau, PNG, Solomon Islands, Tonga, and Tuvalu

Objective

Completion of contemporary used oil audits in Cook Islands, FSM, Kiribati, Marshall Islands, Nauru, Niue, Palau, PNG, Solomon Islands, Tonga, and Tuvalu to establish volumes of lubricating, hydraulic and transmissions oils imported into each country and the volume of used oil produced, and stored or otherwise disposed of.

Location of Work

- Sub-region A: PNG
- Sub-region B: FSM, Marshall Islands and Palau
- Sub-region C: Kiribati, Nauru , Solomon Islands and Tuvalu
- Sub-region D: Tonga, Cook Islands, and Niue

Tasks

For each nominated sub-region (A, B, C & D), the Consultant will visit each country and spend as much time as is necessary to collect the information required to:

- a. Establish and document national oil import/generation volumes and rates for the last 3 years ideally 2011, 2012 and 2013:
 - i. Document by major suppliers, the annual volume of lubricating, hydraulic and transmission oils imported into each country for internal use;
 - ii. Document quantities of each oil distributed to outlying islands from main port(s) of entry;
 - iii. Obtain retail and wholesale purchase costs for: a 205litre and 20litre drum; and 5 litre, 4 litre and a 1 litre containers of lubricating oils; and
 - iv. Identify prices for fuels in particular the cost of diesel fuel purchased by power generators.
- b. Establish national used oil production rates for the last 3 years ideally 2011, 2012 and 2013:
 - i. Document used oil volumes recovered from outlying islands;
 - ii. Visit large and small vehicle service centres to establish actual recovery rates;
 - iii. Visit bus, haulage and construction companies to establish actual recovery rates;

- iv. Visit the port authority, operators of fishing/private vessel and international vessels, shipping agents and shipping companies to establish actual recovery rates;
- v. Visit electricity generators using diesel powered generators to establish recovery rates; and
- vi. Document volumes of used oil generated by any other major users.
- c. Oil Audit Balance for the last 3 years ideally 2011, 2012 and 2013:
 - i. Prepare an audit balance of new oils and used oils.
- d. Document and summarise existing national used oil management procedures:
 - i. Identify existing storage facilities and stored oil volumes;
 - ii. Identify where possible, current used oil disposal locations;
 - iii. Provide photographic records of existing collection and storage facilities;
 - iv. Identify possible end users in country or within the relevant distribution network for the used oil, either using the used oil as a diesel extender, a supplementary furnace fuel etc;
 - v. Review the paperwork pertaining to the transportation of any used oil from each country; and
 - vi. Document shipping costs of containerised or tank-tainers of used oil to the nearest main port with adjacent used oil recycling facilities (e.g. Australia, Fiji, India, Japan, New Zealand, Philippines, Singapore). Shipping costs shall include documentation costs, port handling costs and any insurance costs.
- e. Document and summarise existing national used oil management instruments:
 - i. Document used oil provisions in national legislations by identifying relevant national waste management legislation, regulations and policies that manage used oil, and provide an overview of any national used oil management regulatory considerations.

Project Deliverables

Provide comprehensive draft audit reports (individual reports for each country) including the methodology used and associated confidence levels for the reported data for each country by the 29th August 2014 and final reports by the 30th September 2014 or other date subsequently agreed with SPREP.

Timeframes

All final reports completed and submitted to SPREP within twenty six (26) weeks from the date of contract signature.

Appendix 2: Organisational Details and List of Contacts

A2.1 Organisational Details

The visit to Kosrae took place from 23 June to 30 June 2014. The consultant was Martyn O’Cain.

The primary agency for liaison was the Kosrae Island Resource Management Authority, and the following personnel were involved:

Presley Abraham, Environmental Officer

Kiobu Luey, Environmental Officer

These officers were very helpful and provided considerable support during the visit.

Numerous other people were visited and considerable assistance was willingly provided. Full contact details are given below.

A2.2. List of Contacts

Company	Date	Location	Type	Category	Contact	ULO Generated (litres/year)	Stockpiled (litres)
Luen Thai Ship Repair Services	24/06/2014	Tafunsak	Boat repair	Boat		340	370
Fisheries & Marine Division	25/06/2014	Lelu	Boat repair	Boat		40	0
FSM Telecommunication Corp	24/06/2014	Lelu	Telecom	Generator	Witson Phillip	55	47
Kosrae Utility Corporation	24/06/2014	Lelu	Power Plant	Generator	Fred Skilling	2,500	28,350
Black Micro Corporation	24/06/2014	Tafunsak	Construction	Vehicle	William	620	0
Sai Repair Shop	24/06/2014	Tafunsak	Engine repair	Vehicle	Sai	200	150
Department of Transportation & Infrastructure	24/06/2014	Tofol, Lelu	Government maintenance	Vehicle	Weston Luckymis	2,100	7,860
L&H Scrap Metal Company	24/06/2014	Lelu	Salvage yard	Vehicle	Mr Lee	200	830
Tinlo Sigrah Repair Shop	24/06/2014	Lelu	Engine repair	Vehicle	Tinlo Sigrah	200	830
Tony Edwin Repair Shop	24/06/2014	Lelu	Engine repair	Vehicle	Tony Edwin	480	80
Wayne Skilling Repair Shop	24/06/2014	Lelu	Engine repair	Vehicle	Wayne Skilling	200	470
KIDCO Saw Mill Company	25/06/2014	Tafunsak	Saw mill	Vehicle		85	400
PMW Repair Shop	24/06/2014	Malem	Engine repair	Vehicle	Chris	60	0
Pacific TreeLodge Hotel	25/06/2014	Lelu	Engine repair	Vehicle	Simeone	15	5
Nautilus Resort	25/06/2014	Lelu	Hotel	Vehicle		115	0
FSM Petroleum Corporation	24/06/2014	Tafunsak	Fuel distributor	Vehicle	Frank Skilling	500	2,925

Kosrae State Waste Oil Audit

Kosrae Terminal and Stevedoring Co	24/06/2014	Tafunsak	Port activities	Vehicle	Hillon	130	830
Municipal Government (multiple)	25/06/2014	Tafunsak	Govt maintenance	Vehicle		55	0
Airport Authority	25/06/2014	Tafunsak	Port activities	Vehicle	Wadel Kinere	140	200
Jarred Albert Repair Shop	25/06/2014	Lelu	Engine repair	Vehicle	Jarred Albert	75	0
KNS Car Rentals	25/06/2014	Lelu	Engine repair	Vehicle		190	0

Appendix 3: KIRMA Regulations and Draft Solid Waste Management Plan