

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

**Report for the State of Pohnpei
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 Pohnpei 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 16 June to 23 June 2014 and was organised through the local Environmental Protection Agency in Pohnpei.

Used Oil Production

The quantity of lubricating oils imported into Pohnpei for 2013 based on figures provided by private importing companies was about 483,000 litres and it is estimated that approximately 50% of that will end up as used oil. In addition small amounts of the 17,585,493 litres of diesel imported into Pohnpei 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 243,260 litres of used oil is produced per year. What is unclear however is the amount that is being generated on the Island and the volume that is generated by visiting ships that purchase new oil but do not off load their used product. Such a volume could be up to 254,500 L/yr. 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 Pohnpei. There is no formal used oil collection point in Pohnpei however the local landfill is currently being used as an informal storage facility as there is nowhere else for it to be put. Any disposal of used oil on Pohnpei is not officially governed or managed by either the private sector or a government agency.

It does not appear that used oil is being disposed of in an uncontrolled manner as there is over 800,000 litres currently stored on Pohnpei. Some of the oil has been there for up to 10 years. This loosely aligns with the amount of oil that is being generated on the Island when the possible shipping volumes are removed from the equation

There are no oil reuse options available on Pohnpei with regard to light or heavy industry at this stage however FSM Petroleum Corporation is considering establishing a used oil recovery system at the local power plant that would alleviate used oil generation and stockpiling issues that currently exist on Pohnpei. If an oil recovery system cannot be achieved then the best management option is for the used oil to be collected and exported offshore.

National Instruments

The local EPA does provide limited governance over the management of used oil. The most prescriptive regulation is in Part 8 (e) of the Solid Waste Regulations which describes briefly how waste oil should be managed.

The Marine and Freshwater Quality Regulations and Air Quality Standards also provide governance on the management of petroleum products however the enforcement of such regulations is difficult due to limited resources.

Recommendations

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

- Enter into immediate discussions with FSM PC to establish legitimacy of their intention to invest in a waste recovery system;
- If the outcome of the initial approach to FSM PC is favourable then:
 - assist FSM PC with building relationships with consultants and/or companies that can help with the type of technology and infrastructure that they will require, including the level of treatment the used oil will require in order to meet their expected outcomes; and
 - discuss the likelihood of utilising a large storage tank within the distribution compound to store current and future stockpiles of used oil. This requires immediate attention to alleviate the existing environmental risk that is present.
- If the outcome of the initial approach to FSM PC is not favourable then:
 - immediate action is required for removing the used oil stocks offshore by a company or agent that is capable of transporting it to a country that can treat and reuse the product;
 - 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 Pohnpei;
 - Establish a specifically designed centralised collection point within Pohnpei. 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 or export 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; and
 - Consider reuse options on Pohnpei. Look at reuse/waste recovery options at the power plant without the assistance of FSM PC.

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1. Introduction

1.1 Purpose

This report covers the State of Pohnpei 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 16 June to 23 June 2014 and was organised through both the Office of Environment & Emergency Management of the Federated States of Micronesia and the Environmental Protection Agency of Pohnpei State.

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 Pohnpei, based on the data obtained from the Customs Department and from companies that import directly into Pohnpei (CTSI, FSM Petroleum Corp, Ace Hardware, etc).

An estimate of used oil generation rates and volumes is set out in Section 3 and Section 4 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 EPA regulations for managing used oil are given in Appendix 3.

2.0 Oil Imports

2.1 Information Provided by the Pohnpei Customs Department

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

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

Type of Oil	2011 (litres)	2012 (litres)	2013 (litres)	3-Year Average (litres)
Various Oil Types	503,035	528,419	43,307	358,253
Diesel	17,375,624	19,785,570	15,595,285	17,585,493

The figures provided by the Customs Department raise concerns as to the accuracy of how the imported oil is being recorded. In 2011 & 2012 the oil imports exceed 500,000 litres however in 2013 the volume of imported oil drops by over 93% to 43,300 litres.

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 Pohnpei (2013) as Provided by Importing Companies

Company	2013 (litres)
FSM PC	30,125
Ace Hardware	26,705
CTSI	194,000
Caroline Fisheries Co	37,440
PT&S	183,040
Ocean Care Co	11,640
Total	482,950

The 2013 data provided by local import companies is over 10 times of that provided by the Customs Department.. The volumes are closer to the amount of oil recorded by Customs in 2011 and 2012.

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 Pohnpei was obtained by visiting as many companies and operations as possible 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

Twenty seven 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 oil generated by these businesses is calculated to be 28,990 L/yr.

3.2 Used Oil Recovery from Ship and Boat Servicing

Four boats were visited that maintained, repaired or serviced their engines within the port at Dekehtik in Pohnpei. Three of the boats were police vessels and one was used to transport sand from a designated mine site on the reef surrounding Pohnpei.

The annual volume of oil generated by these operations is calculated to be 16,250 L/yr.

Pohnpei does not have the facilities nor the capability to accept used heavy fuel oil from visiting ships. Boats visiting Pohnpei are mainly cargo ships providing necessary supplies to the Island or fishing vessels entering Pohnpei for supplies or to offload their catch.

It is important to note that the harbour in Pohnpei is very active and busy. There were numerous ships within the dock area or anchored offshore during the time this audit was carried out. Unfortunately access to the vessels was not readily available to determine how each one manages their used oil generated as a result of servicing the engines. However, discussions with a number of the agents that supply oil to visiting ships indicated that they do not accept used oil from the ships. Where they dispose of their used oil is unknown.

3.3 Used Oil Recovery by Power Stations and Small Generators

Large power generators often use heavy fuel oil as their operating fuel. In Pohnpei 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 Pohnpei is considered stable and reliable and the use of private generators is not common. However the local hospital and telecommunications operator maintain backup generators to support their services in case a power cut did occur. These organisations generate 400 L/yr.

Only one private industry was identified that used a generator to provide a significant amount of their domestic power requirements. The local scrap metal recovery merchant collects used oil from abandoned vehicles and heavy machinery which it then mixes with recovered used diesel to run a small generator. The head mechanic stated that they collect 10,000 L/yr of which 7,500 litres is used to run the generator therefore a surplus of 2,500 L is generated annually.

3.3.2 Pohnpei Utility Corporation (Power Station)

The Pohnpei Utility Corporation (PUC) is located in Nanpohnmal, Sokehs.

Oil collected from the maintenance of the 4 diesel generators at PUC is collected in drums and large tanks which are located on the property.

The annual volume of used oil generated by PUC is estimated to be 13,000 L/yr.

3.5 Used Oil Recovered from Outer Islands

The 2000 census indicates that the total population of Pohnpei State was 34,486 with only 2,091 living on the Outer Islands. The outer island population represents only 6 % of the total population.

The islands do not have utility power nor do they have any vehicles. Used oil generation will be primarily from small generators and the maintenance of outboard motors. It is accepted that there would be a small percentage of the total volume of used oil being generated on the outer islands however anecdotal evidence gathered from the main centres throughout the Micronesia Islands indicates that used oil is re-used for such things as pest control, suppressing odour from 'natural' toilets and fuel for lanterns.

3.6 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 483,000 litres, based on the 2013 figure 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 483,000 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 **241,500 litres**.

Waste Oil from Fuel Oil used by Power Stations

The generators operating in Pohnpei use diesel to produce the countries 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 states 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. **1,760 litres/year**.

The above figures are summarised in Table 3 below:

Table 3 – Theoretical Used Oil Production in Pohnpei

Source of Used Oil	Estimated Quantities (litres/year)
Lubricating Oil	241,500
Waste from Diesel and Other Sources	1,760
TOTAL	243,260

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

4.2 Actual Used Oil Production Rates

The used oil being collected on Pohnpei 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 purpose 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 Used Oil Collection in Pohnpei

Source of Used Oil	Actual Quantities (litres/year)
Vehicle and machinery servicing	28,990
Ship and boat servicing	16,250
Small generators	2,900
CUPC Power Station	13,000
Sub Total	61,140
Survey Allowance (10%)	6,114
TOTAL	67,254

4.3 Used Oil Balance

The actual used oil estimate represents less than 28% of the theoretical used oil production. This shows a significant difference between the two methodologies that have been used to determine the amount of used oil that is generated in Pohnpei. The project representatives are confident that at least 90% of the businesses and organisations that produce used oil were visited and interviewed with regards to the amount they actually produce.

A significant amount of the discrepancy may be explained through the way oil is managed within the shipping industry. There are a number of shipping agents located in Pohnpei who provide services to visiting ships when in dock. One of the services is the supply of new oil. Each of the shipping agents that were interviewed was asked if they collect or manage the used oil from the ships they supply in return for supplying the new oil. Each one confirmed that they did not take used oil off the ships. The implications associated with this is that a significant volume of oil is being identified as entering Pohnpei's oil lifecycle but it cannot be accounted for in terms of used oil generation, storage or disposal.

To help explain this, a breakdown of the information provided by the importers for 2013 can assist. Three of the companies interviewed (Caroline Fisheries, PT & S, Ocean Care Company) are specialised shipping agents that it is understood supply oil exclusively to marine vessels. It is also understood that FSM PC and CTSI also supply marine vessels but not exclusively. CSTI indicated that approximately 10% of their sales are to the marine industry. This will also be applied to the FSM PC figures.

The total volume of oil imported for the marine industry is estimated to be around 254,532 L/yr leaving 228,418 L/yr being used for activities and industries on the island. 50% of 228,418 L is 114,209 L. This volume may be closer to the theoretical volume of used oil being generated on Pohnpei each year if the influence of the shipping industry is removed. This assessment reduces the difference between the theoretical value and the actual value of used oil from 72% to 42%.

A 42% difference between the theoretical used oil generation and the actual used oil generation still represents a substantial volume that cannot be accounted for and 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% margin of error is not high enough;
- An under estimate by the individuals that were interviewed regarding the actual amount they expect to generate each year;
- A number of suppliers to the shipping industry were not identified; and
- A combination of some or all of the above.

We cannot rule out any of the possibilities described above including that a number of land based operations were missed during the site investigation. However the following information tends to show that the amount of oil being generated by land based organisations on Pohnpei when calculated to represent litres per head of population is within the range calculated for the other FSM States (Table 5).

Table 5 – litres of used oil actually generated per head of population

	Population (2000 census)	Actual used oil Generated (L/yr)	L/yr/head of population
Yap	7,391	12,530	1.7
Chuuk (Weno)	13,856*	27,990	2.0
Pohnpei	32,395	61,140	1.8
Kosrae	7,686	8,300	1.0

The figures shown in Table 5 indicates that the information gathered from organisations operating on the main Island of Pohnpei is within the range of litres generated per head of population when compared to the other FSM States. The implications are that most of the organisations and

businesses that generate used oil were visited and that the 42% discrepancy may be associated with oil being used in the shipping and fishing industry that was not picked up during this audit.

It is also important to note that anecdotal evidence was provided indicating that a company referred to as ISIS operate from a ship that anchors offshore. They apparently sell oil directly to anyone or any company that requires it. This may help to explain how some used oil generators were missed and therefore the reason for the large discrepancy.

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 level of confidence**. Most of the quantities are based on official Customs data however a reasonable percentage needed calculating from the official CIF that was provided. The difference between the customs data and the importers data for 2013 is 18%. It is acknowledged however that some suppliers within the shipping and fishing industry may have been missed; and
- The figure for total used oil produced can be taken as having a **medium to low 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. The difference between the theoretical used oil volumes and the actual volumes would indicate that some data is missing.

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 Pohnpei. Used oil generated by local businesses and organisations is directed to the local landfill however this site is not set up to accept large volumes of product. Currently in Pohnpei used oil is mostly being stored at the site where it is being generated until an unspecified amount is collected and it is then transported to the local landfill. Used oil at the landfill is mainly being stored in drums.

5.1.2 Current Stockpiles

Thirty five 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 810,575 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. The addition of 10% increases the estimated stockpile of used oil in Pohnpei to 891,600 L.

The used oil stockpiles in Pohnpei can be separated into four categories; the landfill stockpile, power station stockpile, Penda Ocean stockpile, local businesses and organisations. Table 6 shows the volumes that are stockpiled at each location.

Table 6 – Used oil stockpile locations

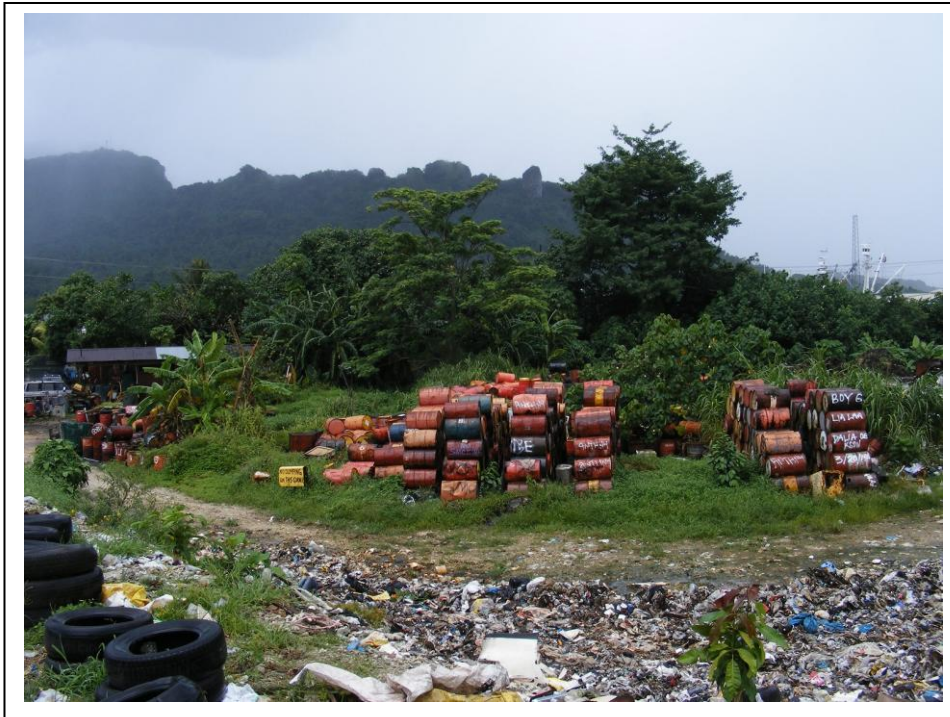
Location	Stockpiled used Oil (litres)
Landfill	245,000
Power Station	473,800
Penda Ocean stockpile	73,000
Local Businesses & Organisations	18,775

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

Pohnpei Landfill – the local landfill is the unofficial collection point for used oil. The product is usually delivered to the landfill in 208 litre drums. Approximately 245,000 L is currently stockpiled at this location. There is no designated or constructed storage area within the landfill area. Drums are

stored wherever there is available space and with no cover from the elements. The landfill management believe that some of the drums have been there for around 10 years and are beginning to fail. Figure 1 shows a panoramic view of where the drums are being stored.

Figure 1 – used oil drums stored at Pohnpei landfill



Pohnpei Utility Corporation (PUC) – 473,800 L is currently stockpiled at Pohnpei power station. The oil is being generated from the maintenance of the four generators that are in operation. 83,000 L is stored in three large tanks, 268,300 L is currently stored in drums and 122,500 L is as free product stored in continuous concrete pits or sumps constructed into the floor of the buildings where the generators are housed. The drums are located under cover however there is no protective bunding around the structure. The power station has been stockpiling used oil for approximately 10 years. Figure 2 shows the drums stockpiled at the power station while Figure 3 shows two of the tanks where used oil is being stored.

Penda Ocean stockpile – in April 2013 approximately 73,000 L of used oil was salvaged from a ship (Penda Ocean) that ran aground in late 2012. About 28,000 L is being stored in tanks and about 45,000 L is in drums. It is likely that there is a high water content mixed with the oil that has been stockpiled. The tanks and drums are not protected from the elements. Figure 4 shows the drums being stockpiled.

Figure 2 – stockpiled drums at the power plant



Figure 3 – tanks filled with used oil



Figure 4 – drums of used oil collected from the Penda Ocean



Local Businesses and Organisations – 18,775 L is currently stockpiled at various local businesses and organisations around Pohnpei. 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 over one third (7,800 L) of the used oil in this category was being stored at the FSM Petroleum Corporation tank farm and distribution facility.

5.2 Current Reuse or Disposal Methods

The investigation only discovered one industry within Pohnpei that was reusing used oil. The local scrap metal merchant (Maixiong Pacific International Inc.) collects used oil from wrecked and abandoned cars. The oil is mixed with diesel also collected from disused vehicles which is then used to run a generator from which they draw electricity. The site foreman stated that they collect or generate approximately 10,000 L/year of used oil. They mix about 7,500 L/year with the diesel leaving a balance of 2,500 L/year which is disposed of at the landfill.

The Pohnpei hospital stated that they did have a medical waste incinerator that was fuelled by used oil however at the time of the investigation it was out of order and there was no indication as to when it would be repaired. It was, however, unlikely to be capable of making a significant impact on the volume of used oil that is being generated in Pohnpei.

Outside of the two scenarios discussed above, there are no other heavy or light industry options on Pohnpei that are capable of utilising the Islands' used oil.

It is worth noting that PUC stated that they have a small centrifuge for treating used oil however it does not have the capacity to treat the amount of oil that they are constantly generating. They have also tried mixing used oil with diesel to run the generators however the product was of poor quality and therefore they ceased using it. They currently mix coconut oil with the diesel as a cost saving measure however they have questioned whether or not they are getting the equivalent calorific energy return.

The only alternative option for the disposal of the excess used oil from Pohnpei, at the time the audit was undertaken, is to have it taken off shore and disposed of at a facility that has the capability to treat the product to a standard where it can be reused for light and/or heavy industry purposes elsewhere.

5.3 Assessment of Possible Future Alternatives.

Future alternatives are limited on Pohnpei given the absence of any significant light or heavy industries that require large drying kilns or incinerators that can utilise used oil. However the project representatives discussed the increasing used oil issue with management from FSM Petroleum Corporation (FSM PC). Mr Maderson Ramon (Commercial Manager) indicated that they are very interested in exploring waste to energy options using used oil. They are looking to establish a relationship with PUC to better utilise used oil from the power plant and that collected from throughout the Island.

FSM PC understands that the management of used oil on Pohnpei and throughout the rest of the FSM is a significant concern. They are aware that reusing it in a beneficial manner is the most appropriate way of dealing with the problem however they are also very aware that they will need guidance on how to establish and maintain such a system and are therefore open to potential partnership/consulting relationships.

5.4 Administration of Used Oil Exports

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

5.5 Current Shipping Costs

Ms Sylvia Bolotaulo of CTSI Logistics estimated the cost to ship a 20 ft container from Pohnpei to the Phillipine's at US\$2350 with a bunker adjustment factor (BAF) of US\$420. CTSI would charge US\$150 handling fee. This does not include:

- 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 State of Pohnpei has a number of regulations that control various environmental activities which include references to used or waste oil.

The management of used oil is regulated under the country's solid waste regulations. Part 3 (nn) defines solid waste as *"...garbage, refuse and other discarded solid materials including solid waste materials resulting from industrial and commercial operations, and from community activities, ... This definition is intended to include liquid waste materials such as waste oil, pesticides, paints, solvents, and hazardous waste."*

Section (e) Part 8 – Standards for Hazardous Waste specifically address the management of waste or used oil, *"Generators of waste oil shall adopt all practical measures to reduce waste quantities and to reuse or recycle waste oil to the maximum extent possible. Where it can be demonstrated that wastage is necessary, disposal methods shall be approved by the Director. Spreading of oil on roadways, airports, or other areas for the purpose of dust control shall be initially limited to areas which preclude the possibility of contamination of (1) potable ground water; (2) surface waters; and, (3) areas under agricultural cultivation of foods crops"*.

Marine and Freshwater Quality Standard Regulations provide a level of governance aimed at the correct management of oil products. Section B(9) of Part 6 – Water Quality Standards states that for all waters *"the concentration of oil or petroleum products shall not:*

- a) Be detectable as a visible film, sheen or discoloration of the surface or cause an objectionable odour.*
- b) Cause tainting of fish or other aquatic life, be injurious to the indigenous biota or cause objectionable taste in drinking water.*
- c) Form an oil deposit on beaches or shoreline or on the bottom of a body of water."*

The Pohnpei EPA Air Pollution Control Standards and Regulations also refer to the management of oil. Section 8.1 of Part 8, 'Control of Open Burning' states *"No person shall dispose of burnable refuse by open burning, or cause, allow, or permit open burning of refuse including grass, weeds, wire, twigs, branches, insulation, vehicle bodies and their contents, paper, garbage, tires, waste materials, tar products, rubber products, oil, and similar smoke producing materials, within the territorial limits of the State of Pohnpei. In areas where no public or commercial refuse collection service is available on the effective date of this Regulation, open burning of refuse on residential property, or refuse originating from dwelling units on such property, shall be allowed provided such burning does not violate any existing laws of the State of Pohnpei, until such refuse collection becomes available."*

Section 8.2(g)(3) states *oils, rubber or other similar material which produce unreasonable amounts of air contaminants may not be burned.*

The relevant EPA Regulations are attached as Appendix 3.

6.2 Relevant National or State Programmes and Policies

No National or State programmes were provided by Pohnpei EPA staff.

7.0 Discussion and Recommendations

7.1 Used Oil Generation

The quantity of lubricating oil imports into Pohnpei is for 2013 is about 483,000 litres and it is estimated that approximately half of that would end up as used oil. In addition small amounts of the 17,585,493 litres of diesel and other oil based products imported into Pohnpei would end up in the used oil stream.

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

There are no established companies in Pohnpei 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 or taken to the local landfill where it is stored without formal management or governance.

There is a significant difference between the amount of used oil being generated as determined by visiting local businesses and the theoretical volumes. The amount currently being produced, using both estimates, ranges between 61,000 L/yr and 243,260 L/yr respectively. A substantial amount of the discrepancy may be accounted for within the shipping industry associated with Pohnpei. The shipping agents that were interviewed during the investigation indicated that they regularly supply visiting ships with 'new' oil but do not collect or accept used oil in return. The used oil generated by visiting ships is disposed of offshore.

While there is a certain amount of information missing with regard to identifying the actual amount of used oil being generated each year in Pohnpei, the information does indicate that a minimum of 60,000 L to 70,000 L is being produced on the island by vehicle repair shops, construction companies and generators annually.

7.2 Used Oil Collection

As discussed in Section 5.1.1 there is no established oil recovery company operating in Pohnpei nor is there any formal centrally located collection facility for used oil. The local landfill has been identified as a location where used oil is being directed to by the local EPA as there is no alternative location available at this stage. While the landfill may seem like a logical facility to accept and store used oil, the Pohnpei landfill is not designed to accept and store drums of used oil nor does it have the capacity to accept it on a large scale. The local landfill, under the current system is a temporary solution that is rapidly becoming an environmental hazard.

A significant amount of used oil is also being stored at the Pohnpei Utility Corporation. Approximately 351,300 L is currently stored under reasonably secure conditions in drums that are undercover or in large capacity tanks. However 122,500 L of used oil is being stored as free product in inspection pits and sumps within the buildings where the generators are housed. This is not an acceptable situation.

The balance of the used oil on Pohnpei is currently being collected in drums or other various containers and stored on the premises where it originated. 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 891,600 L stockpiled at various locations around Pohnpei. This poses a potentially significant environmental risk to Pohnpei.

7.3 Used Oil Management

The volume of used oil being generated in the state of Pohnpei by vehicle workshops, generator servicing and construction companies is estimated at between 60,000 L and 70,000 L per year. This is much lower than what is theoretically calculated from oil import information however it is likely that difference can be attributed to the transient shipping industry that operates out of Pohnpei. 60,000 L to 70,000 L of used oil being generated per year is not unusual for a population size of Pohnpei. However what is alarming and can be considered to be a critical situation is the volume of oil that is being stockpiled on Pohnpei and how it is being managed.

Pohnpei currently has over 890,000 L of used oil stockpiled on the Island. Three quarters of this volume is stored at two locations and according to the site managers, some of it has been at these locations for up to 10 years. This loosely aligns with the Island generating up to 70,000 L per year.

The used oil on Pohnpei is both a valued commodity and a significant environmental risk.

FSM PC are looking to introduce a system that is fuelled by used oil with the intention of eventually establishing a waste to energy option that will sustainably and efficiently utilise the used oil being generated on Pohnpei. The accumulated used oil stocks will provide an initial resource that could be critical to the financial feasibility of setting up such a system. However, the timing of setting up such a system is crucial if the current stockpiles are to be considered a commodity rather than an environmental risk.

The used oil stockpiles on Pohnpei are being poorly managed. The State regulations do provide the ability for the local EPA office to enforce stricter management requirements however without a formal set of protocols for managing used oil and a secure and environmentally protective location for it to be kept in bulk, there is little point in trying to initiate enforcement action.

The drums and storage tanks on Pohnpei, and in particular those at the local landfill, have been stored for up to 10 years. The drums are rapidly deteriorating and, if they have not already failed, they will begin to fail soon thus releasing used oil into the environment. This is an unacceptable situation.

If FSM PC is looking to establish a waste recovery system at the power plant, thus requiring the accumulated stockpiles of used oil to assist with the viability of such a project, then it is strongly suggested that they work closely with the local EPA office and state government to find a secure and long-term storage facility with a storage capacity in excess of the 890,000 litres that is currently stockpiled on Pohnpei. It is suggested that a proposal be put to FSM PC to consider providing a large capacity storage tank at their distribution facility in Dekehtik, Nett. Utilising one of the large storage tanks within the existing tank farm would ensure that the existing 890,000 L of used oil is not only

secure in terms of a significant environmental hazard but ensures that a valuable commodity is safely stored and not at risk of being exported offshore.

If there is no available large capacity storage tank within the FSM PC tank farm then it is suggested that FSM PC assist with providing a formalised and environmentally safe collection facility within the compound. Such a facility at this location will assist FSM PC with securing the resource and ensuring it is safely stored until it is required for the intended waste recovery purpose.

If FSM PC is unable to assist with securing a suitable and safe storage system for the existing used oil stocks on Pohnpei then it is strongly suggested that the state government immediately begin the process of investigating options for having the existing stocks of used oil exported off the Island. As mentioned earlier, the current stockpile volumes and the manner in which they are being managed poses a significant and immediate risk to the environment.

Whether or not FSM PC are involved with the long term management of used oil, there needs to be a formalised and centralised collection system established on Pohnpei. Ideally this would be at the FSM PC distribution facility however if this is not possible then alternative locations will need to be considered. Alternative sites to be considered are:

- The local landfill (albeit on a more organised and engineered basis than what is currently occurring);
- The PUC site;
- Within the port area; and
- An area or site that has been identified as a suitable location but not currently associated with the oil or waste industry.

Each of these locations would need a robust assessment with regard to available space, location (export requirements), public access, security and environmental sensitivity.

There was no real indication that used oil on Pohnpei was being deliberately mismanaged or disposed of illicitly based on the amount that has been stockpiled and the amount generated each year. However there is less certainty regarding the fate of used oil that is generated on ships that frequently use the port at Pohnpei to replenish their oil requirements.

An opportunity is available for Pohnpei to accept used oil from visiting ships if FSM PC establishes a waste recovery system. This is not only an opportunity for FSM PC to provide a service that would potentially help protect the environment but also provides marketing opportunities to shipping companies that are looking for environmentally safe ways of disposing of used oil accumulating on their ships.

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

Table 7: Summary of Key Information on Waste Oil for Pohnpei

ANNUAL OIL IMPORT VOLUME (LITRES/YEAR) 2013	ANNUAL WASTE VOLUME ESTIMATE (LITRES/YEAR)	CURRENT STOCKPILE OF WASTE OIL ESTIMATE	ORGANISED COLLECTION BY?
482,950 litres/year	60,000 – 70,000 litres/year onshore up to 400,000 litres/year offshore	890,000 litres (includes 10% allowance)	Nil
DIRECT CONTAINER SHIPPING ROUTE TO PHILIPPINES?	SHIPPING COSTS (APPROX. FOR A 20FT CONTAINER)	CURRENT REGULATORY DRIVERS?	PARTY TO BASEL/WAIGANI?
Yes	US\$3,000 (excludes wharf fees, insurance etc)	Yes (EPA regulations however they appear limited)	Yes/Yes

7.4 Recommendations

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

- Enter in to immediate discussions with FSM PC to establish legitimacy of their intention to invest in a waste recovery system;
- If the outcome of the initial approach to FSM PC is favourable then:
 - assist FSM PC with building relationships with consultants and/or companies that can help with the type of technology and infrastructure that they will require, including the level of treatment the used oil will require in order to meet their expected outcomes; and
 - discuss the likelihood of utilising a large storage tank within the distribution compound to store current and future stockpiles of used oil. This requires immediate attention to alleviate the existing environmental risk that is present.
- If the outcome of the initial approach to FSM PC is not favourable then:
 - immediate action is required to removing the used oil stocks offshore by a company or agent that is capable of transporting it to a country that can treat and reuse the product;
 - 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 Pohnpei;
 - Establish a specifically designed centralised collection point within Pohnpei. This will include establishing an environmentally secure collection facility that is banded,

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 or export 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 off set 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; and
- Consider reuse options on Pohnpei. Look at reuse/waste recovery options at the power plant without the assistance of FSM PC.

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 or partnering with 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 Pohnpei took place from 16 June to 23 June 2014. The consultant was Martyn O’Cain.

The primary agency for liaison was the Pohnpei Environmental Protection Authority, and the following personnel were involved:

Brad Soram, Environmental Officer

The officer was 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 (litre/year)	Stockpiled (litres)
Pohnpei Landfill	16/06/2014	Dekehtik, Nett	Landfill	Storage	Bius	0	245,000
PUC (power plant)	16/06/2014	Nanpohnmal, Sokehs	Power Station	Generator	Dackson Solomon	13,000	474,000
Penda Ocean	19/06/2014	Dekehtik, Nett	Store Yard	Recovered		0	73,000
VCS Construction	17/06/2014	Yakupa, Kolonia	Boat	Boat	Mike Sanniclaus	1,250	0
FSM Maritime Wing	19/06/2014	Dekehtik, Nett	Police Boats	Boat	Lucas	15,000	0
FSM Telecom	16/06/2014	Likinkel, Kolonia	Communications	Generator	Snider James	200	200
Pohnpei Hospital	19/06/2014	Kahmar, Nett	Hospital	Generator & vehicles	Andy	200	400
Maixiong Pacific International	20/06/2014	Kahmar, Nett	Scrap Metal Yard	Generator & vehicles	Moses	2,500	400
Pohnpei Transport Authority	17/06/2014	Peilapap, Kolonia	Engine Repair	Vehicle	Swingly	2,500	200
Etscheit Construction	17/06/2014	Kahmar, Nett	Construction	Vehicle	Brian Etscheit	2,500	100
Ace Construction	17/06/2014	Yasiring, Nett	Construction	Vehicle		7,500	2000
Pasco Auto Shop	16/06/2014	Nanpohnmal, Sokehs	Engine Repair	Vehicle	Jackson	270	0
EMC Construction	17/06/2014	Dolonier, Nett	Construction	Vehicle		150	0
Padicom Auto	17/06/2014	Dolonier, Nett	Engine Repair	Vehicle		400	4100
PCR Auto	17/06/2014	Pohnrakied, Kolonia	Engine Repair	Vehicle		200	260
PNI Auto Plus	17/06/2014	Likinkel, Kolonia	Engine Repair	Vehicle		75	50

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Peter Helcer	17/06/2014	Komwonlaid, Kolonia	Engine Repair	Vehicle		200	0
VCS Construction	17/06/2014	Yakupa, Kolonia	Construction	Vehicle	Mike Sanniclaus	1,660	0
Hyundai Auto Repair	17/06/2014	Waterfront, Kolonia	Engine Repair	Vehicle		830	830
High Speed Auto	17/06/2014	Dowenou, Koloniua	Engine Repair	Vehicle	Loverson	830	200
CTRS Auto	17/06/2014	China Town, Kolonia	Engine Repair	Vehicle		200	15
J & P Auto	17/06/2014	China Town, Kolonia	Engine Repair	Vehicle	Fernando	225	15
SADO Auto Shop	17/06/2014	Nanpepper, Nett	Engine Repair	Vehicle		0	0
Ace Service Station	16/06/2014	Kahmar, Nett	Engine Repair	Vehicle		680	100
Car Care Centre	16/06/2014	Kahmar, Nett	Engine Repair	Vehicle		900	0
Caroline Fisheries Ltd	16/06/2014	Dekehtik, Nett	Port Activities	Vehicle	Mackenzie	830	0
Pohnpei Landfill	16/06/2014	Dekehtik, Nett	Landfill	Vehicle	Bius	400	0
Pohnpei Port Authority	18/06/2014	Dekehtik, Nett	Engine Repair	Vehicle		2,000	830
Robinson Alex Auto	19/3/6/14	Mwalok, Sokehs	Engine Repair	Vehicle	Anton Obisbo	400	5
Helicopter Maitenance	19/06/2014	Dolonier, Nett	Helicopter Repair	Vehicle	Ian	2,500	260
Apsco Quarry	19/06/2014	Ipwal, Sokehs	Engine Repair	Vehicle	Onnie Camia	400	50
Ellen's Auto Shop	19/06/2014	Ohmine, Kolonia	Engine Repair	Vehicle		500	500
Pohnpei Fire Station	20/06/2014	Peilapap, Kolonia	Fire Station	Vehicle	Romeo	40	60
Pohnpei Community College	20/06/2014	Daini Kolonia	Education	Vehicle		400	400
FSM Petroleum Corp	20/06/2014	Dekehtik, Nett	Fuel Distributor	Vehicle	Trevayne Esiel	2,400	7,800

Appendix 3: EPA Regulations

POHNPEI EPA SOLID WASTE REGULATIONS

PART 3 DEFINITIONS

- (nn) "Solid Waste" means garbage, refuse, and other discarded solid materials including solid waste materials resulting from industrial and commercial operations, and from community activities, but does not include solid or dissolved material in domestic sewage or other substances in water sources, such as silt, dissolved or suspended solids in industrial waste water effluents, dissolved materials in irrigation return flows or other common water pollutants. This definition is intended to include liquid waste materials such as waste oil, pesticides, paints, solvents, and hazardous waste.

PART 8 STANDARDS FOR HAZARDOUS WASTES

- (e) Generators of waste oil shall adopt all practical measures to reduce waste quantities and to reuse or recycle waste oil to the maximum extent possible. Where it can be demonstrated that wastage is necessary, disposal methods shall be approved by the EPA. Spreading of oil on roadways, airports, or other areas for the purpose of dust control shall be initially limited to areas which preclude the possibility of contamination of (1) potable ground water; (2) surface waters; and (3) areas under agricultural cultivation of food crops.

POHNPEI ENVIRONMENTAL PROTECTION AGENCY MARINE AND FRESH WATER QUALITY STANDARD REGULATIONS

PART 6 WATER QUALITY STANDARDS

- (9) Oil and Petroleum Products
- (a) All Classes The concentration of oil or petroleum products shall not:
- (i) Be detectable as a visible film or sheen on, or discoloration of, the water's surface; or cause an objectionable odor.
 - (ii) Cause tainting of fish or other aquatic life, be injurious to the indigenous biota, or cause objectionable taste in drinking water.
 - (iii) Form an oil deposit on beaches or shoreline, or on the bottom of a body of water.

POHNPEI EPA AIR POLLUTION CONTROL STANDARDS AND REGULATIONS

PART 8 CONTROL OF OPEN BURNING

- 8.1 No person shall dispose of burnable refuse by open burning, or cause, allow, or permit open burning of refuse including grass, weeds, wire, twigs, branches, insulation, vehicle bodies and their contents, paper, garbage, tires, waste materials, tar products, rubber products, oil, and similar smoke producing materials, within the territorial limits of the State of Pohnpei. In areas where no public or commercial refuse collection service is available on the effective date of this Regulation, open burning of refuse on residential property, or refuse originating from dwelling units on such property, shall be allowed provided such burning does not violate any existing laws of the State of Pohnpei, until such refuse collection becomes available.
- 8.2 Exceptions here from may be allowed upon application and approval by the EPA provided the burning is not prohibited by, or is conducted in compliance with, other applicable laws, ordinances, and regulations. Exceptions to conduct open burning under the provision of this Regulation does not excuse a person from the consequences, damages, or injuries which may result therefrom. The following are exceptions for which application may be made:
- (g) The burning of trees, brush, grass and other vegetable matter in the clearing of land, right-of-way maintenance operations and agricultural crop burning is permitted under the following conditions:
- (3) Oils, rubber or other similar material which produce unreasonable amounts of air contaminants may not be burned.