SPREP **PROE**

South Pacific Regional Environment Programme

Programme régional océanien de l'environnement

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Federated States of Micronesia (FSM) POPs Project Country Plan
(Prepared by SPREP, January 2003)

1. Introduction

The Australian Agency for International Development (AusAID) several years ago identified the mismanagement of hazardous chemicals in the Pacific Island Countries as a serious environmental concern, and hence the Persistent Organic Pollutants in Pacific Island Countries (POPs in PICs) project was developed as an AusAID funded initiative, to be carried out by SPREP. POPs are a group of twelve particularly hazardous chemicals that have been singled out by the recent Stockholm Convention for urgent action to eliminate them from the world. They include polychlorinated biphenyls (PCBs), which are mainly found in transformers, and several pesticides that are very persistent and toxic to the environment.

Phase I of the project involved predominantly an assessment of stockpiles of waste and obsolete chemicals and identification of contaminated sites, for 13 Pacific Island Countries. Other Phase I activities included education and awareness programmes in each country and a review of relevant legislation.

FSM was a participant in Phase I of this work. A comprehensive report of this Phase I work was prepared and circulated, and significant quantities of hazardous wastes were identified in the countries visited, including estimated figures of 130 tonnes of PCB liquids and 60 tonnes of pesticides (although only about 3 tonnes of POPs pesticides). Many other hazardous wastes were also identified as well. In addition, quite a large number of contaminated sites were discovered, including six locations of buried pesticides. On the basis of this report, it was decided to proceed to the Phase II of the project, which involved the preparation of a more detailed inventory, and then collecting, transporting and disposing of the wastes, to a suitable Australian facility.

The first part (Component 1) of the Phase II work is now nearly complete, and has involved visits to each of the countries involved in the project, including FSM, for detailed inventories to be carried out, including testing of all stockpiled transformers.

Other work was also carried out during these visits, including improving the temporary storage arrangements where necessary, and obtaining written agreement from each country for the project to proceed. Copies of the FSM visit report (for all four states) are contained in Appendices 1-4 below.

The most significant conclusion found from this next stage of the work is that the estimated amount of PCB contaminated oils was far too high. Instead of the expected 130 tonnes, only 12.5 tonnes were found. This presented an opportunity to include additional wastes in the project, and it was decided to collect and dispose of all the pesticides, rather than only the POPs pesticides (as well as all the PCB transformer oils that were confirmed positive). A total of 50,265 kg of pesticides will now be dealt with, including 1825 kg of POPs pesticides and 6542 kg of unknowns, some of which may be POPs pesticides.

A full inventory of all pesticides and PCB contaminated oils was prepared in November 2002 as the basis for bid invitations to appoint an Australian Management Contractor (AMC) to carry out the rest of the Phase II work. As a result, the Australian company GHD Pty Ltd was appointed as AMC. GHD is expected to start work shortly and it is important that all countries agree to a confirmed plan for implementing the rest of the Phase II work. The wastes will all go to the BCDT / SRL Plasma plant in Narangba, north of Brisbane.

AusAID have engaged the Australian legal firm of Blake Dawson Waldron ("**BDW**") and instructed them to provide advice in relation to aspects of the POPs Project. As part of this process BDW has asked SPREP to obtain from participating countries some information as presented in Section 4 below.

2. Country Inventory

(It is possible that more wastes may be found in the categories below, prior to the time of pickup. If so, these could be added to the inventory, subject to negotiation with AusAID and the AMC.)

All field tests were carried out using Dexsil Chlor-N-Oil 50 test kits. The Dexsil kits test for all chlorine and not just chlorine in PCBs, so they are susceptible to "false positive" results. All confirmation testing was carried out by sending samples by courier to Hill Laboratories in Hamilton, New Zealand

Yap

In Yap, all the stockpiled transformers were stored at the Yap Power Station or on vacant land just below the Power Station. On one area near the landfill, there were 17 transformers and 6 drums containing oil drained from other old transformers. One of the transformers tested positive and one of the drums, although both were later confirmed as negative. There was also one very large old transformer near the entrance that tested negative.

The second transformer stockpile at the Power Station was to the right of the entrance road, heading into the Power Station. There were 55 old transformers stored here, including 16 empty or water filled ones. Seven of these transformers tested positive and three were later confirmed as positive. There were also 40 burnt out transformer carcasses in this location from a recent fire in a warehouse. These transformers contained no oil as it had all been burnt in the fire. The transformers were all new at the time of the fire, which was less than two years previously, so they were all presumed to be PCB-free.

The third transformer stockpile at Yap was located at the vacant land below the Power Station. There were 44 very old transformers stockpiled here, and four of these tested positive. Only one was later confirmed as positive.

Chuuk

At Chuuk, there were 45 transformers in the front of the Power Station and one drum of transformer oil. Of these, 26 were tested and all tested negative, as did the drum of oil, 19 were empty or water filled, and 10 were labelled PCB free.

There were four large old transformers at the rear of the Power Station, one of which was completely empty. The other three all tested positive and were later confirmed as positive. Two families of squatters lived directly behind these transformers and their children played around them.

At the Port, 83 transformers were identified, and 55 more were identified at the Chuuk Sewage Treatment Plant (STP). Fifty-three of the transformers at the Port were moved to the STP and 30 remain at the Port. (The relocation exercise was interrupted because the crane truck was requisitioned to help with the typhoon relief effort.)

The following is the breakdown of the results from the STP (including those 53 moved from the Port), and those still at the Port.

<u>Adjacent to the sea</u>:
There were 17 units, of which 8 tested negative, 2 tested positive, 5 were already certified "PCB free" and 2 were either empty or full of water. The transformers that tested positive were later confirmed as negative.

<u>On roof of plant</u>:
There were 19 units, of which 11 tested negative, 3 tested positive, 2 were certified "PCB free" and 3 were either empty or full of water. The transformers that tested positive were later confirmed as negative.

<u>On roof of small shed</u>:
There were 19 units, of which 13 tested negative, 2 tested positive, 3 were certified "PCB free" and 1 was empty. The transformers that tested positive were later confirmed as negative.

Under trees in corner:
There were 53 units, of which 15 tested negative, 5 tested positive, 1 was certified "PCB free" and 32 were either empty or full of water. The transformers that tested positive were later confirmed as negative.

Still at the Port
There were 30 units, of which 10 tested negative and one tested positive. Ten were empty or full of water. The transformer that tested positive was later confirmed as negative.

One old transformer located on the road near the Truk Stop Hotel was also tested and this was negative.

Money and test kits were left to test a number of transformers on Tonoas Island, and to send samples of the ones that tested positive, back to New Zealand for testing. The testing was carried out with the help of the US EPA and of the 20 that were tested, 12 tested positive, and some of the ones that tested positive were leaking. Samples of the "positive" ones were never, however, sent back to New Zealand for testing.

Pohnpei

Five transformers were tested at the "Jack Adams" site (local contractor). They all tested negative. Other transformers previously held at this site had all been dumped.

Fifteen transformers were inspected at the landfill, and staff of the Pohnpei EPA gave assurances that they had been tested previously and found to be negative.

At the Pohnpei Power Station, 65 transformers were tested, and only one tested positive (later confirmed as negative). Of the others at the Power Station, 6 were empty, 11 were brand new, and 8 had been tested previously as negative.

Six transformers on the old power barge were tested and all were negative. The three pole transformers on the old power barge could not be tested, as access was difficult and a ladder was needed.

Kosrae

All the transformers tested were at the Kosrae Power Station. As the result of a previous testing exercise, eleven transformers that previously tested positive had been placed in a locked container. These were retested and 6 tested positive, with two later confirmed as positive.

Fifteen had not been tested previously and so these were tested, with one testing positive that was later confirmed as negative.

There were an indeterminate number of old transformers at the Power Station in a pile that was largely covered by long grass, so could not be counted. Not enough test kits had been brought to test all these transformers, so as many as possible were tested until the kits ran out. A total of 46 more were tested and 12 were found to be positive, with three confirmed as positive. The three confirmed as positive were all between 20 and 50 ppm, but should still be treated as positive and removed.

It was agreed that SPREP would be advised as to how many more transformers remained of the "previously tested" pile, and more test kits would be sent to test them. Despite repeated requests, SPREP was never advised of this number, so this remains a matter to be investigated in the next phase of the project.

FSM therefore has the following **PCB Contaminated Oils** to be collected.

State	Location	ID No of Transformers	Wt of Oil (kg)	PCB Conc (mg/kg)	No of Flushes	Total Waste Wt (incl Flushes) (kg)
Chuuk	Weno Power	46	600	1170	4	3000
	Station	47	600	518	4	3000
		48	600	321	3	2400
Kosrae	Kosrae Power	62	325	399	3	1300
	Station	78	260	443	3	1040
		309	75	21	2	225
		310	225	27	2	675
		311	200	23	2	600
Yap	Yap Power	63	420	1410	4	2100
	Station	64	420	2090	4	2100
		65	420	1240	4	2100
		74	420	92	2	1260

FSM has the following **Pesticides** to be collected:

State	Location	Chemical	Active Agent	Quantity	Comments
				kg	
Kosrae	Kosrae Agriculture	Sevin 80S	Carbaryl	50	
	Store, Tofol				
N.B. The above pesticide is kept in an insecure store in Kosrae					
Pohnpei	Pohnpei	DDT	DDT	40	2x30l sealed pails -

	Botannical Gardens				assume 20 kg in each pail
		Chlordane	Chlordane	20	1x30l sealed pail - assume 20 kg in pail
		Terrachlor	Terrachlor	20	1x30l sealed pail - assume 20 kg in pail
		Chlorpyriphos	chlorpiriphos	20	1x30l sealed pail - assume 20 kg in pail
		Treflan	Trifluralin	20	1x30l sealed pail - assume 20 kg in pail
		Dibrom		20	1x30l sealed pail - assume 20 kg in pail
		2,4-D	2,4-D	20	1x30l sealed pail - assume 20 kg in pail
		Ortholide	Ortholide	20	1x30l sealed pail - assume 20 kg in pail
		Benlate	Benomyl	20	1x30l sealed pail - assume 20 kg in pail
		Strychnine	Strychnine	20	1x30l sealed pail - assume 20 kg in pail
		Carbamate	carbamate	20	1x30l sealed pail - assume 20 kg in pail
		Dimethoate	dimethoate	20	1x30l sealed pail - assume 20 kg in pail
		Diazinon	Diazinon	20	1x30l sealed pail - assume 20 kg in pail
		Captan	Captan	20	1x30l sealed pail - assume 20 kg in pail
		Bravo	chlorothalonil	20	1x30l sealed pail - assume 20 kg in pail
		Dithane	Mancozeb	40	2x30l sealed pail - assume 20 kg in pail
		Sevin	Carbaryl	40	2x30l sealed pails - assume 20 kg in each pail
		Malathion	Malathion	60	3x30l sealed pails - assume 20 kg in each pail
		Di-syston	Disulfoton	60	3x30l pails - assume 20 kg in each pail
		Karmex	Diuron	120	6x20l containers
		Manzate	Mancozeb	100	5x20l containers
		Kelthane	Dicofol	10	2x5l jars
		Unknown mixed		1600	10x200l drums unknown powdered and liquid pesticides
		Unknown liquids		55	11x5l jars unknown liquid pesticides
		Unknown Powder		100	5x30l pails - assume 20 kg in each pail
		Floor Sweepings		80	4x30l pails - assume 20 kg in each pail

		Rinse Water		125	5x30l pails - assume 25 kg in each pail
N.B. 1. The above are all kept in a locked store in a bad location, in the middle of the popular Botannical Gardens.					
2. The quantities above are approximate only, as all materials had been repacked in bulk containers as above, securely several years ago. They were therefore not unpacked in the Phase 2 exercise, but quantities were estimated based on labels on the new containers. This label information was not detailed.					
Yap	Yap Agricultural	Kelthane 35 Miticide	Dicofol	2	Repacked in Sealed Drums
	Research Station	Thiodan 50WP		2	Ditto
		Dithane M4D	Mancozeb	1	Ditto
		Dithane M45	Mancozeb	6	Ditto
		Orthiolide 50 wettable	Ortholide	13	Ditto
		Karathane WD	Dinocap	22	Ditto
		Benlate	Benomil	4	Ditto
		Sevin 50W	Carbaryl	14	Ditto
		Manzate 20D	Mancozeb	6	Ditto
		Unknown Powder		114	Ditto
		Unknown Powder		5	Ditto
		OLW Terracide WP		4	Ditto
		Golden Marin Fly bate	Methomyl	0.5	Ditto
		Dipel worm killer	Bacillus thuringiensis	0.5	Ditto
		Captan WP	Captan	2	Ditto
		Lannate L	Methomyl	16	Liquid
		Ortho Bibromo 8		4	Liquid
		Cygon	dimethoate	8	Liquid
		Methyl bromide	methyl bromide	12	120 ampoules each 100g
		Furadan 3G	Carbofuran	200	50x4kg packs
N.B. The above are all kept in an insecure store at the back of the Yap Agricultural Research Station. Access to the research station is good, but the pesticides shed is at present accessible only by a long walking track. The old road to the shed may be accessible by four wheel drive, but is currently not used.					

3. Other Project Work

Yap

Surplus chemicals were inspected at the State Supply Warehouse. (Chemicals formerly stored at the Waab warehouse had been transferred there.) The State Supply Warehouse now contains 26 drums of sulphonate purchased for hardening the soil as a base for road construction. There are also 18 x 200 litre drums of caustic soda beads, 7 smaller drums of solid caustic potash, and various other smaller amounts of mostly unknowns, although some small containers are marked as citronella oil.

The surplus chemicals at the Public Hospital were inspected. These consisted of three cardboard boxes and a sealed metal trunk. The boxes contained a variety of salts (including mercuric salts), bacterial cultures, buffer solutions, and small amounts of organics (phenol, benzaldehyde, methanol). The metal trunk contains 3 gals of acetic acid, 2 gals of hydrochloric acid, 3 gals of sulfuric acid, and 1 gal of phosphoric acid.

The EPA also had several boxes of chemicals that the hospital had left with them. These were stored in a semi-open area at the back of the EPA office, and were badly damaged by rain. Almost all the labels were missing, but it was assumed that the composition of these chemicals was approximately similar to those in the cardboard boxes stored at the hospital now (see above), although this could be an invalid assumption. Several large plastic garbage bins with lids were purchased, and the chemicals were packed safely, so that the Yap EPA could store them safely until a satisfactory solution was available.

A visit was made to the Yap High School in the morning to inspect a box of chemicals and biological specimens. There was nothing there that represented any real hazard to anyone.

The Board of Education was reported to be storing about 100 kg of chemicals from the outer islands high school, but upon investigation it was discovered that these chemicals had been dumped in the landfill.

The Communications Center is storing 34 large old lead acid UPS batteries. The UPS system at the center has been completely replaced, and the old batteries are now surplus to requirements. A more suitable store is needed for these old UPS batteries.

At the request of Sefa Nawadra from SPREP, the matter of the US Mississinewa (sunk by the Japanese during WW2) was raised with the Yap EPA and the Chief of the Planning Division, Office of Planning and Budget.

Chuuk

The three old transformers that tested positive are all in the back of the power station yard. They are large ones with the two squatter houses behind, and it was observed that the squatters use the transformers to hang their laundry on to dry, and their children also play around the transformers. There is also one other transformer in the same location of similar type and age, that is completely empty, so it may also have contained PCB

contaminated oil and its contents may have leaked out on the surrounding ground. A composite soil sample was taken of the ground, and the resulting analysis gave a low but still positive result of ***2.5 mg/kg dry weight for total PCBs (sum of individual congenors)***. As a precaution a large amount of limestone sand was placed around the transformers, to cover up any contamination from spilled PCBs.

In 1994, as part of a WHO training exercise, about 910 kg of pesticides (not including the weight of packaging), located in the Dept of Agriculture Pesticide Store Room, were repackaged in new containers (used drums and plastic bags) and placed back in the same store. About two years later, this store became part of the Campus of the College of Micronesia, and the pesticides (now in their new containers) were relocated to a new site behind the Post Office (leased by the Dept of Agriculture) in the middle of a poor residential area. The pesticides were placed in a container standing on the site. The site was kept locked but access into the site was not difficult. The door of the container was partly open, and some of the pesticides were left outside the door.

Numerous residential houses were very close to the container, and residents over the past few years have been complaining of headaches, rashes, nausea and various other symptoms. Some flooding over the years had also washed pesticides into the houses and contaminated their two wells (used for washing persons and clothes). The pesticides in the container included karmex (diuron), orthocide (captan), parathion, terrachlor, dimethoate, methyl bromide, and dactal, plus numerous other ones in smaller qauantities. Many are persistent and most can have serious (or very serious) effects on humans.

Another issue was that the old pesticide storeroom (now part of the College of Micronesia) had not been properly cleaned and teachers and students still complained about it.

The current pesticide storage site and the old pesticide storage site were both inspected. It was clearly evident that there was a serious problem with the current site. There was a strong smell coming from the container, and a large area of grass around it had been killed off. Several nearby residents reported the ill-health that the pesticides had caused. Much of the grass kill appeared recent, and it was evidently due to the flooding caused by the recent typhoon. Flood debris had apparently caused the waster to reach people's waists for a while and that certainly would have washed some pesticides out of the container.

The old pesticide storage area in the college was a shed now filled with old equipment. There was an unmistakable smell of pesticides coming from the shed, which was not strong, but still objectionable.

The decision was made to attempt a cleanup of the pesticides stored in the container, and also of the old storeroom in the College of Micronesia.

The first thought was that the pesticides (due to the urgent nature of the problem) could be relocated at the Weno garbage dump. An inspection of the garbage dump revealed,

however, that this was out of the question, as it was a very badly run facility. It was just an open dumping area in a large area near the sea, surrounded by residences close by. There were also quite a few scavengers roaming the surface of the dump.

The shed at the College of Micronesia was cleaned up first. This was where the pesticides were originally stored. All the stored materials and old equipment was emptied out, and the walls, floors and ceilings were thoroughly scrubbed with Clorox.

Then the cleanup commenced, of the container stored in the residential area behind the post office, using mostly locally sourced materials and safety equipment. This work continued for a few days and by then the US Federal Emergency Management Agency (FEMA) had built up a strong presence in Chuuk, for the typhoon relief work, and they were accompanied by US EPA representatives. The opportunity then arose for FEMA / US EPA to get involved with the pesticide cleanup. After several meetings this was agreed to (as part of the flood relief effort), and a US EPA cleanup team arrived, packaged the waste and placed it in two containers at the Port. Aside from the 910 kg of pesticides, there was a considerable amount of contaminated debris placed in the original container and this material has also been packaged up.

SPREP has been advised that the US EPA will arrange to have these two containers taken to the USA for destruction of their contents. As a result, they were left out of the inventory for the AusAID "POPs in PICs" project. If this situation changes, consideration will need to be given for these two containers to be picked up by the AMC as part of the AusAID project.

There is also the outstanding issue of the contaminated site. The US EPA did not clean up the site contamination and this needs to be investigated further, particularly in light of the fact that two village wells (used for washing and laundering clothes) are very close by, and also that numerous houses and grounds have been contaminated by the flooded pesticides.

A visit was made to the hospital to find out about the surplus chemicals stored there. The Director of Health Services handed over two boxes of old chemicals to take away (mostly acids and salts, a few organics such as xylene, and some culture media). These chemicals have all now been stored with the pesticides by the USEPA in the containers at the Port, and it is hoped they will be taken away by the US EPA for destruction with the pesticides.

A visit was also made to Francis Xavier School, and the surplus chemicals stored there were inspected. It was agreed that the science teacher would make an inventory of the surplus chemicals and advise Chuuk EPA.

A visit was also made to the quarry where large amounts of old bitumen drums were stored. There was at least 1000 drums of bitumen stored here, many leaking and in bad condition. A large area was quite seriously contaminated with leaked bitumen.

Serious public health concerns were reported by the Director of Health Services, in relation to the water supply and the sewage discharge. The water supply is mainly from underground sources, with some surface water. Past testing for faecal coliforms has indicated that it is sometimes heavily contaminated. No funding is currently available to carry out testing at present, even for chlorine residuals. Some parts of the supply were also damaged by the recent typhoon. The sewage treatment plant has apparently never worked. It was built by the USA in the 70's and always suffered from salt water intrusion problems. It ran "after a fashion" for a while and then stopped altogether. The STP now just acts as a pumping station into the lagoon.

Pohnpei

The building now used for the pesticides and chemicals store for Pohnpei is located in a most unfortunate place in the middle of the Botannical Gardens, a site frequently visited by tourists and close to hotels, sports areas, shops and the US Embassy. The building could easily catch fire, and then there would need to be a major and urgent evacuation. This situation was examined and a letter written to the Pohnpei EPA (see Appendix 3 below). It should be noted that as well as about 2710 kg of pesticides, this store contains about 1400 kg of mixed "non-pesticide" chemicals from various sources.

The old Japanese Communications Building is next to the above pesticides and chemicals store and formerly held about 1000 kg of pesticides, including DDT. There is still some contamination in this building and it needs to be thoroughly cleaned out.

The following contaminated (or potentially contaminated) sites were visited:

1. ***DDT Burial Site***. About 2 tonnes of DDT in 200 litre drums were buried at this site in the late 70's. The location is the site of the old Pohnpei hospital, near the old incinerator.

2. ***Former Power Plant***. The power plant operated on this site for about 25 years until the mid-eighties. It is now used as a private maintenance repair shop and for gas cylinder storage. The manager of the site advised that every time he dug into the site he found lots of oil contamination. Around the road downstream of the site, there was no evidence of oil contamination in the road drains (it had been raining quite heavily), but most of the easily leachable hydrocarbon had probably already left the site, however.

3. ***Landfill***. At the landfill, about 20 drums were stored in one location, which was also contaminated over quite a large area with spilt oil. Several hundred batteries were also stockpiled in deteriorating condition at the landfill, in two locations.

4. ***Vehicle Maintenance Depot*** This site was operated by the Public Works Dept, and was in a clean and well-maintained condition. There had been previous reports of extensive oil contamination and poor housekeeping, but considerable efforts had apparently been made recently to clean up this site.

5. ***Asphalt Plant at Palikir.*** This plant is near the Federal Government Administrative Centre, and there are several locations where bitumen has been spilled. There are also numerous old rusty drums of asphalt accumulated around the site. The EPA has issued instructions to the company to clean up the site and has also imposed fines, which were never paid. Two other smaller plants located at some distance from the main centre were not visited, but were also reported to be contaminated.

The old Power Barge was visited. This power barge was brought to Pohnpei in the 80's to solve a short-term power crisis. The Pohnpei Utilities Corporation had since tried to sell it without success, and none of the generators probably now worked. They now keep the power on it to keep the cathode protection alive and prevent corrosion. Otherwise the barge would probably corrode irretrievably and sink. It contains fuel oil and is a potential source of contamination of the sea water, and represents an ongoing problem.

The hospital was reported to have a store of expired drugs, but these were not examined.

Kosrae

A visit was made to the Dept of Agriculture, Land and Fisheries, where it was reported that a large amount of pesticides and agricultural chemicals was dumped in the late eighties under the supervision of the then Kosrae EPA. The location of the dumping was unknown.

Visits were made to all the small landfills at Malem, Utwe and Tafunsak. These were just dumps, and were poorly located in water. The poorly located and badly managed small dumps at Malem, Utwe, and Tafunsak need to be upgraded or closed.

A visit was made to the Tofol landfill, which was quite well located up high and away from groundwater behind the Power Plant. It was also being covered (not regularly) and was quite well maintained. There was, however, limited room for expansion. A large number of cars were piled up at the landfill. Also some attempt had been made to store old batteries, but unfortunately these had been piled up and covered by an overenthusiastic bulldozer operator.

The waste oil storage container at the landfill was also inspected. This took waste oil from the vehicle maintenance depot and also from several other generators including the two main contracting companies on the island, and private vehicle repair shops. The container was a large horizontal cylinder of about 100 tonnes capacity. It was about one-third full, and at the current rate of filling, it would last for another one to two years before needing removal. Last time, the waste oil from the island had gone to Nauru.

4. Domestic Laws on Collection, Packaging, Transportation and Export of Hazardous Waste

AusAID have engaged the Australian legal firm of Blake Dawson Waldron ("**BDW**") and instructed them to provide advice in relation to aspects of the POPs Project. As part of this process BDW has asked SPREP to obtain from FSM (as well as all other participating countries) the following information:

a) What are the legal responsibilities in FSM for persons involved in collection, packaging, transportation and disposal of hazardous wastes and who are those responsibilities allocated to by the laws in FSM.

b) Who is the owner of the hazardous wastes in FSM.

c) Does FSM have domestic legislation which allocates responsibility for POPs waste during collection, packaging and export? If so, how is this responsibility allocated? Please consider that liability and responsibility may arise from:

- requirements to comply with clean-up notices or Government directions relating to the waste;
- requirements to meet safety, environmental and other standards in relation to the waste; and
- requirements to compensate others for damage to property, human health or the environment.

d) Does FSM have a domestic policy in relation to providing or withholding consent under the prior informed consent provisions of the Waigani Convention (Article 6) for:

- FSM
- any other Pacific Island Countries planning to 'transit' wastes through FSM.

e) Has FSM developed a national hazardous waste management strategy in accordance with Article 4(4)(e) of the Waigani Convention? If so, how is the strategy relevant to:

- the collection, packaging, transportation and exportation of POP waste; and
- responsibility for and ownership of the POP waste at each of the steps in (i).

Should you have any enquiries, please contact the following relevant Blake Dawson Waldron staff, Tony Hill on (02) 9258 6185 or Joanna Perrens on (02) 9258 6401 in Sydney, Australia.

5. Discussion

Yap

There have been 4 transformers identified in Yap with PCB contaminated oil, with a total of 1680 kg (or about 1980 litres) of oil. If these transformers are flushed, then this will generate about 7560 kg (or about 8900 litres) of combined contaminated oil plus flushing solvent. About 45 x 200 litre drums will therefore be needed to contain this amount of liquid waste.

The transformers confirmed positive had all leaked to some extent, so the soil under the transformers may be contaminated with PCBs. In addition, 16 transformers were empty or water filled, so may have contained PCB contaminated oils that had now leaked onto the site. It would therefore be prudent to remove about 5 cubic meters of soil (and possibly more) from the surface of this site, adjacent to the PCB positive transformers. It may also be necessary to carry out more analyses of the soil on this site. Removal of this contaminated soil will therefore require at least 25 more drums.

There is about 436 kg of pesticides stored at the Yap Agricultural Research Station, including about 200 kg of carbofuran and about 114 kg of unknowns. Much of this material has been securely repacked in 4 x 200 litre drums. These pesticides are all kept in an insecure store at the back of the Yap Agricultural Research Station. Access to the research station is good, but the pesticides shed is at present accessible only by a long walking track. The old road to the shed may be accessible by four wheel drive, but is currently not used. About 8 drums will be needed to contain these pesticides, including packaging.

The total number of drums needed is therefore a minimum of 78, and possibly more, depending on the amount of contaminated soil to be removed. A total of 80 drums will fit inside a 20 ft container, so one 20 ft container should only just be sufficient if only 5 cubic meters of soil are removed. In the eventuality that more soil is to be removed, it would therefore be prudent to send two 20 ft containers to Yap.

A staging location will be needed for the containers, and probably a good location would be at the Yap Power Station, as this is where the bulk of the work is to be done. The pesticides will need to be brought here in drums, and the Yap Agricultural Research Station is quite close to the Power Station. The local transport of the drums to the container staging area needs to be on safe covered trucks with good containment. The filled containers will also need to be moved to the port.

A central store for hazardous wastes is urgently needed, especially as the State Supply Warehouse is about to be demolished. The waste chemicals stored in the State Supply Warehouse can then be relocated, together with the waste chemicals at the hospital, the

waste chemicals stored at the Yap EPA, any school chemicals, and the 34 large old lead acid UPS batteries stored at the Communications Centre.

Chuuk

There have been 3 transformers identified in Chuuk with PCB contaminated oil, with a total of 1800 kg (or about 2120 litres) of oil. If these transformers are flushed, then this will generate about 8400 kg (or about 9880 litres) of combined contaminated oil plus flushing solvent. About 50 x 200 litre drums will therefore be needed to contain this amount of liquid waste.

The transformers that tested positive are, as noted above, all in the back of the power station yard, with two squatter houses behind them in close contact with the transformers. The possibility of relocating the squatter families should now be investigated, as the whole area must now be considered as a potentially contaminated site. The area containing the transformers should then be cordoned off and access prevented, until the transformers can be removed. Warning signs should be erected around the cordoned off area.

The transformers confirmed positive had all leaked to some extent, so the soil under the transformers may be contaminated with PCBs. In addition, one other transformer of similar age and make is standing empty in the same location, so it may have spilled all its contents on the adjacent ground. It would therefore be prudent to remove at least 5 cubic meters of soil from the surface of this site, adjacent to the PCB positive transformers. It may also be necessary to carry out more analyses of the soil on this site. Removal of this contaminated soil will therefore require at least 25 more drums.

If the US EPA takes away the two containers of pesticides stored at the port, from the recent repackaging and cleanup exercise, then Chuuk will have no pesticides to be removed. This is apparently likely, but if these arrangements fall through, then consideration will need to be given to these containers being removed and disposed of as part of this AusAID project. These two containers would need no further work done on them as the US EPA packaging crew has ensured that they are ready for shipment, and full records are available regarding the contents.

Even if the US EPA eventually removes these two containers of packaged pesticides and contaminated debris, they now need to be monitored carefully until collection can be arranged. The Chuuk EPA should make sure the containers are properly labelled in English and Chuukese, as agreed with the US EPA. The Chuuk EPA holds the only keys to the two containers, and an EPA staff member should inspect the containers and their contents at least every month, to make sure everything is in order.

The total number of drums needed is therefore a minimum of 75, and possibly more, depending on the amount of contaminated soil to be removed. A total of 80 drums will fit inside a 20 ft container, so one 20 ft container should only just be sufficient if only 5

cubic meters of soil are removed. In the eventuality that more soil is to be removed, it would therefore be prudent to send two 20 ft containers to Chuuk.

A staging location will be needed for the containers, and probably a good location would be at the Chuuk Power Station, as this is where all the work is to be done. The filled containers will then need to be moved to the port.

If it has not been done already, the remaining transformers located at the port should be relocated to the Sewage Treatment Plant.

The Tonoas transformers that tested positive (above 50 ppm) need to be sampled, and the samples couriered for analysis at Hill Laboratories, New Zealand. (Funds were left for the cost of the courier.) Two samples need to be taken and one of each retained by Chuuk EPA for security, in case the courier parcel goes missing.

The garbage dump on Weno is a serious environmental problem, and a new site needs to be found. Until a new site is found, the management of the old site needs to be improved as much as possible, given the limited resources. The Chuuk EPA should initiate the preparation of a management plan that eventually obtains broad acceptance and action that everyone agrees to.

The contaminated site still remaining at the location of the old pesticide containers and the large bitumen contaminated area at the quarry needs to be investigated and solutions need to be found. There is also quite a lot of waste oil contamination at the Power Station which needs cleaning up.

Pohnpei

All transformers tested have been established as PCB free. The Pohnpei Utilities Corporation requested that a field test be carried out on the transformer oil in the blue plastic tank near the maintenance shop at the back of the Power Plant. Sufficient test kits were left to test this oil. It would also be advisable to test the three pole transformers on the old power barge, although they are up high and access is difficult.

About 2710 kg of pesticides are stored at the surplus pesticides and chemicals store at the Botannical Gardens. Much of this material has been carefully repackaged in plastic pails and steel drums, and about 30 drums will be needed to properly package it all, including packaging. <u>These pesticides were not inventoried in detail during the most recent visit, as all the materials in the shed had been carefully repacked. Estimates were therefore made based on an earlier inventory and on labelling on the pails and drums</u>.

The total number of drums needed is therefore about 30 drums. A total of 80 drums will fit inside a 20 ft container, so one 20 ft container should easily be sufficient.

A staging location will be needed for the containers, and in one respect a good location would be at the Botannical Gardens, as this is where all the pesticides for removal are located. This is a very public location, however, and it probably would be better to find a private staging area nearby. The alternative would be to position the container at the Botannical Gardens and set up a secure locked and screened area, to keep the public out while the work proceeds. The local transport of the drums to the container staging area needs to be on safe covered trucks with good containment (if the staging area is located away from the Botannical Gardens). The filled container will also need to be moved to the Port.

As noted above, the current location of the pesticides / hazardous waste store in the Botanical Gardens is unsatisfactory and a new location should be found (see letter in Appendix 3) as it may be quite a long time until the AMC comes to pick up the wastes. Alternatively, the existing store should be made much more secure, and a fire warning / protection system installed.

The old pesticides store at the Japanese Communications Building also needs to be thoroughly cleaned out and the walls, ceiling and floor washed down with Clorox. Disposable overalls, respirators and gloves should be worn throughout this exercise.

The Pohnpei EPA should closely monitor the current state and future fate of the old power barge, especially in relation to any oil stored on the barge.

The Pohnpei EPA should continue to monitor the large quantities of waste oil that may be dumped under the site of the old power plant. It may be advisable to investigate drilling one or two monitoring bores. Ongoing monitoring of the spilled bitumen at the asphalt plants is also needed.

The buried DDT near the site of the old hospital is a matter of serious concern, and it is important that all possible information is collected about this burial and the current status of the site. For instance, were the dumped DDT containers disturbed when the new road was built? It may be necessary to dig up this DDT and arrange for proper disposal.

Kosrae

There have been 5 transformers identified in Kosrae with PCB contaminated oil, with a total of 1085 kg (or about 1280 litres) of oil. If these transformers are flushed, then this will generate about 3840 kg (or about 4520 litres) of combined contaminated oil plus flushing solvent. About 23 x 200 litre drums will therefore be needed to contain this amount of liquid waste.

There is about 50 kg of carbaryl located at the Kosrae Agricultural Store. Two drums should be sufficient to package up this material. This unwanted and deteriorating Sevin 80S should be packed in secure containers and kept locked away until it can be collected.

The total number of drums needed is therefore about 25 and a total of 80 drums will fit inside a 20 ft container. One 20 ft container should therefore easily be sufficient for Kosrae's wastes.

A staging location will be needed for the containers, and probably a good location would be at the Kosrae Power Station, as this is where the bulk of the work is to be done. The pesticides will need to be brought here in drums, and the Kosrae Agricultural Store is quite close to the Power Station. The local transport of the drums to the container staging area needs to be on safe covered trucks with good containment. The filled container will also need to be moved to the port.

Transformers #309, #310, and #311 should be moved into the Power Station on-site storage container. Transformers marked #100, #301, #86, #210, #120, #302, #50, #303, and #304 can all be moved out of the container.

As three of the transformers in the yard tested positive (albeit at less than 50 mg/kg) all the transformers in the yard not tested as part of the recent visit should now be tested (or retested, as they were tested several years ago). This remains a matter to be investigated in the next phase of the project. SPREP agreed to send test kits for this testing, when advised of the number of transformers still to test, but this advice was never given despite numerous requests.

The poorly located and badly managed small dumps at Malem, Utwe, and Tafunsak need to be upgraded or closed. One solution would be to set up transfer stations at each of the three locations, and the collected garbage could then be brought to the main landfill at Tofol, which is reasonably well operated and appears to have some spare capacity with room to expand. Perhaps some of the many spare steel bins at the old Pacific Tuna Industries site could be modified to use as transfer bins at each of the transfer stations. These bins could be kept under covered shelters, and transferred easily to Tofol when they are full.

Every effort should be made to establish whether in fact a large quantity of pesticides and agricultural chemicals were dumped in Kosrae in the mid-eighties, and if so then every effort should be made to discover where these wastes were dumped. It may be necessary dig them up and dispose of them properly.

Federal Issues

It is also important that consent procedures are in place to process the application from GHD to FSM to export the waste. FSM has ratified the Waigani Convention, and needs to be ready to handle effectively, the export application, including any appropriate public consultation processes. SPREP plans to hold a workshop soon to assist countries with this consent process.

The impact on the public in the four FSM states should be minimal, provided everything is organized and implemented according to a well-designed management plans. The local transport routes and movement times will be part of the plans, and the only risk of public exposure will be if some incident occurs during this local transport, which leads to a spill. The basis of the management plans should be communicated to the public effectively via radio, and printed media, but not in an alarmist fashion, as the risk to the public is very low.

6. Conclusions

Yap

1. Yap has four PCB contaminated transformers, all located at the Yap Power Station, and at least 5 cubic meters of PCB contaminated soil will need to picked up as well.

2. There are about 436 kg of mixed pesticides to be picked up from the Yap Agricultural Research Station, including about 200 kg of carbofuran and 114 kg of unknowns.

3. At least 78 drums will be required for Yap, which will only just fit into one container. As the quantity of soil to be picked up may exceed 5 cubic meters, then two containers should be provided for Yap.

4. A central store for hazardous wastes is urgently needed, especially as the State Supply Warehouse is about to be demolished. The waste chemicals stored in the State Supply Warehouse can then be relocated, together with the waste chemicals at the hospital, the waste chemicals stored at the Yap EPA, any school chemicals, and the 34 large old lead acid UPS batteries stored at the Communications Centre.

Chuuk

1. Chuuk has three large old PCB contaminated transformers at the Chuuk Power Station and at least 5 cubic meters of PCB contaminated soil will need to picked up as well.

2. Chuuk has no pesticides to pick up, unless the US EPA fails to uplift the 2 containers of pesticides now located at the Port (from the cleanup of the pesticide container behind the Weno Post Office). Then, consideration will need to be given to the AusAID "POPs in PICs" project uplifting these containers.

3. At least 75 drums will be required for Chuuk, which will only just fit into one container. As the quantity of soil to be picked up may exceed 5 cubic meters, then two containers should be provided for Chuuk.

4. The garbage dump on Weno is a serious environmental problem, and a new site needs to be found.

5. The contaminated site still remaining at the location of the old pesticide containers and the large bitumen contaminated area at the quarry needs to be investigated and solutions need to be found. There is also quite a lot of waste oil contamination at the Power Station that should be cleaned up.

Pohnpei

1. Pohnpei has no PCB contaminated transformers.

2. About 2710 kg of pesticides are stored at the surplus pesticides and chemicals store at the Botannical Gardens. Much of this material has been carefully repackaged in plastic pails and steel drums, and about 30 drums will be needed to properly package it all, including existing packaging.

3. The total number of drums needed for Pohnpei is therefore about 30 drums, which will easily fit into a 20 ft container.

4. As noted above, the current location of the pesticides / hazardous waste store in the Botanical Gardens is unsatisfactory.

5. The old pesticides store at the Japanese Communications Building also needs to be thoroughly cleaned out.

6. The old power barge represents an ever present threat of oil pollution and a considerable nuisance if it sinks.

7. The old power plant site may still be heavily polluted with oil.

8. The buried DDT at the old hospital is a matter of serious concern.

9. Stockpiles of used chemicals were identified in several possible locations, such as schools (advice only) and the main hospital. There is also a large stockpile of non-agricultural chemicals in the Botannical Gardens Store.

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Kosrae

1. Kosrae has 5 transformers with PCB contaminated oil at the Kosrae Power Station. There may, however, be some PCB positive transformers among the previously tested stockpile stored on the Power Station site and now partly buried by weeds.

2. There is about 50 kg of carbaryl pesticide located at the Kosrae Agricultural Store.

3. The total number of drums needed for Kosrae is therefore about 25, which will easily fit into a 20 ft container.

4. The poorly located and badly managed small dumps at Malem, Utwe, and Tafunsak need to be upgraded or closed.

5. A large quantity of pesticides and agricultural chemicals may have been dumped in an unknown location in Kosrae in the mid-eighties.

7. Actions

Yap

1. Confirm with the Yap Public Utility Company that the four transformers that tested positive with PCB contaminated oil are to be drained and flushed, and that some contaminated soil also needs to be collected.

2. Confirm with the Dept of Agriculture that these pesticides at the Yap Agricultural Research Station are definitely to be removed as part of the project. There may also be more pesticides that were not discovered in the recent visit.

3. Organise a central store for hazardous wastes urgently, in view of the fact that the State Supply Warehouse is about to be demolished. The waste chemicals stored in the State Supply Warehouse can then be relocated, together with the waste chemicals at the hospital, the waste chemicals stored at the Yap EPA, any school chemicals, and the 34 large old lead acid UPS batteries stored at the Communications Centre.

Chuuk

1. Confirm with the Chuuk Public Utility Corporation that the 3 large old transformers containing the PCB contaminated oil are to be drained and flushed, and that some contaminated soil also needs to be collected.

2. Arrange if possible for the relocation of the squatter families now living behind the PCB contaminated transformers, as the whole area must now be considered as

a potentially contaminated site. The area containing the transformers should then be cordoned off and access prevented, until the transformers can be removed. Warning signs should be erected around the cordoned off area.

3. Arrange for samples to be taken and sent for analysis, of the transformers on Tonoas Island that tested positive in field tests.

4. Establish whether or not the two containers of pesticide wastes at the Port (packed by the US EPA) will be removed by the US EPA. Furthermore, even if the US EPA eventually removes these two containers of packaged pesticides and contaminated debris, they now need to be monitored carefully until collection can be arranged. The Chuuk EPA should make sure the containers are properly labelled in English and Chuukese, as agreed with the US EPA. The Chuuk EPA holds the only keys to the two containers, and an EPA staff member should inspect the containers and their contents at least every month, to make sure everything is in order.

5. Note that it would be appropriate to do further testing to establish properly the full extent of the contamination by the old pesticide container behind the Post Office, the large bitumen contaminated area at the quarry, and the waste oil contamination at the Power Station. This work should all be done as soon as a suitable opportunity arises, which will probably be during the preparation of the National Implementation Plan (NIP) for the Stockholm Convention. Substantial funding is available from the GEF for the preparation of the NIP. More urgent action may, however, be needed for the pesticide contaminated site.

6. Note the very poor state of the Weno Refuse Dump and take temporary measures until a new site can be found. The management of the old site needs to be improved as much as possible, given the limited resources. The Chuuk EPA should initiate the preparation of a management plan that eventually obtains broad acceptance and action that everyone agrees to.

7. Find out about the chemicals at the Francis Xavier School. It was agreed that the science teacher would make an inventory of the surplus chemicals and advise Chuuk EPA.

Pohnpei

1. Confirm with relevant Government Authorities that the pesticides at the Botannical Gardens are to be removed as part of the project. There may also be more pesticides that were not discovered in the recent visit.

2. Consider finding a location for the pesticides and other waste chemicals now held at the Botannical Gardens (see letter in Appendix 3), as it may be quite a long time until the AMC comes to pick up the wastes. Alternatively, the existing store

should be made much more secure, and a fire warning / protection system installed.

3. Note that it would be appropriate to do further testing to establish properly the full extent of the contamination by waste oil at the old power station site. This should be done as soon as a suitable opportunity arises, which will probably be during the preparation of the National Implementation Plan (NIP) for the Stockholm Convention. Substantial funding is available from the GEF for the preparation of the NIP.

4. Note that the buried DDT near the site of the old hospital is a matter of serious concern, and it is important that all possible information is collected about this burial and the current status of the site. For instance, were the dumped DDT containers disturbed when the new road was built? It may be necessary to dig up this DDT and arrange for proper disposal. This could also be investigated during the preparation of the National Implementation Plan (NIP) for the Stockholm Convention.

5. Continue to safely stockpile used chemicals that are not to be picked up by the current AusAID project. It would be appropriate to find a suitable central locked storage area with proper shelving for these chemicals (not the Botannical Garden site), and also to ensure that proper segregation of incompatibles (e.g. acids and alkalis, oxidizers and reducers, acids and cyanides) is achieved.

6. Continue to monitor the current state and future fate of the old power barge, especially in relation to any oil stored on the barge

Kosrae

1. Confirm with the Kosrae Power Station that the five transformers with the PCB contaminated oil are to be drained and flushed.

2. Confirm with the Dept of Agriculture that the small quantity of pesticide found in Kosrae is definitely to be removed as part of the project. There may also be more pesticides that were not discovered in the recent visit.

3. At the Power Station, move Transformers #309, #310, and #311 into the Power Station on-site storage container. Transformers marked #100, #301, #86, #210, #120, #302, #50, #303, and #304 can all be moved out of the container.

4. Make an estimate of the remaining transformers to be tested, and advise the number to SPREP who will arrange for the required number of test kits to be sent to Kosrae. This advice is needed urgently. (As three of the transformers in the yard tested positive (albeit at less than 50 mg/kg) all the transformers in the yard

not tested as part of the recent visit should now be tested - or retested, as they were tested several years ago).

5. Investigate establishing transfer stations at each of the three small landfill locations (Malem, Utwe, and Tafunsak). The collected garbage could then be brought to the main landfill at Tofol, which is reasonably well operated and appears to have some spare capacity with room to expand. Perhaps some of the many spare steel bins at the old Pacific Tuna Industries site could be modified to use as transfer bins at each of the transfer stations. These bins could be kept under covered shelters, and transferred easily to Tofol when they are full.

6. Make every effort to establish whether in fact a large quantity of pesticides and agricultural chemicals were dumped in Kosrae in the mid-eighties, and if so then make every effort to discover where these wastes were dumped. It may be necessary dig them up and dispose of them properly. This could be investigated during the preparation of the National Implementation Plan (NIP) for the Stockholm Convention.

Federal Issues

1. Local management plans will need to be prepared for all local operations, including the determination of the location of the containers while the collection operations are going on. These plans will need to address such issues as local transportation arrangements, local contact focal point, and the best way of carrying out consultation with the public in each FSM state, on the local implementation of the project. These plans needs to be developed in conjunction with the AMC.

2. Local systems need to be put in place to ensure effective processing of the application from the AMC to export hazardous waste from FSM to Australia. This application will be lodged under the Waigani Convention. A SPREP workshop is planned for April this year to assist countries with these procedures, and a FSM representative should attend this workshop. (Financial assistance will be provided.)

3. Provide SPREP with appropriate responses to the BDW questions regarding Domestic Laws on Collection, Packaging, Transportation and Export of Hazardous Waste

Appendix 1

JOHN O'GRADY'S VISIT TO YAP FOR THE POPS IN PICS PROJECT

1. DETAILED TRAVEL REPORT

Saturday 29 June

Flew to Yap, FSM in evening.

Sunday 30 June

Met ***Abdon Martin, Pesticide and Hazardous Materials Officer for the Yap EPA***, who showed me around Yap in the morning.

Monday 1 July

Abdon Martam picked me up in the morning and we went directly to the Yap Power Station. We met and had a meeting with ***Steve Libmad, Superintendent of Power Distribution, Yap Public Services Corporation***. I explained to Steve and Abdon about the transformer testing. There were three main stockpiles of transformers, one at the back overlooking the landfill (Area A), one on the right hand side of the drive going in (Area B), and one on a separate piece of land just below the Power Station on the opposite side to the landfill (Area C).

We proceeded to test all 16 transformers in Area A, and also tested a very large old out-of-service 4000 kVA transformer by the live transformer compound. We also tested 6 drums containing transformer oil drained out of some of the transformers in Area B. All were negative except for a transformer containing about 400 litres of oil (our number 16), and a drum containing about 100 litres (#4). The large transformer unit was negative.

We also took the chance to visit and inspect the landfill. It was well located away from any houses and remote from the sea, although there was potential to contaminated groundwater. It was also well run and regularly covered. We had the chance to study the operation for almost a day while we tested the transformers, and a bulldozer was operating most of the day covering new material as it arrived, and shaping and compacting the landfill.

Tuesday 2 July

We spent all day testing transformers, moving on to Area B, where there were 55 transformers, mostly old and rusted. Some of these had been drained and the liquids placed in drums, which we had tested the previous day.

There were also 40 transformers stored here that were only about 2 years old, but had been caught in a warehouse fire. The warehouse was situated on the now vacant lot below the Power Station (Area C). These transformers were all badly burnt, and had no oil left in them. We concluded that as they were so new, they would not have had any PCBs in them, so we did not attempt to get soil samples or test for the products of PCB combustion (e.g. dioxins and furans).

Wednesday 3 July

We finished testing the transformers in Area B and the tests resulted in 7 more positive ones (# 35, 49, 57, 62, 63, 64, 65). These transformers were all quite small and of a similar size, with an average oil content of about 300 liters. Sixteen of the 55 transformers were empty or water filled.

We then moved on to Area C, where there were 44 more very old transformers. Again most of these were small and of a similar size, with again an average oil content of about 300 litres. There were, however, four large transformers, which were all badly rusted and filled with water. Seventeen others were also either empty or water-filled.

Thursday 4 July

We completed testing Area C transformers, and found in total four more positives (#73,74,103, 113). There were therefore 12 transformers that tested positive and one drum, with a total oil volume of about 3800 litres.

I then had a meeting with ***Leonard Tinug, Director of the Yap EPA***. We discussed the POPs project and also the US Mississinewa (at the request of Sefa Nawadra).

The US Mississinewa was a US ship sunk by the Japanese during WW2, within the lagoon at Ulithi. During a severe typhoon last year, it began to leak oil quite badly. Yap declared a state of emergency and the US Navy collected 26 drums of oil and sent them to Guam for reprocessing, thus solving the immediate problem. They then had to return to the US after the September 11 attacks, and never returned to finish the job, although they promised to do so. There is still apparently about 9 million gallons of oil to be removed, and this oil may come out at any time, to the extreme detriment of the lagoon, which is a very sensitive environment (turtle breeding etc), as well as an important food source for local people.

The US Navy has appointed a contractor to pump out the rest of the oil, and this contractor has visited Yap for an inspection. Yap State is becoming increasingly

frustrated, however, at the delays that are occurring, and recently the Yap Governor visited Washington to push for immediate action. The US Navy is insisting on an EIS being done, even though the Yap EPA has waived this requirement.

I suggested (based on Sefa's advice) that Yap EPA, through the Federal FSM Govt, could bring the matter up again at the SPREP Meeting in a couple of weeks time, where they would be very likely to receive strong support.

I also discussed with Leonard the new waste oil destruction facility operating in Yap. This is being run by ***Island Development Company***, which is owned by an American ***Mike Hauge*** who is married to a local Yap woman. This company has a combustion system that apparently destroys waste oil in the drums with no harmful emissions. The cost is $US80 per drum. Leonard Tinug had no details and had issued a conditional permit that could be withdrawn at any time. There is a waste oil disposal problem in Yap. The Power Station used to burn off waste oil until stopped by the Yap EPA, and now they store it. About 90 drums are stockpiled there at present, stored horizontally in a non-bunded area.

I then went with Abdon Martam firstly to inspect the waste bitumen at the old airport site. There were about 400 drums of old bitumen in a location near the airport, but hidden behind trees. Many of the drums had leaked and large pools of bitumen had accumulated on the site. This has the potential to contaminate nearby underground water supplies.

We then visited the old Coastguard Service site to inspect the oil contamination. There are still the concrete foundations in place for a small tank farm that once held diesel fuel. Tank bottom sludges had previously been emptied in this area when the tanks were removed by Micronesia Petroleum Co. There are few obvious signs of this contamination now, and there is probably no need to further regard this as a contaminated site.

We then inspected the chemicals stored at the State Supply Warehouse and discovered that the chemicals formerly stored at the Waab warehouse had been transferred there. The State supply warehouse now contains 26 drums of sulphonate purchased for hardening the soil as a base for road construction. There are also 18 x 200 litre drums of caustic soda beads, 7 smaller drums of solid caustic potash, and various other smaller amounts of mostly unknowns, although some small containers are marked as citronella oil.

We then inspected the pesticide store at the Yap Agricultural Research Station, and met ***Tamdad Sulog, the Chief of Agriculture***. This pesticide store is right at the bottom of the Station and the path is now overgrown, so access is difficult. Some of the pesticides have been packed in four drums, as part of a WHO training exercise in 1994. These drums are in good condition and a detailed WHO inventory exists, showing that the pesticides consist mainly of dithane, karathane, ortholide and sevin, with smaller quantities of several other ones. Of concern is the fact that there are also 118 kg of unknown powders. In addition to the WHO packaged pesticides, there are 6 boxes each

containing 20 ampoules of methyl bromide, and 50 x 4 kg packs of Furaden 3G (Carbofuran). There are also 10 x 25 kg bags of ferrous sulphate and 10 x 50 kg bags of an unknown fertilizer. The store is sound and not leaking, but is not secure, as access could easily be gained through a large open window at the back.

Friday 5 July

Went to the hospital and met ***Augustine Harong, Maintenance Supervisor***. We inspected the chemicals stored there. These consist of three cardboard boxes and a sealed metal trunk. The boxes contain a variety of salts (including mercuric salts), bacterial cultures, buffer solutions, and small amounts of organics (phenol, benzaldehyde, methanol). The metal trunk contains 3 gals of acetic acid, 2 gals of hydrochloric acid, 3 gals of sulfuric acid, and 1 gal of phosphoric acid.

We also inspected the new hospital incinerator, which was working well and was well maintained, except for a small leak around the stack, which needs to be fixed. It is 9 months old, and has a primary chamber about 1.4m high x 1.2 m wide x 0.8m wide. There is a small secondary burner prior to the stack. It is charged at the start of the cycle and not disturbed until the cycle finishes, which takes 1-2 hours, followed by an hour to cool down. It produces no black smoke and the only puzzle is the operating temperature, which, at 985^0F (529^0C), is too low to effectively destroy toxic gases. The unit is manufactured by Shenandoah Manufacturing Company, Harrisonburg, Virginia, USA, and is one the few successful Pacific Island medical incinerators I have seen.

I then had a meeting with ***John Sohlith, Chief of the Planning Division, Office of Planning and Budget***, regarding the POPs in PICs project and also the US Mississinewa. John Sohlith advised that they planned to close the State Supply warehouse soon and demolish the building. This means that a new central hazardous chemical / waste store will be urgently needed.

The Board of Education was reported to be storing about 100 kg of chemicals from the outer islands high school. We investigated and discovered that these chemicals had been dumped in the landfill.

At the request of the Communications Center, we inspected their stockpile of 34 large old lead acid UPS batteries. The UPS system at the center has been completely replaced, and the old batteries are now surplus to requirements.

The EPA had several boxes of chemicals that the hospital had left with them. These were stored in a semi-open area at the back of the EPA office, and were badly damaged by rain. Almost all the labels were missing, but it was assumed that the composition of these chemicals was approximately similar to those in the cardboard boxes stored at the hospital now (see above). (This could be an invalid assumption!) I purchased several large plastic garbage bins with lids, and, together with Abdon Martam, we packed the

chemicals safely, so that the Yap EPA could store them safely until a satisfactory solution was available.

Saturday 6 July

Went to the Yap High School in the morning and inspected a box of chemicals and biological specimens. There was nothing there that represented any real hazard to anyone.

2. ANALYTICAL RESULTS

Area A (At back overlooking landfill)

Two samples sent for analysis: #4 (drum), #16 (transformer).

Confirmed positive: none.

Area B (On RHS of drive entering site)

Seven samples sent for analysis: #35, #49, #57, #62, #63, #64, #65.

Confirmed positive:

#63 at concentration of 1410 mg/kg
#64 at concentration of 2090 mg/kg
#65 at concentration of 1240 mg/kg

Area C (Land below Power Station site)

Four samples sent for analysis: #73, #74, #103, #113.

Confirmed positive:

#74 at concentration of 92 mg/kg

3. RECOMMENDATIONS

1. The transformers that tested positive (63, 64, 65 and 74) should all be carefully opened and checked to see what the oil level is. If the transformer is partly full, any soils under the transformer should also be regarded as potentially contaminated, and should also be collected and kept. Then the transformers and any potentially contaminated soils should be shifted to a safe contained and covered storage location, to await final collection and disposal. Care should be

taken to avoid any skin contact with the contaminated oil or the potentially contaminated soil.

2. An estimate of the volume of oil in each transformer needs to be made, to assist the removal plan. This can be done by measuring the external dimensions and checking the oil level.

3. The waste oil destruction technology of the Island Development Company needs to be assessed properly. Mr Mike Hauge should be asked to provide a detailed description of the technology and equipment. John O'Grady would be pleased to assess the information he provides.

4. A central store for hazardous wastes is urgently needed, especially as the State Supply Warehouse is about to be demolished. The waste chemicals stored in the State Supply Warehouse can then be relocated.

5. The present location for storing the waste pesticides needs to be properly secured. Ideally these pesticides should be relocated to a more suitable location, which can be more easily accessed. If a suitable central hazardous waste store is found, then this would be the ideal place to relocate the waste pesticides.

6. The UPS batteries from the Communications Center should also be relocated to the new central hazardous waste store.

7. The hospital waste chemicals and the waste chemicals now stored at the back of the EPA should also be relocated to the new central hazardous waste store.

Appendix 2

JOHN O'GRADY'S VISIT TO CHUUK FOR THE POPS IN PICS PROJECT

1. DETAILED TRAVEL REPORT

Sunday 7 July

Travelled to Chuuk via Guam.

Monday 8 July

I went to the Chuuk EPA first thing in the morning, but because of the recent typhoon, Joe Konno, Chuuk EPA Director, was not there. I met EPA staff members ***Julita Albert, Elmud Yleizah, and Merry Ann Ludwig (student trainee)***. It took quite a while to arrange a rental car and contact the Chuuk Public Utility Company's Power Station representative, but we were finally ready to commence testing transformers by afternoon.

There were 45 transformers at the front of the power station or on the roof at the front and one drum of old transformer oil. All the transformers were small, each containing on average about 300 liters of oil. We managed to test 16 of these transformers plus the drum, by the end of the day, and all were negative. In addition, a further 9 transformers were found to be either empty or full of water, and 4 were labelled "certified PCB free".

Tuesday 9 July

Met ***Herbert Osawa, also of the Chuuk EPA***, and Elmud, Herbert and I continued to test transformers at the power station. We finally finished by noon, and by then had tested a further 10 transformers, mainly on the roof, and all were negative. Six other transformers were labelled "certified PCB free". We also found 4 large transformers at the back of the Power Station, bordering on to two makeshift squatter houses very close by. These transformers were all 333kVA Westinghouse units. One was completely empty and the other three each contained 550 kg of oil (probably about 610 litres). The three full units all tested positive (#46, 47, and 48). We took soil samples from around the base of the transformers, especially the empty one, to be analysed for PCB residues. We also put a large amount of limestone sand around the transformers, to cover up any possible contamination from spilled PCBs.

In the afternoon, we hunted for all the other missing transformers and finally found them. There were 83 at the Port, largely covered by long grass and stored in a very disorderly fashion. We also found 55 transformers stored at the Chuuk Sewage Treatment Plant

(STP). These were stored in three places at the plant, namely on the ground by the sea, on the roof of the plant, and on the roof of a small concrete shed.

I was also advised that there were about twenty transformers located on Tonoas Island that needed to be tested, so I left test kits and funds with Julita Albert (who lived on Tonoas Island) to carry out this testing. Julita carried out this testing with the assistance of Michelle Rogow of US EPA Region 9, and Michelle's two relevant site reports set out below. These site reports indicated that there were 20 transformers including two pole ones that recently came down with the typhoon. Of these twenty, a total of five were identified positive (greater than 50 ppm) at the Tonoas Power Plant, three positive at the High School, three positive at the Ice Plant (plus one that could not be opened) and one that was downed by the recent typhoon. Some evidence was also noted of leaks from the transformers that tested positive.

Wednesday 10 July

We began testing transformers at the STP, and also tried to get the transformers at the Port moved to the more controlled area at the STP.

In 1994, as part of a WHO training exercise, about 910 kg of pesticides (not including the weight of packaging), located in the Dept of Agriculture Pesticide Store Room, were repackaged in new containers (used drums and plastic bags) and placed back in the same store. About two years later, this store became part of the Campus of the College of Micronesia, and the pesticides (now in their new containers) were relocated to a new site behind the Post Office in the middle of a poor residential area. This site was leased by the Dept of Agriculture, from Fostino Antonio. The pesticides were placed in a container standing on the site. The site was kept locked but access into the site was not difficult. The door of the container was partly open, and some of the pesticides were left outside the door.

Numerous residential houses were very close to the container, and residents over the past few years have been complaining of headaches, rashes, nausea and various other symptoms. Some flooding over the years had also washed pesticides into the houses and contaminated their two wells (used for washing persons and clothes).

The pesticides in the container included karmex (diuron), orthocide (captan), parathion, terrachlor, dimethoate, methyl bromide, and dactal, plus numerous other ones in smaller qauantities. Many are persistent and most can have serious (or very serious) effects on humans.

Another issue was that the old pesticide storeroom (now part of the College of Micronesia) had not been properly cleaned and teachers and students still complained about it.

We inspected both the current pesticide storage site and the old pesticide storage site. It was clearly evident that there was a serious problem with the current site. There was a strong smell coming from the container, and a large area of grass around it had been killed off. Several residents approached us and complained and told us about the ill-health that the pesticides had cause. Much of the grass kill appeared recent, and it was evidently due to the flooding caused by the recent typhoon. We were told that flood debris had caused the waster to reach people's waists for a while and that certainly would have washed some pesticides out of the container.

The old pesticide storage area in the college was a shed now filled with old equipment. There was an unmistakable smell of pesticides coming from the shed, which was not strong, but still objectionable.

Thursday 11 July

We continued testing transformers at the STP. We also continued trying to get the transformers moved from the port to the STP, and were finally successful. We met ***Tos Nakayama, Director, Dept of Public Works***, and he agreed to provide a crane truck for us to relocate the transformers. We next met ***Karita, the Acting Chief Executive of the Chuuk Public Utility Company(CPUC)***, and she also consented to our relocating the tansformers. (The STP was under her control.)

Elmud and Herbert then spent the afternoon relocating the transformers.

We made the decision to attempt a cleanup (as best we could with limited resources) of the pesticides stored in the container, and also of the old storeroom in the College of Micronesia.

I went with Merry Ann to inspect the Weno garbage dump, as there was some thought we could relocate the pesticides here. It was out of the question though, as it was a very badly run facility. It was just open dumping in a large area near the sea, surrounded by residences close by. There were also quite a few scavengers roaming the surface of the dump.

We stopped at Mobil to see if they could provide us with any drums to repackage the pesticides. We met ***Charles Matam, Manager of the Chuuk Bulk Plant***, and he was sympathetic, but said that he didn't have many drums in the first place and all his drums were used for accepting returned waste oil. He said that the floating Dive Hotel "Thorfin" took quite a lot of waste oil. He also said that he was quite impressed with Mike Hauge's process from Yap. (Charles Matam was Yapese.)

We then went to the quarry where large amounts of old bitumen drums were stored. There was at least 1000 drums of bitumen stored here, many leaking and in bad condition. A large area was quite seriously contaminated with leaked bitumen.

Friday 12 July

The day was spent relocating the transformers to from the port to the STP, and testing transformers at the STP.

I also went to Francis Xavier School, and met Father Jim Grohgan, the Director. He showed us some surplus chemicals stored there. The science teacher was not there, but we agreed that the science teacher would make an inventory of the surplus chemicals and advise Chuuk EPA (Julita Albert).

I then purchased equipment and prepared for the pesticide cleanup, which was timed to start of Saturday.

Saturday 13 July

We worked all day on the pesticide cleanup work, together with Elmud, Herbert, Harry Ewan (from Environmental Health) and Merry Ann Ludwig.

We cleaned up the shed at the College of Micronesia first. This was where the pesticides were originally stored. We emptied out all the stored materials and old equipment, and thoroughly scrubbed the walls, floors and ceilings with Clorox. Then we replaced the equipment.

We then started on the cleanup of the container stored in the residential area behind the post office. We used PPE stored in the EPA Office, together with respirators and gloves purchased at the local store. We filled up 8 x 50 gallon containers with the pesticide wastes, which were severely water damaged and in a bad condition.

Monday 15 July

No more transformers could be transferred from the Port for now, as the US Federal Emergency Management Agency (FEMA) staff had arrived in force, to undertake remediation measures after the floods. They had taken control of the crane truck we were using. This meant 30 units were left at the Port that would have to be shifted later.

We completed testing of the transformers, including the 30 units still left at the Port. The results of the testing were as follows:

STP

Adjacent to the sea:

There were 17 units, of which 8 tested negative, 2 tested positive (230 and 232), 5 were already certified "PCB free" and 2 were either empty or full of water.

On roof of plant:

There were 19 units, of which 11 tested negative, 3 tested positive (201, 204, and 208), 2 were certified "PCB free" and 3 were either empty or full of water.

On roof of small shed:

There were 19 units, of which 13 tested negative, 2 tested positive (240 and 250), 3 were certified "PCB free" and 1 was empty.

Under trees in corner:

There were 53 units, of which 15 tested negative, 5 tested positive (51, 263, 267, 274, and 280), 1 was certified "PCB free" and 32 were either empty or full of water.

Still at the Port

There were 30 units, of which 10 tested negative and one tested positive (108). Ten were empty or full of water.

We also tested one transformer located on the road near the Truk Stop Hotel, and this tested negative.

Tuesday 16 July

We continued working on the pesticide cleanup in the morning, removing several plastic bags of materials. I also made email contact with ***Michelle Rogow, On-Scene Coordinator, US EPA Region 9***. Michelle was coming to Chuuk in two days as part of the FEMA cleanup team, to assess environmental impacts from the typhoon. We discussed the possibility of FEMA / US EPA assisting with the cleanup of the pesticides.

In the afternoon, I visited the hospital (with Elmud) to find out about the surplus chemicals stored there. Met ***Nachsa Siren, Director of Health Services (ph 330-2210)***, who gave us two boxes of old chemicals to take away "(mostly acids and salts, a few organics such as xylene, and some culture media). Nascha Siren also described in detail the problems with the water supply, sewage treatment plant, and garbage dump.

The water supply is mainly from underground sources, with some surface water. Past testing for faecal coliforms has indicated that it is sometimes heavily contaminated. No funding is currently available to carry out testing at present, even for chlorine residuals. Some parts of the supply were also damaged by the recent typhoon.

The sewage treatment plant has apparently never worked. It was built by the Americans in the 70's and always suffered from salt water intrusion problems. It ran "after a fashion" for a while and then stopped altogether. The STP now just acts as a pumping station into the lagoon.

The garbage dump is very poorly operated and badly located, as noted above. There have, however, been several attempts of relocate this dump with no success, because of the severe shortage of land in Weno.

Wednesday 17 July

We spent all day on the pesticide cleanup, including purchasing more equipment and obtaining some good strong plastic bags from Continental Micronesia. We entered the container several times in full protective clothing and filled up 18 bags.

Thursday 18 July

Assisted with an urgent request from Chuuk Public Utility Company (CPUC) regarding the environmental impact of an emergency power connection on Tonoas Island.

Michelle Rogow arrived that morning and we met with her and also ***Tom Fortuna of Ecology and Environment Inc (Environmental Coordinator to the US EPA)***, who had accompanied her as a technical assistant. We visited the pesticide site, and discussed numerous aspects of the cleanup.

We met ***Curtis Sos, Manager, Airport Division of the Dept of Transport*** (formerly with the Chuuk EPA), and Curtis agreed to provide free, a container and a location at the port, for the temporary storage of the pesticides.

I attended the FEMA briefing meeting in evening.

Friday 19 July

I attended the FEMA briefing again in the morning, and then visited a site where three transformers were downed by the typhoon. Two transformers were lying on the side and were empty and half buried. We tested the third transformer and found it less than 50 ppm. We also investigated the location of the well, relative to the downed transformers.

We revisited the pesticide site with Tom and then spent most of the afternoon with Curtis, selecting a suitable container. We then relocated it to a suitable place.

Saturday 20 July

I met Tom and Michelle for further discussions in the morning, regarding the pesticide cleanup. Later we also met with FEMA personnel. It seemed that there was a good chance of FEMA continuing the pesticide cleanup by bringing a US EPA cleanup team. They would clean the site up and package the pesticides and debris in containers to UN specifications. It was unlikely, however, that they would pay for the transport and disposal of the waste.

Sunday 21 July

I visited the pesticide site again with Michelle and Tom. We examined the impact of heavy rain that had just occurred, and also talked to nearby residents. It was clear that the pesticides had been the source of severe nuisances over a long period of time. Residents complained of numerous ailments and said that the recent flood had caused the pesticides to come into their dwellings. Their two wells used for washing and laundering clothes, had also been contaminated by the pesticides.

I later met Michelle at FEMA headquarters in evening, for further discussions.

Monday 22 July

I visited Michelle and Tom at FEMA headquarters and found out latest position. I was advised that a request was needed from the Vice President, FSM office to FEMA, via an "Action Request Form". Also FSM may have to pay 25% of the total cost. I agreed to follow this matter up as soon as I arrived in Pohnpei.

I then flew to Pohnpei later in the morning.

2. ANALYTICAL RESULTS

A total of 17 samples were sent for analysis: #46, #47, #48, #51, #108, #210, #204, #208, #230, #232, #240, #250, #263, #267, #274, #280, #301.

Confirmed positive:

#46 at concentration of 1170 mg/kg
#47 at concentration of 518 mg/kg
#48 at concentration of 321 mg/kg

These transformers are all at the back of the power station, and there are two squatter families located immediately behind. ***A composite soil sample was taken of the soil***

immediately around the transformers, and it was tested as having no detectable levels of PCBs. This sample was just a grab of a few surface locations however, and the real concern is that the empty transformer #45, which was in the same group, may have spilled its contents on the site a long time ago.

3. PESTICIDE CLEANUP

After John O'Grady left Chuuk, the US EPA team (funded by FEMA) were successful in cleaning up the pesticides and contaminated debris and placing all the materials in two containers that are now stored at the Port. A memo from Michelle Rogow of US EPA Region 9 to John O'Grady is set out below.

4. RECOMMENDATIONS

1. The transformers that tested positive (#46, #47, and #48) are all in the back of the power station yard. They are the large ones with the two squatter houses behind, as noted above, and it was observed that the squatters use the transformers to hang their laundry on to dry. The possibility of relocating the squatter families should now be investigated, as the whole area must now be considered as a potentially contaminated site. There should be some health legislation that can require them to be moved. The area containing the transformers should then be cordoned off and access prevented, until the transformers can be removed. Warning signs should be erected around the cordoned off area.

2. An estimate of the volume of oil in each transformer needs to be made, to assist the removal plan. This can be done by measuring the external dimensions and checking the oil level inside the transformers. A check of the oil level inside the transformers needs to be done also to determine the possibility of leakage from #46, #47 and #48. Care should be taken to avoid any skin contact with the contaminated oil or the potentially contaminated soil.

3. If it has not been done already, the remaining transformers located at the port should be relocated to the Sewage Treatment Plant.

4. The two containers of packaged pesticides and contaminated debris stored at the Port now need to be monitored carefully until collection can be arranged. The Chuuk EPA should make sure the containers are properly labelled in English and Chuukese, as agreed with the US EPA. The Chuuk EPA holds the only keys to the two containers, and an EPA staff member should inspect the containers and their contents at least every month, to make sure everything is in order. (John O'Grady will endeavor to secure funding to have the containers removed.)

5. The Tonoas transformers that tested positive (above 50 ppm) need to be sampled, and the samples couriered to John O'Grady at SPREP. (Funds were left for the cost of the courier.) Two samples need to be taken and one of each retained by Chuuk EPA for security, in case the courier parcel goes missing. Moses Pretrick of the Dept of HESA in the FSM Federal Government has sufficient sample containers given to him by John O'Grady and he is bringing these containers to Chuuk soon.

6. The issue of the chemicals at the Francis Xavier School needs to be followed up, with Fr Jim Grohgan.

7. The garbage dump on Weno is a serious environmental problem, and a new site needs to be found. Until a new site is found, the management of the old site needs to be improved as much as possible, given the limited resources. Could the Chuuk EPA initiate the preparation of a management plan that eventually obtains broad acceptance and action that everyone agrees to?

US EPA SITE REPORTS ON THE TONOAS ISLAND VISIT

8/7 EPA Sitrep

Transformer assessment:
Traveled to Tonoas with Chuuk EPA
- *Met with CPUC representatives
- *Conducted assessment of transformers at Tonoas Power Plant
  - -11 out of service transformers
    - 3 with no lids, filled with water on top of oil
      - 1 greater than 50ppm PCB
      - 2 less than 50pmm PCB (but detected)
    - 7 with lids, full of oil
      - 4 greater than 50 ppm PCB
      - 3 less than 50 ppm PCB (but detected)
    - 1 empty lying on ground
- *Assessed 4 transformers at High School ? transformer oil spilled out all over the area ? all spilled transformers PCB contaminated
  - 3 greater than 50 ppm PCB
  - 1 less than 50 ppm PCB

Did not have enough time and test kits to finish assessment. More transformers at high school and still need to finish power pole assessment around the island.

Recommend coordination with CPUC and Chuuk EPA regarding cover and protection of PCB contaminated transformers (especially those with no lids) until proper disposal can occur.

Michelle Rogow, P.E.
Emergency Response Section (SFD-9-2)
(415) 972- 3082 new phone
(415) 947-3518 new fax
rogow.michelle@epa.gov

8/11 Final on island Sitrep for ESF #10

Completed Tonoas Transformer Assessment on 8/9/02
- Ice plant had 3 transformers
  - 2 with no lids
    - 1 empty ? probably cracked and leaked onto ground
    - 1 full of water, less than 50 ppm PCB
    - 1 could not be opened
- Walked island
  - 2 additional transformers at bases of power poles
    - 1 less than 50 ppm PCB
    - 1 greater than 50 ppm PCB

Transformers are located in areas near residences or businesses. Releases from transformers need to be addressed. Transformers should be covered and properly disposed. Contaminated soils need to also be cleaned up.

Completed pesticide stabilization activities
- Completed restoration activities at the site
- Held closing meeting with Chuuk EPA
  - Chuuk EPA given keys to containers
  - Chuuk EPA to place signs on container the week of 8/12/02
- Conducted site and container inspections
- Photodocumented conditions and took GPS readings

Prepared preliminary report and cost summary for DFCO on transformers and pesticide stabilization. ESF #10 has received no additional mission assignments to continue activities on Chuuk. ESF #10 submitted request for demobilization on 8/11/02.

Michelle Rogow, P.E.
Emergency Response Section (SFD-9-2)
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US EPA MEMO ON THE PESTICIDE CLEANUP

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

MEMORANDUM

DATE: **August 23, 2002**

SUBJECT: Status Report for Weno Pesticide Site Chuuk State, FSM

FROM: **Michelle Rogow, P.E.**
USEPA Federal On-Scene Coordinator

TO: **John O'Grady**
SPREP POPs in PICs Project

As you are aware, as part of the disaster response to Typhoon Chata'an in Chuuk State, FSM, the US Federal Emergency Management Agency (FEMA) participated in the funding of emergency protective measures at the Weno Pesticide Site behind the Post Office. These emergency activities were conducted under the Stafford Act which provides for assistance in alleviating immediate threats to public health and safety, but it is limited to re-establishing pre-disaster conditions. FEMA is to be commended for their quick response and support in site stabilization. Unfortunately, due to its limited authorities, FEMA has denied FSM's request for assistance in the disposal of the stabilized materials. Also, the US Environmental Protection Agency (EPA) has no independent authorities which allow for assistance with the site cleanup. Although our agencies are unable to provide any additional financial assistance at this time, we are hopeful that your agency will be able to assist Chuuk and FSM in identifying funding for the disposal of this material. Please let us know if we can assist you further in this matter.

Below is a summary of the activities at the pesticide site, conducted as part of the FEMA Typhoon Chata'an Response. I have also included details regarding the containers and their contents in order to assess disposal alternatives. In addition, I have included a rough cost estimate, based on USEPAs costs to address the transportation and disposal of these materials.

Pesticide Project

Phase I and II – FEMA Assessment and Emergency Stabilization

FEMA tasked the US EPA to conduct the emergency stabilization. This work was conducted July 28, 2002 to August 11, 2002 and included air monitoring in and around the drums and trailer, an assessment and inventory of the materials in and around the trailer, and implementation of the most appropriate measures for stabilization of the site. Loose pesticides and pesticides in unstable/unsecure containers were packed into drums and over packs (DOT approved hazardous materials containers.) Visibly contaminated materials, such as wood and soil in the immediate area beneath and around the trailer were packaged to stabilize contamination. Post-excavation field sampling was conducted and sent to a Mainland laboratory for analysis. 14 - 55 gallon and 14 - 85 gallon drums of pesticides and 6 cubic yard boxes of pesticide contaminated soil and

debris were generated in stabilization activities. Drums and containers are labeled, with Chuuk EPA named as the generator, and stored in 2 shipping containers at the Weno Port. (This area is not a permitted storage and/or disposal facility for hazardous wastes in compliance with US laws and regulations.) Keys to the containers were provide to Chuuk EPA and Chuuk EPA was supposed to provide labeling for the containers in English and Chuukese.

Phase III – Transportation and Disposal

Currently, drums of pesticides and cubic yard boxes of soil and contaminated debris are being stored in 2 – 20 foot shipping containers. The shipping containers are locked and stored at the Weno Port awaiting proper disposal. Should no action be taken, shipping containers at the Port and the drums and boxes inside will deteriorate and may pose a risk of release into the environment. The containers are locked but in proximity to water and subject to the elements.

Work – Proposed work includes coordination, investigation of transportation/disposal alternatives and selection of transportation and disposal services. Packaging will need to be inspected for integrity prior to transportation for disposal. 55 gallon and 85 gallon drums, and soil/debris boxes need to be secured for transport within the containers. Drums and boxes need to be re-labeled with proper generator and disposal information. The sea containers need to be appropriately placarded for transport and disposal. The containers need to be transported off island to be properly treated, destroyed or disposed at an approved facility for disposal. Disposal certificates need to be obtained. A team will need to be mobilized to conduct on island work.

2 - 20' containers at the Weno Port. Container contents:

14	85 gallon	Waste Toxic Solids, Organic, N.O.S., Marine Pollutant, R.Q., 6.1, PGII (Endosulfan, Dimethoate) UN 2811, U 060, U061, U185, U244, U279, P044, P050, P051, P066, P205 [8400 pounds]
14	55 gallon	Waste Toxic Solids, Organic, N.O.S., Marine Pollutant, R.Q., 6.1, PGII (Endosulfan, Dimethoate) UN 2811, U 060, U061, U185, U244, U279, P044, P050, P051, P066, P205 [5600 pounds]
6	cubic yard	Waste Toxic Solids, Organic, N.O.S., Marine Pollutant, R.Q., 6.1, PGII (Endosulfan, Dimethoate) UN 2811, U 060, U061, U185, U244, U279, P044, P050, P051, P066, P205 [1200 pounds]

Schedule - This action could take at least three weeks to plan and up to 8 weeks to complete. Completion time will be based on the marine transportation schedule and disposal facility. This action will need to be bid and contracted for this waste stream.

Estimated Costs - Cost estimates are based upon existing rates for the USEPA Region 9 personnel and contracts with disposal of the material in the US Mainland. Cost estimates may have to be adjusted after potential bids for the removal are received, and/or if there is a substantial increase in material that requires attention.

Phase IIIERRS2 – Mobilization & response cleanup	$ 25,000
Transportation and disposal	$ 37,000EPA -
Project management, oversight, travel	$ 13,000
	$ 75,000

Phase IV – Long term site cleanup and restoration

Work – While gross contamination at the Site was addressed through stabilization activities. Contamination at the site may still exist. Soil and water sampling to determine extent of contamination. If necessary, the site should be cleaned up to established standards.

USEPA recommends that Chuuk EPA, the FSM Minister of Public Health and Environment and the South Pacific Regional Environmental Program (SPREP) work together on a solution for addressing the site investigation and cleanup. If requested, EPA may be able to provide technical support through our Pacific Insular Area Programs Office.

If you require any additional information or assistance, please do not hesitate to contact me via email <rogow.michelle@epa.gov> or call 011 (415) 972-3082.

Appendix 3

JOHN O'GRADY'S VISIT TO POHNPEI FOR THE POPS IN PICS PROJECT

1. DETAILED TRAVEL REPORT

Monday 22 July

I then flew to Pohnpei in the afternoon, and later had a preliminary meeting with ***Pohnpei EPA staff – Director Elden Hellan, Donna Scheuring, and Perez Ioanis***.

Tuesday 23 July

I visited the Federal Government offices, with Elden Hellan, and met ***Jeff Benjamin, Asst Secretary for Health Services, Dept of HESA, FSM Govt***. We discussed the Chuuk pesticide emergency and other matters.

I visited the Australian embassy and met ***Brendan Doran (Consul General Guam and CNMI)***. I briefed him about the POPs in PICs project, and what I had learnt so far about hazardous wastes in FSM.

I met ***Albert Roby, Pollution Control Division Manager, Pohnpei EPA***, and together we inspected the transformers at the power plant. We also visited Jack Adams site and met his son Larry Adams. We were shown 5 transformers, which we agreed to test. After some searching it was concluded that all the other Adams transformers (reported to be 26 originally) have gone to the landfill.

In the afternoon we visited (with Elden Hellan) the US Embassy and met ***Deborah Kingsland, Charge d'Affaires***, and ***Victor Hobson, US Dept of the Interior***. We discussed the POPs in PICs project and the Chuuk Pesticides.

We the returned to Dept of HESA and had a meeting with ***Dr Elliuel Pretrick, Secretary for Health Services***, and others, regarding the Chuuk Pesticides and the POPS in PICs project.

Wednesday 24 July

I went back to the Adams site with Perez Ioanis and tested the five transformers on the site. Three of these transformers were very difficult to get into and we needed to drill through the top of the casing. We learnt that all the other transformers that had been dumped in the landfill were reportedly empty. The location where these transformers were stored (and presumably leaked) has now been covered over with compacted hardfill, and used for truck access in the Adams yard.

We then visited the landfill and inspected the site and also about 15 stockpiled transformers. Perez was certain that all had been tested, and were negative. We then inspected the old power generation barge, which had on board, several transformers.

I then went back out to the Dept of HESA and met Jeff Benjamin, after waiting for him to return from a meeting with the Vice President, regarding the Chuuk Pesticides. He had a copy of the latest memo from Michelle Rogow, recommending a staged cleanup approach:

1. Temporary containment with a berm and cover with tarpaulin (they intended to do this anyway) – about $US5000.
2. Proper packaging in a container, ready for shipment. – about $135,000.
3. Removal of the container to the US Mainland for disposal – about $110,000.
4. Thorough cleanup of the contaminated soil. – no value stated.

In order to move to Stage 2, a letter was needed from the Governor of Chuuk to the Vice-President, asking for help. Then an "Action Request Form" (ARF) would be sent to FEMA via the US Embassy. FSM apparently had the funds to pay 25% of Stage 2 but not Stage 3 as well.

I then called up Michelle Rogow, to see if she could push the letter from the Governor of Chuuk.

Thursday 25 July

We started testing the transformers at the PUC Power Plant, with the assistance of Perez and his son Willy.

I went back out to the Dept of HESA, and had a further meeting with Jeff Benjamin and ***Marcus Samo, Non-Communicable Diseases Specialist***. We also reviewed and made suggested changes to draft letter from the Vice-President to the Governor of Chuuk, about the pesticide contamination.

In afternoon we (together with Elden Hellan) had a meeting with ***David Hawkins, Assistant GM, Dept of Transmission and Distribution, Pohnpei Utilities Corporation (Ph: 691/320-2374)***. We discussed the PCB testing, and David Hawkins was sure that we were unlikely to find any PCBs at all, as all his transformers were quite recent (less than 20 years old). We discussed the power barge and David Hawkins advised that that it was brought to Pohnpei in the 80's to solve a short-term power crisis. They had since tried to sell it without success, and he said that none of the generators probably now worked. They kept the power on it to keep the cathode protection alive and prevent corrosion. Otherwise the barge would probably corrode irretrievably and sink. David Hawkins agreed to turn the power off tomorrow, so we could test the transformers on the barge.

We then went to the pesticides and laboratory chemicals hazardous waste store near the Visitor's Centre. This store was nailed shut, however, and it proved quite difficult to get access. I was able to carry out a cursory inspection through the windows on either side, but it was agreed that I needed to get access and have a closer look before leaving Pohnpei.

Friday 26 July

Perez and Willy continued to test transformers and I went with Elden Hellan to inspect the contaminated sites reported in the SPREP Phase I Report. We looked at the following sites:

6. ***DDT Burial Site***. About 2 tonnes of DDT in 200 litre drums were buried at this site in the late 70's. Elden took part in this burial and was able to show me the exact location. It is at the site of the old Pohnpei hospital, near the old incinerator.

7. ***Former Power Plant***. The power plant operated on this site for about 25 years until the mid-eighties. It is now used as a private maintenance repair shop and for gas cylinder storage. We spoke to the manager of the site and he said that every time he dug into the site he found lots of oil contamination. We walked around the road downstream of the site and there was no evidence of oil contamination in the road drains. (It had been raining quite heavily.) Most of the easily leachable hydrocarbon had probably already left the site, however.

8. ***Landfill***. We paid another visit to the landfill, this time to look at the waste oil store. About 20 drums were stored in one location, which was also contaminated over quite a large area with spilt oil. We also looked at the stored batteries, which were in two locations. Several hundred batteries were stockpiled in deteriorating condition at the landfill.

9. ***Vehicle Maintenance Depot*** This site was operated by the Public Works Dept, and was in a clean and well-maintained condition. There had been previous reports of extensive oil contamination and poor housekeeping, but considerable efforts had apparently been made recently to clean up this site.

10. ***Asphalt Plant at Palikir.*** This plant is near the Federal Government Administrative Centre, and there are several locations where bitumen has been spilled. There are also numerous old rusty drums of asphalt accumulated around the site. The EPA has issued instructions to the company to clean up the site and has also imposed fines, which were never paid. I did not get a chance to visit two other smaller plants located at some distance from the main centre.

Later in the afternoon I went with Perez and Willy to test the transformers on the old power barge. We tested 6 transformers in total and all were negative. We were unable to test the three small pole transformers, as we did not have a ladder.

I called Victor Hobson at the US Embassy and Marcus Samo at the Dept of HESA, to update them on the Chuuk Pesticides.

Saturday 27 July

We finished testing the transformers at the PUC Power Plant. We tested 65 transformers in total. A further 6 were not tested because they were empty, and a further 8 old ones were not tested because Perez remembered clearly that they tested negative several years ago. In addition, there were 11 new ones that were not tested as they had just recently arrived. Only one transformer tested positive (#6).

In the afternoon, the pesticide and laboratory chemical hazardous waste store was opened, and I put on safety equipment and went in and inspected the store.

The Pohnpei EPA had no records on file of what had been placed in the store. Based on the SPREP Phase I report and Elden Hellan's recollections, however, it is likely that the following materials are in this hazardous waste store:

1. Pesticides originally in the store and repackaged as part of a WHO training exercise in 1993. These pesticides included DDT, Chlordane and strychnine. Total = 1500 kg.
2. Additional mixed chemicals in poor condition were added from various sources in 1999 and the pesticides were repackaged. Total additional chemicals = 800 kg.
3. Loose pesticides, including DDT, carbamates, and many unknowns, were shifted from the neighbouring former Japanese Communications Building in 1999, repackaged, and placed in the store. The quantity shifted amounted to 1000 kg.
4. Agricultural chemicals from the Pohnpei Agricultural Training School (PATS) were added recently (in 2000?). These included malathion and sevin, and amounted to about 200 kg.
5. Chemicals from the PICS school chemistry laboratory were shifted to the store recently (in 2000?). These chemicals amounted to 600 kg.

The total quantity stored in the hazardous waste store is therefore about 4930 kg (say 5 tonnes approximately.)

The location of this store is quite unsatisfactory, as it is right next to the Visitor's Centre in a Garden which is popular walking spot for tourists. There is quite a strong smell of pesticides coming from the store.

When I entered the store, I didn't disturb the stored materials very much, as the packaging was still in good condition. What I found was:

1. ***40 x 30 liter pails of mixed pesticides***. Labels on these pails identified: DDT, Terrachlor, chlorpyriphos, treflan, carbaryl, di-syston, sevin, ortholine, benlate, chlordane, strychnine, carbamate, malathion, dimethoate, diazanon, captan, algi-gon, dithane, and bravo. Some pails were also labeled unknown powder, floor sweepings, and rinse water.
2. 16 x 20 liter pails marked lab chemicals.
3. ***10 x 200 liter drums of unknown powdered and liquid pesticides.***
4. 1 x 200 liter drum of Mobil Argus 100/120 (oil?)
5. About 200 kg of bluestone (copper sulphate)
6. ***20 x 20 litre containers of karmex, manzate, bluestone (and others? – not all labels were clear).***
7. 3 boxes of small laboratory chemicals.
8. 4 empty (presumably contaminated) drums.
9. ***11 x 5 litre jars of unlabelled liquid pesticides.***
10. ***2 x 5 litre jars of kelthane.***

I also inspected the room in the old (and badly derelict) Japanese Communications Building where 1300 kg of the above materials were originally stored. This room still smells of pesticides, and needs to be decontaminated. There is quite a large pile of junk in this room.

Monday 29 July

Wrote a letter for Elden Hellan (see attached), regarding the serious situation presented by the pesticides and chemicals stored at the Botanical Gardens. Elden immediately took the letter to the Governor's Office. Later Elden told me that the Governor wanted to act immediately on one of the recommendations, namely that a fire protection system be put in place, or at least a fire warning system and a fire extinguisher.

I tried to get back to the hospital to inspect the stored expired drugs, but did not have time. I then sent the spare box of eighty test kits to Nauru, and caught the flight to Kosrae.

2. ANALYTICAL RESULTS

Only one transformer tested positive and that was #6. The oil sample from this transformer has now been analysed and confirmed as negative.

3. RECOMMENDATIONS

1. All transformers tested have been established as PCB free. David Hawkins of the Pohnpei Utilities Corporation did ask that we test oil in the blue plastic tank near the maintenance shop at the back of the Power Plant. This oil is all transformer oil. We did not test this oil and it should now be done. It would also be advisable to test the three pole transformers on the old power barge, although they are up high and access is difficult.

2. The current location of the pesticides / hazardous waste store in the botanical gardens is unsatisfactory and a new location should be found (see letter in Appendix 1). Alternatively, the existing store should be made much more secure, and a fire warning / protection system installed.

3. The old pesticides store at the Japanese Communications Building also needs to be thoroughly cleaned out and the walls, ceiling and floor washed down with Clorox. Disposal overalls, respirators and gloves should be worn throughout this exercise.

4. The buried DDT near the site of the old hospital is a matter of serious concern, and it is important that all possible information is collected about this burial and the current status of the site. For instance, when the new road was built, were the dumped DDT containers disturbed? It may be necessary to dig up this DDT and arrange for proper disposal.

5. The Pohnpei EPA should closely monitor the current state and future fate of the old power barge, especially in relation to any oil stored on the barge.

6. The Pohnpei EPA should continue to monitor the large quantities of waste oil that may be dumped under the site of the old power plant. It may be advisable to investigate drilling one or two monitoring bores.

LETTER TO POHNPEI EPA ABOUT PESTICIDES / HAZARDOUS CHEMICALS STORE

SPREP **PROE**

South Pacific Regional Environment Programme ***Programme régional océanien de l'environnement***

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E-mail: sprep@sprep.org.ws Website: http://www.sprep.org.ws/

Please use sprep@samoa.net if you encounter any problems with sprep@sprep.org.ws

AP 6/3/2

5 July, 2007

Pohnpei Environmental Protection Agency,
Pohnpei State Government,
Pohnpei,
Federated States of Micronesia

Attention: Mr Elden Hellan
Executive Director

Dear Mr Hellan,

Pohnpei Hazardous Waste Store

During my visit to Pohnpei to assess hazardous wastes for the AusAID / SPREP POPs project, I inspected the hazardous wastes store behind the Visitor's Bureau in the Botannical Gardens. This store contains over 4 tonnes of miscellaneous pesticides, as well as nearly one tonne of miscellaneous laboratory chemicals. These materials are well packed and contained, although there is still quite a strong odour of pesticides around the store, as several of the pesticides have a very low odour threshold.

The pesticides and chemicals stored there are quite safe for the moment, provided the store is kept well locked up, but it should be realized that many of the stored materials are very toxic and persistent. It would be a serious public health and environmental problem if an event occurred (such as a fire) to release these materials into the environment.

The store is not well suited for storing hazardous wastes, and is in an unfortunate location, near the Visitor's Bureau and in a location frequented by numerous tourists. It is also close to a recreational centre, and to the US Embassy and a popular hotel.

It is intended that the AusAID / SPREP project collects these materials in about one year's time, for disposal away from Pohnpei. In the meantime, however, it is most important that every measure is taken to keep these materials safe. The ideal situation would be to move them to a more secure and suitable location, although in itself, this move would have risks associated with it, due to potential accidents and possible release of hazardous materials during the relocation exercise. If necessary, I would be pleased to come to Pohnpei to supervise a relocation exercise, assuming a more suitable storage location can be found.

If the materials are retained in their present location until they can be moved, the storage shed should be more clearly marked with hazard warnings, and the window openings should be boarded up. The EPA should regularly and frequently inspect the site, and there should be an evacuation plan devised in the event of a sudden and unexpected release of these materials. It would also be advisable to position a fire hose near the store, as well as a smoke and flame detector alarm, so that a fire can be put out quickly.

Could I ask that you keep in touch with me on this issue? I would be pleased to provide you with any further advice, as it is potentially a matter of serious public health and environmental concern.

Yours truly,

John O'Grady
Project Coordinator
Persistent Organic Pollutants (POPs) Disposal
For Director

Appendix 4

JOHN O'GRADY'S VISIT TO KOSRAE FOR THE POPS IN PICS PROJECT

1. DETAILED TRAVEL REPORT

Monday 29 July

I arrived in Kosrae at about 3pm and was met by ***Simpson Abraham, Administrator for the Development Review Commission (DRC), Kosrae State Government***, and ***Moses Pretrick, Environmental Health Specialist, Department of Health, Education and Social Affairs, FSM Federal Government***. We all went to the DRC Offices and had a meeting regarding the POPs in PICs project and my visit. I also met the ***DRC Project Permits Officer Andy George***, who was to be my counterpart for my visit.

In the evening I had dinner with ***Moses Pretrick, Environmental Health Specialist, Dept of HESA, FSM***, who was visiting Kosrae on his way back to Pohnpei. We discussed all the issues arising from my overall visit to FSM.

Tuesday 30 July

I went with Moses Pretrick to meet ***Dr Hirosi Ismael, Director of Health Services***. Dr Ishmael described his concerns about solid waste management and waste mangement in general in Kosrae, and offered his assistance.

Met ***Timothy Timothy, Operations Manager for the Kosrae Utility Authority (KUA)***. He advised that they had tested a large number of the stockpiled transformers at the Power Station Site, and had found 11 "positives" which they placed in a container. He also said that they had a further 15 on site that they had not tested. We inspected all the stockpiled transformers and made a start on the testing, commencing with the 11 "positives" in the container. Access was difficult for some of these transformers. We then tested the 15 transformers that had not previously been tested.

Wednesday 31 July

We continued testing the transformers at the power station. We decided to test the ones that had previously been tested negative, although we did not have enough test kits to test all these transformers. We agreed that if some of the ones we tested were later confirmed as positive, I would send enough test kits later, to enable all the remaining stockpiled transformers to be retested.

In total we tested 72 transformers (8 of the kits were faulty out of the box of 80). Of the 11 that had previously tested positive, we tested six as positive with the test kits (#100, 210, 120, 302, 78, and 62). Of the other 61 that were tested, we found 13 positive with the test kits (#107, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316). All these transformers were quite small, and most were pole-type transformers. Typical oil volumes in these transformers were 300 – 400 litres.

Thursday 1 August

I toured the island with Andy George. We visited all the small landfills at Malem, Utwe and Tafunsak. These were just dumps, and were poorly located in water.

We visited the ***Vehicle Maintenance Depot*** and met ***Supervisor Thansley Kinere***. Thansley showed us around the Tofol landfill, which was quite well located up high and away from groundwater. It was behind the Power Plant. It was also being covered (not regularly) and was quite well maintained. There was, however, limited room for expansion. A large number of cars were piled up at the landfill. Also some attempt had been made to store old batteries, but unfortunately these had been piled up and covered by an overenthusiastic bulldozer operator.

Thansley showed us the waste oil storage container at the landfill. This took waste oil from the vehicle maintenance depot and also from several other generators including the two main contracting companies on the island, and private vehicle repair shops. The container was a large horizontal cylinder of about 100 tonnes capacity. It was about one-third full, and Tansley believed that at the current rate of filling, it would last for another one to two years before needing removal. Last time, the waste oil from the island had gone to Nauru.

Thansley also took us to the hospital where he showed us the incinerator he had constructed. It was being used for incineration of all their clinical wastes including expired drugs, and it appeared to be doing quite a good job – very simple construction.

We then met ***Cornelius Glasstine, Administrator, Crop Production, Dept of Agriculture, Land and Fisheries***. Cornelius advised that his department used malathion and benlate in small amounts, but otherwise did not use pesticides. He also advised that a large amount of pesticides and agricultural chemicals was dumped in the late eighties under the supervision of the Kosrae EPA, which has now been brought into the DRC. He said he had only heard about this dumping and did not know where it had all been dumped. He took us to the office where these pesticides were formerly stored, and it was now being used as an office. There was no sign of any pesticide odours remaining. He also took us to the current pesticide store. There was about 50 kg of surplus Sevin 80S carbaryl insecticide stored there, which would not be used.

We visited the site of Pacific Tuna Industries, which had now closed down, and noted that there were large numbers of steel bins that could be used for garbage collection on the island.

We inspected the Micronesia Oil Company Bulk Fuel Plant premises. These premises appeared to be tidy and well run, and there was no evidence of any oil spills.

We then had a debriefing meeting with Simpson Abraham and also returned to the KUA to debrief Timothy Timothy.

Friday 2 August

I had a final meeting with Moses Pretrick in the morning, reviewing work in FSM and making plans for the future.

I then sent by courier the "positive" oil samples from Pohnpei and Kosrae.

I then flew to Honolulu en route for Apia.

2. ANALYTICAL RESULTS

Transformers in Container

Six samples were sent for analysis: #62, #78, #100, #120, #210, #302

Two were confirmed positive:

#62 at concentration of 399 mg/kg
#78 at concentration of 443 mg/kg

Transformers in Yard

Thirteen samples were sent for analysis: #107, #305, #306, #307, #308, #308, #310, #311, #312, #313, #314, #315, #316

Three were confirmed as positive, although the levels detected were below 50 mg/kg:

#309 at concentration of 21 mg/kg
#310 at concentration of 27 mg/kg
#311 at concentration of 23 mg/kg

3. RECOMMENDATIONS

1. The transformers that tested positive (62, 78, 309, 310 and 311) should all be carefully opened and checked to see what the oil level is. Care should be taken to avoid any skin contact with the contaminated oil. Then an estimate of the volume of oil in each transformer needs to be made, to assist the removal plan. This can be done by measuring the external dimensions and checking the oil level.

2. Transformers #309, #310, and #311 should be moved into the container. Transformers marked #100, #301, #86, #210, #120, #302, #50, #303, and #304 can all be moved out of the container.

3. As three of the transformers in the yard tested positive (albeit at less than 50 mg/kg) all the transformers in the yard not tested as part of John O'Grady's visit should now be tested (or retested, as they were tested several years ago). An estimate should be made of the remaining transformers to be tested, and the number advised to John O'Grady, who will arrange for the required number of test kits to be sent to Kosrae.

4. The poorly located and badly managed small dumps at Malem, Utwe, and Tafunsak need to be upgraded or closed. One solution would be to set up transfer stations at each of the three locations, and the garbage collected, could then be brought to the main landfill at Tofol, which is reasonably well operated and appears to have some spare capacity with room to expand. Perhaps some of the many spare steel bins at the old Pacific Tuna Industries site could be modified to use as transfer bins at each of the transfer stations. These bins could be kept under covered shelters, and transferred easily to Tofol when they are full.

5. Every effort should be made to establish whether in fact a large quantity of pesticides and agricultural chemicals were dumped in Kosrae in the mid-eighties, and if so then every effort should be made to discover where these wastes were dumped. It may be necessary dig them up and dispose of them properly.

6. The unwanted and deteriorating Sevin 80S currently stored in the pesticide store should be packed in secure containers and kept locked away until it can be collected.