

SPREP

South Pacific Regional
Environment Programme



PROE

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Solomon Islands 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.

The Solomon Islands 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 the Solomon Islands, 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. A copy of the Solomon Islands visit report is contained in Appendix 1 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.)

The Solomon Islands has no **PCB Contaminated Oils** in stockpiled transformers. All stockpiled transformers were tested with Dexsil Chlor-N-Oil 50 test kits and five tested positive out of 16 transformers (all stockpiled at Honiara except for one at Gizo). The Dexsil kits test for all chlorine and not just chlorine in PCBs, so they are susceptible to "false positive" results. All five transformers were later confirmed as negative by Hills Laboratories in New Zealand.

The Solomon Islands has the following **Pesticides** to be collected:

Location	Pesticide	Active Agent	Quantity	Comments
			Kg	
Tulagi Agriculture Office	Carbaryl 80 WP	Carbaryl	2	
	Orthene		7	
	Applaud 25W	250g/kg Buprofezin	15	
	Target		1.4	Liquid
Tulagi Malaria Shed	ICON 10WP		30	Expired in 2000
	Empty DDT boxes & Packets		20	
Auki Malaria Shed	Abate 500 E		60	Liquid
	Abate 500 E		75	Granules
	DDT 75% WDP		577.5	16 x 35kg boxes & 1 half filled. (May be used)
Buala Malaria Shed	Permaqua		21	Used only during malaria outbreaks
	ICON 10WP		13	
	DDT 75% WDP		230	May be used
	Bacillus Thuringiensis		20	New stock, Larvicide
	Emulsion	25% DDT	40	Liquid
	Permethrin		12	New stock
MHMS (Shed 2)	ICON 10WP		241	Probably to be used
Forestry room Honiara	Arsenic Pentioxide		150	
Metazona shed	Mocap	Ethoprophos	320	16 sacks in very corroded drums, some spillage
	Rice Saturn	Thiobencarb	180	One badly corroded drum, contents spilled
	Saturn D	Thiobencarb	540	3 badly corroded drums, contents spilled
	Zinc Chelate	Zinc Chelate	180	One badly corroded drum, contents spilled
	Stam F-34	Propanil	4860	27 badly corroded drums, most spilled
	Unknown liquids		1440	8 badly corroded drums, most spilled
Forestry Munda	Spin	50% Carbendazim	1.5	
	Unknown		45	Liquid
	Alcohol		25	Liquid
	Orthene		25	
	Unknown		0.5	Liquid
	Gramoxone		5	Liquid
	Unknown		4	Liquid
	Diuron		5	Liquid
	Shell Azodrin 400		5	Liquid
	Ammate		10	Liquid
	Flowable Primatol	50% Ametryn	5	Liquid
	Unknown		5	Liquid

	Ortho Dibrom 8		14	Liquid
	PP993 10%		1	Liquid
	Blitzem	20% Methyaldehyde	0.6	
	Phymone	20% NAA	15	Liquid
	Formol	40% Formaldehyde	5	Liquid
	Root dip		20	
	Seradix		75.6	
	Cobox		50	
	Benlate		25	
	Unknown		60	Liquid
Gizo	ICON 10WP		9.25	For current use
	Bacillus Turengensis (BTI)		20	For current use
	Permethrin 50% EC		12	For current use
	Aqua Resigen		21	For current use
Fisheries Bait fish Lab.	Rotenone		60	
RIPEL Chemical Storage shed	Nuvacron 400		180	Liquid
	Actellic		4	Liquid
	Unknown		4	Liquid
	Unknown		30	
RIPEL General Store	Nilverm		15	Liquid, dewormer
	DMS		1	Liquid
	Perfelethion	Organo-phosphate	10	Liquid
Kirakira Agriculture Store	Gramoxone		4	Liquid
	Carbaryl		5	
	Orthene		7	
	Garden Master		10	
	Applaud 25WP	250g/kg Buprofezin	15	
Kirakira Malaria Store	Permaqua		30	May not be used because of fog machine failure
	Permethrin		17	For current use
	ICON 10WP		18.5	For current use

3. Other Project Work

A visit was made to the *Solomon Islands Broadcasting Corporation (SIBC)* transmitter site, where two 200 litre drums of numerous small to medium capacitors (of different made and kind) were located. The capacitors were sealed, but sufficient oil was obtained from two of them to enable a field PCB test to be carried out, and in both cases the result

was positive. It would be prudent to consider these capacitors as PCB-filled, and remove them to Brisbane for destruction.

One of the pesticides inspections was to look at previously reported stores of DDT found in the first phase of the POPs project, in the Rural Water Supply Shed and the other Hardware Shed 2 (both sheds belonging to the Ministry of Health & Medical Services, MHMS). It was found that these storage sheds no longer contained DDT as it had all been used for Malaria control, with the exception of the leaking drums of liquid DDT at the eastern end of the Hardware Shed 2, which had been dumped at the Landfill. There was only one rusting empty drum still beside the Hardware Shed 2. The only chemical found was 26 drums of ICON 10WP, which will probably be used. Two composite soil samples and a plant sample were collected within the compound of the Hardware shed 2. They were all sent by courier for DDT analysis, but only one soil sample arrived at the laboratory. The results of the analysis of the one sample that arrived revealed quite high levels of DDT isomers and breakdown products as follows:

mg/kg dry weight

<i>2,4'-DDD</i>	<i>8.2</i>
<i>2,4'-DDE</i>	<i>0.3</i>
<i>2,4'-DDT</i>	<i>164</i>
<i>4,4'-DDD</i>	<i>60.5</i>
<i>4,4'-DDE</i>	<i>7.6</i>
<i>4,4'-DDT</i>	<i>1390</i>

This analysed soil sample was taken as a composite from quite a wide area on the right hand side of the shed, looking at the shed, and near the front end (entrance) of the shed.

It is unfortunate that the other two samples were lost, but the above results give sufficient justification to carry out further sampling and analyses, and to treat the site as a contaminated site.

A visit was made to the ***Geology Laboratory***, where a large amount of chemicals are stored in bad condition. The storeroom was poorly ventilated and had no power, and strong fumes of chemicals could be detected even before the door was opened. A large variety of chemicals including salts, acids and alkalis, oxidizers and reducers, were stored in the room with many not labeled or properly shelved. A major concern was the close storage of incompatible chemicals, which could produce disastrous results if they come into contact. As an example, acids were stored close to cyanides and sulphides and thus a release of highly toxic gases (hydrogen cyanide and hydrogen sulphide) could easily occur. Some work was done on making these chemicals safe, subsequent to the recent visit, but quite a lot more needs to be done.

A visit was made to the ***pesticide storage shed in the Metapona Plains***, east of Honiara. This was the site of a large rice-growing project that was not continued after a cyclone in the 1980's caused severe damage to the area. A repackaging exercise for these pesticides

had been carried out several years ago, but was largely a waste of time, as now the portion of the shed containing the repackaged pesticides was without a roof, and the door was missing. The repackaged pesticides had thus been exposed to the sun and rain for a long time, thus contributing to the rapid deterioration of the steel drums used for repackaging. Runoff from the shed had formed a pool on the cement pavement. The shed was filled with a strong chemical stench.

A total of 45 drums (200 litres) were scattered on the floor with 11 being full of the repackaged chemicals whilst 24 were empty. All drums showed severe corrosion and the empty ones have had all their contents spilled on to the floor. The pesticides still remaining in the drums were also in a bad state. About 10 bags labeled as Mocap lay burst and exposed on the wooden pallets. The sludge on the floor was murky, thick and "blackish" and it drained to form a large pool outside the shed. There was quite a large number of pallets that had been brought in as part of the last repackaging exercise and these pallets were now in a mess and contaminated with pesticides.

A visit was made to the Medical Laboratory at the *Number 9 Central Hospital*, where the chemical storeroom, is holding over 180 different types of unwanted chemicals including 5.5 litres of picric acid. The storeroom was over crowded and the chemicals were not segregated. The picric acid represents an explosion danger and should be destroyed. The stockpile of chemicals arose from the shift to automated systems of analysis, which utilized ready-made reagents, that are bought from overseas. Some plans are under way to utilize the chemicals elsewhere in the provincial hospitals but that is quite unlikely to happen because of the lack of resources in the provincial hospitals.

Stockpiles of other hazardous wastes besides POPs and pesticides were also investigated, apart from the stockpile at the geology laboratory and the Honiara central hospital mentioned above. There are large stockpiles held at several schools, and some chemicals are also held at the Fisheries Bait fish laboratory.

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 the Solomon Islands (as well as all other participating countries) the following information:

- a) What are the legal responsibilities in the Solomon Islands for persons involved in collection, packaging, transportation and disposal of hazardous wastes and who are those responsibilities allocated to by the laws in the Solomon Islands.
- b) Who is the owner of the hazardous wastes in the Solomon Islands.

- c) Does the Solomon Islands 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 the Solomon Islands have a domestic policy in relation to providing or withholding consent under the prior informed consent provisions of the Waigani Convention (Article 6) for:
- the Solomon Islands
 - any other Pacific Island Countries planning to 'transit' wastes through the Solomon Islands.
- e) Has the Solomon Islands 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

Although there are no PCB filled transformers in the Solomon Islands, there are two 200 litre drums (filled to overflowing) of capacitors at the SIBC transmitting site, locked securely in a well-constructed shed. Field test kits of two leaking capacitors gave a positive result for PCBs but these tests were not able to be confirmed. There is a reasonable chance that these capacitors may contain PCBs, given their age and the positive indications revealed by the field tests, so they should be collected, especially as PCB liquids in capacitors are often 100% PCB. (Allow 4 drums.)

The visit to Tulagi revealed a small amount of pesticides, in total approximately 75 kg, including some empty DDT packet and boxes that contain some residual DDT. Some of

this material was stored at the agriculture office, which was unsatisfactory, and the rest was stored in a secure malaria storage shed. (These pesticides will fit into three 200 litre drums, allowing for packaging.)

There are quite large amounts of DDT at the Auki (Malaita) malaria shed, i.e. about 578 kg, but it may still be used, although this is unlikely as there were no funds available for its application. This shed also has about 135 kg of Abate 500E in both liquid and granule form, and this material had expired. The storage shed was secure. (Allow 8 drums, provided all these pesticides are to be abandoned.)

At Buala, Santa Isabel, there were about 336 kg of various anti-malaria pesticides stored in the malaria shed, but no DDT. This shed was locked but still not very secure. (Allow 5 drums.)

The MHMS Shed 2 at Honiara was a large locked shed that contained about 241 kg of ICON 10WP. In the Phase 1 work, about 5500 kg of DDT was identified as being stored there but it had all been used. It was likely that all the ICON 10WP would also be used. Soil samples adjacent to this shed revealed quite serious DDT contamination, and it would be appropriate to do further testing to establish properly the full extent of the contamination. (Allow 3 drums, provided the ICON10WP is not going to be reused.)

The Forestry Room at Honiara contains 150 kg of arsenic pentoxide, although there is some doubt whether this inorganic metallic waste will be able to be dealt with as part of this project. This material is in 3 x 50 kg containers and could just be placed in 3 drums provided this material is to be taken as part of the project.

The visit to Metapona Plains revealed that the earlier efforts at repackaging this waste had been largely wasted, as both the roof and the door were missing from the shed, and the damage to the stored pesticide was extensive, resulting in a large area around the shed being contaminated. Apart from the contaminated soil and the contaminated pool on the concrete in front of the shed, there is approximately 7520 kg of pesticides sitting in the open shed. There is also a pesticide sludge coating on the floor, and numerous contaminated pallets. The amount of drums will depend on how much of the contaminated debris, sludge and soil is going to be taken. It would be appropriate at least, to collect for disposal the sludge on the floor of the open shed, and probably all the contaminated pellets as well, and these pallets would then need to be cut up to fit into drums. It may also be necessary to cut up at least some of the contaminated rusted drums for removal, and place in new drums. Therefore at least 80 drums would be needed, and maybe quite a lot more, if it is decided to remove some of the adjacent contaminated soil, and the sludge on the concrete in front of the shed.

The Forestry shed at Munda is locked and in good order. It contains numerous pesticides in small quantities, amounting to a total of approximately 402 kg. (Allow 6 drums.)

There are approximately 62 kg of pesticides (anti-malaria) stored in a locked shed in Gizo, but it is likely that these will all be used. (Allow 2 drums if these chemicals are not going to be reused.)

There is one container at the Fisheries Bait Fish Laboratory Honiara, containing 60 kg of rotenone. (Allow one drum.)

At the Russell Islands (RIPEL) Chemical Storage Shed, there is about 280 kg of pesticides stored (no DDT but some unknowns), and at the General Store there is a further 26 kg of unwanted pesticides. The Chemical Storage Shed is secure but the chemicals at the General Store are on shelves in the store. (Allow 6 drums.)

At Kirakira, Makira, there is about 41 kg of pesticides kept in the Agriculture Store and a further 66 kg approximately, kept in the Malaria Store. Both these stores are in sound condition and are secure. The pesticides in the Malaria Store will probably be used for malaria control, except for about 30 kg of permaqua, which needs a fogging machine that has broken down. (Allow 4 drums.)

The total number of drums needed is therefore at least 125 drums, depending on the amount of contaminated soil and debris removed from Metapona Plains. A total of 80 drums will fit inside a 20 ft container, so two 20 ft containers should be sufficient. This would allow an extra 55 drums for any additional contaminated soil and debris from Metapona Plains.

A staging location will be needed for the containers, and possibly a good location would be at the MHMS Shed 2 at Ranadi, Honiara, provided the cooperation of the MHMS can be secured. It is a large covered largely empty shed, and some material may have to be picked up there.

The local transport of the drums to the container staging area needs to be on safe covered trucks with good containment. About 29 drums will come from islands outside Guadalcanal, and the sea transport on the ferries of these drums will need to be discussed with local shipping companies.

Once the containers are securely packed and all the paperwork is completed, the containers will be transported from the staging area to the Port for shipment.

It is also important that consent procedures are in place to process the application from GHD to the Solomon Islands to export the waste. The Solomon Islands 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 Solomon Islands should be minimal, provided everything is organized and implemented according to a well-designed management plan. The local transport routes and movement times will be part of the plan, 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 plan 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.

The chemicals stored in a dangerous condition at the Geology Laboratory are a serious risk to public health, and should be tidied up, segregated and stored on an urgent basis. Chemical reactions may cause fires or the release of toxic gases. The picric acid at the hospital is of even more concern, because of the risk of explosion, which may occur even when the picric acid containers are picked up. The staff and visitors to the hospital are therefore being exposed to a serious hazard and the picric acid should be removed by Solomon Islands explosives experts and exploded in a remote location.

6. Conclusions

1. The Solomon Islands has no PCB contaminated transformers, but it does have two 200 litre drums full of capacitors suspected of containing PCBs.
2. The following quantities of pesticides are to be picked up from various locations in The Solomon Islands:

a. Tulagi	75 kg
b. Auki, Malaita	713 kg
c. Buala, Santa Isabel	336 kg
d. MHMS, Honiara	241 kg
e. Forestry Room, Honiara	150 kg
f. Metapona Plains	7520 kg
g. Munda Forestry	402 kg
h. Gizo	63 kg
i. Fisheries Lab, Honiara	60 kg
j. RIPEL	306 kg
k. Kirakira, Makira	107 kg

This gives a total of 9,973 kg pesticides to be picked up from The Solomon Islands, although the 150 kg of arsenic pentoxide from the Forestry Room at Honiara may not be able to be picked up as part of this project.

3. The pesticides shed at Metapona Plains is open and badly affected by the weather, with badly rusted drums, contaminated pallets, pesticide sludge on the floor and surrounding concrete, and contaminated soil. It is likely that much more than the contained pesticides needs to be removed, and this needs to be assessed carefully when the AMC do their first inspection visit.
4. A minimum of 125 drums will be required for the Solomon Islands and possibly more, depending on how much contaminated debris, sludge and soil is removed

from the Metapona Plains storage shed. It is expected that two containers should be sufficient.

5. The Solomon Islands also has a DDT contaminated site around the MHMS shed at Ranadi, Honiara, and this needs to be assessed further and probably remediated.
6. Stockpiles of other used chemicals were identified in several locations, such as schools, laboratories and the main hospital. There are serious issues with the Geology Lab (untidy, crowded, and incompatibles in close proximity) and the main hospital laboratory (picric acid) that need to be sorted out urgently.

7. Actions

1. The pesticides for collection need to be isolated and secured. It needs to be confirmed with the owners / managers that these pesticides are definitely to be removed as part of the project.
2. A local management plan will need to be prepared for all local operations, including the determination of the location of the container while the collection operations are going on. This plan will need to address such issues as local transportation arrangements, local contact focal point, and the best way of carrying out consultation with the Solomon Islands public on the local implementation of the project. This plan needs to be developed in conjunction with the AMC.
3. Local systems need to be put in place to ensure effective processing of the application from the AMC to export hazardous waste from the Solomon Islands 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 Solomon Islands representative should attend this workshop. (Financial assistance will be provided.)
4. Advise the relevant Agriculture Dept and MHMS offices of the results of the inventories and also the result of the DDT analyses at the MHMS Store at Ranadi.
5. Note that it would be appropriate to do further testing to establish properly the full extent of the contamination by DDT at the MHMS Store at Ranadi. 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.
6. Note the contaminated site problem that exists at Metapona Plains and ensure that discussions are held with the AMC during their initial inspection trip, to work out an action plan for remediating as much of the site as possible, within the bounds of the current project.

7. Establish with AusAID and the AMC whether the arsenic pentoxide stored at the Forestry Room at Honiara will be able to be dealt with as part of this project. If not, it will need to be stored safely until suitable disposal can be arranged. Stabilisation with cement, followed by local disposal may be the only option available.
8. 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, and also to ensure that proper segregation of incompatibles (e.g. acids and alkalis, oxidizers and reducers, acids and cyanides) is achieved. This is especially important at the Geology Laboratory, where a real danger exists, of possible fire or release of toxic gases, because of the close proximity of incompatible chemicals.
9. Ensure the picric acid at the main Honiara hospital is destroyed by Solomon Islands explosives experts.
10. Provide SPREP with appropriate responses to the BDW questions regarding Domestic Laws on Collection, Packaging, Transportation and Export of Hazardous Waste

Appendix 1

REPORT OF THE VISIT OF JOHN O'GRADY (SPREP) TO THE SOLOMON ISLANDS FOR THE POPS PROJECT

(Melchior Mataki was at that time a resident in the Solomon Islands and he also took part in this visit. He made some preparatory visits in the Solomon Islands as follows, during the period 21 to 29 October 2002, prior to the arrival of John O'Grady.)

Monday 21 October

The Inter Island vessel travels between Tulagi and Honiara three times in a week and Melchior went across to Tulagi on Monday afternoon. On his arrival he paid courtesy visits to the *Provincial Secretary (Mr. Benjamin Newyear)* and the *Provincial Premier (Hon. Mark Kemakeza)* and gave both of them the introductory letters from the Department of Environment and Conservation (DEC). He used the rest of the evening to brief them about the Project and importance of this Project as an opportunity to safely dispose of any obsolete chemicals that may be held in Tulagi.

Tuesday 22 October

Melchior met with *Mr. Edward Hori (Principal Field Officer: Agriculture)* and he advised that their chemical storage room was located in an office block. He said that in general, not a lot of chemicals are used by the farmers apart from those that have been brought through the Republic of China's (Taiwan) Rice Project. The chemicals are distributed for free to farmers and in small quantities (see the attached inventory for details). Melchior told them that it is not a good idea to have offices in the same building as a chemical storeroom.

Edward Hori advised that a number of farmers who have been planting rice (mainly for consumption) for a few years to date have found insects to be resistant to Orthene and thus the Taiwanese Rice Project Officers in Honiara have sent over another insecticide (Applaud 25W). He suggested a visit the Taiwanese Rice Project Officers in Honiara to check for any expired chemicals in their Bulk store.

Melchior then went to the Malaria Office and was met by *Mr. Basil Maefane (Senior Malaria Officer)* and *Mr. Martin Poropaena (Field Officer Malaria)*. The storage shed was then inspected. This storage shed was also used for the treatment (with Pymethrin) of bed nets. There was no old or current stock of DDT as it was not sent over from Honiara, however, there were 6 empty cartons of DDT containing plastic bags used to store 1kg packs of DDT. They have another insecticide, ICON 10 WP that was recently sent over from Honiara but on inspection it was found that the above chemical had already expired in 2000. It follows from this that the Malaria Research Institute will have to be questioned over the storage of expired ICON 10 WP in their facilities.

Thursday 24 October

Melchior flew into Auki, Malaita, very early on Thursday with **Mr. Tia Masolo (Environment Officer, DEC)**. On our way to the Provincial Head Quarters, **Dr. Judson Leafasia (Director Health & Medical Services, Malaita Province)** met them and took them to the Provincial Secretary and presented the introductory letter from DEC. However, the Provincial Secretary advised that they were quite busy with some Provincial matters but suggested visits to the relevant Provincial Departments. Dr Judson volunteered to join the visits and provided his department's vehicle for use in Auki.

A visit was made to the Auki Malaria Storage Shed, assisted by **Mr. Leslie Wai (Anti-Malaria Field Officer)**. They had stockpiles of Abate 500E and DDT, both of which could not be used. Firstly the Abate 500E had expired and DDT could not be used because of the lack of funds to finance its application. Dr Judson said that it is very likely that the stored DDT will not be used within the next year or so, as such, should be disposed of by the POPs project. Furthermore, the DDT did not have any information on the packets about shelf life. Dr Judson also said that another insecticide used against Mosquitoes (ICON 10 WP) had been used around the Province to stun fauna in rivers and streams.

Melchior and Tia met with **Mr. Victor Kaihou (Principal Field Officer, Agriculture)** and he showed them their storage shed, which did not hold excess chemicals apart from a few packets of Orthene. According to him, no other chemicals are stored in their other Field Stations apart from small quantities of Orthene held at Rohinari and Afio for rice farmers. From discussions, it became apparent that Agriculture chemicals have not been used for a long time till the commencement of the Taiwanese Rice Project in the mid 1990s.

Melchior and Tia visited the Kilufii hospital (Provincial Referral hospital) with the assistance from Dr. Judson. They visited all the departments that use chemicals including their medical stores and found no stockpiles of expired chemicals. However, at the X-Ray Department, they found that wastes (Silver contaminated) from the X-Ray film developer were not collected but piped directly to the drainage system. The officers from this Department were aware that the wastes should be collected and stored for appropriate disposal.

At the SIEA Power Station, Melchior and Tia met **Mr. Bentley Samuel (Station Superintendent)** and he showed them around their facilities. He told us that their Transformer Section did all transformer repairs and oil changes on site and the transformer oils are collected and sold to the public for use in chainsaws and other machines. There was evidence of waste fuel and oil with in their premises and according to Mr. Bentley, during rainy days, the waste fuel and oil exited through the drainage system. Furthermore, the collection system for waste fuel is intentionally emptied during heavy rains because of its small capacity. Another matter of concern is the close proximity (about 10 meters away) of the water source for Auki town to the Power Station and the possible seepage of waste fuel and oil to the water source.

Friday 25 October

We used the early part of the morning to brief Dr. Judson about our findings in Auki. He suggested that a brief report be made and sent to the Provincial authorities so that appropriate actions can be taken. Furthermore, the brief report will be of educational value to a lot of relevant officers with in the Province.

Monday 28 October

It is unfortunate that none of the officers from DEC was able to join for this stage of the Solomon Islands visits, for the trip to Buala, Santa Isabel. Melchior's flight to Buala was delayed for 3 hours and thus we reached Buala in the afternoon. A courtesy was made to **Mr. Sam Gaviro (Provincial Secretary)** and he was given a briefing about the visit and the purposes of the project in general.

Melchior met up with **Mr. Landry Losi (Senior Field Officer Vector Borne Diseases)** and explained in detail the purpose of the visit and the need to be responsive to matters relating to the disposal of expired pesticides used in their Anti-malaria Programs. As with the other Provincial Malaria Offices visited so far, the major reason for the stockpile of pesticides (although in small quantities) is the lack of funds from the Central Government to execute their programs. Mr. Landry took Melchior to their storage shed, which is made of local materials but may not withstand thieves and vandalism.

At the storage shed 5 different types of mosquito pesticides (see the attached inventory for details) were stored in minor quantities except for DDT.

Melchior met **Mr. James Tewa'ani (Chief Field Officer Agriculture)** and discussed with him the purpose of the visit and the importance of ensuring the proper storage, use and disposal of chemicals used in Agriculture. He advised that unlike in the colonial days where large quantities of chemicals were used by the Agriculture Department, nowadays, very few chemicals are used. Furthermore, a lot of "excess" Agriculture chemicals from the colonial days were buried or dumped at landfills at the various Provincial Centres. The only chemicals used are those that were brought in for the Taiwanese Rice project (see the attached inventory for details) and will be used by farmers.

Tuesday 29 October

Melchior inspected the Agriculture shed and found small quantities of Orthene and Applaud 25WP (both used for rice farming). He also paid a visit to the X-Ray Laboratory and met **Mr. Ben Otoa (Medical Technologist)**. The only matter of concern as seen at Auki was the direct disposal of X-Ray film development waste containing silver into drain. We also visited the Medical Laboratory but there weren't any obsolete or excess chemicals in the laboratory.

Tuesday 5 November

John O'Grady flew to the Solomon Islands via Brisbane, arriving late in the afternoon. He was met by Melchior Mataki.

Wednesday 6 November

Given the numerous places to be visited, we (i.e. John O'Grady and Melchior Mataki) spent most of the day organizing our visits with in Honiara. We paid a courtesy call to the Australian High Commission and met with **Mr. Dan Heldon (Second Secretary Development Cooperation)** and his replacement **Ms. Stacy Green** and briefed them about the project and also sought their advice on the security measures that we may need to take whilst in rural Guadalcanal. We met with **Mr. Joe Horokou (Senior Environment Officer)** and **Mr Tia Masolo (Environment Officer)** from the DEC and discussed with them the proposed sites to be visited in Guadalcanal.

One of the locations was in the Metapona Plains which was a in an area where there was still quite a lot of rebel activity. We paid a visit to the **National Peace Council (NPC)** and met its **Secretary, Mr. Nathaniel Supa** and sought his assistance to provide transport and security to Metapona on Saturday and he agreed in principle to assist us in that respect.

We also visited the SIEA facility at Ranadi and met **Mr. Dreadnought Namohunu (Distribution Engineer)** and briefed him about the project in relation to the use of PCB in transformer oils. We made arrangement to meet him tomorrow to carry out the tests on the old transformers in their workshop. From our discussions with him, it is apparent that chainsaw owners took transformer oil as lubricant and some of this oil was also dumped at the landfill at Ranadi. All transformer maintenance was done in their Ranadi Workshop

Thursday 7 November

The two officers from DEC accompanied us to the SIEA Workshop in Ranadi and we met with Mr. Dreadnought and his **Transformer Supervisor, Mr. Robert Masi**. We performed PCB screening tests on 10 old transformers in the workshop and one of them gave a positive test. We also performed tests on 5 drums of transformer oil (transferred from old transformers) kept in a room with in the workshop and two of the drums gave positive tests. Composite oil samples were collected from all the drums and transformers that tested positive. We also agreed to leave a box of test kits with the DEC officers, who should then make available the test kits to SIEA, should there be any decommissioned transformers after our visit that may need PCB screening.

We met **Mr. Bernard Bakote'e (Director of Vector-Borne Diseases, SIMTRI)** and we had a discussion about the POPs project and its implication on the use of DDT in the "fight" against Malaria in the Solomon Islands. He told us the DDT is a preferred insecticide over others like Malathion and ICON because of its comparable effectiveness with these other insecticides and more importantly DDT's cost effectiveness.

(Unfortunately it is manufactured in large amounts in China especially and is much cheaper than other insecticides that are being used. He further stated that, unlike in the past, DDT is no longer ordered and used in big quantities and it is only used in areas that have outbreaks of malaria. According to him, it will be difficult for them to leave DDT out altogether in their malaria campaign because when it is combined with other preventative measures, the results are much more favorable than DDT or other measures on their own. Since 1998, no new orders for DDT have been made (lack of funds and difficulty in trans-shipment), however, plans are underway to obtain the old stock of DDT held in Papua New Guinea, which has banned DDT.

We went with Bernard Bakote'e to inspect previously reported stores of DDT found in the first phase of the POPs project, namely in the Rural Water Supply Shed and the other Hardware Shed 2 (both sheds belonging to the Ministry of Health & Medical Services, MHMS). These storage sheds no longer contained DDT. It had all been used for Malaria control, with the exception of the leaking drums of liquid DDT at the eastern end of the Hardware shed 2, which had been dumped at the Landfill. There was only one rusting empty drum still beside the Hardware Shed 2. The only chemical found was 26 drums of ICON 10WP, which will probably be used. Two soil samples and a plant sample were collected within the compound of the Hardware shed 2 and will be sent for DDT analysis.

We terminated our fieldwork by visiting the ***Solomon Islands Broadcasting Corporation (SIBC)*** transmitter site under the guidance of their ***Transmission Technician, Mr. Patrick***. We found two 200 litres drums of numerous small to medium capacitors (of different make and kind) and not transformer oil in the two drums. This was contrary to the assertion provided for in the report of the first phase of the POPs project. Two different types of capacitors (leaking) were screened for PCBs and both of them gave positive results, with one of them suspected to be containing pure PCB. Given the difficulty in opening up the one suspected to be containing pure PCB, a sample could not be obtained. (Only one sample could be obtained from the other one, and it was lost by the courier company before it could be analysed.)

We made another trip late in the afternoon to the NPC to confirm the availability of their 4WD vehicle for the proposed trip to Metapona tomorrow and found that the vehicle was sent for repairs but was expected to be back on service tomorrow.

Friday 8 November

We visited the NPC and discovered that NPC vehicle earmarked for our trip to Metapona was still at the repair workshop and thus we could not make the trip today.

We then went to the Geology laboratory and met ***Mr. Robert Hopu (Senior Laboratory Officer)*** who showed us their chemical storeroom. The storeroom was poorly ventilated and had no power and strong fumes of chemicals could be detected even at the door. A large variety of chemicals including salts, acids and alkalis, oxidizers and reducers, were stored in the room with many not labeled or properly shelved. A major concern was the

close storage of incompatible chemicals, which could produce disastrous results if they come into contact. As an example, acids were stored close to cyanides and sulphides and thus a release of highly toxic gases (hydrogen cyanide and hydrogen sulphide) could easily occur.

Furthermore, there seemed to be no concern on the part of responsible authorities to ensure the proper storage of the laboratory chemicals and this was evident in the collapsing shelves and the storage of chemicals on the floor of the room. Some time was spent making an inventory of the main constituents of the storeroom and arrangements were made with Robert Hopu to work closely with the Melchior Mataki next month to isolate the incompatible chemicals and effect the disposal of the excess acids and alkalis and any other chemicals that could be safely disposed. There was also a nearby small storeroom with many chemicals in a slightly better but also dangerous condition, and we listed the main constituents of this storeroom as well.

A check on a room used by the Forestry Department revealed the presence of 3 x 50kg containers of arsenic pentoxide, although the labels were missing. A senior Forestry officer corroborated, however, that the containers contained Arsenic Pentoxide.

We terminated our work for the day by spending a long time trying to make arrangements for the trip to Metapona tomorrow.

Saturday 9 November

All our arrangements with relevant Government authorities to get us to Metapona fell through and so we finally visited the market and eventually hired a truck from the Metapona Region to take us there. One of the main difficulties was that vehicles with Honiara number plates were likely to be stopped and stolen by rebels, leaving the occupants to walk. We also needed some protection from the rebels, so we enlisted the help of the Melanesian Brotherhood, who were respected by all sides of the conflict. Two of the Brothers agreed to accompany us to Metapona.

When we finally arrived at the location of the pesticide storage shed in the Metapona Plains, we discovered that the access road to the shed was overgrown with grass although the shed was still accessible by foot. The portion of the shed containing the repackaged pesticides was without a roof and the door was missing. (Both the door and the roof had apparently been stolen.) The repackaged pesticides had thus been exposed to the sun and rain for a long time, thus contributing to the rapid deterioration of the steel drums used for repackaging. Runoff from the shed had formed a pool on the cement pavement. The shed was filled with a strong chemical stench and we used our respirators and protective clothing.

A total of 35 drums (200 litres) were scattered on the floor with 11 being full of the repackaged chemicals whilst 24 were empty or part empty. All drums showed severe corrosion and the empty ones have had all their contents spilled on to the floor. The pesticides still remaining in the drums were also in a bad state. About 10 bags labeled as

Mocap lay burst and exposed on the wooden pallets. The sludge on the floor was murky, thick and “blackish” and it drained to form a large pool outside the shed. There were quite a large number of pallets that had been brought in as part of the last repackaging exercise and these were now in a mess and contaminated with pesticides.

It was clear that the previous repackaging exercises were a waste of time, and a proper arrangement for storing the pesticides should have been made a long time ago. We agreed that an urgent cleanup and repackaging exercise was needed, and Tia Masolo was assigned to make the necessary logistic preparations for this proposed clean up. This time all the repackaged materials need to be taken back to secure storage in Honiara.

Monday 11 November

Joe Horokou accompanied us for the visit to the Western Province, our first stop was at Munda. We met **Mr. Hedrick Reuben (Field Officer Vector Borne Diseases)** and he showed us their storage room, which had 5 different pesticides, used in their anti-malarial program (see the attached inventory for details). The pesticides were stored in small quantities and are in current use. At the Agriculture Division storage shed, **Mr. Leslie Keadapitu (Senior Field Officer, Agriculture)** showed us about 2kg of Orthene, which is the only chemical they have in stock. We paid a visit to the National Forestry Research Office and met **Mr. Philip Zekele (Forest Officer)** and we inspected their storage shed which held about 28 different pesticides used in various forestry projects in the past. The chemicals also included concentrated mineral acids (see the attached inventory for details). According to Philip, they did try to dispose the chemicals by burying but the landowners in Munda did not agree with them. This stockpile was not mentioned in the Phase I Report, although two visits were made to Munda. We made arrangements for a boat to take us to Gizo, and on the way we stopped at the Soltai Processing Office at Noro (formerly Solomon Taiyo Ltd). We met **Mr. David Byrom (Operations Manager)** and he told us that they do not have any stockpiles of unwanted chemicals, although they have chemicals currently used in fish processing. After this we started our 2 hour boat trip to Gizo.

Tuesday 12 November

We met **Mr. Allan Takanonu (Project Officer, Agriculture)** and he told us they do not have any stockpile of pesticides apart from a bucket of Orthene, which was brought as part of the Taiwanese Rice project. He reiterated that unlike in the colonial days, they do not use a lot of chemicals. We pressed further and met **Mr. Julio Kelvani (Forest Officer In-Charge)** and he told us that they do not have in stock any pesticides.

We paid a visit to the Malaria section of the Gizo hospital and met **Mr. Masive Sale (Senior Anti-malaria officer)** who showed us to their storage room. As with the other provincial anti-malarial sections, they have the usual pesticides (see the attached inventory for details) excluding DDT. However, all the pesticides, they have are for current use.

We went to the SIEA power station and met **Mr. Isaiah Pitakaka (Station Manager)**. He told us that oil samples could not be obtained from the transformers currently on use, however, he showed us two old transformers that they have decommissioned; one of them was already filled with water. There were visible signs of waste oil contamination within the power station.

Wednesday 13 November

We tested one of the transformers near the hospital and it gave a positive result although it was manufactured in 1990. The other transformer on the way to the SIEA power station may also have given a positive test if it had not been full of water, as it was of the same make and vintage as the one we tested today.

We then returned to Honiara by plane, via Munda.

When we arrived back in Honiara we went to the DEC to discuss with Tia Masolo the progress of the preparation work he had been doing for the clean up at Metapona and he told us that the major stumbling block was that he was not able to secure a storage shed for the repackaged pesticides. Given this, we decided to proceed with our travel to Port Vila as planned. The clean up at Metapona will have to be done after our Vanuatu visits.

We visited the Fisheries Bait fish laboratory and met **Mr. Edward Honiwala (Fisheries Officer)**. We inspected the laboratory and a number of laboratory chemicals were stored there, including acids and acetone. The acetone and acid could be reused, although it is quite unlikely that any of the schools will need these chemicals. A 60kg container full of rotenone was also located in the laboratory. Another container of rotenone broke last year and the officers dumped it in the sea nearby, thus causing a fish kill in that area.

Thursday 14 November

We went to the Medical Laboratory at the **Number 9 Central Hospital** and met **Mr. Andrew Darcy (Laboratory Manager)**. He showed us their chemical storeroom, which held over 180 different types of chemicals including 5.5 litres of Picric acid. The storeroom was over crowded and the chemicals were not segregated. The Picric acid represents a serious explosion danger and will need to be destroyed by Melchior Mataka after his return from Vanuatu. The stockpile of chemicals arose from the shift to automated systems of analysis, which utilized ready-made reagents, that are bought from overseas. According to Andrew, plans are under way to utilize the chemicals elsewhere in the Provincial hospitals but that is quite unlikely to happen because of the lack of resources in the Provincial hospitals.

We went to **KGVI secondary school** and met **Mr. John Rofeta (HOD, Science)**. He showed us their chemical storeroom, which held more than 80 different chemicals but mostly salts. He told us that many of their obsolete chemicals including organic solvents and acids were buried after they received advice from the Solomon Islands Curriculum Development Centre.

