

SPREP

South Pacific Regional
Environment Programme



PROE

Programme régional
océanien de l'environnement

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Fiji 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.

Fiji 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 Fiji, 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 Fiji 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.)

Fiji has no known **PCB Contaminated Oils** in stockpiled transformers. Fiji has adopted a practice of sending all used transformer oils to their steel plant as use for supplementary fuel, so any PCBs in old transformers would have been destroyed. There were still 21 old transformers identified as being in service in Suva and these were all tested with Dexsil Chlor-N-Oil 50 test kits and found to be negative. The other location for transformer maintenance in Fiji is Lautoka and all transformers in for maintenance there had been drained of their oil. The oil had been placed in drums, which were awaiting transport to the steel plant. Two of these drums were tested and one was found to be positive with the test kit, although later confirmed as negative.

Fiji has the following **Pesticides** to be collected.

Location	Pesticide	Active Agent	Quantity	Comments
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			Kg	
AgChem Ltd	Technical grade Isopropcarb	Isopropcarb	4800	24 Drums
Suva	50 WP ETRO	Isopropcarb	2000	Packed in cardboard boxes
N.B. The above are stored securely and tidily at the rear of AgChem's Premises in Lomi, a covered and bunded location.				
Lomaivuna	Maneb	Maneb	4500	180 bags x 55lb
(Near Suva)	Dithane	Maneb	75	3 bags x 55lb
	Fumazon	Fumazon	54	Liquid: 3 x 4 gallons(in Paraquat containers)
N.B. The above are stored in a locked secure shed, but in an untidy manner.				
Lakena	Sevin	Carbaryl	2705	Some in boxes and others in their 1.5kg packets
(Nausori)	Orthene	Acephate	270	36 boxes x 100 packets x 75g
	Dicidex	Trichlorfon	889	Liquid: 2222 x 1 litre containers, average 40% full
	ETRO	Isopropcarb	12	From deduction, labels missing
	Chinese Insecticide	Carbamate	1.5	1 x 1.5kg packet
	Kopi	copper oxychloride	72	12 boxes x 4 tins x 1.5kg, one box spilled
	Propal	Propanil	88	Liquid, Poor labels on the containers
	Gesaprim 80	Atrazine	6	
	Riceclean 1	Propanil	5176	Liquid: 190 boxes x 6 x 1gallon
	Malathion	Malathion	176	Liquid: 44 x 4litre containers
	Propal	Dimethoate	9	Liquid: 6 containers x 1.5kg
N.B. The above are stored in a locked and tidy concrete shed. Some of the volatiles are evaporating.				
Seaqaqa	Sevin	Carbaryl	3	
Vanua Levu	Ethone		3	In a Gramoxone container
	BHC	Lindane	1	Liquid
	Gesaprim 80	Atrazine	1	Liquid
	Rogor	Dimethoate	3	Liquid
	Dithane	Maneb	1	

	2-4-5-T	2,4,5-T	1	Liquid
	Karmex	Diuron	2	
	Benlate	benomyl	1	
	Saturn EC-50	thiobencarb	0.5	Liquid
	Zineb	mancozeb	2	
	Maneb	Carbaryl	50	Identity based on deduction
	Lasso	Atrazine	44	Liquid
	Unknown Liquid Chemicals		4	Liquid: 4 x 1litre bottles, not labelled
	Unknown Insecticide		0.5	Liquid
N.B. The above are stored in a locked and tidy shed.				
Dreketi	Sevin	Carbaryl	396	66 boxes x 4tins x 1.5kg
Vanua Levu	Dicidex	trichlorfon	638	Liquid: 1 litre containers, some spilled on the floor
	Sevin	Carbaryl	6	
	Malathion	malathion	16	Liquid: 4x5l containers (some part full)
	Malathion	malathion	35	Liquid: 7containers x 5 litres
	Empty Dicidex Containers etc	Dicidex	600	60 plastic bags of largely empty containers (from Korokadi)
	Dicidex liquid	Dicidex	230	Liquid: 17 buckets x 18 litres x 0.75 full (from Korokadi)
	Dicidex sludge	Dicidex	700	14 x 70l containers each 50kg (from Korokadi)
	Dioxin contam waste?		200	4 x 70l containers each 50kg (from Korokadi)
	Carbaryl	Carbaryl	18	(from Korokadi)
N.B. The above are stored in a locked and tidy shed. All the waste formerly at Korokadi has now been brought to Dreketi as a result of a cleanup at Korokadi.				
Wainigata (near Savosavo)	Malathion	malathion	2	Liquid: 2 x 1 litre tins
Vanua Levu	Diazinon	diazinon	4	Liquid: 2 x 2 litre tins
	Rogor	dimethoate	4	Liquid
	Mancozeb	mancozeb	2	Liquid: 1 packet
	Lannate	methomyl	3	Liquid
	Benlate	benomyl	2	
	Ridomil MZ	methaxyl & mancozeb	2.5	
	Dithane M-45	mancozeb	1	
	Kopi	copper oxychloride	12.5	
	Carbaryl 80 W	carbaryl	9.2	17 1 lb packets + 1 x 1.5 packet

	Orthene	acephate	0.7	
N.B. The above are stored in a locked and tidy shed.				
Koronivia	Rice spray 70	chlorophenoxyacetic acid	20.5	Liquid
Shed 27	Oftanol GR5		8	Experimental pesticide
Nausori	HOE 084498 Staub		4.25	
	Mocarb		2	
	Padan 4G		3	
	Methomex	methomyl	5	Liquid
	Miral 5G		0.5	
	Monitor	methamidiphos	1	Liquid
	Paracol	paraquat & diuron	0.25	
	Aflix	endosulfan & dimethoate	1	Liquid
	JF9199/A		1	Liquid
	Lannate	methomyl	1	Liquid
	Monitor GS		3	Liquid, experimental pesticide
	Snip 05	carbamate	2.25	
	Hopcin 20 ULV		5	Liquid
	Kelthane EC	dicofol	0.5	Liquid
	Cymbush 3ED		1.2	Liquid, experimental pesticide
	ETRO 50WP	isopropcarb	1	
	Supracide		0.2	
	Afugan		1	Liquid
	Hostathion 40EC		0.5	Liquid
	Malathion	malathion	10	Liquid
	Furadan 10G	carbofuran	7	
	Maneb	maneb	25	
	Counter 150G			
	Unknown		61	Various unlabelled solids
	Tefluthrin		0.015	Labelled Very Toxic
	Asulox 40	Asulam	4	Liquid
	Basagran		5	Liquid
	Chlorpiriphos	chlorpiriphos	1	Liquid
	Ditronn EC			Liquid
	Fenom P425 EC		1	Liquid
	Tamaron SL 500		1	Liquid
	Mitre 20		1	Liquid
	Propanil 360 EC	propanil	1	Liquid
	Monocrotofos 60LC		2	Liquid
	ETRO 20 WP	isopropcarb	1	Liquid
	Chinese Unknown liquid		6	Liquid

	Ficam W		1.2	
	Chinese Pesticide	carbamate		
	Decig 25 Ec	deltamethrin	0.2	Liquid
	Marshal 25 EC	carbosulfan	1	Liquid
	DD Soil fumigant		4	Liquid
	Saturn EC50	thiobencarb	4	Liquid
	Gesaprim	atrazine	5	Liquid
	Taiwanese MIPC		1	
	Thimiet 10-G	phorate	14	
	Ficam 20		0.5	
	Lorsban		0.1	
	Endosulfan		0.1	
	Fenitrothin		0.1	
	Actellia		0.1	
N.B. The above are stored in cramped conditions in a secure but untidy shed.				
Koronivia	Cosan (Wettable Sulfur)		3.2	
Weed Research	Aquagon		10	Liquid
Nausori	Alicep	chlorbufam & chloridazon	4	
	Round up		5	
	Stacker WP		2	
	Saturn-D-GR	thiobencarb	60	
	Chinese Pesticide		48	
	Blue Bell (Lanes)		20	Liquid
	Clarosan		7.5	
	Cobex Dinitramine		1.5	Liquid in poor container
	Shelleston P		1.3	Liquid
	Carbaryl 80WP	carbaryl	2	
	Dicambone 75-D		5	Liquid
	ARD/13/33	asulam & atrazine	5	Liquid
	Experimental Herbicide		4	Liquid
	ICI Caneclean		5	
	Tribunil		0.8	
	Girraween		1.5	
	Dual 720 EC		20	Liquid
	Amitrol		5	Liquid
	Weedazol		30	Liquid
	Frenock		10	Liquid
	Icapon		2.5	
	Caragard		30	
	Planavin 75		2.5	
	Linuron 50		2	

	Hyvarx		0.5	
	Venture Tridex		1	Liquid
	Linurex 50WP		0.5	
	Frontier Herbicide		1	Liquid
	Mixture	atrazine & amethryne	4	
	Propal	propanil	4	Liquid
	Ally Herbicide		0.2	
	Saturn EC	thiobencarb	0.5	Liquid
	Pillarxone	paraquat	1	Liquid
	Atrazine 40%		0.8	Liquid
	Mixture	paraquat & diuron	0.6	Liquid
	Bennol	dicamba	0.5	Liquid
	Igran 500 FW		0.5	Liquid
	Ametryne 20%		0.2	Liquid
	Propazol 50	propazine	0.5	
	Paraquat 20%	paraquat	0.5	Liquid
	BASF Citrowet Sticker/Herb		2	Liquid
	Triflurane		1	Liquid
	Classic 250F	chlorinuon ethyl	2	
	Gesapex 500		1	Liquid
	Velpar K4	diuron	1.5	
	Unknown		5.8	Various solids with no labels
	Unknown		157	Various liquids with no labels
N.B. The above are stored in a secure but very untidy shed.				
Rentokil	Smoke Bombs		0.45	
	Mouse Powder	DDT	11	
	Actellic Smoke Generator		0.1	
	Chlordane	chlordane	3	Liquid
	Wood Borer		2	Liquid
	EDB	ethylene dibromide	20	Liquid
	Unknown FOG solution		25	Liquid
	Unknown		5	Liquid, probably an organophosphate
N.B. The above are stored in a secure shed at the rear of the Rentokil premises.				
Navua	Dicidex	trichlorfon	11	Liquid, 19 x 1 litre containers, 8 empty
	Carbaryl	carbaryl	46.5	
	Riceclean #1	propanil	144	Liquid

N.B. The above are stored in a secure shed, and the volatile pesticides are evaporating.				
Legalega	Cycocel 750		1	Liquid
	Bayleton 125 EC		1	Liquid
	Aliette	fosetyl	3	In 1kg containers but partly used
	Phymone		4	Liquid
	Brestan 60		1	
	Manzate	maneb	1.5	
	Carbaryl 80 WP	carbaryl	6.5	
	Rogor CDP	dimethoate	3	Liquid
	Endosulfan		4	Liquid
	Nitofol		10.8	Liquid
	Lepidex	trichlorfon	5	Liquid
	Riceclean 70	propanil	5	Liquid
	Orthene	acephate	4	In a Gramoxone box
	Stam F-34	propanil	4	Liquid
	Propal	propanil	4	Liquid
	Actril DS	2,4-D	2	
	Mancozeb 80 WP	mancozeb	7	
	Foresite		1	
	ETRO 50WP		2	
	Saturn EC 50	thiobencarb	3	Liquid
	Riceclean #1	propanil	13	Liquid
	Icipon		1.5	
	Dicidex	trichlorfon	5.5	Liquid
	Sutan +		10	Liquid
	Rice spray		15	Liquid
	Tridex		5	Liquid
	Thiram 80		20	
	Embutor	2,4-DB	4.5	Liquid
	Pyrienei 48 EC		1	Liquid
	Senior		1	
	Ronilan		0.5	Liquid
	Baristin FL		1	Liquid
	Primextra 500 FW		20	Liquid
	Primextra 2		20	Liquid
	Kilval	vamidothion	1	Liquid
	Impact (Sopra)		1	Liquid
	Cobex		1	Liquid
	Lasso	atrazine	2	Liquid
	Dimilin WP 25		0.3	
	Unknown		0.5	White powder
	MCPA		44.5	Liquid

	Manzeb	mancozeb	1.2	
	Milcarb		3	Liquid
	Diuron 90 WG	diuron	0.2	Liquid
	Cymbush 3ED		0.75	Liquid
	Septene 80		3	
	Karmex	diuron	0.5	
	Velpar K4	hexazinome & diuron	6	
N.B. The above are stored in a secure shed.				
Sigatoka				
Research	FR304/5		2	
Storeroom	Furadan 5G	carbofuran	1.5	
	Tordon		1.5	
	Vegiben 2E		1	Liquid
	Unknown			Liquid
	ETRO 50 WP	isopropcarb	4	
	ETRO 20 WP	isopropcarb	3	Liquid
Fruit & Vegetable	Pymethrin	pymethrin	1	
	Unknown		2	Liquid, 2 containers
	Benlate	benomyl	1	
	Basagran		1	Liquid
N.B. The above are stored in secure sheds.				

3. Other Project Work

A cleanup was carried out of a large amount of spilled pesticides (mainly Dicidex) at the Agricultural Research Station at Korokadi, Vanua Levu. All the cleaned up materials were taken to the Agricultural Research Station at Dreketi where they are shown in the above inventory. In addition the supervisor of the Korokadi Station had burnt some of the old Dicidex containers and shelving soaked in Dicidex, in an effort to get rid of it. As Dicidex is a chlorinated pesticide, the ash from the burnt materials was composite sampled and sent for dioxin and furan analysis. The resulting comprehensive analysis for all tetra to octa dioxins and furans revealed some very low levels of dioxins but sufficient to regard the collected ash and debris (about 200 kg total) now stored at Dreketi, as contaminated with dioxins and furans.

Isomers that registered above the detectable limits were:

ng/kg

<i>2,3,7,8-TCDF</i>	<i>1.4</i>
<i>Total TCDF</i>	<i>11.0</i>
<i>Total TCDD</i>	<i>3.0</i>
<i>Total HxCDD</i>	<i>10.0</i>
<i>Total HpCDF</i>	<i>6.7</i>
<i>Total HpCDF</i>	<i>33.0</i>
<i>OCDD</i>	<i>140.0</i>

The total 2,3,7,8-TCDD equivalence factor was calculated as 0.50 ng/kg (using ITE Factors).

A composite sample of oily soil was also taken from the transformer draining area at Lautoka. This sample was analysed for PCBs and the results were below the level of detection for all isomers.

Stockpiles of other hazardous wastes besides POPs and pesticides were also investigated. There are large stockpiles held at USP, and the main hospital in Suva and we were advised of other stockpiles in other hospitals and schools.

Old buried pesticide dumps were investigated at near the Lakena Research Station and at the Dreketi Research Station. About 2 tonnes of pesticides and empty containers may be buried near the Lakena Research Station under a house owned by the Department of Agriculture and rented on a long-term basis. At the Dreketi a similar quantity of pesticides and debris are buried very close to the pesticide storage shed.

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

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

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

The pesticides stored at AgChem Ltd, Suva are kept in a secure banded area and are in good condition. A total of approximately 6800 kg of pesticides are stored here, consisting entirely of Isopropcarb in two different forms. (These pesticides will fit into 45 drums allowing for packaging.)

The pesticides at the Lomaivuna Research Station near Suva are locked up but are in piled in an untidy heap, in a bad condition. The shed is an old wooden one and would be quite flammable, which is a concern, as the main pesticide stored here is Maneb, which releases toxic fumes when burnt. A total of approximately 4629 kg of pesticides are stored here. (Allow 40 drums.)

The Lakena Research Station at Nausori has approximately 9405 kg of various pesticides, mainly Sevin, Riceclean and Dicidex. (Allow 70 drums.) These pesticides are stored in secure tidy concrete sheds, although many of the containers have decayed with time and are leaking. The pesticide odour coming from these sheds is strong. There are about 2 tonnes of buried pesticides near the research station that are reportedly under a house occupied by long-term tenants.

The Seaqaqa Research Station store on Vanua Levu has small quantities of a number of surplus pesticides, amounting in total to about 117 kg. (Allow 3 drums.) The shed they are stored in is tidy and secure. Another project (the pineapple project) was operating independently at the research station and advice was given during the recent visit that they had a separate store of old surplus pesticides. No-one was available, however, to open these premises, so this remains as a matter to be checked out.

At Dreketi in Vanua Levu, there is now a combination of the original pesticides that were stored there, plus the pesticides cleaned up during the recent visit, from the neighbouring Korokadi Research Station. In addition some of the original pesticides had leaked from decayed containers on the shelves, contaminating the floor. Right next to the shed, about 2 tonnes of pesticides and pesticide debris have been buried. The total quantity of pesticides at Dreketi, including the quantity of pesticide debris brought from Korokadi, is 2839 kg. (Allow 35 drums, which would allow the plastic pails to be placed in the drums intact.)

The Waingata Research Station near Savosavo, Vanua Levu has a very small quantity of several surplus pesticides, amounting to about 43 kg. (Allow 2 drums.) These pesticides are stored in a locked and tidy shed.

At the Koronivia Research Station near Nausori, there are two sheds (Shed 27 and the Weed Research Shed) that have large untidy piles of pesticides mixed with other chemicals. In Shed 27 there is about 220 kg consisting of numerous miscellaneous pesticides in quite bad condition, many of which have been sent as samples by suppliers. In the Weed Research Shed there are about 474 kg of pesticides in even worse condition, mostly sitting on floors in broken packaging. Both sheds are locked. (Allow 12 drums in total because of the large amount of packaging.)

At the Rentokil premises in Suva there are about 67 kg of several pesticides no longer used by the company, including small amounts of the POPs chlordane and DDT. These pesticides are stored securely at the back of the premises in a tidy shed. (Allow 3 drums.)

At the Navua Research Station there are about 202 kg of three pesticides (Dicidex, Carbaryl and Riceclean). (Allow 6 drums.) They are stored in a secure tidy shed, but some a leaking and loss of pesticides is occurring from evaporation.

At the Legalega Research Station near Nadi there are small amounts of many pesticides amounting to about 256 kg in total. These pesticides are stored in a secure and tidy shed. (allow 8 drums.)

e. Dreketi	2839 kg
f. Waingata	43 kg
g. Koronivia Shed 27	220 kg
h. Koronivia Weed Research	474 kg
i. Rentokil, Suva	67 kg
j. Navua	202 kg
k. Legalega	256 kg
l. Sigatoka	18 kg

This gives a total of 25,070 kg pesticides to be picked up from Fiji.

3. A total of about 226 drums will be required, which will fit into three 20 ft shipping containers.
4. Fiji has two dumps of buried pesticides, at the Lakena Research Station and at the Dreketi Research Station.
5. Stockpiles of other used chemicals were identified in several locations, such as the main hospital in Suva and the University of the South Pacific.

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 Fiji 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 Fiji 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 Fiji representative should attend this workshop. (Financial assistance will be provided.)
4. Advise the relevant Agriculture Dept offices of the results of the inventories and also the dioxin / furan analyses from Korokadi.
5. Note and record the existence of buried pesticides, at the Lakena Research Station and at the Dreketi Research Station and endeavour to find out as much as possible about what is buried there, exactly where it is, how deep it is, and any other

relevant information. There may be funding available as a later project, for the proper excavation and removal of these buried pesticides.

6. 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.
7. 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 AND MELCHIOR MATAKI TO FIJI FOR THE POPS PROJECT

Monday 23 September

We flew to Fiji (Nadi International Airport) and drove all the way from Nadi to Suva.

Tuesday 24 September

We met up with *Vandana Naidu (Waste & Pollution Officer) for the Department of Environment*, and briefed her about the project. We looked at the brief schedule we sent her the previous week and made arrangements for our visits within the country. The LOA (Letter of Agreement) was given to Vandana together with a covering letter, for the consideration of the Permanent Secretary. We also spent the rest of the morning organizing our trip to Vanua Levu and made arrangements for the change of the rental car to a 4WD vehicle for rest of our work around Suva.

In the afternoon, we visited *Moti Lal Autar, Principal Plant Protection Officer, at the Department of Agriculture Koronivia Research Station*. He was previously involved with the first phase of the Project in 1998. He expressed his concern over the lengthy period it had taken for this follow up and the eventual disposal of pesticides. Further to this, he told us that a lot of the liquid pesticides initially identified in 1998 might have already leaked or evaporated given the deterioration of the containers. He also told us that the pesticides mentioned to be buried near Lakena research station were most likely empty drums and other containers that formerly held liquid pesticides.

We then visited the USP Chemistry Department to ascertain the existence of obsolete and waste chemicals. **Dr. Philomena Gangaiya** (Head of Chemistry Department) told us that she had already prepared a detailed inventory of the above items, which would be made available to us by tomorrow.

Wednesday 25 September

In the morning, we visited the *FEA* premises in Kinoya and met with the following officers, *Mr. Savenaca (Sub-Station Technician), Harold Rounds (Operations and Maintenance Technician) and Aktar Ali (Environment and Safety Officer)*. They told us that they perform transformer oil regeneration (which is basically a process aimed at removing moisture, sludge and effecting the correct pH), but they do not test for PCBs. Similar work is also done at the Lautoka Sub-Station and old transformers from the outer islands are brought into Kinoya or their Lautoka for this regeneration. Furthermore, they assured us that all the current transformer oils used are PCB free. The waste transformer

oil and engine oil is stored for collection and use by Fletcher Challenge Steel Fiji Ltd at Walu Bay in their steel furnace as a fuel substitute.

FEA did, however, tell us that in the Suva area, there are several old transformers that are currently in use (as far back as the sixties). A demonstration of the use of the test kit was carried out on a disused transformer near the workshop, with a negative result. We then agreed to test next day the old transformers that are currently in use, as well as any other disused transformers lying around the workshop. Apparently, the old transformers were not thrown away as both the oil and the carcass had value as scrap, once they no longer had any value for spare parts.

We were unable to get a 4WD vehicle from the car rental company we had contacted yesterday and this adversely affected our plan for the day as far as visiting Lakena Research Station was concerned. However, we were able to get a 4WD from another rental company after much searching. We drove all the way to Koronivia and spoke with **Mr. Toloi Vasuidreketi** (Taro Beetle Officer) and postponed our visit to Lakena and Lomaivuna Research Stations to Friday. Toloi will be assisting us since Moti Lal Autar will be busy for the rest of the week. We finished our work for the day by collecting the inventory from the USP Chemistry Department.

Thursday 26 September

I gave a presentation in the morning at the Department of Environment offices, to several Government representatives. The presentation focused on the AusAID POPs in PICs project. It was chaired by **Epeli Nasome, Director of Environment**, and organized by Vandana Naidu of the Department of Environment. Representatives from the Departments of Labour, Health, Works and Agriculture also attended, as well as a representative from FEA. The representative from the Department of Health advised that the 100 cyanide canisters that were in storage in the Vector Control Yard in Suva had all been safely removed and disposed of recently, by a specialist WHO consultant.

I then went out to Koronivia and picked up Toloi Vasuidreketi. We went together to visit **AgChem Ltd** in Lami, where we met **Ben Nand, General Manager**. We had planned also to visit Navua that day, but ended up staying all afternoon at AgChem. Mr Nand spent quite a lot of time explaining the pesticides industry in Fiji and how the stockpiles had accumulated. In most cases they were the result of generous pesticide budgets that accompanied various projects to grow a variety of crops, but most commonly, high yield varieties of rice. Often the projects failed, leaving large quantities of pesticides in storage sheds. Another reason for the stockpiles was that in many cases, pests developed resistance to pesticides that had been purchased in bulk.

AgChem Ltd had the following pesticides stockpiled at the back of their premises:

- (a) 24 x 200 litres drums of Technical grade Isopropcarb (Solid & nearly 100%)

- (b) 2 tonnes 50WP E.T.R.O, which had been repacked into small cardboard boxes.
This substance is 50% Isopropcarb (Also known as MIPC and Solid)

NB: When phase 1 of the POPs project was done in the late 1998, AgChem only declared 2 tonnes in cardboard boxes as surplus to its requirements as they hoped to use the technical grade material. This hasn't happened however and they need the technical grade Isopropcarb removed as well.

Isopropcarb is used in the control of hoppers in rice, and it is stockpiled unused because of reasons typical of those set out above, namely the collapse of the rice industry in Fiji and also the fact that the hoppers developed resistance to Isopropcarb after a couple of years.

Ben Nand was very interested in and supportive of the POPs project and indicated his willingness to assist in any way he could, including use of his premises, and the provision of experienced AgChem manpower to assist with the project implementation in Fiji.

While I was undertaking the activities described above, Melchior Mataki went to the FEA and accompanied **Jioji Bilivatu (FEA Electrical Technician)** to test the old transformers currently in service in the Suva area. This was a dangerous activity, as it involved taking transformer oil samples from large high voltage transformers that were connected and live. A total of 21 transformers were identified and tested, and none of them gave a positive test result for PCB, although one of them (at USP) nearly gave a positive result.

Based on the above, it is very likely that in Suva, there are no PCB contaminated transformer oils either in service or in stockpiled transformers. If there had been such oils in the past, they would by now have all gone to Fletcher Steel for use as a fuel substitute. No further transformer testing was therefore done for Suva.

Friday 27 September

We met Vandana Naidu at the Dept of Environment offices and Ben Nand of AgChem picked us up from there. We went out to Koronivia and met **Mrs. Anjali Sharma (Acting Senior Research Officer-Weeds)** who was assigned to us by the Department of Plant Protection. We drove to the Lomaivuna Agricultural Research Station (north of Suva) where we were met by **Ms. Sainimere Raganivatu (Senior Agriculture Assistant)**, who showed us the shed that has the chemicals. We were also accompanied by several farm workers.

These chemicals were brought in the 1960s for the banana industry that collapsed in the 1970s, these chemicals have been stock piled and the following were found:

- (a) 10 x 20 litres of sticker (alcohol based) used to enhance the adherence of pesticides to crops during application.

- (b) 180 x 25kg of Maneb (80% Manganese Ethylene bisdithiocarbamate). (This quantity is approximate, as the bags of pesticides were all stacked in a heap, which made counting difficult. The estimate is based on the best count that could be made under the circumstances, as well as information provided by long term workers at the Station.)
- (c) 3 x 25kg of Dithane (contains 80% Maneb)
- (d) 1 x 20 litre of OBM oil
- (e) 2 x 20 litre of Mobil oil (DUO40-50)
- (f) 80kg of office papers that have been contaminated with Maneb that has spilled from its sacks
- (g) 3 x 18 litres of Fumazone in Paraquat containers

A number of the cardboard sacks of Maneb have broken and spilled onto the floor. The whole building could therefore be considered to be contaminated. Maneb is a fungicide used for the control of fungal diseases of bananas, potatoes, tomatoes, tobacco, celery and carrots. Staff houses were very close to the shed, and a serious concern is if the storage shed catches fire. This would produce large amounts of toxic fumes from the burning of the manebe, especially hydrogen sulphide, carbon disulfide, and oxides of nitrogen and sulfur.

We then drove to Lakena (near Nausori), but we were not able to see the stockpile of chemicals because the person responsible for the Stores had left for the day. However an arrangement was made with his superior for him wait for us the next day (Saturday) at 9am.

Saturday 28 September

We went to Lakena again and were met by **Mr. Varea Fatiaki** (Assistant Storeman). The following chemicals were stock piled in three different well constructed and locked storerooms. We prepared the following inventory:

Room 1

- (a) 1703 x 1.5kg packets (packed into small cardboard boxes -84) of Sevin (Carbaryl)
- (b) 3600 x 75g packets of Bangbang (Orthene-75% Acetate O,S-Dimethyl acetyl phosphoramidothioate)
- (c) 6 x 1.5kg of empty Propal plastic containers (360g/litre of Propanil)
- (d) 1 x 1.5kg of 2-Isopropyl phenyl-N-Methyl carbamate
- (e) 2222 x 1 litre Dicide (Trichlorfon), about 70% of which have evaporated.

Room 2

- (a) 100 x 1.5kg of Sevin (Carbaryl)
- (b) 48 x 1.5kg of Kopi (Copperoxychloride)
- (c) 60 x 50kg of Potash

(d) 10 x 50kg of Superphosphate

We suggested that items (c) and (d) above could be distributed free to farmers.

Room 3

- (a) 44 (95% empty) x 4 litres plastic containers of Malathion
- (b) 22 x 4 litres of Propal (poorly labelled)
- (c) 6kg of Gesaprimo 80
- (d) 1140 x 4.54 litres (1 gallon) of Propanil.

The Phase I Report stated that about 2 tonnes of pesticides were buried on a piece of land (formerly owned by the Department of Agriculture and now owned by the Department of Lands), which had been rented to the same family for several years. The home is situated on top of the buried pesticides. Varea Fatiaki took us to see this land (about half a kilometer from the research station) and he said that a lot of scrap metals were also buried there. He also said that the occupant of the house is currently sick with a heart related problem. The house was built on this piece of land about 10 years ago.

It is not clear what pesticides were buried there, and Varea could not remember. When we mentioned this matter to Mr Moti Lal, however, he said that only the empty pesticide containers were buried there.

Sunday 29 September

We flew into Labasa late in the evening and checked into a hotel.

Monday 30 September

We met up again with Anjali Sharma, who was to accompany us for our work in Vanua Levu. We all then went to the Dept of Agriculture Office in Labasa. There we had a meeting with the Senior Agriculture Officer **Mr. Sugrim Chand**, and discussed our plans for Vanua Levu. Mr Chand recommended we also visit Seaqaqa and Waingata Research Stations, and he offered to provide us with whatever we needed for our work.

We first went to the *Seaqaqa Research Station*, and there we met **Mr Surendra Nath (Farm Manager)** and taken to the their old store for obsolete chemicals (pesticides and herbicides). A large variety of chemicals were located in there but in small quantities (see the inventory in Appendix 3 for details). The room was secure but poorly ventilated.

We then went to *Dreketi Research Station*, and met **Mr. Viren Chand (Farm Manager), Mr. Shiu Narayan (Station Administrator) and Mr. Isikeli Kidia (Storeman)**. Isikeli showed to the Storeroom. The three major types of chemicals found were Sevin (Carbaryl), Malathion and Dicidex (see the inventory in Appendix 3 for details). A

number of the Dicide containers had lost their contents and several had broken and spilled on to the floor. The distinctive smell of Dicide could be detected outside the storeroom even though it has a secure door. The site where pesticides and pesticide containers had been buried was only 2 metres away from the Storeroom. The storeman also showed us an abandoned Well house in which obsolete chemicals were dumped into the well.

The storeman also advised that they had carried out a clean up of the storeroom about a year ago with out proper advice on the clean up process. Although the storeroom was far from residences, it was situated less than 15 metres from a rice milling plant.

We drove further south to **Korokadi Research Station** and met up with **Mahend Chand (Field Man 2) who was the sole officer** at this station. He showed us to the storeroom and we were surprised at the state of the storage room. About 2200 x 1 litre containers of dicidex were spread all over the floor. **Mahend** told us that the shelves collapsed about four years ago. The storeroom was badly contaminated with the spilled Dicide. Given the state of this storeroom, we decided to stay back a few more days and do a clean up of this storeroom. Mahend was suffered from a chronic form of “red eye” and had developed grey hair, although he was a young person. Contrary to the Phase I Report, the home of Mahend and his family was about 80 metres from the storeroom and the spilled Dicide odour was strongly detected here and even at a home about 300 metres from the station. This storeroom is now not suitable for the long-term storage of chemicals because of the lack of shelves. According to Angali, the last person who was at this station also suffered from the chronic “red eye” problem.

We then headed back to Labasa and started shopping for the items needed for the cleanup at Korokadi.

Tuesday 1 October

We spend most of the day collecting all the items that we needed for the clean up job as well as changing our travel schedule to Suva. We also paid another visit to Sugrim Chand to solicit his assistance for the cleanup, mainly through support to be provided by his officers based in Dreketi. We also shifted our base to Dreketi Research Station to be close to Korokadi, after dropping off at Korokadi all the items we had purchased for the cleanup.

Wednesday 2 October

We spent the whole day, with the assistance from a several assistants from the Department of Agriculture (based in Korokadi and Dreketi), recovering the “left over” Dicide that was found in the storeroom. A total of 230 litres of Dicide was recovered from the 2200 litres that was initially stored in the store. A significant portion of the

thickened sludge in the room was also collected in 70 litre buckets and the empty Dicide containers were all placed in garbage bags.

Mahend, the officer stationed at Korokadi, had also unknowingly burnt about 100 empty Dicide containers and some contaminated shelves near the shed. This may have generated dioxins as Dicide is chlorinated. All remnants of containers and wood in the potentially dioxin contaminated site were collected and stored in four x 70 litre buckets and labelled clearly as being potentially dioxin contaminated.

Given the amount of further work needed to be done at this site, we had to move back our flight to Suva for another two days to complete the work, with the plan to complete the final scrubbing of the storeroom and the dismantling of contaminated shelves on Friday.

The recovered liquid Dicide (230 litres in 17 buckets x 18litres x $\frac{3}{4}$ full), Dicide containers (60 garbage bags), Dicide sludge (14 buckets x 70 litres), potentially dioxin contaminated items (4 buckets x 70 litres) and Carbaryl (1 bucket x 70 litres and 2 boxes x 4 tins x 1.5kg) were taken to Dreketi Research Station for storage.

We then drove to Savusavu for the night.

Thursday 3 October

In the morning we visited the Coconut Research Station at Waingata near Savusavu. A variety of chemicals were found in their storeroom (see the inventory in Appendix 3 for details) but in small quantities. **Mr. Alipate** (Storeman) could not tell us whether the chemicals would be used, although on further questioning we learnt that all the chemicals apart from KOPI were brought into the research station in the 70s and 80s and thus it is very unlikely that these chemicals will be reused. Furthermore, there was about 2.1 tonnes of fertilizer (Muriate of Potash) in a room adjacent to the chemical storeroom.

We then drove back to Labasa where Anjali Sharma returned to Suva because of the work commitments. We then spent the rest of day getting all the items needed for the rest of the clean up work in Korokadi, and drove south again to spend the night at Dreketi.

Friday 4 October

We made an early start with the help again of assistants from Dreketi and Korokadi, continuing with the clean up work at Korokadi. The remaining shelves were cut down with a chainsaw, and transported to Dreketi Research Station, together with the remaining sludge on the floor. The Storeroom (4 metres x 8 metres) was then scrubbed with 150 litres of water and 14 litres of Janola (Bleach). To minimize contamination of the ground water, the “washings” were left in the room for evaporation. After the clean up, the strong smell of Dicide was greatly reduced and could not be detected at the home of the officer stationed here.

On the advice of **Mr. Shiu Narayan** (former Base Manager for the Pineapple project), we went back to Seaqaqa Research Station to have a look at the chemical storeroom of the Extension section (Pineapple research) but unfortunately, none of the officers of this section was available. However, the officers from the Research section confirmed to us that a number of obsolete chemicals were stored here. During our first visit, we were not told about this stockpile of chemicals. We made arrangements for an inventory of the chemicals held in this storeroom to be prepared and given to Anjali Sharma at Koronivia Research Station.

Saturday 5 October

We returned to Suva in the morning, and then headed for Koronivia again. There were two pesticide storerooms there (Shed 27 and the Weed Science Storeroom) that were not inspected during the first phase of this POPs project. The storerooms held large varieties of agricultural chemicals and pesticides, including chemicals used for analytical work by the respective research sections (see the inventory in Appendix 3 for details). The storerooms were poorly maintained and had all sorts of rusting cans, drums, and empty containers as well as spilled chemicals among others on the floor. These storerooms need to be tidied up on an urgent basis, including the construction of shelves in the Weed Science storeroom.

Monday 7 October

Today was Fiji Day, so I spent the day working on and editing the Project Design Document (PDD) for AusAID.

Tuesday 8 October

We spent a while getting our visas extended for another week, and then met up again with Ben Nand (General Manager AgChem Ltd). We went first to visit ***Rentokil Initial Ltd*** and met ***Mr. Jerry Le Claire (General Manager)***. He showed us their dangerous goods storeroom, which held a small variety of chemicals including two POPs substances DDT and Chlordane (see inventory in Appendix 3 for details). The storeroom was very close to the sea and was open in part, so we advised them to fully enclose the storeroom to withstand bad weather and the rust initiated by sea sprays. Jerry Le Claire was very supportive of the project and offered his assistance when the contractor's packaging crew arrived in Fiji.

We then went to ***Navua Central Irrigation Project*** and met up with **Mr. Ami Chand** (Farm Manager) and **Mr. Vilimone Vute** (Storeman) and they showed us to their storeroom. Only three types of chemicals were found there (see Appendix 3 for details).

They told us that they have already started the necessary paper work needed for writing off the chemicals, and they looked forward to their removal.

Wednesday 9 October

We flew to Nadi in the morning and then went to the *Legalega Research Station* near the airport. We met with *Mr. Narendra Prasad (Farm Manager) and Mr. Eroni Delai (Storeman)* and they showed us the chemical storeroom. We prepared an inventory of the obsolete chemicals (see Appendix 3 for details). A large variety of chemicals were present but in small quantities. The storeroom also had fertilizers (current use) and it was in a poor state of upkeep. A number of the chemicals held did not have any labels.

We drove to Sigatoka and met up with Mr. Ben Nand, who guided us to the *Sigatoka Research Station*. On arrival, we met *Mr Bijendra Datt (Senior Research Officer - Horticulture)* who showed us to several parts of the Station. However, we only located a few chemicals in the research and fruit & vegetable storerooms, as most of the chemicals identified in the first phase of the project have either been reused or are destined for reuse.

Thursday 9 October to Monday 13 October

These five days were spent working on inventories for all countries visited, reworking the PDD and getting other documents ready for AusAID, for calling tenders for the Australian Management Contractor. This was done in Nadi as I was unable to fly back to Apia until the following Tuesday evening.

Tuesday 14 October

Drove to Lautoka and visited the *Fiji Electricity Authority (FEA)* yard. Met *Saumen Bandyopadhyay (Distribution Manager Western)* and *Basant Kumar (Distribution Engineer Western)*. Inspected their transformer maintenance operation, which is very similar to the Suva operation. They service transformers in Lautoka from the west and north of the country, and the rest of the country is serviced from Suva. All transformer oil is drained off into drums and then placed in a large waste oil storage tank. It is then picked up and taken to the Steel Plant in Suva for use as a fuel substitute.

I tested two drums of the drained transformer oil, and one tested positive for PCBs. I trained Basant Kumar to do the test and left him with some test kits. We agreed that if the positive test with the test kit was actually confirmed positive, then we need to confer urgently, regarding further testing and a strategy for managing transformer oil. I also took a sample of soil for analysis, at a location where quite a lot of transformer oil had accumulated.

In the afternoon I returned to Nadi, and sent the samples from Fiji away for analysis. I also responded to further questions from AusAID about the information I had sent to them.

I returned to Apia in the evening.