



# REGIONAL SEAS

UNITED NATIONS ENVIRONMENT PROGRAMME

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## *Hazardous waste storage and disposal in the South Pacific*

*UNEP Regional Seas Reports and Studies No. 48  
Appendices*

*Prepared in co-operation with*



SPC



SPEC



ESCAP

## PREFACE

Twelve years ago the United Nations Conference on the Human Environment (Stockholm, 5-16 June 1972) adopted the Action Plan for the Human Environment, including the General Principles for Assessment and Control of Marine Pollution. In the light of the results of the Stockholm Conference, the United Nations General Assembly decided to establish the United Nations Environment Programme (UNEP) to "serve as a focal point for environmental action and co-ordination within the United Nations system" (General Assembly resolution 2997(XXVII) of 15 December 1972). The organizations of the United Nations system were invited "to adopt the measures that may be required to undertake concerted and co-ordinated programmes with regard to international environmental problems", and the "intergovernmental and non-governmental organizations that have an interest in the field of the environment" were also invited "to lend their full support and collaboration to the United Nations with a view to achieving the largest possible degree of co-operation and co-ordination". Subsequently, the Governing Council of UNEP chose "Oceans" as one of the priority areas in which it would focus efforts to fulfil its catalytic and co-ordinating role.

The Regional Seas Programme was initiated by UNEP in 1974. Since then the Governing Council of UNEP has repeatedly endorsed a regional approach to the control of marine pollution and the management of marine and coastal resources and has requested the development of regional action plans.

The Regional Seas Programme at present includes eleven regions <sup>1/</sup> and has over 120 coastal States participating in it. It is conceived as an action-oriented programme having concern not only for the consequences but also for the causes of environmental degradation and encompassing a comprehensive approach to combating environmental problems through the management of marine and coastal areas. Each regional action plan is formulated according to the needs of the region as perceived by the Governments concerned. It is designed to link assessment of the quality of the marine environment and the causes of its deterioration with activities for the management and development of the marine and coastal environment. The action plans promote the parallel <sup>2/</sup> development of regional legal agreements and of action-oriented programme activities.

The idea for a regional South Pacific environment management programme came from the South Pacific Commission (SPC) in 1974. Consultations between SPC and UNEP led, in 1975, to the suggestion of organizing a South Pacific Conference on the Human Environment. The South Pacific Bureau for Economic Co-operation (SPEC) and the Economic and Social Commission for Asia and the Pacific (ESCAP) soon joined SPC's initiative and UNEP supported the development of what became known as the South Pacific Regional Environment Programme (SPREP) as part of its Regional Seas Programme.

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<sup>1/</sup> Mediterranean, Kuwait Action Plan Region, West and Central Africa, Wider Caribbean, East Asian Seas, South-East Pacific, South Pacific, Red Sea and Gulf of Aden, East Africa, South-West Atlantic and South Asian Seas.

<sup>2/</sup> UNEP: Achievements and planned development of UNEP's Regional Seas Programme and comparable programmes sponsored by other bodies. UNEP Regional Seas Reports and Studies No. 1. UNEP, 1982.

A Co-ordinating Group, consisting of representatives from SPC, SPEC, ESCAP and UNEP, was established in 1980 to co-ordinate the preparations for the Conference. As part of these preparations, 18 "country reports" and 13 "topic reviews" were prepared identifying the environmental problems of individual countries and the region <sup>2/</sup>.

These reports and reviews were examined by a technical meeting (Noumea, June 1981) attended by experts from the South Pacific region.

The meeting also drafted the basic working documents which were submitted to the Conference on the Human Environment in the South Pacific (Rarotonga, 8 - 11 March 1982).

The Conference adopted: the South Pacific Declaration on Natural Resources and the Environment; the Action Plan for Managing the Natural Resources and Environment of the South Pacific Region; and agreed on the administrative and financial arrangements needed to support the <sup>4/</sup> implementation of the Action Plan and on the workplan for the next phase of SPREP <sup>4/</sup>.

At the request of the States and Territories of the South Pacific Region, negotiations were initiated to develop, in the framework of the Action Plan, a Convention for the Protection and Development of the Natural Resources and Environment of the South Pacific Region with specific protocols related to (i) prevention of pollution by dumping and (ii) co-operation in combating oil pollution emergencies. In order to facilitate the negotiation of these legal instruments, a review of hazardous waste storage and disposal in the South Pacific Region was commissioned from Messrs R. Golob and J. Egan of World Information Systems, Cambridge, Mass., U.S.A.

The review was issued as

SPC/SPEC/ESCAP/UNEP: Hazardous waste storage and disposal in the South Pacific. UNEP Regional Seas Reports and Studies No. 48. UNEP, 1984. ✓

and the present document reproduces the appendices to the review which were collected by Messrs R. Golob and J. Egan.

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3/ The Country Reports and Topic Reviews have been published by SPC, 1981. For an overview based on these documents see:

- A. L. DAHL and I. L. BAUMGART: The state of the environment in the South Pacific. UNEP Regional Seas Reports and Studies No. 31. UNEP, 1983.

4/ SPC/SPEC/ESCAP/UNEP: Action Plan for managing the natural resources and environment in the South Pacific Region. UNEP Regional Seas Reports and Studies No. 29. UNEP, 1983.

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South Pacific survey  
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enclosed questionnaire for your region and return it to us as soon as possible. If possible, to further reduce time delay, please send the requested information to us by telex to 710-320-1628 WORLDINFO.

Only with a complete set of information from each region can we hope to make an accurate assessment of the hazardous waste situation in the South Pacific. We share your commitment to the assessment and improvement of the South Pacific environment, and we believe that this preliminary study is a vital step toward achieving that goal.

Thank you for your cooperation.

Yours sincerely,

Richard Golob  
Director

Joseph Egan  
Research Associate

RG/ip  
Enclosures

16 October 1982

Ms. Helen R. Hughes  
Acting Commissioner for the Environment  
P.O. Box 10241  
Wellington  
New Zealand

Dear Ms. Hughes:

We are writing to ask your participation in a preliminary survey of hazardous chemical waste storage and disposal in the South Pacific region. World Information Systems, an international environmental research company, is conducting this survey under the direction of the South Pacific Commission. Our survey, which will not include radioactive wastes, is intended to serve as an information tool for governments and policy makers now in the process of assessing the human environment in the South Pacific region.

As part of this urgent survey, we are asking the representatives of numerous governments, industries, and research institutes to assist us by furnishing basic information, bibliographic references, and statistics on local hazardous waste storage and disposal in their immediate region. Specifically, we would appreciate it if you would provide us with data on the following:

- o Types of hazardous wastes stored or disposed of in the past and at present, or planned to be stored or disposed of in your region;
- o Amounts of hazardous wastes stored or disposed of in your region, including whenever possible the sources of these wastes and their countries of origin;
- o Environmental and public health effects, observed or potential, resulting from the hazardous wastes stored or disposed of in your region.

We would be especially grateful to receive copies of any published statistics, technical reports, press articles, and bibliographic listings on this particular subject in your region, and we would be happy to reimburse you for any reasonable reproduction costs, mailing expenses, and telex fees incurred in sending the materials.

Our group is working under very severe time constraints. We ask, therefore, that these materials be mailed to us via airmail special delivery. We would also appreciate it if you would complete the

# WORLD INFORMATION SYSTEMS

P.O. Box 535, Cambridge, Massachusetts 02238, U.S.A.  
Telephone: 617-491-5100 Cable: WORLDINFO TWX: 710-320-1628

## Hazardous Waste Survey under the direction of the South Pacific Commission

Name: \_\_\_\_\_  
Affiliation: \_\_\_\_\_  
Address: \_\_\_\_\_  
Country: \_\_\_\_\_  
Telex: \_\_\_\_\_ Telephone: \_\_\_\_\_

Please complete this questionnaire and return it via airmail to World Information Systems, P.O. Box 535, Cambridge, MA 02238. If possible, please telex the requested information to 710-320-1628 WORLDINFO. If you do not have the requested information, please answer "not available" in the appropriate space. Where necessary, please use additional paper. Thank you for your cooperation.

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INDUSTRY QUESTION

Which of the following operating industries are based in your area?  
(Please check appropriate industries and indicate with an "L" if the industry is locally owned or with an "F" if the industry is owned by a foreign agency.)

- |  |   |
|--|---|
| <input type="checkbox"/> Agricultural Chemicals          | <input type="checkbox"/> Machinery (non-electrical)   |
| <input type="checkbox"/> Agricultural Services           | <input type="checkbox"/> Non-Ferrous Metals           |
| <input type="checkbox"/> Chemical Warehouses             | <input type="checkbox"/> Organic Chemicals & Products |
| <input type="checkbox"/> Drugs                           | <input type="checkbox"/> Paints & Products            |
| <input type="checkbox"/> Electric & Electronic Equipment | <input type="checkbox"/> Paper & Allied Products      |
| <input type="checkbox"/> Explosives                      | <input type="checkbox"/> Petroleum & Coal Products    |
| <input type="checkbox"/> Fabricated Metal Products       | <input type="checkbox"/> Petroleum Refining           |
| <input type="checkbox"/> Ferrous Metals                  | <input type="checkbox"/> Plastics & Synthetics        |
| <input type="checkbox"/> Furniture & Fixtures            | <input type="checkbox"/> Primary Metals               |
| <input type="checkbox"/> Gasoline Service Stations       | <input type="checkbox"/> Printing & Publishing        |
| <input type="checkbox"/> Health Services                 | <input type="checkbox"/> Rubber Products              |
| <input type="checkbox"/> Industrial Inorganic Chemicals  | <input type="checkbox"/> Stone, Clay & Glass Products |
| <input type="checkbox"/> Instruments & Products          | <input type="checkbox"/> Textile Products             |
| <input type="checkbox"/> Leather & Tanning               | <input type="checkbox"/> Transportation Equipment     |
| <input type="checkbox"/> Lumber & Wood Products          | <input type="checkbox"/> Other: _____                 |



**CURRENT HAZARDOUS WASTE STORAGE AND DISPOSAL**

- Please list the primary types and amounts of hazardous wastes that are now being disposed of and stored in your region each year:

<u>Type of Waste</u>	<u>Annual Amount in Tonnes</u>
_____	_____
_____	_____
_____	_____

- Please list the names, addresses, and telex/telephone numbers of the principal hazardous waste storage and disposal companies in your region:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telex/Telephone: \_\_\_\_\_

Type of waste being accepted: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- Please list the names, addresses and telex/telephone numbers of the principal government agencies, if any, responsible for overseeing current hazardous waste management activities:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telex/telephone: \_\_\_\_\_

**PAST HAZARDOUS WASTE STORAGE AND DISPOSAL**

- Please list the primary types and amounts of hazardous wastes that have been disposed of and stored in your region in the past:

<u>Type of Waste</u>	<u>Annual Amount in Tonnes</u>
_____	_____
_____	_____
_____	_____

- What are the names and locations of the industries or government agency that generated the hazardous waste?

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

**FUTURE HAZARDOUS WASTE STORAGE AND DISPOSAL**

- Please describe below any anticipated changes in the hazardous waste streams of the principal industries and government agencies in your area:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Please describe any anticipated projects to increase the disposal and storage capacity of the local hazardous waste management firms:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Please describe any anticipated plans to clean up abandoned waste sites and dispose of the accumulated wastes: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**REGULATIONS AND LEGISLATION**

- Does your government have any legislation for regulating hazardous wastes?

\_\_\_\_\_  
\_\_\_\_\_

- If yes, please send a copy of the legislation, along with the regulations.

**ENVIRONMENTAL IMPACTS/HEALTH EFFECTS**

- Please describe any major hazardous waste incidents, such as a groundwater contamination from an abandoned waste site, or a fire at a waste storage facility: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Please list any potential or actual environmental impacts or health effects resulting from hazardous wastes stored or disposed of in your region: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**BIBLIOGRAPHY**

- Please list below any technical reports, articles, press reports, or other materials related to the storage and disposal of hazardous chemical wastes in your region:

Title/author: \_\_\_\_\_

Publisher: \_\_\_\_\_

Publisher's address: \_\_\_\_\_

Title/author: \_\_\_\_\_

Publisher: \_\_\_\_\_

Publisher's address: \_\_\_\_\_

**CONTACTS**

- Please list the names or institutions of any people that would have additional information on hazardous waste storage and disposal in your area:

Name/affiliation: \_\_\_\_\_

Address: \_\_\_\_\_

Telex/telephone: \_\_\_\_\_

Name/affiliation: \_\_\_\_\_

Address: \_\_\_\_\_

Telex/telephone: \_\_\_\_\_

## Recommendations

The Committee recommends that:

1. the Minister for Home Affairs and Environment seek the adoption by the Australian Environment Council of measures to ensure—
  - (a) generators of hazardous wastes are required to register hazardous wastes whether stored or disposed of on or off the generating site;
  - (b) registration details include the constituents that present potential hazards, the quantities to be stored or disposed of and the manner in which they are to be stored or disposed of;
  - (c) that subsequent to registration, generators keep records of the quantities generated, stored and disposed of and make regular returns of this information to the regulatory authority;
  - (d) regulatory authorities keep abreast of recovery and recycling developments and in their monitoring of the waste stream advise industry on available techniques;
  - (e) hazardous wastes which can be reprocessed economically are not to be landfilled, immobilised or incinerated unless required as a source of energy for incineration;
  - (f) regulatory authorities encourage the re-use of hazardous wastes wherever possible through the operation of waste exchanges;
  - (g) the production and distribution, with financial support from the Commonwealth, of a national waste exchange bulletin containing information supplied by each State and Territory;
  - (h) uniform standards for hazardous waste storage areas are drawn up and implemented as a matter of urgency;
  - (i) storage sites are established by regulatory authorities and those generators lacking adequate storage facilities by required to store their hazardous wastes at them;
  - (j) hazardous waste storage areas are licensed and subject to regular inspection;
  - (k) public access is given to up-to-date records of the types, quantities and location of stored hazardous wastes;
  - (l) the development of national standards for hazardous waste recycling, immobilisation and disposal facilities;

- (m) all operators involved in the handling of hazardous wastes are licensed;
  - (n) regulatory authorities have adequate numbers of trained inspectors to enforce standards;
  - (o) licensed operations be regularly inspected and public access be given to the results of monitoring tests;
  - (p) penalties for non-observance of waste standards and regulations be substantial, including the cancellation of a licence where appropriate;
  - (q) licensing provisions for operators handling hazardous chemicals include the operator having adequate indemnity insurance against accidental damage caused by wastes;
  - (r) a fund be established to finance hazardous waste clean up operations where an operator fails to perform the work within reasonable time. The fund to be financed substantially by levies raised through a licensing system. Costs incurred by the fund in cleaning up should be recovered wherever possible and the fund reimbursed;
  - (s) the development of standards for the safety of waste disposal sites after closure, including appropriate future uses;
  - (t) programs are developed to identify sites of past hazardous waste disposal so that they can be assessed and any necessary remedial action taken;
  - (u) the development of an effective multiple docket system for the regulation of the movement of hazardous wastes;
  - (v) the Maunsell Report on the Management and Disposal of Hazardous Industrial Wastes be made public as soon as possible; and
  - (w) the national strategy of the Australian Environment Council for dealing with hazardous wastes be completed as soon as possible.
2. (a) the Commonwealth urgently seek the views of the States and the Northern Territory on the question of a single national incinerator, and, if appropriate;
  - (b) the Commonwealth approach the New South Wales Government with a view to allowing national access to the Sydney incinerator either through co-operative funding of its construction or through a grant under section 96 of the Constitution.
3. if State Governments have failed to incorporate the Australian Code for the Transport of Dangerous Goods by Road and Rail into legislation by 1985 the Commonwealth should legislate to enforce the Code to the fullest extent of its power.
  4. the Minister for Transport seek through the Australian Transport Advisory Council the development of categories of hazardous wastes for incorporation in the Index of

**Dangerous Goods within the Australian Code for the Transport of Dangerous Goods by Road and Rail.**

**5. Australian Capital Territory**

- (a) the Department of the Capital Territory prepare a hazardous waste disposal strategy as a matter of urgency;
- (b) legislation to effectively regulate the notification, transport and disposal of hazardous wastes in the Australian Capital Territory be prepared and introduced as a matter of urgency;
- (c) an ordinance relating to the control and disposal of radioactive materials in the Australian Capital Territory be introduced within six months of this report being presented and that in the event of this not occurring the Minister for Health make a statement to the House explaining the failure to do so;
- (d) standards for chemical effluent discharge to the sewer in the Australian Capital Territory be developed and incorporated in the Sewerage Regulations, and
- (e) dischargers of chemical waste to the sewerage system be required to register the nature and volumes of the waste with the relevant authority.

**6. Other Commonwealth Responsibilities**

- (a) staffing of the secretariat to the National Advisory Committee on Chemicals be substantially increased to meet its responsibilities;
- (b)
  - (i) all Commonwealth departments and instrumentalities comply with relevant State, Territory or Commonwealth legislation concerning hazardous waste;
  - (ii) for Commonwealth authorities not bound by State or Territory legislation, the Commonwealth develop a set of standards for the regulation of waste disposal consistent with the standards developed by the Australian Environment Council and that there be statutory obligations for those Commonwealth departments and authorities to comply with these standards;
- (c) the Department of Defence test ground and surface water flowing from World War II chemical weapon storage and disposal sites for the presence of chemical leachate;
- (d) Customs (Prohibited Import) Regulations be introduced to prevent the dumping of hazardous waste from overseas;
- (e) Australia seek international machinery to regulate the shipping of hazardous waste between countries and in the meantime notify any countries to which hazardous wastes from Australia are exported;
- (f) in no circumstances should hazardous waste be exported to countries which do not have the facilities required to safely dispose of the waste;

- (g) if State Governments fail to introduce effective waste disposal strategies by 1985 the Commonwealth legislate to control hazardous wastes to the fullest extent of its power;

TABLE 2.1 - HAZARDOUS WASTE GENERATION - AUSTRALIA (TONNES PER ANNUM)

CATEGORY	*NEW SOUTH WALES	#VICTORIA	QUEENSLAND	SOUTH AUSTRALIA	WESTERN AUSTRALIA	TASMANIA	NORTHERN TERRITORY	AUSTRALIAN CAPITAL TERRITORY
1. Persistent	950 plus 7,843 stored	562 plus 1,511 stored		190 in use 6 stored		10 in use	5 in use	0.5
2. Acutely toxic, mutagenic etc.	120 stored	19 stored						
3. Flammable	16,570	10,000 to 20,000 plus 1,109 stored	3,325					
4. Odorous								
5. Explosive, reactive, and oxidising								
6. Toxic metals and organometallics	1,500	200 plus 1,404 stored				100's		
7. Toxic inorganics	30,000							
8. Strongly acidic and caustic (20% +)	25,000		6,675			15		
9. Dusts		600						
10. Gas generating	2,300							
11. Water reactive								
12. Cylinders		11 stored						
13. Miscellaneous	1,350	16 stored						

\* for more detail on wastes in Sydney see Table 2.2  
# for more detail on wastes in Victoria see Table 2.3

NOTE: Blank space does not necessarily indicate a nil quantity.



TABLE 2.2 - HAZARDOUS WASTE QUANTITIES - SYDNEY

CATEGORY	QUANTITY IN TONNES		COMMENT
	GENERATED P.A.	STORED	
1. Persistent Organics	950	7,600	Chlorinated hydrocarbon wastes from the manufacture of plastics and chlorinated solvents.
		108	Liquid P.C.B.
		100	P.C.B. contaminated solids (mainly gravel).
		35	175 x 200 L drums containing P.C.B. contaminated solids.
		660 No.	Failed capacitors containing P.C.B.
			In addition to the above P.C.B. wastes, there is P.C.B. in equipment that is presently operational but will ultimately require disposal.
2. Acutely toxic, mutagenic etc.		120	600 x 200 L drums containing dioxin wastes adsorbed onto activated charcoal.
			Various pesticide wastes produced on a once off basis. The largest volume of these wastes requiring disposal in any one year was 20 tonnes.
3. Flammable	3,640		The combustible floating fraction produced when aqueous wastes are centrifuged.
		5,530	Sludge produced when aqueous wastes are centrifuged.
		1,000	Solvent residues heavily contaminated with pigments, resins and glues (not suitable for recycling)
		2,600	Other wastes delivered in 200 litre drums. They are generally extremely viscous or pasty and are difficult to remove from the drums.
4. Odorous			Wastes produced on a once off basis, volumes are very limited e.g. drums containing residual mercaptans.
5. Explosive, reactive and oxidising			Off specification products of peroxides, whose shelf life has been exceeded and have started to deteriorate e.g. methyl ethyl ketone peroxide, benzoyl peroxide, sodium hypochlorite. These wastes are produced on a once off basis and are explosive and likely to cause fires.
6. Toxic metals and organometallics	1,500		Brine sludges containing 500 ppm of mercury, disposed of by fixing in concrete.
			Organometallics produced on a once off basis during cleaning out of leaded gasoline tanks. These are generally disposed of on the premises at which they are generated.
			Comparatively small volumes of organometallics produced by other sources. Small quantities of arsenic, lead arsenate, etc. frequently require disposal.
7. Toxic inorganics			Small volumes of cyanide wastes frequently require disposal. Until recently cyanides were oxidised by the Lithgow Small Arms Factory but it no longer accepts cyanide wastes.
8. Strongly acidic or caustic wastes			These wastes are produced frequently e.g. during an accident when the sight glass on a tank was broken.
9. Dusts			
10. Gas Generating	2,300		Refinery caustic wastes.
11. Water Reactive			e.g. phosphorous oxychloride, produced on a once off basis and disposed of by ocean dumping.
12. Cylinders			Occasionally miscellaneous cylinders which have their valves rusted on require disposal. The most recent example was a cylinder of

TABLE 2.3 - HAZARDOUS WASTE QUANTITIES - VICTORIA

CATEGORY	QUANTITY IN TONNES		COMMENT
	GENERATED P.A.	STORED	
1. Persistent Organics		73	Consists of P.C.B.'s, contaminated flushing oils, contaminated solids, redundant capacitors.
	562	1,438	Chlorinated hydrocarbons, large reduction expected since the major existing generator will cease producing this waste in 1982. Further, the planned VCM plant at Point Wilson will incinerate its waste on site.
2. Acutely Toxic, Mutagenic etc.	Probably Minor	19	
3. Flammable	430	581	Dirty solvents, material has value as for reclamation or as fuel source in other installations.
	250	30	Sludge.
	116	9	Solvent recovery material from the bottom of stills. Further solvent recovery may be economical which could allow these residues to be disposed of through existing landfill outlets.
	300	212	Waste paint.
	105	120	Raw materials .
	110	157	Other flammables.
	10,000 to 20,000		Combustible oils, the precise quantity is unknown because oil content of many of the emulsion is unknown.
4. Odorous	Unknown	Unknown But Decreasing	
5. Explosive, Reactive, & Oxidising	Unknown	Unknown	
6. Toxic metals & Organo-metallics	200	1,404	
7. Toxic inorganics	Unknown	30 and increasing	
8. Strongly acidic & caustic (20% +)	Probably Minor	Probably Minor	
9. Dusts	600	Unknown But Decreasing	
10. Gas Generating	Probably Minor	Probably Minor	
11. Water Reactive	Probably Minor	Probably Minor	
12. Cylinders	Probably Minor	11	
13. Miscellaneous	Unknown	16	

SUMMARY OF OCEAN DUMPING OPERATIONS OFF EASTERN COAST OF AUSTRALIA  
AS NOTIFIED TO DEPARTMENT OF HOME AFFAIRS AND ENVIRONMENT

JUNE 1978 - FEBRUARY 1982

Substance	Quantity	Date	Location & Depth
Unserviceable Sodium filled exhaust valves	420	June 78	34°00'S, 151°35'E. Gazetted dump site for derelict vessels. (200 metres)
Spent Sulphuric Alkylation Acid	3500 tonnes	July 78	Between 35°45'S 153°49'E to 38°34'S 152°55'E (4000 metres)
Spent Caustic Soda	2500 tonnes	July 78	34 53'S 154°00'E to 36°20'S 153°30'E (4000 metres)
Unserviceable Sodium filled exhaust valves	322	Dec 78	34°00'S, 151°35'E (200 metres)
Spent Caustic Soda	1474 tonnes	April 79	37°18'S, 153°40'E to 38°35'S 153°12'E (4000 metres)
Heat Treatment Salts	8.8 tonnes	May 79	34°10'S 151°55'E (2400 metres)
Spent Sulphuric Alkylation Acid	2493 tonnes	June 79	not less than 150 miles off the coast of Australia, South of 25°S, not less than 100 miles from islands and reefs in Tasman sea.
Jarosite zinc & iron precipitates and traces of heavy metals	199,926 tonnes (dry weight)	July 79 - June 80	43°38'S 148°18'E 8 km radius (2000 metres)
RAN Pontoon/ Lighter	one	Aug 79	33°43'S 151°21'E Artificial Reef (33 metres)

Sodium	350 kg	Sept 1979	34°10'S 151°55'E 2400 metres
Unserviceable Sodium filled exhaust valves	169	Oct 79	34°00'S, 151°35'E (200 metres)
Steel Barge	One	Dec 79	33°43'S, 151°21'E (33 metres)
Steel Dredge DHB 656	One	June 80	33°43'S, 151°21'E (33 metres)
Jarosite (zinc & iron precipitates & traces of heavy metals)	207,631 tonnes (dry wt)	July 80 to June 81	43°38'S, 148°18'E 8 km radius (2000 metres)
ex Manly ferry "Bellubera"	610 tonnes	Aug 80	33°43' 151°21'E Artificial Reef (33 metres)
Unserviceable Sodium filled exhaust valves	138	Aug 80	34°00'S, 151°36'E (200 metres)
Steel Dredge "Coolooli"	900 tonnes	Aug 80	33°43'S, 151°21'E Artificial Reef (33 metres)
Spent Caustic Soda	1900 tonnes	Nov 80	36°33'S 154°11'E to 38°43'S 153°21'E (4000 metres)
Ammunition	2 x 44 Gal. Drums	April 81	26°58.9'S, 153°57.5'E in (2000 metres)
Jarosite (zinc & iron precipitates and traces of heavy metals)	211,231 tonnes (dry wt)	July 81 to June 82	43°38'S, 148°18'E 5n mile radius (2000 metres)
Black Liquor Paper digestion residue (trial)	2650 tonnes	Nov 81	38°00'S 153°07'E to 34°25'S 154°31'E in 4000 metres

Ammunition	150 kg	Dec 81	17°58.5'S 147°21'E in 1030 metres
Bucket dredge	751 tonnes	Feb 82	27°9.81'S 153°22.0'E in 2 metres Artificial reef

Department of Home Affairs  
and Environment  
November 1982

# WORLD INFORMATION SYSTEMS

P.O. Box 535, Cambridge, Massachusetts 02238, U.S.A.  
Telephone: 617-491-5100 Cable: WORLDINFO TWX: 710-320-1628

## Hazardous Waste Survey under the direction of the South Pacific Commission

Name: Helen R. Hughes

Affiliation: Acting Commissioner for the Environment

Address: PO Box 10241, Wellington

Country: New Zealand

Telex: \_\_\_\_\_ Telephone: 04-849-955

Please complete this questionnaire and return it via airmail to World Information Systems, P.O. Box 535, Cambridge, MA 02238. If possible, please telex the requested information to 710-320-1628 WORLDINFO. If you do not have the requested information, please answer "not available" in the appropriate space. Where necessary, please use additional paper. Thank you for your cooperation.

### INDUSTRY QUESTION

Which of the following operating industries are based in your area? (Please check appropriate industries and indicate with an "L" if the industry is locally owned or with an "F" if the industry is owned by a foreign agency.)

- |  |   |
|--|---|
| <u>L/F</u> Agricultural Chemicals          | <u>L/F</u> Machinery (non-electrical)   |
| <u>L</u> Agricultural Services             | <u>L/F</u> Non-Ferrous Metals           |
| <u>L/F</u> Chemical Warehouses             | <u>L/F</u> Organic Chemicals & Products |
| <u>L/F</u> Drugs                           | <u>L/F</u> Paints & Products            |
| <u>L/F</u> Electric & Electronic Equipment | <u>L/F</u> Paper & Allied Products      |
| <u>L/F</u> Explosives                      | <u>L/F</u> Petroleum & Coal Products    |
| <u>L/F</u> Fabricated Metal Products       | <u>L/F</u> Petroleum Refining           |
| <u>L/F</u> Ferrous Metals                  | <u>L</u> Plastics & Synthetics          |
| <u>L</u> Furniture & Fixtures              | <u>L/F</u> Primary Metals               |
| <u>L/F</u> Gasoline Service Stations       | <u>L</u> Printing & Publishing          |
| <u>L</u> Health Services                   | <u>L/F</u> Rubber Products              |
| <u>L/F</u> Industrial Inorganic Chemicals  | <u>L</u> Stone, Clay & Glass Products   |
| <u>L/F</u> Instruments & Products          | <u>L</u> Textile Products               |
| <u>L</u> Leather & Tanning                 | <u>L/F</u> Transportation Equipment     |
| <u>L/F</u> Lumber & Wood Products          | Other: _____                            |

A discrete categorisation into Local or Foreign ownership is not appropriate, as there may be several firms forming an industry and the percentage of shareholding will vary between firms. Generally overseas shareholding is limited to 24.9%, but consent for a greater share ownership may be applied for. It is understood that the majority of applications are approved and that in these cases the

## CURRENT HAZARDOUS WASTE STORAGE AND DISPOSAL

*Q. Please list the primary types and amounts of hazardous wastes that are now being disposed of and stored in your region each year:*

A. The types and amounts of hazardous wastes are not known in detail. Results of surveys undertaken in Wellington, Christchurch and Taranaki are attached.

*Q. Please list the names, addresses and telex/telephone numbers of the principal hazardous waste storage and disposal companies in your region:*

A. Local authorities are the principal disposers of wastes in New Zealand. The following authorities have shown an interest in hazardous waste disposal; their addresses can be found on the address list:

Auckland Regional Authority  
Phone 09-794-420

Christchurch City Council  
Phone 03-791-660

Northland United Council  
Phone 089-84-879

Taranaki United Council  
Phone 067-88-099

Waikato United Council  
Phone 071-81-919

Wellington Regional Council  
Phone 04-845-708

The Auckland Regional Authority has two studies currently underway which are expected to be completed about March 1983. The Planning Department is investigating hazardous activities and the Refuse Department is studying harmful waste disposal.

The Christchurch City Council and Christchurch Metropolitan Refuse Disposal Committee has produced reports, copies of which have been forwarded.

The Northland United Council has accepted an offer from the Ministry of Works and Development to organise an investigatory committee on the disposal of toxic wastes in its area.

The Taranaki United Council would like to conduct a study to gather more accurate information on the nature, quantity and disposal options for various hazardous wastes generated in its region. Wastes from the planned petrochemical industry may justify the establishment of a regional hazardous waste disposal facility.

Other local bodies with an interest in hazardous waste include Regional Water Boards, which are responsible for issuing water rights including those for the disposal of hazardous liquid wastes.

Some private manufacturers dispose of their own hazardous wastes. For example, a chemical manufacturing company has an industrial incinerator for disposal of chemical wastes.

There are a number of waste disposal companies listed in the "yellow pages" of our telephone books. Some of these specify that they handle industrial wastes. To determine whether any of the wastes that they handle are hazardous wastes, each company would need to be approached. Such a survey has recently been attempted in New Zealand (see articles by Jane Francis and Alastair Gunn, dispatched as background material), but the response rate was poor.

- Q. *Please list the names, addresses and telex/telephone numbers of the principal government agencies, if any, responsible for overseeing current hazardous waste management activities:*
- A. The Department of Health has the primary responsibility for overseeing hazardous waste disposal; contact:

The Director-General  
Department of Health  
PO Box 5013  
WELLINGTON

Phone: 04-727-627 Telex: 3571

A number of other government agencies have related responsibilities. The following agencies have an interest in various aspects of hazardous wastes; their addresses can be found on the address list:

Chemistry Division, Department of Scientific and  
Industrial Research  
Phone 04-666-919

Department of Labour  
Phone 04-737-800 Telex: 3441

Ministry of Agriculture and Fisheries  
Phone 04-720-367 Telex: MAFWN 31532

Ministry of Transport  
Phone 04-721-253 Telex: Civair 31524

Water and Soil Conservation Authority  
Phone 04-729-929 Telex: 3844

Ministry of Works and Development  
Phone 04-724-696 Telex: 3844

Standards Association of NZ  
Phone 04-842-108 Telex: Standards 3850



#### PAST HAZARDOUS WASTE STORAGE AND DISPOSAL

*Q. Please list the primary types and amounts of hazardous wastes that have been disposed of and stored in your region in the past:*

A. The types and amounts are not known.

*Q. What are the names and locations of the industries or government agency that generated the hazardous waste?*

A. Not known.

#### FUTURE HAZARDOUS WASTE STORAGE AND DISPOSAL

*Q. Please describe below any anticipated changes in the hazardous waste streams of the principal industries and government agencies in your area:*

A. A number of new industries are either under construction or proposed, and existing industries are being expanded. These include petrochemicals manufacture, synthetic fuels production, metal smelting, and pulp and paper manufacture. Land use changes such as mining and horticulture are increasing. These all have the potential for generating hazardous wastes.

*Q. Please describe any anticipated projects to increase the disposal and storage capacity of the local hazardous waste management firms:*

A. Surveys of hazardous wastes are underway or planned in order to identify where sites should be available. Recently, the Department of Health has completed a five-yearly survey of waste disposal sites. The information obtained can be used to indicate which sites may be suitable for receiving hazardous wastes. A report of this grading exercise will be available, but not until early this year. Discussions can then be held about the designation of suitable landfill sites as hazardous waste disposal sites.

*Q. Please describe any anticipated plans to clean up abandoned waste sites and dispose of the accumulated wastes:*

A. Waste disposal sites are the responsibility of local authorities, and hence cannot strictly be abandoned.

One example of a problem with disposal of hazardous wastes involves the tailings from a closed mine at Te Aroha.

In order for these to be cleaned up, both Government and local authorities will pay for remedial work.

## REGULATIONS AND LEGISLATION

- Q. Does your government have any legislation for regulating hazardous wastes?
- A. A number of Acts contain provisions for regulating hazardous materials and waste materials.

The Local Government Act 1974 contains provisions for local authorities to provide various services including the disposal of trade wastes (Part XXVIII) and the collection and disposal of refuse (Part XXXI), and to preserve public health and well-being (Part XXXV). To carry out these duties authorities may make bylaws (Part XLIII). This Act is administered in the Department of Internal Affairs.

The Health Act 1956 contains restrictions on offensive trades (sections 54 and 55). This Act is administered in the Department of Health.

The Toxic Substances Act 1979 enables those substances defined as toxic to be controlled (see section 7). It also allows for the importation of toxic substances to be prohibited (see section 33). Regulations can be made under the Act (see section 82) to control the disposal of containers that have been used to convey, hold or store toxic substances. The Act has not come fully into force, although regulations have been drafted. This Act is administered in the Department of Health.

Similar acts are the Pesticides Act 1979, which regulates the sale and use of pesticides, and the Animal Remedies Act 1967, which regulates the sale and use of animal remedies. These Acts are administered in the Ministry of Agriculture and Fisheries.

The Marine Division of the Ministry of Transport has responsibility under the Marine Pollution Act 1974 for the disposal of hazardous waste at sea. However, no hazardous waste apart from low-level radioactive waste material is disposed of by dumping at sea in New Zealand waters. Other divisions of the Ministry have an interest in the disposal of hazardous wastes through the Standing Advisory Committee on the Transport of Hazardous Substances. The carriage of hazardous substances is regulated in Acts which are administered by the Ministry.

Other hazardous substances are controlled by the Explosives Act 1957 and the Dangerous Goods Act 1974. These Acts are administered in the Department of Labour. Although the Dangerous Goods Act 1974, and regulations pursuant to it, make no specific provision relating to storage or disposal of hazardous materials there is a requirement that all substances defined as dangerous goods be packed, marked, handled, carried, stored and used in accordance with the provisions of the Act. There is also a requirement

to purge containers of any remaining dangerous goods or flammable vapour or gas before selling or disposing of a container which has held dangerous goods.

An Inspector of Dangerous Goods has powers to destroy or render harmless any dangerous goods for public safety reasons. The actual disposal of hazardous industrial wastes is considered to be a matter between local authorities and industry, but Inspectors are available to advise.

Other legislation which can affect the disposal of hazardous wastes include the Water and Soil Conservation Act 1967, the Town and Country Planning Act 1977, and the Soil Conservation and Rivers Control Act 1941. These Acts are administered in the Ministry of Works and Development.

Standards to cover the transport of hazardous substances are being completed by the Standards Association of New Zealand. These are "Transportation containers for hazardous substances NZS 5418 parts 1 and 2", and "Code of practice for the transport of hazardous substances on land NZS 5433".

*Q. If yes, please send a copy of the legislation, along with the regulations.*

A. Relevant parts of the above Acts have been sent separately.

#### ENVIRONMENTAL IMPACTS/HEALTH EFFECTS

*Q. Please describe any major hazardous waste incidents, such as a groundwater contamination from an abandoned waste site, or a fire at a waste storage facility:*

A. Although there have been incidents involving hazardous substances, few of these have involved waste disposal sites. One problem arose when toxic metals leached from the tailings of a closed mine at Te Aroha into a stream used for water supply (see the reply to the question on abandoned waste sites).

In general New Zealand has not had any major incidents. Accidental spillages have caused localised incidents. The major problem with these has been inadequate labelling of toxic materials.

*Q. Please list any potential or actual environmental impacts or health effects resulting from hazardous wastes stored or disposed of in your region:*

A. A number of electrical capacitors containing PCBs are nearing the end of their useful life. In order to minimise the entry of PCBs into the environment, a trial incineration was undertaken in a cement kiln; a report on this was sent. Negotiations are under way for further disposal to be undertaken.

Dangerous goods are stored in various locations throughout New Zealand. These are a potential problem.

BIBLIOGRAPHY

- Q. *Please list below any technical reports, articles, press reports, or other materials related to the storage and disposal of hazardous chemical wastes in your region:*
- A. Material on this subject has been forwarded to you under separate cover. A bibliography is attached.
- ...

POL 4/1C

BIBLIOGRAPHY OF MATERIAL RELATED TO HAZARDOUS WASTES

Animal Remedies Act 1967: pp 354-5

Auckland Regional Authority (1982): Letter notifying that submissions will be received for the Regional Planning Scheme Review - planning for hazardous activities.

Christchurch City Council, City Health Department (1981): Report of the Working Party on the disposal of toxic and hazardous wastes.

Christchurch Metropolitan Refuse Disposal Committee (1982): The next step in dealing with hazardous and toxic waste.

Dangerous Goods Act 1974: pp 915-6

Davis K R (1980): The collection and disposal of liquid industrial wastes Report 81.192 to the Water and Soil Management and Regional Recreation Committee.

Department of Health (1982): Explanatory memorandum on the Refuse Disposal Survey 1982.

Explosives Act 1957: pp 361-2

Forbes R (1982): 'Toxic wastes in the environment' in New Zealand Environment 35; pp 15-18.

Francis J and Gunn A (1982): 'Hazardous wastes in the Waikato' in Waikato Environment 3: p 2-5.

Gunn A and Francis J (1982): 'Hazardous wastes - an overview' in New Zealand Environment 35: pp 7-12.

Harding John (1980): Draft background paper on hazardous waste disposal in New Zealand.

Health Act 1956: pp 1450-2, 1490-2, 1547.

Howell D J (1977): Hazardous substances - safe practice and administration. Paper presented to the New Zealand Institute of Industrial Safety Seminar on the handling, transport and storage of hazardous substances, July 1977.

Local Government Act 1974: pp 77, 84-90, 458-468, 488-92, 525-27 582-82.

Marine Pollution Act 1974: pp 729-30, 760-1.

Marine Pollution Amendment Act 1980: pp 484, 486-492.

Ministry of Transport, et al: Transport of hazardous substances (pamphlet).

Moody T (1980): The experience of the (Christchurch) City Health Department in disposing of wastes.

Pesticides Act 1979: pp 402-3.

Soil Conservation and Rivers Control Act 1941: pp 3064-8.

Town and Country Planning Act 1977: pp 2232-5, 2245-6 2346-7.

Toxic Substances Act 1979: pp 449-50, 456-8, 473, 500-4.

Water and Soil Conservation Act 1967: pp 1703-6.

WELLINGTON	m <sup>3</sup> /yr to landfill
Paints and paint residues	1,600
Acids	621
Alkalis	1,063
Oils, wastes, including fats and sludges	2,026
Solvents	22
Other chemicals (including herbicides and pesticides)	340
Emulsions (eg latex)	48
Organic wastes	1,062
Miscellaneous	172

TARANAKI	m <sup>3</sup> /yr
Drilling mud	1
Chemicals, sludges (herbicides and pesticides)	5
Organic pathogenic incubator material	10
Silicate sludges	250-500
Sodium dichromate	0.1
Lead sulphate	0.36
Caustic	4
Cable drawing liquor	34
Zinc slurry	1.2
Hydrogen peroxide	5.5
Oil	4.5
Mercury wastes	0.05

<u>Type of Waste</u>	<u>Annual Quantity*</u>	<u>Methods of Disposal</u>
1. <u>Acids</u>		
(a) Liquids and sludges	35,000 l	- Disposal companies - Diluted & down drains - Soak pits on property
(b) Acid tar	60,000 k	- Acid tar is dumped
2. <u>Caustics</u>		
(a) Liquids and sludges	208,000 l	- Disposal companies - Neutralization of wastes in soak pits
(b) Slaked lime (sludge and water)	3,700,000 l	- Disposal companies used by tanneries
3. <u>Cyanides</u>		
(a) Liquids and sludges	2,360 l	- Stored to allow breathe-down & dumped
(b) Solids	1,000 k	- Diluted and drained
(c) Salts (AgCH: NaCN)	500 k	- Disposal companies
4. <u>Degreasing Chemicals</u>		
(a) Liquids and sludges	17,500 l	- Disposal companies - Diluted and drained - Soak pits
4. <u>Solvents and Thinners</u>		
(a) Liquids	65,000 l	- Small amounts in general rubbish - Disposal companies - Fire service practice - Reused
5. <u>Oils and Lubricants</u>		
(a) Sludges	1,700,000 l	- Disposal companies
(b) Waste Oil	38,800 l	- Some recycled - Some burnt as fuel
(c) Oil impregnated filter earth	9,000 k	- Dust settling
(d) Wax sludges	250,000 l	- Soak pits
6. <u>Paints</u>		
(a) Sludges	50,000 l	- With general rubbish
(b) Solids	16,000 k	- Washed down drains
7. <u>Polyurethane</u>		
(a) Raw materials	600 l	- Tipped, burning produces toxic gases
(b) Excess foam	40,000 l	
(c) Offcuts/rejects	300 m <sup>3</sup>	
8. <u>Fibreglass</u>		
(a) Dusts in solution	5,000 l	- Disposal companies
(b) Offcuts/dry dusts	5,400 m <sup>3</sup>	- Tipped
9. <u>Dyes and Inks</u>		
(a) Liquids	400 k	- Tipped
(b) Solids	5,000 l	
10. <u>Other Factory Sludges</u>		
(a) Fluoride-Acid sludges	50 m <sup>3</sup>	- Disposal companies
(b) Furnace Extractor sludge (contains metals)	500,000 l	
11. <u>Timber Preservation Chemicals</u>		
(a) Sludge (high sulphate arsenic content)	6,000 l	- Onto wood waste and tipped
12. <u>Chemicals and Pharmaceuticals</u>		
(a) Various types and quantities		- Treatment and tipped

\* l = litres: k = kilograms: m<sup>3</sup> = cubic metres



# WORLD INFORMATION SYSTEMS

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## Hazardous Waste Survey under the direction of the South Pacific Commission

Name: D. G. Koteka

Affiliation: Secretary of Health

Address: Ministry of Health

Country: Cook Islands

Telex: \_\_\_\_\_ Telephone: \_\_\_\_\_

Please complete this questionnaire and return it via airmail to World Information Systems, P.O. Box 535, Cambridge, MA 02238. If possible, please telex the requested information to 710-320-1628 WORLDINFO. If you do not have the requested information, please answer "not available" in the appropriate space. Where necessary, please use additional paper. Thank you for your cooperation.

### INDUSTRY QUESTION

Which of the following operating industries are based in your area?  
(Please check appropriate industries and indicate with an "L" if the industry is locally owned or with an "F" if the industry is owned by a foreign agency.)

- |   |  |
|---|--|
| <input type="checkbox"/> Agricultural Chemicals               | <input type="checkbox"/> Machinery (non-electrical)          |
| <input checked="" type="checkbox"/> Agricultural Services     | <input type="checkbox"/> Non-Ferrous Metals                  |
| <input type="checkbox"/> Chemical Warehouses                  | <input type="checkbox"/> Organic Chemicals & Products        |
| <input type="checkbox"/> Drugs                                | <input type="checkbox"/> Paints & Products                   |
| <input type="checkbox"/> Electric & Electronic Equipment      | <input type="checkbox"/> Paper & Allied Products             |
| <input type="checkbox"/> Explosives                           | <input type="checkbox"/> Petroleum & Coal Products           |
| <input type="checkbox"/> Fabricated Metal Products            | <input type="checkbox"/> Petroleum Refining                  |
| <input type="checkbox"/> Ferrous Metals                       | <input type="checkbox"/> Plastics & Synthetics               |
| <input type="checkbox"/> Furniture & Fixtures                 | <input type="checkbox"/> Primary Metals                      |
| <input checked="" type="checkbox"/> Gasoline Service Stations | <input type="checkbox"/> Printing & Publishing               |
| <input checked="" type="checkbox"/> Health Services           | <input type="checkbox"/> Rubber Products                     |
| <input type="checkbox"/> Industrial Inorganic Chemicals       | <input type="checkbox"/> Stone, Clay & Glass Products        |
| <input type="checkbox"/> Instruments & Products               | <input type="checkbox"/> Textile Products                    |
| <input type="checkbox"/> Leather & Tanning                    | <input checked="" type="checkbox"/> Transportation Equipment |
| <input type="checkbox"/> Lumber & Wood Products               | <input type="checkbox"/> Other: _____                        |

**CURRENT HAZARDOUS WASTE STORAGE AND DISPOSAL**

- Please list the primary types and amounts of hazardous wastes that are now being disposed of and stored in your region each year:

<u>Type of Waste</u>	<u>Annual Amount in Tonnes</u>
<u>Nil</u>	<u></u>
<u></u>	<u></u>
<u></u>	<u></u>

- Please list the names, addresses, and telex/telephone numbers of the principal hazardous waste storage and disposal companies in your region:

Name: N.A.

Address: \_\_\_\_\_

Telex/Telephone: \_\_\_\_\_

Type of waste being accepted: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- Please list the names, addresses and telex/telephone numbers of the principal government agencies, if any, responsible for overseeing current hazardous waste management activities:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telex/telephone: \_\_\_\_\_

**PAST HAZARDOUS WASTE STORAGE AND DISPOSAL**

- Please list the primary types and amounts of hazardous wastes that have been disposed of and stored in your region in the past:

<u>Type of Waste</u>	<u>Annual Amount in Tonnes</u>
<u>Nil</u>	<u></u>
<u></u>	<u></u>
<u></u>	<u></u>

- What are the names and locations of the industries or government agency that generated the hazardous waste?

Name: Nil

Address: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

**FUTURE HAZARDOUS WASTE STORAGE AND DISPOSAL**

- Please describe below any anticipated changes in the hazardous waste streams of the principal industries and government agencies in your area:

None anticipated  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Please describe any anticipated projects to increase the disposal and storage capacity of the local hazardous waste management firms:

Nil  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Please describe any anticipated plans to clean up abandoned waste sites and dispose of the accumulated wastes:

None  
\_\_\_\_\_  
\_\_\_\_\_

**REGULATIONS AND LEGISLATION**

- Does your government have any legislation for regulating hazardous wastes?

\_\_\_\_\_  
\_\_\_\_\_

- If yes, please send a copy of the legislation, along with the regulations.

**ENVIRONMENTAL IMPACTS/HEALTH EFFECTS**

- Please describe any major hazardous waste incidents, such as a groundwater contamination from an abandoned waste site, or a fire at a waste storage facility: None

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- Please list any potential or actual environmental impacts or health effects resulting from hazardous wastes stored or disposed of in your region: None

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**BIBLIOGRAPHY**

- Please list below any technical reports, articles, press reports, or other materials related to the storage and disposal of hazardous chemical wastes in your region:

Title/author: None

Publisher: \_\_\_\_\_

Publisher's address: \_\_\_\_\_

Title/author: \_\_\_\_\_

Publisher: \_\_\_\_\_

Publisher's address: \_\_\_\_\_

**CONTACTS**

- Please list the names or institutions of any people that would have additional information on hazardous waste storage and disposal in your area:

Name/affiliation: Nil

Address: \_\_\_\_\_

Telex/telephone: \_\_\_\_\_

Name/affiliation: \_\_\_\_\_

Address: \_\_\_\_\_

Telex/telephone: \_\_\_\_\_

# WORLD INFORMATION SYSTEMS

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Hazardous Waste Survey  
under the direction of the South Pacific Commission

Name: RUTH HARNISH (MRS).  
Affiliation: MURI WOMENS VILLAGE COMMITTEE  
Address: BOX 1 - RAROTONGA.  
Country: COOK ISLANDS  
Telex: \_\_\_\_\_ Telephone: 2652 RAROTONGA.

Please complete this questionnaire and return it via airmail to World Information Systems, P.O. Box 535, Cambridge, MA 02238. If possible, please telex the requested information to 710-320-1628 WORLDINFO. If you do not have the requested information, please answer "not available" in the appropriate space. Where necessary, please use additional paper. Thank you for your cooperation.

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INDUSTRY QUESTION

Which of the following operating industries are based in your area?  
(Please check appropriate industries and indicate with an "L" if the industry is locally owned or with an "F" if the industry is owned by a foreign agency.)

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> Agricultural Chemicals          | <input checked="" type="checkbox"/> Machinery (non-electrical)   |
| <input checked="" type="checkbox"/> Agricultural Services           | <input checked="" type="checkbox"/> Non-Ferrous Metals           |
| <input checked="" type="checkbox"/> Chemical Warehouses             | <input checked="" type="checkbox"/> Organic Chemicals & Products |
| <input checked="" type="checkbox"/> Drugs                           | <input checked="" type="checkbox"/> Paints & Products            |
| <input checked="" type="checkbox"/> Electric & Electronic Equipment | <input checked="" type="checkbox"/> Paper & Allied Products      |
| <input checked="" type="checkbox"/> Explosives                      | <input checked="" type="checkbox"/> Petroleum & Coal Products    |
| <input checked="" type="checkbox"/> Fabricated Metal Products       | <input checked="" type="checkbox"/> Petroleum Refining           |
| <input checked="" type="checkbox"/> Ferrous Metals                  | <input checked="" type="checkbox"/> Plastics & Synthetics        |
| <input checked="" type="checkbox"/> Furniture & Fixtures            | <input checked="" type="checkbox"/> Primary Metals               |
| <input checked="" type="checkbox"/> Gasoline Service Stations       | <input checked="" type="checkbox"/> Printing & Publishing        |
| <input checked="" type="checkbox"/> Health Services                 | <input checked="" type="checkbox"/> Rubber Products              |
| <input checked="" type="checkbox"/> Industrial Inorganic Chemicals  | <input checked="" type="checkbox"/> Stone, Clay & Glass Products |
| <input checked="" type="checkbox"/> Instruments & Products          | <input checked="" type="checkbox"/> Textile Products             |
| <input checked="" type="checkbox"/> Leather & Tanning               | <input checked="" type="checkbox"/> Transportation Equipment     |
| <input checked="" type="checkbox"/> Lumber & Wood Products          | <input checked="" type="checkbox"/> Other: _____                 |

**CURRENT HAZARDOUS WASTE STORAGE AND DISPOSAL**

- Please list the primary types and amounts of hazardous wastes that are now being disposed of and stored in your region each year:

<u>Type of Waste</u>	<u>Annual Amount in Tonnes</u>
<u>NIL</u>	<u>NIL</u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>

- Please list the names, addresses, and telex/telephone numbers of the principal hazardous waste storage and disposal companies in your region:

Name:   NIL  

Address:  

Telex/Telephone:  

Type of waste being accepted:   NIL  

- Please list the names, addresses and telex/telephone numbers of the principal government agencies, if any, responsible for overseeing current hazardous waste management activities:

Name:   NIL  

Address:  

Telex/telephone:  

**PAST HAZARDOUS WASTE STORAGE AND DISPOSAL**

- Please list the primary types and amounts of hazardous wastes that have been disposed of and stored in your region in the past:

<u>Type of Waste</u>	<u>Annual Amount in Tonnes</u>
<u>NIL</u>	<u>NIL</u>
<u> </u>	<u> </u>
<u> </u>	<u> </u>

- What are the names and locations of the industries or government agency that generated the hazardous waste?

Name: N/A

Address: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

**FUTURE HAZARDOUS WASTE STORAGE AND DISPOSAL**

- Please describe below any anticipated changes in the hazardous waste streams of the principal industries and government agencies in your area:

N/A

- Please describe any anticipated projects to increase the disposal and storage capacity of the local hazardous waste management firms:

None

- Please describe any anticipated plans to clean up abandoned waste sites and dispose of the accumulated wastes:

N/A

**REGULATIONS AND LEGISLATION**

- Does your government have any legislation for regulating hazardous wastes?

No

- If yes, please send a copy of the legislation, along with the regulations.

**ENVIRONMENTAL IMPACTS/HEALTH EFFECTS**

- Please describe any major hazardous waste incidents, such as a groundwater contamination from an abandoned waste site, or a fire at a waste storage facility: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- Please list any potential or actual environmental impacts or health effects resulting from hazardous wastes stored or disposed of in your region: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**BIBLIOGRAPHY**

- Please list below any technical reports, articles, press reports, or other materials related to the storage and disposal of hazardous chemical wastes in your region:

Title/author: \_\_\_\_\_  
 Publisher: \_\_\_\_\_ *N/A* \_\_\_\_\_  
 Publisher's address: \_\_\_\_\_

Title/author: \_\_\_\_\_  
 Publisher: \_\_\_\_\_ *N/A* \_\_\_\_\_  
 Publisher's address: \_\_\_\_\_

**CONTACTS**

- Please list the names or institutions of any people that would have additional information on hazardous waste storage and disposal in your area:

Name/affiliation: \_\_\_\_\_  
 Address: \_\_\_\_\_ *NIL* \_\_\_\_\_  
 Telex/telephone: \_\_\_\_\_

Name/affiliation: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Telex/telephone: \_\_\_\_\_



- 36 -

IN REPLY PLEASE QUOTE:

T.P.2/1/68-4



DIRECTORATE OF TOWN & COUNTRY PLANNING  
P.O. BOX 2350  
GOVERNMENT BUILDINGS  
SUVA, FIJI

3rd February, 1983.

Mr. Richard Golob,  
World Information Systems,  
P.O. Box 535,  
Cambridge,  
Massachusetts 02238,  
U.S.A.

Dear Sir,

re; Hazardous Waste Survey

First of all let me apologise to you for the delay in responding to your request for information on the above survey.


As I have mentioned to you in my letter T.P.2/1/68-4 of 4th November, 1982, I circulated copies of your questionnaire and letter to other government departments and ad hoc bodies for information. Some of the agencies have responded while others are still working on them. The Government Pharmacist has informed me that because of misunderstanding, he has posted the questionnaire directly to you.

I must also emphasise that there is a dearth of information on hazardous waste disposal and storage. I also suspect that a great deal of chemical coming to Fiji under the general category of pesticides, weedicides or insecticides, are banned in many overseas countries. There has been concern over the use of fertilizers, which, if not properly controlled, have adverse effect on the environment.

Most of the industries in Fiji are relatively clean, but is <sup>NOT</sup> likely to remain so for long. Pressures for development are great and some noxious industries are likely to be established in the not too distant future.

I am afraid it has not been possible to furnish all the information as requested in the questionnaire and the letter. Two of the Government Departments are still working on it and as soon as the information come into hand, I shall post them to you.

Yours faithfully,

  
(M.S. Hannif)

for Director of Town and Country Planning

ISE/zr

# WORLD INFORMATION SYSTEMS

P.O. Box 535, Cambridge, Massachusetts 02238, U.S.A.  
Telephone: 617-491-5100 Cable: WORLDINFO TWX: 710-320-1628

Hazardous Waste Survey  
under the direction of the South Pacific Commission

Name: M. S. HANNIF

Affiliation: MINISTRY OF LANDS, LOCAL GOVERNMENT AND HOUSING

Address: DEPT. OF TOWN AND COUNTRY PLANNING, PO BOX 2350 GOVT. BLDE

Country: FIJI

Telex: \_\_\_\_\_ Telephone: 211790

Please complete this questionnaire and return it via airmail to World Information Systems, P.O. Box 535, Cambridge, MA 02238. If possible, please telex the requested information to 710-320-1628 WORLDINFO. If you do not have the requested information, please answer "not available" in the appropriate space. Where necessary, please use additional paper. Thank you for your cooperation.

## INDUSTRY QUESTION

Which of the following operating industries are based in your area? (Please check appropriate industries and indicate with an "L" if the industry is locally owned or with an "F" if the industry is owned by a foreign agency.)

- |  |   |
|--|---|
| <input type="checkbox"/> Agricultural Chemicals ( <i>imported</i> ) <u>L/F</u> | <input type="checkbox"/> Machinery (non-electrical)             |
| <input type="checkbox"/> Agricultural Services                                 | <input type="checkbox"/> Non-Ferrous Metals                     |
| <input type="checkbox"/> Chemical Warehouses                                   | <input type="checkbox"/> Organic Chemicals & Products           |
| <input type="checkbox"/> Drugs ( <i>imported</i> )                             | <input checked="" type="checkbox"/> Paints & Products           |
| <input type="checkbox"/> Electric & Electronic Equipment                       | <input checked="" type="checkbox"/> Paper & Allied Products     |
| <input type="checkbox"/> Explosives ( <i>imported</i> )                        | <input checked="" type="checkbox"/> Petroleum & (Coal Products) |
| <input checked="" type="checkbox"/> Fabricated Metal Products ( <i>imp</i> )   | <input type="checkbox"/> Petroleum Refining                     |
| <input type="checkbox"/> Ferrous Metals  | <input checked="" type="checkbox"/> Plastics & Synthetics       |
| <input checked="" type="checkbox"/> Furniture & Fixtures                       | <input type="checkbox"/> Primary Metals                         |
| <input checked="" type="checkbox"/> Gasoline Service Stations                  | <input checked="" type="checkbox"/> Printing & Publishing       |
| <input checked="" type="checkbox"/> Health Services                            | <input type="checkbox"/> Rubber Products                        |
| <input checked="" type="checkbox"/> Industrial Inorganic Chemicals             | <input type="checkbox"/> Stone, Clay & Glass Products           |
| <input type="checkbox"/> Instruments & Products                                | <input type="checkbox"/> Textile Products                       |
| <input type="checkbox"/> Leather & Tanning                                     | <input checked="" type="checkbox"/> Transportation Equipment    |
| <input checked="" type="checkbox"/> Lumber & Wood Products                     | <input checked="" type="checkbox"/> Other: _____                |

**CURRENT HAZARDOUS WASTE STORAGE AND DISPOSAL**

- Please list the primary types and amounts of hazardous wastes that are now being disposed of and stored in your region each year:

<u>Type of Waste</u>	<u>Annual Amount in Tonnes</u>
N/A	

- Please list the names, addresses, and telex/telephone numbers of the principal hazardous waste storage and disposal companies in your region:

N/A

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telex/Telephone: \_\_\_\_\_

Type of waste being accepted: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- Please list the names, addresses and telex/telephone numbers of the principal government agencies, if any, responsible for overseeing current hazardous waste management activities:

Name: MINISTRY OF HEALTH

Address: GOVERNMENT BUILDING

Telex/telephone: 211212

**PAST HAZARDOUS WASTE STORAGE AND DISPOSAL**

- Please list the primary types and amounts of hazardous wastes that have been disposed of and stored in your region in the past:

<u>Type of Waste</u>	<u>Annual Amount in Tonnes</u>
N/A	

- What are the names and locations of the industries or government agency that generated the hazardous waste?

EMPEROR GOLD MINES,

Name: \_\_\_\_\_

Address: VATUKOULA, FIJI (EVIDENCE CYANIDE FOUND)

Name: FIJI SUGAR CORPORATION

Address: LAUTIDICA, FIJI

**FUTURE HAZARDOUS WASTE STORAGE AND DISPOSAL**

- Please describe below any anticipated changes in the hazardous waste streams of the principal industries and government agencies in your area:

N/A

- Please describe any anticipated projects to increase the disposal and storage capacity of the local hazardous waste management firms:

N/A

- Please describe any anticipated plans to clean up abandoned waste sites and dispose of the accumulated wastes: N/A

**REGULATIONS AND LEGISLATION**

- Does your government have any legislation for regulating hazardous wastes?

YES (Public Health) legislation

- If yes, please send a copy of the legislation, along with the regulations.

ENVIRONMENTAL IMPACTS/HEALTH EFFECTS

- Please describe any major hazardous waste incidents, such as a groundwater contamination from an abandoned waste site, or a fire at a waste storage facility: Death of fish in Sabasa River due to disposal of waste from sugar mill

- Please list any potential or actual environmental impacts or health effects resulting from hazardous wastes stored or disposed of in your region: N/A

BIBLIOGRAPHY

- Please list below any technical reports, articles, press reports, or other materials related to the storage and disposal of hazardous chemical wastes in your region:

Title/author: N/A  
 Publisher: \_\_\_\_\_  
 Publisher's address: \_\_\_\_\_

Title/author: \_\_\_\_\_  
 Publisher: \_\_\_\_\_  
 Publisher's address: \_\_\_\_\_

CONTACTS

- Please list the names or institutions of any people that would have additional information on hazardous waste storage and disposal in your area:

Name/affiliation: DR. R.N. DUBE / MINISTRY OF AGRICULTURE & HEALTH  
 Address: KORONIVA RESEARCH STATION  
 Telex/telephone: 47044

Name/affiliation: DONALD BASS, MINISTRY OF HEALTH  
 Address: CENTRAL BOARD OF HEALTH, GOVT BUILDING  
 Telex/telephone: 211212

# WORLD INFORMATION SYSTEMS

P.O. Box 535, Cambridge, Massachusetts 02238, U.S.A.  
Telephone: 617-491-5100 Cable: WORLDINFO TWX: 710-320-1628

Hazardous Waste Survey  
under the direction of the South Pacific Commission

Name: V. K. GARIB.  
Affiliation: MINISTRY OF HEALTH  
Address: P. O. Box 106  
Country: SUVA, FIJI ISLANDS.  
Telex: — Telephone: 22857

Please complete this questionnaire and return it via airmail to World Information Systems, P.O. Box 535, Cambridge, MA 02238. If possible, please telex the requested information to 710-320-1628 WORLDINFO. If you do not have the requested information, please answer "not available" in the appropriate space. Where necessary, please use additional paper. Thank you for your cooperation.

-----  
INDUSTRY QUESTION

Which of the following operating industries are based in your area?  
(Please check appropriate industries and indicate with an "L" if the industry is locally owned or with an "F" if the industry is owned by a foreign agency.)

- |  |   |
|--|---|
| <input type="checkbox"/> Agricultural Chemicals            | <input type="checkbox"/> Machinery (non-electrical)       |
| <input checked="" type="checkbox"/> Agricultural Services  | <input type="checkbox"/> Non-Ferrous Metals               |
| <input type="checkbox"/> Chemical Warehouses               | <input type="checkbox"/> Organic Chemicals & Products     |
| <input checked="" type="checkbox"/> Drugs                  | <input checked="" type="checkbox"/> Paints & Products     |
| <input type="checkbox"/> Electric & Electronic Equipment   | <input type="checkbox"/> Paper & Allied Products          |
| <input type="checkbox"/> Explosives                        | <input type="checkbox"/> Petroleum & Coal Products        |
| <input type="checkbox"/> Fabricated Metal Products         | <input type="checkbox"/> Petroleum Refining               |
| <input type="checkbox"/> Ferrous Metals                    | <input type="checkbox"/> Plastics & Synthetics            |
| <input type="checkbox"/> Furniture & Fixtures              | <input type="checkbox"/> Primary Metals                   |
| <input type="checkbox"/> Gasoline Service Stations         | <input checked="" type="checkbox"/> Printing & Publishing |
| <input checked="" type="checkbox"/> Health Services        | <input type="checkbox"/> Rubber Products                  |
| <input type="checkbox"/> Industrial Inorganic Chemicals    | <input type="checkbox"/> Stone, Clay & Glass Products     |
| <input type="checkbox"/> Instruments & Products            | <input type="checkbox"/> Textile Products                 |
| <input type="checkbox"/> Leather & Tanning                 | <input type="checkbox"/> Transportation Equipment         |
| <input checked="" type="checkbox"/> Lumber & Wood Products | <input type="checkbox"/> Other: _____                     |

CURRENT HAZARDOUS WASTE STORAGE AND DISPOSAL

- Please list the primary types and amounts of hazardous wastes that are now being disposed of and stored in your region each year:

Type of Waste	Annual Amount in Tonnes
N/A	N/A.

- Please list the names, addresses, and telex/telephone numbers of the principal hazardous waste storage and disposal companies in your region:

Name: NOT AVAILABLE

Address: \_\_\_\_\_

Telex/Telephone: \_\_\_\_\_

Type of waste being accepted: \_\_\_\_\_

- Please list the names, addresses and telex/telephone numbers of the principal government agencies, if any, responsible for overseeing current hazardous waste management activities:

Name: THE SECRETARY, PHARMACY & POISONS BOARD

Address: MINISTRY OF HEALTH

Telex/telephone: SUVA, FITI Phone 211309

PAST HAZARDOUS WASTE STORAGE AND DISPOSAL

- Please list the primary types and amounts of hazardous wastes that have been disposed of and stored in your region in the past:

Type of Waste	Annual Amount in Tonnes
N/A	

ENVIRONMENTAL IMPACTS/HEALTH EFFECTS

- Please describe any major hazardous waste incidents, such as a groundwater contamination from an abandoned waste site, or a fire at a waste storage facility: \_\_\_\_\_

NO

- Please list any potential or actual environmental impacts or health effects resulting from hazardous wastes stored or disposed of in your region: \_\_\_\_\_

NIL

BIBLIOGRAPHY

- Please list below any technical reports, articles, press reports, or other materials related to the storage and disposal of hazardous chemical wastes in your region:

Title/author: NIL

Publisher: \_\_\_\_\_

Publisher's address: \_\_\_\_\_

Title/author: \_\_\_\_\_

Publisher: \_\_\_\_\_

Publisher's address: \_\_\_\_\_

CONTACTS

- Please list the names or institutions of any people that would have additional information on hazardous waste storage and disposal in your area:

Name/affiliation: NOT KNOWN

Address: \_\_\_\_\_

Telex/telephone: \_\_\_\_\_

Name/affiliation: \_\_\_\_\_

Address: \_\_\_\_\_

Telex/telephone: \_\_\_\_\_



Hazardous Waste Survey  
Page Two

- What are the names and locations of the industries or government agency that generated the hazardous waste?

Name: \_\_\_\_\_ N/A \_\_\_\_\_

Address: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

FUTURE HAZARDOUS WASTE STORAGE AND DISPOSAL

- Please describe below any anticipated changes in the hazardous waste streams of the principal industries and government agencies in your area:

\_\_\_\_\_ N/A \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- Please describe any anticipated projects to increase the disposal and storage capacity of the local hazardous waste management firms:

\_\_\_\_\_ — \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- Please describe any anticipated plans to clean up abandoned waste sites and dispose of the accumulated wastes:

\_\_\_\_\_ — \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

REGULATIONS AND LEGISLATION

- Does your government have any legislation for regulating hazardous wastes?

\_\_\_\_\_ N/A \_\_\_\_\_  
 \_\_\_\_\_

- If yes, please send a copy of the legislation, along with the regulations.

MEMORANDUM

GP 137

<p><i>From</i>.....The Permanent Secretary for Agriculture &amp; Fisheries</p> <p><i>To</i>.....The Directors, Town and Country Planning</p> <p>Re: Survey of Hazardous Chemical</p> <p><u>Waste Storage and Disposal in The South Pacific Region</u></p> <p>(Your reference memo dated 2/11/82.....)</p>	<p>Phone No. 311233</p> <p>File No. 15/1</p> <p>Date 9/11/1982</p>
---	--

Attention: Mr M.S. Hannif

As you havestated in your above quoted memorandum the details required are unlikely to be available from a single source. It seems you will have to compile a consolidated reply.

My ministry is responsible for registration of pesticides. We are neither involved in nor responsible for manufacture of agro-chemicals. Some pesticides are used on research stations and in demonstration plots by Ministry of Agriculture & Fisheries.

Ministry of Agriculture and Fisheries through appropriate undertakings is involved in sales of pesticides in some areas. In addition veterinary drugs are used and sold to farmers.

Generally agro-chemicals and veterinary drugs are stored in proper secured places. Expired veterinary drugs are destroyed by burrying or burning. As to agro-chemicals, in the recent years we have not disposed off unsaleable of old stock. Generally recommendation for agro-chemicals empty container disposal is by burrying. This is normally observed in case of use by the Department. Farmers may tend to clean to reuse.

I do not consider Ministry of Agriculture & Fisheries is involved in hazardous chemical waste storage and disposal. We are mainly involved in storage of finished agro-chemicals and fertilizers.

I have replied in view of the above in this manner rather than getting the questionnaire and trust you will find the information useful.

N.P. Patel  
for Permanent Secretary for  
Agriculture & Fisheries

# WORLD INFORMATION SYSTEMS

P.O. Box 535, Cambridge, Massachusetts 02238, U.S.A.  
Telephone: 617-491-5100 Cable: WORLDINFO TWX: 710-320-1628

## Hazardous Waste Survey under the direction of the South Pacific Commission

Name: FIJI SUGAR CORPORATION LTD

Affiliation: -

Address: G.P.O. Box 283, SUVA, FIJI

Country: FIJI.

Telex: 2119 FSC FJ Telephone: 313455

Please complete this questionnaire and return it via airmail to World Information Systems, P.O. Box 535, Cambridge, MA 02238. If possible, please telex the requested information to 710-320-1628 WORLDINFO. If you do not have the requested information, please answer "not available" in the appropriate space. Where necessary, please use additional paper. Thank you for your cooperation.

### INDUSTRY QUESTION

Which of the following operating industries are based in your area?  
(Please check appropriate industries and indicate with an "L" if the industry is locally owned or with an "F" if the industry is owned by a foreign agency.)

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> L Agricultural Chemicals    | <input checked="" type="checkbox"/> L Machinery (non-electrical)          |
| <input checked="" type="checkbox"/> L Agricultural Services     | <input type="checkbox"/> Non-Ferrous Metals                               |
| <input type="checkbox"/> Chemical Warehouses                    | <input type="checkbox"/> Organic Chemicals & Products                     |
| <input type="checkbox"/> Drugs                                  | <input type="checkbox"/> Paints & Products                                |
| <input type="checkbox"/> Electric & Electronic Equipment        | <input type="checkbox"/> Paper & Allied Products                          |
| <input type="checkbox"/> Explosives                             | <input type="checkbox"/> Petroleum & Coal Products                        |
| <input checked="" type="checkbox"/> L Fabricated Metal Products | <input type="checkbox"/> Petroleum Refining                               |
| <input type="checkbox"/> Ferrous Metals                         | <input type="checkbox"/> Plastics & Synthetics                            |
| <input type="checkbox"/> Furniture & Fixtures                   | <input type="checkbox"/> Primary Metals                                   |
| <input checked="" type="checkbox"/> L Gasoline Service Stations | <input type="checkbox"/> Printing & Publishing                            |
| <input type="checkbox"/> Health Services                        | <input type="checkbox"/> Rubber Products                                  |
| <input type="checkbox"/> Industrial Inorganic Chemicals         | <input type="checkbox"/> Stone, Clay & Glass Products                     |
| <input type="checkbox"/> Instruments & Products                 | <input type="checkbox"/> Textile Products                                 |
| <input type="checkbox"/> Leather & Tanning                      | <input type="checkbox"/> Transportation Equipment                         |
| <input type="checkbox"/> Lumber & Wood Products                 | <input checked="" type="checkbox"/> L Other: <u>Raw Sugar Manufacture</u> |

CURRENT HAZARDOUS WASTE STORAGE AND DISPOSAL

- Please list the primary types and amounts of hazardous wastes that are now being disposed of and stored in your region each year:

<u>Type of Waste</u>	<u>Annual Amount in Tonnes</u>
SLUDGE	
EX-GOLD EXTRACTION	NA

- Please list the names, addresses, and telex/telephone numbers of the principal hazardous waste storage and disposal companies in your region:

Name: EMPEROR GOLD MINING CO. LTD

Address: POST OFFICE, VATUKOULA, FIJI.

Telex/Telephone: Telephone 114

Type of waste being accepted: Disposed - sludge from Gold processing plant.

- Please list the names, addresses and telex/telephone numbers of the principal government agencies, if any, responsible for overseeing current hazardous waste management activities:

Name: MINISTRY OF HEALTH

Address: SUVA, FIJI

Telex/telephone: 211212

PAST HAZARDOUS WASTE STORAGE AND DISPOSAL

- Please list the primary types and amounts of hazardous wastes that have been disposed of and stored in your region in the past:

<u>Type of Waste</u>	<u>Annual Amount</u>	<u>Tonnes</u>
NA	NA	

Hazardous Waste Survey  
Page Two

- What are the names and locations of the industries or government agency that generated the hazardous waste?

Name: NA

Address: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

FUTURE HAZARDOUS WASTE STORAGE AND DISPOSAL

- Please describe below any anticipated changes in the hazardous waste streams of the principal industries and government agencies in your area:

NA  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Please describe any anticipated projects to increase the disposal and storage capacity of the local hazardous waste management firms:

NA  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Please describe any anticipated plans to clean up abandoned waste sites and dispose of the accumulated wastes: NA

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

REGULATIONS AND LEGISLATION

- Does your government have any legislation for regulating hazardous wastes?

NOT AWARE OF ANY  
\_\_\_\_\_

- If yes, please send a copy of the legislation, along with the regulations. -

**ENVIRONMENTAL IMPACTS/HEALTH EFFECTS**

- Please describe any major hazardous waste incidents, such as a groundwater contamination from an abandoned waste site, or a fire at a waste storage facility: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Please list any potential or actual environmental impacts or health effects resulting from hazardous wastes stored or disposed of in your region: \_\_\_\_\_

Radiation from French Nuclear Tests  
\_\_\_\_\_  
\_\_\_\_\_

**BIBLIOGRAPHY**

- Please list below any technical reports, articles, press reports, or other materials related to the storage and disposal of hazardous chemical wastes in your region:

Title/author: \_\_\_\_\_ NA  
Publisher: \_\_\_\_\_ NA  
Publisher's address: \_\_\_\_\_ NA

Title/author: \_\_\_\_\_ NA  
Publisher: \_\_\_\_\_ NA  
Publisher's address: \_\_\_\_\_ NA

**CONTACTS**

- Please list the names or institutions of any people that would have additional information on hazardous waste storage and disposal in your area:

Name/affiliation: \_\_\_\_\_ MINISTRY OF HEALTH.  
Address: \_\_\_\_\_ SUVA, FIJI  
Telex/telephone: \_\_\_\_\_ -

Name/affiliation: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telex/telephone: \_\_\_\_\_

# WORLD INFORMATION SYSTEMS

P.O. Box 535, Cambridge, Massachusetts 02238, U.S.A.  
Telephone: 617-491-5100 Cable: WORLDINFO TWX: 710-320-1628

Hazardous Waste Survey  
under the direction of the South Pacific Commission

Name: SECRETARY

Affiliation: MINISTRY OF HEALTH AND FAMPLAN

Address: BIKEMBEU TARAUA

Country: REPUBLIC OF KIRIBATI

Telex: \_\_\_\_\_ Telephone: \_\_\_\_\_

Please complete this questionnaire and return it via airmail to World Information Systems, P.O. Box 535, Cambridge, MA 02238. If possible, please telex the requested information to 710-320-1628 WORLDINFO. If you do not have the requested information, please answer "not available" in the appropriate space. Where necessary, please use additional paper. Thank you for your cooperation.

-----  
**INDUSTRY QUESTION**

Which of the following operating industries are based in your area?  
(Please check appropriate industries and indicate with an "L" if the industry is locally owned or with an "F" if the industry is owned by a foreign agency.)

- |   |   |
|---|---|
| <input type="checkbox"/> Agricultural Chemicals                     | <input type="checkbox"/> Machinery (non-electrical)       |
| <input checked="" type="checkbox"/> Agricultural Services           | <input type="checkbox"/> Non-Ferrous Metals               |
| <input checked="" type="checkbox"/> Chemical Warehouses             | <input type="checkbox"/> Organic Chemicals & Products     |
| <input type="checkbox"/> Drugs                                      | <input type="checkbox"/> Paints & Products                |
| <input checked="" type="checkbox"/> Electric & Electronic Equipment | <input type="checkbox"/> Paper & Allied Products          |
| <input type="checkbox"/> Explosives                                 | <input type="checkbox"/> Petroleum & Coal Products        |
| <input type="checkbox"/> Fabricated Metal Products                  | <input type="checkbox"/> Petroleum Refining               |
| <input type="checkbox"/> Ferrous Metals                             | <input type="checkbox"/> Plastics & Synthetics            |
| <input checked="" type="checkbox"/> Furniture & Fixtures            | <input type="checkbox"/> Primary Metals                   |
| <input checked="" type="checkbox"/> Gasoline Service Stations       | <input checked="" type="checkbox"/> Printing & Publishing |
| <input checked="" type="checkbox"/> Health Services                 | <input type="checkbox"/> Rubber Products                  |
| <input type="checkbox"/> Industrial Inorganic Chemicals             | <input type="checkbox"/> Stone, Clay & Glass Products     |
| <input type="checkbox"/> Instruments & Products                     | <input type="checkbox"/> Textile Products                 |
| <input type="checkbox"/> Leather & Tanning                          | <input type="checkbox"/> Transportation Equipment         |
| <input type="checkbox"/> Lumber & Wood Products                     | <input type="checkbox"/> Other: _____                     |

CURRENT HAZARDOUS WASTE STORAGE AND DISPOSAL

- Please list the primary types and amounts of hazardous wastes that are now being disposed of and stored in your region each year:

Type of Waste	Annual Amount in Tonnes
Metals (old cars)	approx 20/year

- Please list the names, addresses, and telex/telephone numbers of the principal hazardous waste storage and disposal companies in your region:

Name: NIL

Address: \_\_\_\_\_

Telex/Telephone: \_\_\_\_\_

Type of waste being accepted: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- Please list the names, addresses and telex/telephone numbers of the principal government agencies, if any, responsible for overseeing current hazardous waste management activities:

Name: Clerk to Teinainane Urban Council

Address: Teoraereke, Tarawa, Rep. of Kiribati

Telex/telephone: \_\_\_\_\_

PAST HAZARDOUS WASTE STORAGE AND DISPOSAL

- Please list the primary types and amounts of hazardous wastes that have been disposed of and stored in your region in the past:

Type of Waste	Annual Amount in Tonnes

NIL



- What are the names and locations of the industries or government agency that generated the hazardous waste?

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

*NIL*

**FUTURE HAZARDOUS WASTE STORAGE AND DISPOSAL**

- Please describe below any anticipated changes in the hazardous waste streams of the principal industries and government agencies in your area:

*Domestic waste will be used for  
CONTROLLED TIPPING → RECLAMATION*

- Please describe any anticipated projects to increase the disposal and storage capacity of the local hazardous waste management firms:

*AS ABOVE*

- Please describe any anticipated plans to clean up abandoned waste sites and dispose of the accumulated wastes:

*AS ABOVE*

**REGULATIONS AND LEGISLATION**

- Does your government have any legislation for regulating hazardous wastes?

*Yes*

- If yes, please send a copy of the legislation, along with the regulations.

ENVIRONMENTAL IMPACTS/HEALTH EFFECTS

- Please describe any major hazardous waste incidents, such as a groundwater contamination from an abandoned waste site, or a fire at a waste storage facility: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Please list any potential or actual environmental impacts or health effects resulting from hazardous wastes stored or disposed of in your region: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

BIBLIOGRAPHY

- Please list below any technical reports, articles, press reports, or other materials related to the storage and disposal of hazardous chemical wastes in your region:

Title/author: \_\_\_\_\_  
Publisher: \_\_\_\_\_  
Publisher's address: \_\_\_\_\_

Title/author: \_\_\_\_\_  
Publisher: \_\_\_\_\_  
Publisher's address: \_\_\_\_\_

CONTACTS

- Please list the names or institutions of any people that would have additional information on hazardous waste storage and disposal in your area:

Name/affiliation: Secretary Ministry of Health TTI?  
Address: BIKENBEU TARITUA KEOF KIRIBATI  
Telex/telephone: \_\_\_\_\_

Name/affiliation: SECRETARY MINISTRY NATURAL RESOURCES + DEVELOPMENT  
Address: BITIRI TARITUA KEOF KIRIBATI  
Telex/telephone: \_\_\_\_\_

# WORLD INFORMATION SYSTEMS

P.O. Box 535, Cambridge, Massachusetts 02238, U.S.A.  
Telephone: 617-491-5100 Cable: WORLDINFO TWX: 710-320-1628

## Hazardous Waste Survey under the direction of the South Pacific Commission

Name: S. Leonardo, Second Secretary.  
 Affiliation: Ministry of Lands & Natural Resources  
 Address: P.O. Box 22, Port Vila,  
 Country: Vanuatu.  
 Telex: 1040 VANLOV NH Telephone: 3105.

Please complete this questionnaire and return it via airmail to World Information Systems, P.O. Box 535, Cambridge, MA 02238. If possible, please telex the requested information to 710-320-1628 WORLDINFO. If you do not have the requested information, please answer "not available" in the appropriate space. Where necessary, please use additional paper. Thank you for your cooperation.

### INDUSTRY QUESTION

Which of the following operating industries are based in your area?  
 (Please check appropriate industries and indicate with an "L" if the industry is locally owned or with an "F" if the industry is owned by a foreign agency.)

- |   |   |
|---|---|
| <input type="checkbox"/> Agricultural Chemicals               | <input type="checkbox"/> Machinery (non-electrical)   |
| <input type="checkbox"/> Agricultural Services                | <input type="checkbox"/> Non-Ferrous Metals           |
| <input type="checkbox"/> Chemical Warehouses                  | <input type="checkbox"/> Organic Chemicals & Products |
| <input type="checkbox"/> Drugs                                | <input type="checkbox"/> Paints & Products            |
| <input type="checkbox"/> Electric & Electronic Equipment      | <input type="checkbox"/> Paper & Allied Products      |
| <input type="checkbox"/> Explosives                           | <input type="checkbox"/> Petroleum & Coal Products    |
| <input checked="" type="checkbox"/> Fabricated Metal Products | <input type="checkbox"/> Petroleum Refining           |
| <input type="checkbox"/> Ferrous Metals                       | <input type="checkbox"/> Plastics & Synthetics        |
| <input checked="" type="checkbox"/> Furniture & Fixtures      | <input type="checkbox"/> Primary Metals               |
| <input checked="" type="checkbox"/> Gasoline Service Stations | <input type="checkbox"/> Printing & Publishing        |
| <input type="checkbox"/> Health Services                      | <input type="checkbox"/> Rubber Products              |
| <input type="checkbox"/> Industrial Inorganic Chemicals       | <input type="checkbox"/> Stone, Clay & Glass Products |
| <input type="checkbox"/> Instruments & Products               | <input type="checkbox"/> Textile Products             |
| <input type="checkbox"/> Leather & Tanning                    | <input type="checkbox"/> Transportation Equipment     |
| <input type="checkbox"/> Lumber & Wood Products               | <input type="checkbox"/> Other: _____                 |

- What are the names and locations of the industries or government agency that generated the hazardous waste?

Name: NA

Address: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

**FUTURE HAZARDOUS WASTE STORAGE AND DISPOSAL**

- Please describe below any anticipated changes in the hazardous waste streams of the principal industries and government agencies in your area:

NA  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Please describe any anticipated projects to increase the disposal and storage capacity of the local hazardous waste management firms:

NA  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Please describe any anticipated plans to clean up abandoned waste sites and dispose of the accumulated wastes:

None.  
\_\_\_\_\_  
\_\_\_\_\_

**REGULATIONS AND LEGISLATION**

- Does your government have any legislation for regulating hazardous wastes?

No.  
\_\_\_\_\_  
\_\_\_\_\_

- If yes, please send a copy of the legislation, along with the regulations.

CURRENT HAZARDOUS WASTE STORAGE AND DISPOSAL

- Please list the primary types and amounts of hazardous wastes that are now being disposed of and stored in your region each year:

Type of Waste	Annual Amount in Tonnes
<u>NA</u>	

- Please list the names, addresses, and telex/telephone numbers of the principal hazardous waste storage and disposal companies in your region:

Name: NA

Address: \_\_\_\_\_

Telex/Telephone: \_\_\_\_\_

Type of waste being accepted: \_\_\_\_\_

\_\_\_\_\_

- Please list the names, addresses and telex/telephone numbers of the principal government agencies, if any, responsible for overseeing current hazardous waste management activities:

Name: Health Inspector.

Address: Port Vila Municipality P.O. Box 99

Telex/telephone: 2113

PAST HAZARDOUS WASTE STORAGE AND DISPOSAL

- Please list the primary types and amounts of hazardous wastes that have been disposed of and stored in your region in the past:

Type of Waste	Annual Amount in Tonnes
<u>NA</u>	

### Impacts of Pesticide Spills

Excerpts from "Marine Environment Impact of Land-Based Activities in the Trust Territory of the Pacific Islands," by Marjorie V. C. Falanruw of the U.S. Forest Service, presented at a Unesco Conference in Papua New Guinea during July 1980.

#### Pesticide Spills

Little is known about the distribution of chlorinated hydrocarbons in reef organisms and less about their specific effects (Ferguson Wood and Johannes, 1975). Instances of damage from pesticide spills, however, are reported by a number of authors. Marschall (1976) reports that after the use of the chlorinated hydrocarbon lindane to control the coconut rhinoceros beetle (Xyloryctes jamaicensis Drury) and the accidental spill of one bag into the lagoon of Nukunono Atoll in the Tokelaus, all corals in a 2-kilometer section of the lagoon along the Motu Te Kakai were dead, with the exception of Porites. Alcyonarian corals and algae typical of waste-polluted waters were absent, and Acanthaster were uncommon in the area. No similar damage was noted in other parts of Nukunono Lagoon where lindane had not been used.

The use of lindane and other chlorinated hydrocarbons was not very effective in controlling the beetle and was abandoned in favor of biological controls between 1967 and 1970. In 1975, six years after the initial survey following the lindane contamination, the lagoon of the Motu Te Kakai was again surveyed, and much of the area was still dead. The only corals in recovered areas were species of Pocillopora.

Marschall (1976) reported that a bag of DDT, accidentally thrown

**ENVIRONMENTAL IMPACTS/HEALTH EFFECTS**

- Please describe any major hazardous waste incidents, such as a groundwater contamination from an abandoned waste site, or a fire at a waste storage facility: \_\_\_\_\_

*None.*  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Please list any potential or actual environmental impacts or health effects resulting from hazardous wastes stored or disposed of in your region: \_\_\_\_\_

*None*  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**BIBLIOGRAPHY**

- Please list below any technical reports, articles, press reports, or other materials related to the storage and disposal of hazardous chemical wastes in your region:

Title/author: \_\_\_\_\_  
Publisher: \_\_\_\_\_  
Publisher's address: \_\_\_\_\_

Title/author: \_\_\_\_\_  
Publisher: \_\_\_\_\_  
Publisher's address: \_\_\_\_\_

**CONTACTS**

- Please list the names or institutions of any people that would have additional information on hazardous waste storage and disposal in your area:

Name/affiliation: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telex/telephone: \_\_\_\_\_

Name/affiliation: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telex/telephone: \_\_\_\_\_

into the lagoon on the atoll of Fakaofu in the Tokelaus, in May 1975, resulted in the death of thousands of fish in the days that followed. His laboratory tests showed that DDT in extremely small quantities could kill corals.

In the past, large amounts of pesticides were shipped to the Trust Territory. Some of these substances have spilled into the water, as in the following examples:

On 17 April 1970, 15 to 25 tons of fish suddenly died in the Truk Lagoon. Six people who ate them were hospitalized (Bourns, 1970). Samples of these fish were sent for analysis and found to contain the pesticide Endrin in the highest concentrations recorded in fish up to that time.

On Yap, during April 1973, approximately 132 liters of Endrin which had become mixed with spilled crystals of sodium arsenite went through two septic tanks and into a freshwater stream and then into an estuarine bay. This spill resulted in the death of everything in the stream and a fish kill in the bay beyond, as well as some dead seabirds and rats, and some sick chickens along the stream and bay. Water samples taken along the river on 5 May, after heavy rains had flushed the river, indicated decreasing levels of arsenic from 22.6 to 0.015 milligram per liter with increasing distance from the spill.

Observations of the contaminated bay, and of a nearby control bay that was not in the path of the flow, were made two weeks after the spill. No fish were seen, and no live plankton were collected in the contaminated bay, while both were abundant in the uncontaminated bay. Forty-five days after the spill, three observers traveling up the contaminated bay for 50 minutes saw no marine life. In contrast, a



period of 8 minutes spent in the uncontaminated bay resulted in the sighting of seven fish and three schools of belonid and/or hemiramphid fish. Plankton tows made in the bays showed that by this time at least planktonic life was returning to the contaminated bay.

Another spill of approximately 19 liters of pesticide into the waters of Yap Harbor resulted in dead fish being seen from the Donguch to the Madrich side of the harbor.

Following the Yap spill, action by the Trust Territory Environmental Protection Branch (TTEPB) and the U.S. Environmental Protection Agency (EPA) resulted in the removal of banned pesticides from Yap Island. Also eventually removed from Yap were about 2,900 kilograms of 10 percent DDT; about 3,860 kilograms of 52 percent sodium arsenite from Truk; 370 kilograms of 75 percent DDT from Majuro; and 680 and 340 kilograms of DDT from Woleai and Ulithi atolls, respectively.

Pesticides in the Trust Territory are now regulated by Trust Territory Pesticide Regulations, Chapter 13, Subchapter IV, Title 63, Trust Territory Code. This regulation is intended to control the importation, use, and disposal of all pesticides in the Trust Territory. It requires that all pesticides sold be registered by the U.S. EPA and that importers of restricted pesticides (those determined by EPA or TTEPB to be especially dangerous) be licensed by the TTEPB, and that they inform the TTEPB of any orders placed, or arrivals of such pesticides. In addition, users of restricted pesticides must be certified and pass an examination and be recertified from time to time. Such applicators are monitored from time to time. Stockpiling of pesticide supplies in the Trust Territory is now kept to a minimum.

U.S. Military Installations in the South Pacific

<u>Name of Installation</u>	<u>Location</u>	<u>Acreage</u>	<u>Major Function</u>
NAS, Agana (Navy)	Agana, Guam	2,502	Patrol, Electricity, Warfare Aircraft
Naval Public Works Center	Agana, Guam	2,005	Facilities Support
Naval Reg. Medical Center	Agana, Guam	113	Health Care
Naval Facility, Guam	Agana, Guam	322	Oceanography
Naval Ship Repair Facility, Guam	Agana, Guam	185	Fleet Maintenance
Naval Communications Area Master Station	Naha Okin, Guam	4,804	Communications
Naval Magazine, Guam	Naha Okin, Guam	8,842	Ammunition Storage
Naval Station, Guam	Naha Okin, Guam	28,967	Fleet Storage
Naval Supply Depot	Naha Okin, Guam	1,558	Supply Support
Anderson Air Force Base	Agana, Guam	11,083	Strategic Wing
Kwajalein Missile Range (Army)	Kwajalein, Trust Territory	3,568	National Test Range
Eniwetok Atoll AAF (Air Force)	Trust Territory	200	Range
Birnie Island Tracking Annex (Air Force)	Gilbert Island	138	Range
Hull Island Tracking Annex (Air Force)	Gilbert Island	4,580	Range

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Naval Facilities Annual Hazardous Waste

Generation for Guam

1980

<u>Product</u>	<u>Quantity</u>
Acid	12,400 gals
Caustics	260 gals
Anti-freeze (ethylene glycol)	231 gals
Paint thinner	289 gals
Paint sludge	1,506 gals
Lacquer thinner	151 gals
Waste oils and solvents	36,000 gals
Nonchlorinated solvents (unspecified)	1,285 gals
Dry cleaning solvent (PD-680)	4,520 gals
Carbon removing compound	300 gals
Gamlin	55 gals
Cleaning compound	1,000 gals
Agitene	660 gals
Ethyl acetate	67 gals
Methyl ethyl ketone	118 gals
Xylene	180 gals
Freon	420 gals
Toluene	42 gals
Isopropyl alcohol	28 gals
Turco	800 gals
Trichlorotrifluoroethane	60 gals
Trichloroethane	22 gals
Trichloroethylene	35 gals
Perchloroethylene	Unspecified
Otto fuel	55 gals
Otto fuel - contaminated materials	300 lbs
Nonreclamable oil	379 gals
Vacuum pump oil	2 gals
Antifouling paint	388 gals
Hydraulic fluid	60 gals
Cutting fluid	25 gals
AFFF	80 gals
Misc. outdated or spoiled drugs	75 lbs
Photographic solutions	4,554 gals
Chromic acid	477 gals
Asbestos	5,010 lbs
Beryllium dust	Unspecified
Sodium chromate	500 lbs
Sodium hypochlorite	250 gals
Sodium nitrite solution	72,000 gals

<u>Product</u>	<u>Quantity</u>
Ammonium hydroxide	20 gals
Calcium hypochlorite	500 lbs
Mercury solution	Unspecified
Mercury	40 lbs
Heavy metal solution	800 gals

Source: Guam Hazardous Wastes Management Plan, Final Report  
Pacific Basin Environmental Consultants, September  
1981.

**TABLE 2-2 - HAZARDOUS WASTE GENERATION\*, GUAM, 1977 (SHEET 1 OF 1)**

Waste Material	Source	Annual Quantity
Digested Sludge (Dry Weight)	Wastewater Treatment Plant (Department of Public Works)	490 Metric Tons 550 English Tons
Hospital Wastes	Hospital	133,000 Kilograms 292,000 Pounds
Lime Slurry (Calcium Hydroxide)	Acetylene Manufacturing	82,000 Kilograms 180,000 Pounds
Petroleum Waste Products		
• Bilge Water	Tuna Ship Maintenance	15,000 Liters 4,000 Gallons
• Oil-Contaminated Sand	Refinery	164,000 Kilograms 361,000 Pounds
• Oil Sludge	Refinery	125,000 Liters 33,000 Gallons
• Tank Bottom Sediments	- Petroleum Bulk Storage Facilities (Tank Cleaning)	35,000 Liters 9,000 Gallons
	- Refinery	125,000 Liters 33,000 Gallons
• Tetraethyl Lead Sludge	Petroleum Bulk Storage Facilities (Tank Cleaning)	15,000 Liters 4,000 Gallons
	- Airport	4,000 Liters 1,000 Gallons
• Waste Lubricating Oils	- Construction Firms	171,000 Liters 45,000 Gallons
	- Department of Public Works (Government)	148,000 Liters 39,000 Gallons
	- Private Vehicles	595,000 Liters 157,000 Gallons
Spent Pesticide Containers** (Glass, Metal, Paper, Plastic)	Construction Firms and Pest Control Firms	60 Items
Water Treatment Residue	Bottling Plant	190,000 Liters 50,000 Gallons

\* Does not include military.

\*\* Assumes 30 gallon drum is average container size.

TABLE 2-5 - FIVE- AND TEN-YEAR PROJECTIONS OF HAZARDOUS WASTE GENERATION, GUAM, 1977 (SHEET 1 OF 1)

Waste Material	1977		1982		1987	
	Metric	English	Metric	English	Metric	English
Hospital Wastes (Kilograms/Pounds)	133,000	292,000	161,000	354,000	190,000	417,000
Lime Slurry (Kilograms/Pounds)	82,000	180,000	55,000	121,000	55,000	121,000
Petroleum Waste Products						
• Bilge Water (Liters/Gallons)	15,000	4,000	16,000	4,200	18,000	4,800
• Oil-Contaminated Sand (Kilograms/Pounds)	164,000	361,000	219,000	482,000	273,000	601,000
• Tank Bottom Sediments (Liters/Gallons)	160,000	42,000	215,000	57,000	268,000	71,000
• Tetraethyl Lead Sludge (Liters/Gallons)	15,000	4,000	18,000	5,000	21,000	6,000
• Waste Lubricating Oil (Liters/Gallons)	918,000	242,000	1,125,000	296,000	1,315,000	346,000
Spent Pesticide Containers (Items)		60 Items		75 Items		85 Items
Water Treatment Residue (Liters/Gallons)	190,000	50,000	207,000	55,000	225,000	59,000
Population		84,701		102,709		120,718

TABLE 2-6 - EVALUATION OF CURRENT HAZARDOUS WASTE MANAGEMENT PRACTICES, GUAM, 1977 (SHEET 1 OF 1)

Waste Material	Storage Method (Meets Criteria?)	Collection Method (Meets Criteria?)	Treatment Method (Meets Criteria?)	Disposal Method (Meets Criteria?)
Digested Sewage Sludge (Commercial and Agat)	Sand Beds (Yes)	None	Air Drying (Yes)	Distributed for Horticultural Use (Yes)
Lime Slurry (Calcium Hydroxide)	Steel Drums (Yes)	Truck (Yes)	None	Buried at Landfill (Yes)
Oil-Contaminated Bilge Water	Steel Drums (Yes)	Truck (Yes)	None	Buried at Landfill (Yes)
Oil-Contaminated Sand	Concrete Basin (Yes)	Truck (Yes)	Biodegradation (Yes)	Waste Oil Farming (Yes)
Pathological/Infectious Wastes	Plastic Bags (Yes)	Hand/Truck (Yes)	None	Incineration (Yes)
Spent Pesticide Containers	None	None	Rinsing (No)	Buried at Point of Use (No)
Suspended and Unusable Pesticides	Locked Storehouse (Yes); Unlocked Shed (No); Tarped (No); Open to Weather (No)	N/A	N/A	N/A
Tank Bottom Sediments	None; Steel Drums (Yes)	Pipe Network (Yes); Truck (Yes)	Biodegradation (Yes)	Waste Oil Farming (Yes); Buried at Landfill (No)
Tetraethyl Lead Sludge	Steel Drums (Yes)	Truck (Yes)	None	Buried at Landfill (No)
Waste Oil: • Airport • Government • Industry - 90 Percent - 5 Percent - 3 Percent - 2 Percent	Steel Drums (Yes) Steel Drums (Yes) Concrete Tanks (Yes) Pond (Yes) Steel Drums (Yes) Steel Drums (Yes)	Truck (Yes) Truck (Yes) Pipe Network (Yes) None Truck (Yes) Truck (Yes)	None None Evaporation/Biodegradation (Yes) None None None	Buried at Landfill (No) Dust Control (No) Waste Oil Farming (Yes) Open Burning (No) Dust Control (No) Buried at Landfill (No)
Water Treatment Residue	None	None	None	Severs (Yes)

Table 1. List of Firms and Government Agencies Surveyed for Hazardous/Toxic wastes. Class of material abbreviations: Flammable (F), Combustible (C), Poison (P) Corrosive (A), Etiologic Agent (E), Compressed Gas (G), Oxidizer (O), Other Regulated Material (ORM)

CONTACTS	CLASS OF MATERIALS	ANNUAL AMOUNT OF WASTE GENERATED	EXISTING ON-ISLAND TREATMENT STORAGE (T)(X)(O) DISPOSAL	PART A HAZARDOUS WASTE APPLICANT	RECEIVED NOTIFICATION PACKET	CURRENT OFF-ISLAND DISPOSAL
<u>CONSTRUCTION AND COMMERCIAL PEST CONTROL</u>						
Heights Termite Control	P	Unknown Number Empty Containers	S	No	No	NO
Island wide Termite and Post Control	P	Unknown Number Empty Containers	D	No	No	No
J and G Modular Homes	P	Six Empty Drums	S	No	No	No
Kaiser Cement and Gypsum	C	Unknown		No	No	No
MSI Foam	F	Four Empty Drums	S, D	No	No	No
Commercial Sanitation	None	---	---	Yes	Yes	No
Santos Termite and Pest Control	None	---	---	No	No	No
Windward Hills Golf and Country Club	None	---	---	No	No	No



CONTACTS	CLASS OF MATERIALS	ANNUAL AMOUNT OF WASTE GENERATED	EXISTING ON-ISLAND TREATMENT STORAGE (TXS)(0)	PART A HAZARDOUS WASTE APPLICANT	RECEIVED NOTIFICATION PACKET	CURRENT OFF - ISLAND DISPOSAL
<p><u>GOVERNMENT OF GUAM</u></p> <p>Agriculture Animal Industry Division Extension Service - Inarajan Extension Service - Mangilao Forestry and Soil Division Plant Industry Division</p>	<p>P None None None P</p>	<p>Unknown --- --- --- Unknown</p>	<p>T, D --- --- --- S</p>	<p>No No No No No</p>	<p>No No No No No</p>	<p>No No No No No</p>
<p>Air Terminal</p>	<p>A, F</p>	<p>50 Gallons</p>	<p>T, D</p>	<p>No</p>	<p>No</p>	<p>No</p>
<p>Commercial Port</p>	<p>A, C</p>	<p>1450 Gallons</p>	<p>S</p>	<p>No</p>	<p>Yes</p>	<p>No</p>
<p>Education Maintenance</p>	<p>P</p>	<p>One Empty Drum</p>	<p>S, D</p>	<p>No</p>	<p>No</p>	<p>No</p>
<p>Schools Dededo Jr. High</p>	<p>C, A, F, P, ORM</p>	<p>Unknown</p>	<p>T, D</p>	<p>No</p>	<p>No</p>	<p>No</p>
<p>Inarajan Jr. High</p>	<p>C, A, F, P, ORM</p>	<p>Unknown</p>	<p>T, D</p>	<p>No</p>	<p>No</p>	<p>No</p>
<p>JFK</p>	<p>C, A, F, P, ORM</p>	<p>200 Gallons</p>	<p>T, D</p>	<p>No</p>	<p>No</p>	<p>No</p>
<p>GMHS</p>	<p>C, A, F, P, ORM</p>	<p>200 Gallons</p>	<p>T, D</p>	<p>No</p>	<p>No</p>	<p>No</p>
<p>Sanchez Jr. High</p>	<p>C, A, F, P, ORM</p>	<p>Unknown</p>	<p>T, D</p>	<p>No</p>	<p>No</p>	<p>No</p>

Table 1. Continued.

CONTACTS	CLASS OF MATERIALS	ANNUAL AMOUNT OF WASTE GENERATED	EXISTING ON-ISLAND TREATMENT STORAGE DISPOSAL (TXS)(0)	PART A HAZARDOUS WASTE APPLICANT	RECEIVED NOTIFICATION PACKET	CURRENT OFF-ISLAND DISPOSAL
Parks and Recreation Agana Pool	G, A	Unknown	T, D	No	No	No
PUAG Supply Management and Issue	G, A,	40 Gallons	S, D	No	No	No
Waste Water	E, G, O	150 Tons <sup>1</sup>	T, S, D	No	No	No
Public Health and Social Services Vector Control and Village Sanitation Program	P	Unknown Number Empty Containers	D	No	No	No
Public Works	A, C	1100 Gallons	S, D	No	No	No
UOG Maintenance	A, P	---	---	No	No	No
<u>LABORATORY AND MEDICAL FACILITIES</u>						
Biopathology Medical Laboratory	None	---	---	No	No	No
Department of Public <sup>2</sup> Safety - Crime Lab	A, F, ORM	Unknown	D	No	No	No
GEPA - Lab <sup>2</sup>	A, F, C, P, E, ORM, O	Unknown	T, D, S	No	Yes	Yes

<sup>1</sup> Digested and Treated Sewage Sludge

<sup>2</sup> Government of Guam Facilities

CONTACTS	CLASS OF MATERIALS	ANNUAL AMOUNT OF WASTE GENERATED	EXISTING ON-ISLAND TREATMENT STORAGE (TXS)(D)	PART A HAZARDOUS WASTE APPLICANT	RECEIVED NOTIFICATION PACKET	CURRENT OFF-ISLAND DISPOSAL
Guam Medical Center (FHP)	F, P, E, ORM	Unknown	T, D	No	No	No
Guam Memorial Hospital <sup>2</sup>	F, P, C, A, E, O, ORM	200,000 Pounds <sup>3</sup>	T, D	No	No	No
Physicians Diagnostic Clinic	A, F, E	Unknown	T, S, D	No	No	No
PUAG - Lab (Dededo) <sup>2</sup>	P, A, O, C, G, ORM	Unknown	D	No	No	No
China Acupuncture Clinic	None	---	---	No	No	No
Good Samaritan Clinic	E	Unknown	D	No	No	No
Guam Polyclinic	E	Unknown	D	No	No	No
Marianas Medical Clinic and Pharmacy	None	---	---	No	No	No
Physicians and Surgeons Clinic	E	Unknown	D	No	No	No
Seventy Day Adventist Clinic	None	---	---	No	No	No
Public Health Lab <sup>2</sup>	F, A, P, O, E, ORM	Unknown	T, D	No	No	No

<sup>2</sup> Government of Guam Facilities

<sup>3</sup> Estimated Total Annual Solid Waste

Table 1. Continued

CONTACTS	CLASS OF MATERIALS	ANNUAL AMOUNT OF WASTE GENERATED	EXISTING ON-ISLAND TREATMENT (TXS)(D)	PART A HAZARDOUS WASTE APPLICANT	RECEIVED NOTIFICATION	CURRENT OFF - ISLAND DISPOSAL
UOG <sup>2</sup> Agricultural Extension - Research Station - Inarajan Biology Department	A, F, O, P, ORM	Unknown	T, D	No	No	No
Chemistry Department	A, P, O, F, ORM	100 Gallons	T, D	No	No	No
Marine Laboratory	P, F, A, C, O, ORM	Unknown	T, D	No	No	No
Water and Energy Research Institute	A, P, O, ORM	200 Gallons	T, D	No	No	No
	A, P, F, O, ORM	Unknown	T, D	No	No	No
<u>MILITARY</u>						
Coast Guard	A, F, C	2400 Kilograms	S, D	No	Yes	Yes
Navy	A, F, C, P, E, O, ORM	80,200 Gallons 41,410 Pounds	T, S, D	Yes (6)	Yes	Yes
<u>PETROLEUM PRODUCTS SUPPLIERS</u>						
Exxon	C, F	100 Gallons	S, D	No	Yes	Yes
GORCO	F, C	200 Pounds 1100 Gallons	S, D	Yes	Yes	No
Mobil	F, C	< 1000 Kilograms	S	Yes	Yes	Yes

CONTACTS	CLASS OF MATERIALS	ANNUAL AMOUNT OF WASTE GENERATED	EXISTING ON-ISLAND TREATMENT STORAGE (T)(S)(D) DISPOSAL	PART A HAZARDOUS WASTE APPLICANT	RECEIVED NOTIFICATION PACKET	CURRENT OFF-ISLAND DISPOSAL
<u>RETAILERS</u>						
Ace Hardware	None	---	---	No	No	No
PCC	None	---	---	No	No	No
True Value Hardware	None	---	---	No	No	No
<u>WHOLESALEERS</u>						
Brewer Chemical	None	---	---	No	Yes	No
Guam Farmers Cooperative Association	None	---	---	No	No	No
J and G Distributors	None	---	---	No	No	No
Sanico	None	---	---	No	No	No
<u>INCOMPLETE RESPONSES</u>						
Perez Bros.	---	---	---	---	---	---
Black Construction	---	---	---	---	---	---
Pestex	---	---	---	---	---	---
International Linen Supply	---	---	---	---	---	---

Table 1. Continued

Table 2. List of Firms and Government Agencies Detailing Waste Inventories On Hand, July, 1981.

CONTACTS	CLASS OF MATERIALS	WASTE ID BY CHEMICAL, TRADE OR COMMON NAME	PHYSICAL DESCRIPTION	AMOUNT ON HAND	COMMENTS
<u>CONSTRUCTION AND COMMERCIAL PEST CONTROL</u>					
Heights Termite Control	Poisons	Chlordane C-100 Dieldren 1.5	Empty Containers	Unknown	55 Gallon Drums 5 Gallon Cans
Islandwide Termite and Pest Control	Poisons	Diazinon Malathion Seven	Empty Containers	Unknown	Storage of Empty Containers in Locked Shed
J and G Modular Homes	Poisons	Chlordane	Empty Containers	6-55 Gallon Drums	Stacked Outside in Yard
<u>GOVERNMENT OF GUAM</u>					
Agriculture Animal Industry Division	Poisons	Kemal	Livestock Spray	None	Excess Washed Down Drain
Plant Industry Division	Poisons	Amazon Karmex		100 Pounds 10 Pounds	Request Removal Request Removal

Table 2. Continued.

CONTACTS	CLASS OF MATERIALS	WASTE ID BY CHEMICAL, TRADE OR COMMON NAME	PHYSICAL DESCRIPTION	AMOUNT ON HAND	COMMENTS
Commercial Port	Combustibles	Oil	Waste Lube Oil	Unknown	600 Gallon Underwater Storage Tank Poured Down Drain
PUAG Wastewater	Corrosives	Sulfuric Acid	Battery Acid	Unknown	Land Spread and Hauled to Ordot
Public Works	Etiologic Agent	Sludge	Dewatered Sewage Sludge	Up to 2 Tons/day	Acid in Dead Batteries Stored Outdoors
	Corrosives	Sulfuric Acid	Battery Acid	40 Gallons	Underground Storage
	Combustibles	Oil	Waste Lube Oil	500-1000 Gallons	
<u>LABORATORY AND MEDICAL FACILITIES</u> Guam Memorial Hospital	Poisons	Arsenous Reagent Acetic Mercuric Histochemical stains Potassium cyanide Sodium azide Sodium arsenate		1 Pint 1 Pint Unknown 1/4 Pound 1/4 Pound 1 Pound	Stored in Old Hospital and New GMH Building - Removal Requested

CONTACTS	CLASS OF MATERIALS	WASTE ID BY CHEMICAL, TRADE OR COMMON NAME	PHYSICAL DESCRIPTION	AMOUNT ON HAND	COMMENTS
Guam Memorial Hospital Continued	Corrosives	Sodium thiocyanate		1/2 Pound	TOTAL Poisons 13 Pounds + 2 1/2 Quarts
		Sodium arsenide		1 Pound	
		Phenol		10 Pounds + 1 1/2 Quarts	
		Acetic anhydride		11 Pints	
		Chromium trioxide		1 Pound	
		Acetic Acid		2 Pounds	
		Ammonium hydroxide		3 Pints	
		Barium hydroxide		3 Pounds	
		Sulfuric Acid		5 Pounds	
		Nitric Acid		4 Pounds	
		Trichloroacetic Acid		5 Pounds	
				1 Pint	
				2 Pints	
				2 Pounds	
				1 Pint	
		1 Gallon			
		1 1/2 Gallon			
			TOTAL Corrosives 20 Pounds + 1 3/4 Gallons		
	Flammables	Ethylene dichloride			TOTAL Flammables
		Formaldehyde			
		Picric Acid			
		Acetone			
		Isoamyl alcohol			
		Toluene			



CONTACTS	CLASS OF MATERIALS	WASTE ID BY CHEMICAL, TRADE OR COMMON NAME	PHYSICAL DESCRIPTION	AMOUNT ON HAND	COMMENTS
Guam Memorial Hospital Continued	Oxidizers	Digestive Reagent (Ammonium Vanadate and Perchloric Acid)		Unknown	
		Potassium permanganate		6 Pounds	
		Potassium persulfate		1 Pound	
		Silver nitrate		1 1/4 Pounds	
		Gross Tissue Specimens Solid Waste		Unknown	
		Aluminum sulfate		Unknown	
		Ammonium sulfate		1 Pound	
		Cupric sulfate		1/4 Pound	
		Dimethylamino Benzaldehyde		15 Pounds 150 Grams	
		Ferrous sulfate		2 Pounds	
	Lithium carbonate		2 Pounds		
					TOTAL Oxidizers 8 1/4 Pounds

CONTACTS	CLASS OF MATERIALS	WASTE ID BY CHEMICAL, TRADE OR COMMON NAME	PHYSICAL DESCRIPTION	AMOUNT ON HAND	COMMENTS
Guam Memorial Hospital Continued		Sodium acetate Sodium flouride Zinc sulfate Potassium dichromate Sodium iodate Chloroform Carbon tetra- chloride		32 Pounds 21 Pounds  12 Pounds 11 Pounds  11 Pounds 1 Pint 1 Pint	
	Non Regulated Materials	Citric Reagent Copper metal Chromium (ic) oxide		1 Pint 1/2 Pound 1 Pound	TOTAL Other Regulated Materials 96 1/2 Pounds + 1 Quart
	Poisons	Aniline Potassium ferrocyanide Mercury di- chloride Mercuric oxide (Red) Phenol Arsenic Acid		5 Pints  1 Pound 1/2 Pound 2 Pounds  13 1/2 Pounds 2 Pounds	TOTAL Non Regulated Materials 1 1/2 Pounds + 1 Pint
Public Health Lab					TOTAL Poisons 19 Pounds + 2 1/2 Quarts

CONTACTS	CLASS OF MATERIALS	WASTE ID BY CHEMICAL, TRADE OR COMMON NAME	PHYSICAL DESCRIPTION	AMOUNT ON HAND	COMMENTS
Public Health Lab Continued	Oxidizers	Ferrous ammonium chlorate		7 Pounds	TOTAL Oxidizers 7 Pounds
	Etiologic Agents	Pathological wastes		Unknown	
	Other Regulated Materials	Ferric chloride		1 Quart	
		Cobalt chloride		8 Ounces	
		Cobaltous chloride		11 Pounds	
		EDTA-ethylene Chloroform		2 Pounds 15 Pints	
		Carbon tetrachloride		8 Pints	TOTAL Other Regulated Materials 13 1/2 Pounds + 3 1/8 Gallons

CONTACTS	CLASS OF MATERIALS	WASTE ID BY CHEMICAL, TRADE OR COMMON NAME	PHYSICAL DESCRIPTION	AMOUNT ON HAND	COMMENTS
Public Health Lab Continued	Corrosives	Acetic Acid Ammonium hydroxide Potassium hydroxide Sodium Hydroxide Trichloroacetic Acid Hydrochloric Acid Sulfuric Acid Acetic Anhydride Zinc chloride Diamineteraacetic Acid Nitric Acid Phosphoric Acid		1 Gallon 4 Pints 4 Pounds 20 Pounds 6 Pounds 50 Pints 75 Pints 8 1/4 Gallons 6 ounces Unknown 1 1/4 Gallons 10 Pints	TOTAL Corrosives 30 1/2 Pounds + 28 Gallons
	Flammable	Picric Acid Ether, anhydrous Xylene Acetone Isobutyl alcohol Benzene Toluene		19 Quarts 1 Pound 1/2 Gallon 8 Pints 8 Pints 19 Pints 2 Pints	TOTAL Flammables 1 Pound + 10 Gallons

CONTACTS	CLASS OF MATERIALS	WASTE ID BY CHEMICAL, TRADE OR COMMON NAME	PHYSICAL DESCRIPTION	AMOUNT ON HAND	COMMENTS
Physician's Diagnostic Clinic	Flammable	Xylene		Unknown	Stored in Safety Cans
PUAG Lab	Combustibles Corrosives	Oil Hydrofluoro-sillicic Acid	Waste Lube Oil ADO 30 Percent Technical Grade Chlorine Gas Cylinders	300 Drums 35 Gallons 100-200 Drums	30 Gallon Drums Damaged and Leaking - Removal Recommended Corroded and Stored Outside
UOG Marine Lab	Compressed Gas Corrosives	Chlorine Chlorine Solution	10 Percent Solution	8 25 Gallons	Stored in Fiberglass Tank
<u>MILITARY</u>	Corrosives	Sulfuric Acid	Battery Acid	2400 Kilo-grams	Normally sent to Hawaii
Coast Guard	Corrosives	---	---	Unknown	See Appendix D for Annual Waste Generation Rates
Navy	Flammables Combustibles Etiologic Agents				

CONTACTS	CLASS OF MATERIALS	WASTE ID BY CHEMICAL, TRADE OR COMMON NAME	PHYSICAL DESCRIPTION	AMOUNT ON HAND	COMMENTS
Navy Continued	Poisons	---	---	Unknown	See Appendix D for Annual Waste Generation Rates
	Compressed Gases				
	Oxidizers				
	Other Regulated Materials				
	Non Regulated Materials				
PETROLEUM PRODUCT SUPPLIERS	Poison	Leaded Sludge	Tank Bottom	None	5-85 Gallon Barrels at Pepper Industries Warehouse
Exxon	Corrosive	Caustic Soda Flakes	Empty 55 Gallon Drums	Unknown	Containers Reused by filling with Asphalt Compounds
GORCO	Poison	Corexit			
	Flammable	Antifouling Agents			
	Combustible	Oil Sludges	Tank bottoms	24,000 Gallons	Stored in tanks

CONTACTS	CLASS OF MATERIALS	WASTE ID BY CHEMICAL, TRADE OR COMMON NAME	PHYSICAL DESCRIPTION	AMOUNT ON HAND	COMMENTS
Mobil	Poison	Oil Sludges	Leaded tank bottoms	4,000 Kilo-grams	Stored in Tanks No. 3, 11, 14, 20

Hazardous Wastes Shipped Off-Site by  
Pepper Industries.

QUANTITY	SHIPPING NAME	HAZARD CLASS	I.D. NU
55 gal.	Pesticides, N.O.S.	Flammable Liq. Poison B	UN1995
55 gal.	Dithiocarbamate Pesticide (Liq.)	Flammable Liq. Poison B	UN2771
55 gal.	Malathion	Poison B ORMA	NA2783
55 gal.	Dithiocarbamate Pesticide	Flammable Liq. Poison B	UN2771
55 gal.	Malathion	Poison B ORMA	NA2783
55 gal.	Dichlorophenoxy Acetic Acid	ORMA	NA2765
30 lb.cans	Bleaching Powder (contains Chlorine)	ORMC	UN2208
55 gal.	Malathion	Poison B ORMA	NA2783
55 gal.	Magnesium Carbonate - Calcium Carbonate (contaminated with DDT)	Poison B	UN258F
2-5 gal.	Cacodylic Acid	Poison B	UN1572
1-5 gal.	2,4-Dichlorophenoxy Acetic Acid	ORMA	NA2765
1 oz.	Mercury Oxide	Poison B	UN1641
18 oz.	Phenol	Poison B	UN1671
80-6 oz. cans	Cyanide N.O.S.	Poison B	UN1588
1/4 lb.	Acetic Anhydride	ORMD	UN1715
1 lb.	Arsenic Pentoxide, Solid	Poison B	UN1559
1 lb.	Benzidine	Poison B	UN1885
1 lb.	Potassium Chlorate	ORMD	UN1485
1/4 lb.	Potassium Cyanide	Poison B	UN1680
1 lb.	Lead Nitrate	ORMD	UN1469
1 lb.	Sodium Arsenate	Poison B	UN1685
1/4 lb.	Sodium Cyanide	Poison B	UN1689



QUANTITY	SHIPPING NAME	HAZARD CLASS	I.D. NUME
( 7-11 lb.	Mercuric Chloride	Poison B	UN1624
( 1/4 lb.	Zinc Peroxide	ORMD	UN1516
1,000 oz. 3 amp.	Methyl Bromide (and more than 2% Chloropicrin Mixture, Liq.	Poison B	NA1581
2 cyl.	Methyl Bromide (and Non- flammable, non-liquefied compress gas mixture, liquid)	Poison B	NA1955
2-125 lb. 2-5 gal.	Pesticides N.O.S.	Poison B	UN1995
55 gal.	Paint, Enamel	Flammable Liq.	UN1263
55 gal.	Chlordane	Flammable Liq.	NA-2762
55 gal.	Malathion	ORMA	NA2783
55 - gal.	Chlordane	Flammable Liq.	NA2762

# WORLD INFORMATION SYSTEMS

P.O. Box 535, Cambridge, Massachusetts 02238, U.S.A.  
Telephone: 617-491-5100 Cable: WORLDINFO TWX: 710-320-1628

## Hazardous Waste Survey under the direction of the South Pacific Commission

Name: JAMES B. BRANCH, Deputy Administrator

Affiliation: Guam Environmental Protection Agency

Address: P. O. Box 2999, Agana, Guam 96910

Country: Guam, U.S.A.

Telex: \_\_\_\_\_ Telephone: 646-8863-64-65

Please complete this questionnaire and return it via airmail to World Information Systems, P.O. Box 535, Cambridge, MA 02238. If possible, please telex the requested information to 710-320-1628 WORLDINFO. If you do not have the requested information, please answer "not available" in the appropriate space. Where necessary, please use additional paper. Thank you for your cooperation.

### INDUSTRY QUESTION

Which of the following operating industries are based in your area? (Please check appropriate industries and indicate with an "L" if the industry is locally owned or with an "F" if the industry is owned by a foreign agency.)

- |   |   |
|---|---|
| <input type="checkbox"/> Agricultural Chemicals               | <input type="checkbox"/> Machinery (non-electrical)                       |
| <input checked="" type="checkbox"/> Agricultural Services     | <input type="checkbox"/> Non-Ferrous Metals                               |
| <input checked="" type="checkbox"/> Chemical Warehouses       | <input type="checkbox"/> Organic Chemicals & Products                     |
| <input type="checkbox"/> Drugs                                | <input type="checkbox"/> Paints & Products                                |
| <input type="checkbox"/> Electric & Electronic Equipment      | <input type="checkbox"/> Paper & Allied Products                          |
| <input type="checkbox"/> Explosives                           | <input type="checkbox"/> Petroleum & Coal Products                        |
| <input type="checkbox"/> Fabricated Metal Products            | <input checked="" type="checkbox"/> Petroleum Refining                    |
| <input type="checkbox"/> Ferrous Metals                       | <input type="checkbox"/> Plastics & Synthetics                            |
| <input type="checkbox"/> Furniture & Fixtures                 | <input type="checkbox"/> Primary Metals                                   |
| <input checked="" type="checkbox"/> Gasoline Service Stations | <input checked="" type="checkbox"/> Printing & Publishing                 |
| <input checked="" type="checkbox"/> Health Services           | <input type="checkbox"/> Rubber Products                                  |
| <input type="checkbox"/> Industrial Inorganic Chemicals       | <input type="checkbox"/> Stone, Clay & Glass Products                     |
| <input type="checkbox"/> Instruments & Products               | <input type="checkbox"/> Textile Products                                 |
| <input type="checkbox"/> Leather & Tanning                    | <input checked="" type="checkbox"/> Transportation Equipment (some are F) |
| <input type="checkbox"/> Lumber & Wood Products               | <input type="checkbox"/> Other: _____                                     |

CURRENT HAZARDOUS WASTE STORAGE AND DISPOSAL

- Please list the primary types and amounts of hazardous wastes that are now being disposed of and stored in your region each year:

<u>Type of Waste *</u>	<u>Annual Amount in Tonnes</u>
<u>Flammables and combustibles</u>	<u>40.5 tons</u>
<u>Poisons</u>	<u>13.9 tons</u>
<u>Corrosives</u>	<u>97.8 tons</u>
<u>Etiologic Agents</u>	<u>18.25 tons</u>
<u>Oxidizers</u>	<u>0.25 tons</u>
<u>Other regulated materials</u>	<u>1.35 tons</u>

- Please list the names, addresses, and telex/telephone numbers of the principal hazardous waste storage and disposal companies in your region:

Name: None

Address: \_\_\_\_\_

Telex/Telephone: \_\_\_\_\_

Type of waste being accepted: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

- Please list the names, addresses and telex/telephone numbers of the principal government agencies, if any, responsible for overseeing current hazardous waste management activities:

Name: Guam Environmental Protection Agency

Address: P.O. Box 2999, Agana, Guam 96910

Telex/telephone: 646-8863, 64, 65

PAST HAZARDOUS WASTE STORAGE AND DISPOSAL

- Please list the primary types and amounts of hazardous wastes that have been disposed of and stored in your region in the past:

<u>Type of Waste</u>	<u>Annual Amount in Tonnes</u>
<u>Same as information at top of this page</u>	<u>_____</u>
<u>_____</u>	<u>_____</u>
<u>_____</u>	<u>_____</u>

\* These are types and estimated amounts of hazardous wastes generated and stored on Guam each year. Hazardous waste from major generators are shipped off-island for disposal.

- What are the names and locations of the industries or government agency that generated the hazardous waste?

Name: Please see attached sheet

Address: \_\_\_\_\_

Name: \_\_\_\_\_

Address: \_\_\_\_\_

**FUTURE HAZARDOUS WASTE STORAGE AND DISPOSAL**

- Please describe below any anticipated changes in the hazardous waste streams of the principal industries and government agencies in your area:

No changes anticipated

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Please describe any anticipated projects to increase the disposal and storage capacity of the local hazardous waste management firms:

No present plans to increase disposal capacity on-island.

However, a centralized storage facility may be constructed in the near future.

\_\_\_\_\_  
\_\_\_\_\_

- Please describe any anticipated plans to clean up abandoned waste sites and dispose of the accumulated wastes:

Abandoned waste sites are anticipated to be evaluated under Federal Superfund activities.

\_\_\_\_\_  
\_\_\_\_\_

**REGULATIONS AND LEGISLATION**

- Does your government have any legislation for regulating hazardous wastes?

Yes. Guam Solid Waste Management and Litter Control Act.

\_\_\_\_\_

- If yes, please send a copy of the legislation, along with the regulations.

Attached

ENVIRONMENTAL IMPACTS/HEALTH EFFECTS

- Please describe any major hazardous waste incidents, such as a groundwater contamination from an abandoned waste site, or a fire at a waste storage facility: \_\_\_\_\_

None on record.

- Please list any potential or actual environmental impacts or health effects resulting from hazardous wastes stored or disposed of in your region: Potential impact exists for contamination  
of principal source aquifer from hazardous wastes stored by

generators.

BIBLIOGRAPHY

- Please list below any technical reports, articles, press reports, or other materials related to the storage and disposal of hazardous chemical wastes in your region:

Title/author: Guam Hazardous Waste Management Plan/  
Pacific Basin Environmental Consultants

Publisher: Same as above

Publisher's address: P.O. Box 20820 GMF, Guam, M.I. 96921

Title/author: Hazardous Waste Management/Garretson, Elmendorf,  
Zinov, Reibin (Architects and Engineers)

Publisher: Same as above

Publisher's address: 124 Spear St., San Francisco, CA 94105

CONTACTS

- Please list the names or institutions of any people that would have additional information on hazardous waste storage and disposal in your area:

Name/affiliation: Mr. J. Lizama

Address: Environmental Engineer

Telex/telephone: U.S. Navy Public Works Center, Guam  
FPO San Francisco, CA 96630  
332-5100

Name/affiliation: Captain P. Fink, Bioenvironmental Engineer

Address: Andersen Air Force Base

Telex/telephone: APO San Francisco 96334  
366-4147

Industries and Government Agencies Generating Hazardous Waste

Esso Eastern, Inc., Post Office Box 21629 GMF, Guam, M.I. 96921  
Mobil International Petroleum Corp., Post Office Box EU, Agana, Guam 96910  
Guam Oil & Refining, Inc., Post Office Box 3190, Agana, Guam 96910  
Bioenvironmental Engineering Dept., Andersen Air Force Base,  
APO San Francisco, CA 96334  
Environmental Engineering Dept., U.S. Navy Public Works Center, Guam  
FPO San Francisco, CA 96630

GOVERNMENT OF GUAM AGENCIES:

Dept. of Agriculture, Post Office Box 2950, Agana, Guam 96910  
Guam Airport Authority, Post Office Box 8770, Tamuning, Guam 96911  
Guam Memorial Hospital, Post Office Box AX, Agana, Guam 96910  
Port Authority of Guam, Post Office Box 1445, Agana, Guam 96910  
Public Utilities Agency of Guam, Post Office Box 3010, Agana, Guam 96910  
Dept. of Public Health & Social Services, P. O. Box 2816, Agana, Guam 96910  
Dept. of Public Works, Post Office Box 2950, Agana, Guam 96910  
University of Guam, U.O.G. Station, Mangilao, Guam 96913  
Guam Community College, Post Office Box 23069 GMF, Guam, M.I. 96921

TABLE 3-2 - HAZARDOUS WASTE GENERATION, AMERICAN SAMOA, 1977 (SHEET 1 OF 1)

Waste Material	Source	Annual Quantity
Digested Sewage Sludge	Wastewater Treatment Plant (Department of Public Works)	126 Metric Tons 140 English Tons
Expired and Unusable Medicines	Hospital/Pharmacy	55 Kilograms 120 Pounds
Lime Slurry (Calcium Hydroxide)	Acetylene Manufacturing	0.6 Cubic Meters 20.0 Cubic Yards
Paint-Contaminated Blasting Sand	Ship Repair Facilities (Bottom Blasting)	630 Metric Tons 700 English Tons
Pathological/Infectious Wastes (Tissue, Laboratory Wastes, Sharps, Test Animals, and Isolation Ward Wastes)	Hospital	5,000 Kilograms 11,000 Pounds
<b>Petroleum Waste Products:</b>		
• Absorbent Chips Contaminated With Oil	Coast Guard (Harbor Oil Spills)	1,900 Liters 500 Gallons
• Bilge Water	Tuna Fishing Fleet	76,000 Liters 20,000 Gallons
• Oily Water	Petroleum Bulk Storage Facility (Tanker Truck Flushings)	11,400 Liters 3,000 Gallons
• Tank Bottom Sediments	Petroleum Bulk Storage Facility (Tank Cleaning)	1,900 Liters 450 Gallons
• Tetraethyl Lead Sludge	Petroleum Bulk Storage Facility (Tank Cleaning)	1,100 Liters 300 Gallons
• Waste Lubricating Oils	• Airport Maintenance Facilities	3,800 Liters 1,000 Gallons
	• Tuna Canneries	19,000 Liters 5,000 Gallons
	• Construction Firms - Heavy Equipment	11,400 Liters 3,000 Gallons
	• Government Vehicles and Equipment (Department of Public Works)	15,200 Liters 4,000 Gallons
	• Power Generating Facilities (Department of Public Works)	114,000 Liters 30,000 Gallons
	• Private Vehicles	38,000 Liters 10,000 Gallons
	• Tuna Fleet	266,000 Liters 70,000 Gallons
	<b>Total</b>	<b>467,400 Liters 123,000 Gallons</b>
Spent Pesticide Containers (Glass, Metal, Paper, Plastic)	• Tuna Canneries	25 Items
	• Department of Agriculture	200 Items
	• Farmers	200 Items
	• Pest Control Firms	<u>25</u> Items
	<b>Total</b>	<b>450 Items</b>
Spent Photo Chemicals (Black and White Developing)	• Hospital	15,200 Liters 4,000 Gallons
	• Photo Developers	30,400 Liters <u>8,000</u> Gallons
	<b>Total</b>	<b>45,600 Liters 12,000 Gallons</b>
Unusable Paints	Ship Repair Facilities	190 Liters 50 Gallons

TABLE 3-3 - FIVE- AND TEN-YEAR PROJECTIONS OF HAZARDOUS WASTE GENERATION, AMERICAN SAMOA, 1977 (SHEET 1 OF 1)

Hazardous Waste	1977		1982		1987	
	Metric	English	Metric	English	Metric	English
Digested Sewage Sludge (Metric/ English Tons)	126	140	315	350	1,080	1,200
Expired and Unusable Medicines (Kilograms/Pounds)	55	120	60	130	70	150
Lime Slurry (Cubic Meters/Yards)	0.6	20	0.6	20	0.6	20
Paint-Contaminated Blasting Sand (Metric/English Tons)	630	700	630	700	630	700
Pathological/Infectious Wastes (Kilograms/Pounds)	5,000	11,000	5,500	12,100	6,100	13,400
Petroleum Waste Products (Liters/ Gallons)	467,400	123,000	486,100	127,900	505,500	133,000
Spent Pesticide Containers (Items)	450 Items		470 Items		500 Items	
Spent Photo Chemicals (Liters/Gallons)	46,600	12,000	47,500	12,500	49,400	13,000
Unusable Paints (Liters/Gallons)	190	50	190	50	190	50



TABLE 3-4 - EVALUATION OF CURRENT HAZARDOUS WASTE MANAGEMENT PRACTICES, AMERICAN SAMOA, 1977 (SHEET 1 OF 1)

Waste Material	Storage Method (Meets Criteria?)	Collection Method (Meets Criteria?)	Treatment Method (Meets Criteria?)	Disposal Method (Meets Criteria?)
Digested Sewage Sludge	None	Truck (Yes)	None	Landfill (Yes)
Expired and Unusable Medicines	Original Containers (Yes)	None	None	Returned to Manufacturer (Yes); Sewer System (Yes); Shipped to Drug Enforcement & Narcotics Administration (Mainland U. S.) (Yes)
Lime Slurry	Drying Ponds (Yes)	Truck (Yes)	Solar Evaporation (Yes)	Codisposed with Tuna Cannery Sludge (Yes)
Paint-Contaminated Blasting Sand	None	Truck (Yes)	None	Disposal on Private Land (No); Landfill (No)
Pathological/Infectious Wastes	Plastic Bags (Yes)	Hand/Truck (Yes)	Autoclaving (Yes); Incineration (Yes); Needle Destruction (Yes)	Landfill for Autoclaved Waste (Yes); Incineration (Yes); Sewer System (Yes)
Petroleum Waste Products:				
• Absorbent Chips Contaminated With Oil	None	Truck (Yes)	None	Landfill (Yes)*
• Bilge Water	None	None	None	Disposed to Navigable Waters (No)
• Oily Water	Drums (Yes)	Tanker Truck (Yes)	None	Airport Fire Department (Fire Drills) (Yes)
• Tank Bottom Sediments/Tetraethyl Lead Sludge	Drums (Yes)	Truck (Yes)	None	Mixed With Cinders on Airport Tank Farm Grounds (No)
• Waste Lubrication Oils	Drums/Tanks (Yes)	Truck (Yes)	None	Ocean Dumping, 57% (No); Road Busting, 30% (No); Landfill, 12% (No); Fire Department, 1% (Yes)
Spent Pesticide Containers	None	None	Rinsing or Puncturing Only (No)	On-Site Burial or Burning (No); Landfill (Yes); Reuse as Refuse Containers (No)
Spent Photo Chemicals	Process Tanks (Yes)	None	None	Sewer System (Yes)*; Storm Drain (No)
Unusable Paints	Original Containers (Yes)	Truck (Yes)	None	Landfill (Yes)**
Suspended and Unusable Pesticides	Unlocked Storehouse (No); Locked Storehouse (Yes)	N/A	N/A	N/A

\* Acceptable for small quantities.

\*\* Acceptable for water base paints containing no toxic pigments only.

**TABLE 4-2**  
**CURRENT HAZARDOUS WASTE GENERATION - NORTHERN MARIANAS ISLANDS**

Waste Material	Source	Annual Quantity	
		Metric	English
Chlorine Containers	Water Treatment Plant	360 Drums	
Digested Sewage Sludge (Liters/Gallons)	Sewage Treatment Plants	456,000	120,000
Hospital Wastes (Kilograms/Pounds)	Dr. Torres Hospital	600	1,300
• Pathologic Waste		2	5
• Expired Medicines			
Oil Contaminated Bilge Water (2-3% Oil) (Liters/Gallons)	Power Barge	1,664,400	438,000
Pesticide Containers	GNMI Agriculture Office		190 Misc. Sacks
	Total Containers		230 Misc. Bottles
			420 Items
Tank Bottom Sediment (Liters/Gallons)	Petroleum Products Distribution Facility	2,000	500
Tetraethyl Lead Sludge (Liters/Gallons)	Petroleum Products Distribution Facility	2,000	500
Waste Oil (Liters/Gallons)	• Power Plant	26,600	7,000
	• Vehicles	4,800	1,300
	- Government	34,300	9,000
	- Private		
	Total Waste Oil	65,800	17,300

TABLE 4-3 - FIVE- AND TEN-YEAR PROJECTIONS OF HAZARDOUS WASTE GENERATION, NORTHERN MARIANAS ISLANDS, 1977 (SHEET 1 OF 1)

Waste Material	Annual Quantity					
	1977		1982		1987	
	Metric	English	Metric	English	Metric	English
Chlorine Containers (Units)	360 Units		415 Units		490 Units	
Digested Sewage Sludge (Liters/Gallons)	456,000	120,000	526,000	138,000	624,000	164,000
Oil Contaminated Bilge Water (Liters/Gallons)	1,664,400	438,000	--	--	--	--
Pathologic Wastes (Kilograms/Pounds)	600	1,300	690	1,500	820	1,800
Pesticide Containers (Units)	420 Units		680 Units		1,090 Units	
Tank Bottom Sediments (Liters/Gallons)	2,000	500	6,000	1,600	6,000	1,600
Tetraethyl Lead Sludge (Liters/Gallons)	2,000	500	2,600	700	3,000	800
Waste Oil (Liters/Gallons)						
• Power Plant	26,600	7,000	83,600	22,000	83,600	22,000
• Vehicles	39,100	10,300	49,600	13,100	57,500	15,100
Population*	14,358		16,549		19,642	

\* Extrapolated from projections provided in Reference 3.

TABLE 4-4 - EVALUATION OF CURRENT HAZARDOUS WASTE MANAGEMENT PRACTICES, NORTHERN MARIANAS ISLANDS, 1977 (SHEET 1 OF 1)

Waste Material	Storage Method (Meets Criteria?)	Collection Method (Meets Criteria?)	Treatment Method (Meets Criteria?)	Disposal Method (Meets Criteria?)
Asphaltic Oil	Leaking Drums (No)	N/A	N/A	N/A
Chlorine Containers	On-Site (Yes)	Truck (Yes)	None (No)	Landfill (Yes)*
Hospital Wastes				
• Pathologic	None	With General Refuse (No)	None (No)	Landfill (No)
• Expired Medicines	None	With General Refuse (No)	None (No)	Landfill (Yes)**; Re- turned to Manufacturer (Yes)
Oil Contaminated Bilge Water	Steel Tank (Yes)	None	Gravity Separation	Evaporation/Percolation (Yes)***
Spent Pesticide Containers	None	With General Refuse (No)	None (No); Rinsed (No)	Landfill (Yes)*; Reuse (No)
Suspended and Unusable Pesticides	Locked Storeroom (Yes) Leaking Drums (No)	N/A	N/A	N/A
Tank Bottom Sediment	Steel Drums (Yes)	Truck (Yes)	None	Landfill (No)
Tetraethyl Lead Sludge	Steel Drums (Yes)	Truck (Yes)	None	Landfill (No)
Waste Oil	Steel Drums (Yes)	None	None	On-Site Ground Disposal (No)

\* Acceptable if properly triple rinsed, punctured and crushed.  
 \*\* Expired medicines can also be incinerated or severed. Proper disposal requires a case-by-case decision.  
 \*\*\* Acceptable if adequate oil separation has occurred.

# WORLD INFORMATION SYSTEMS

P.O. Box 535, Cambridge, Massachusetts 02238, U.S.A.  
Telephone: 617-491-5100 Cable: WORLDINFO TWX: 710-320-1628

## Hazardous Waste Survey under the direction of the South Pacific Commission

Name: Carl L. Goldstein

Affiliation: Division of Environmental Quality

Address: P.O. Box 1115 Saipan, CM 96950

Country: Commonwealth of the Northern Mariana Islands 96950

Telex: \_\_\_\_\_ Telephone: 6984/6114

Please complete this questionnaire and return it via airmail to World Information Systems, P.O. Box 535, Cambridge, MA 02238. If possible, please telex the requested information to 710-320-1628 WORLDINFO. If you do not have the requested information, please answer "not available" in the appropriate space. Where necessary, please use additional paper. Thank you for your cooperation.

### INDUSTRY QUESTION

Which of the following operating industries are based in your area? (Please check appropriate industries and indicate with an "L" if the industry is locally owned or with an "F" if the industry is owned by a foreign agency.)

- |   |   |
|---|---|
| <input type="checkbox"/> Agricultural Chemicals               | <input type="checkbox"/> Machinery (non-electrical)       |
| <input checked="" type="checkbox"/> Agricultural Services     | <input type="checkbox"/> Non-Ferrous Metals               |
| <input type="checkbox"/> Chemical Warehouses                  | <input type="checkbox"/> Organic Chemicals & Products     |
| <input type="checkbox"/> Drugs                                | <input type="checkbox"/> Paints & Products                |
| <input type="checkbox"/> Electric & Electronic Equipment      | <input type="checkbox"/> Paper & Allied Products          |
| <input type="checkbox"/> Explosives                           | <input type="checkbox"/> Petroleum & Coal Products        |
| <input type="checkbox"/> Fabricated Metal Products            | <input type="checkbox"/> Petroleum Refining               |
| <input type="checkbox"/> Ferrous Metals                       | <input type="checkbox"/> Plastics & Synthetics            |
| <input type="checkbox"/> Furniture & Fixtures                 | <input type="checkbox"/> Primary Metals                   |
| <input checked="" type="checkbox"/> Gasoline Service Stations | <input checked="" type="checkbox"/> Printing & Publishing |
| <input checked="" type="checkbox"/> Health Services           | <input type="checkbox"/> Rubber Products                  |
| <input type="checkbox"/> Industrial Inorganic Chemicals       | <input type="checkbox"/> Stone, Clay & Glass Products     |
| <input type="checkbox"/> Instruments & Products               | <input type="checkbox"/> Textile Products                 |
| <input type="checkbox"/> Leather & Tanning                    | <input type="checkbox"/> Transportation Equipment         |
| <input type="checkbox"/> Lumber & Wood Products               | <input type="checkbox"/> Other: _____                     |

CURRENT HAZARDOUS WASTE STORAGE AND DISPOSAL

- Please list the primary types and amounts of hazardous wastes that are now being disposed of and stored in your region each year:

<u>Type of Waste</u>	<u>Annual Amount in Tonnes</u>
Not Available	

- Please list the names, addresses, and telex/telephone numbers of the principal hazardous waste storage and disposal companies in your region:

Name: Not Available

Address: \_\_\_\_\_

Telex/Telephone: \_\_\_\_\_

Type of waste being accepted: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

- Please list the names, addresses and telex/telephone numbers of the principal government agencies, if any, responsible for overseeing current hazardous waste management activities:

Name: Division of Environmental Quality

Address: P.O. Box 1115 Saipan, CM 96950

Telex/telephone: 6114/6984

PAST HAZARDOUS WASTE STORAGE AND DISPOSAL

- Please list the primary types and amounts of hazardous wastes that have been disposed of and stored in your region in the past:

<u>Type of Waste</u>	<u>Annual Amount in Tonnes</u>
Agricultural Pesticides	1 ton

ENVIRONMENTAL IMPACTS/HEALTH EFFECTS

- Please describe any major hazardous waste incidents, such as a groundwater contamination from an abandoned waste site, or a fire at a waste storage facility: \_\_\_\_\_

Not Available

- Please list any potential or actual environmental impacts or health effects resulting from hazardous wastes stored or disposed of in your region: PCB's stored in a warehouse located near  
marine shoreline has potential impact on flora and fauna in the  
marine environment in the event of a catastrophe (e.g. Typhoon).

BIBLIOGRAPHY

- Please list below any technical reports, articles, press reports, or other materials related to the storage and disposal of hazardous chemical wastes in your region:

Title/author: HAZARDOUS WASTE MANAGEMENT

Publisher: PROBLEM ASSESSMENT AND STRATEGY FORMULATION

Publisher's address: FOR HAWAII, GUAM, TTPI, CNMI AND AMERICAN SAMOA.

Title/author: \_\_\_\_\_

Publisher: GEZR, Architects & Engineers

Publisher's address: 124 Specer St., SF, CA 94104

CONTACTS

- Please list the names or institutions of any people that would have additional information on hazardous waste storage and disposal in your area:

Name/affiliation: Carl L. Goldstein, Div. of Environmental Quality

Address P.O. Box 1115, Saipan, CM 96950

Telex/telephone: 6114 or 6984

Name/affiliation: \_\_\_\_\_

Address: \_\_\_\_\_

Telex/telephone: \_\_\_\_\_

- What are the names and locations of the industries or government agency that generated the hazardous waste?

Name: Dept. of Public Works, Dept. of Natural Resources

Address: CNMI, Saipan, CM 96950

Name: \_\_\_\_\_

Address: \_\_\_\_\_

FUTURE HAZARDOUS WASTE STORAGE AND DISPOSAL

- Please describe below any anticipated changes in the hazardous waste streams of the principal industries and government agencies in your area:

Not Available

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Please describe any anticipated projects to increase the disposal and storage capacity of the local hazardous waste management firms:

Not Available

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- Please describe any anticipated plans to clean up abandoned waste sites and dispose of the accumulated wastes:

We are preparing to ship the stored PCB's to the state for

disposal

\_\_\_\_\_

REGULATIONS AND LEGISLATION

- Does your government have any legislation for regulating hazardous wastes?

Yes, we have P.L. 3-23, but no state regulation.

- If yes, please send a copy of the legislation, along with the regulations.



TABLE 5-2 - CURRENT HAZARDOUS WASTE GENERATION, TRUST TERRITORY ISLANDS OF THE PACIFIC, 1977 (SHEET 1 OF 2)

Waste Material	Source	Majuro		Annual Quantity		Truk	
		Metric	English	Metric	English	Metric	English
Brine Sludge (Liters/Gallons)		00	00	00	00	00	00
Chlorine Containers	Water Treatment Plant	480 @ 50 Kg.	(110 Lb.)	360 @ 50 Kg.	(110 Lb.)	40 @ 50 Kg.*	(110 Lb.)
Pathologic Waste (Kilograms/Pounds)	District Hospitals	21,500	47,200	35,400	77,900	8,600	18,900
Pesticide Containers	District Agriculture Offices Forestry Offices	20 Units N/A 20 Units		47 Units 13 Units 60 Units		30 Units N/A 30 Units	
Tank Bottom Sediments (Liters/Gallons)	Petroleum Products Distribution Facility	340	90	570	150	530	140
Tetraethyl Lead Sludge (Liters/Gallons)	Petroleum Products Distribution Facility	380	100	530	140	50	10
Waste Oil (Liters/Gallons)	Public Works • Power Plant • Motor Pool	54,000 3,150	14,300 800	16,700 4,100	4,400 1,100	13,800 2,300	3,600 600
	Private Vehicles Ponape Transportation Authority Coast Guard	3,150 N/A N/A	800 N/A N/A	3,000 800 N/A	800 200 N/A	400 N/A N/A	100 N/A N/A
Total Waste Oil		60,300	15,900	24,600	6,500	16,500	4,300

\* Currently not generated because of non-functioning chlorinator.

TABLE 5-2 - CURRENT HAZARDOUS WASTE GENERATION, TRUST TERRITORY ISLANDS OF THE PACIFIC, 1977 (SHEET 2 OF 2)

Waste Material	Source	Annual Quantity					
		Yap		Palau		Metric	English
		Metric	English	Metric	English		
Brine Sludge (Liters/Gallons)		00	00	41,000	11,000		
Chlorine Containers	Water Treatment Plant	180 @ 50 Kg.	(110 Lb.)	330 @ 50 Kg.	(110 Lb.)		
Pathologic Waste (Kilograms/Pounds)	District Hospitals	9,600	21,200	32,200	70,800		
Pesticide Containers	District Agriculture Offices	60 Units		300 Units			
Total Containers	Forestry Offices	N/A		N/A			
		60 Units		300 Units			
Tank Bottom Sediments (Liters/Gallons)	Petroleum Products Distribution Facility	280	70	930	240		
Tetraethyl Lead Sludge (Liters/Gallons)	Petroleum Products Distribution Facility	200	50	580	150		
Waste Oil (Liters/Gallons)	Public Works	4,600	1,200	102,600	27,000		
	• Power Plant	800	200	7,100	1,900		
	• Motor Pool	3,400	900	10,000	2,600		
	Private Vehicles	N/A	N/A	N/A	N/A		
	Ponape Transportation Authority						
	Coast Guard	11,800	3,100	N/A	N/A		
Total Waste Oil		20,600	5,400	119,700	31,500		

TASK 2 STORAGE

The types, quantities, and locations of hazardous wastes currently held in storage in the Trust Territory Districts are as follows:

Majuro:

District Hospital Storeroom

- 91 kilograms (200 pounds) of DDT.

Ponape:

District Agriculture Office

- 18.9 liters (five gallons) of DDT.
- 7.6 liters (two gallons) of Pratt B6N insect spray.

District Forestry Office

- Approximately 50 kilograms (110 pounds) of miscellaneous pesticides in powder form.
- Approximately eight liters (2.1 gallons) of miscellaneous pesticides in liquid form.

Truk:

District Agriculture Office

- Seven 113.6 liter (30 gallon) drums of Sodium Arsenite
- 22 kilograms (48 pounds) of Parathion
- 114 liters (30 gallons) of Endrin

Yap:

District Agriculture Office

- Three 50 kilogram (100 pound) drums of calcium hyperchlorite
- 80 kilograms (176 pounds) of DDT.
- Approximately one hundred and fifty containers of miscellaneous pesticides

Environmental Health Office

- Approximately three hundred 2.3 kilogram (five pound) containers of DDT.

Yap (Continued)

District Legislature's Equipment Rental Yard

- Approximately five hundred drums (209 liter/55 gallon) of asphaltic oil

Palau: None.

TABLE 5-3 - FIVE- AND TEN-YEAR PROJECTIONS OF HAZARDOUS WASTE GENERATION, MAJURO (SHEET 1 OF 5)

Waste Material	Annual Quantity					
	1977		1982		1987	
	Metric	English	Metric	English	Metric	English
Chlorine Containers	260 Items		340 Items		420 Items	
Digested Sewage Sludge (Cubic Meters/Yards)	00	00	1,000	1,300	1,200	1,600
Pathologic Wastes (Kilograms/Pounds)	21,500	97,200	54,800	61,500	67,600	75,800
Pesticide Containers (Units)	20 Units		N/A		N/A	
Tank Bottom Sediments (Liters/Gallons)	340	90	710	190	870	230
Tetraethyl Lead Sludge (Liters/Gallons)	380	100	530	140	680	180
Waste Oil (Liters/Gallons)	60,000	15,900	121,500	32,100	150,200	39,700
Population*		13,582		17,697		21,812

\* Population projections for Majuro, Ponape, and Truk based on data presented in Reference 1. Projections for Yap and Palau assume three percent increase per year, extrapolated from 1973 data.

TABLE 5-3 - FIVE- AND TEN-YEAR PROJECTIONS OF HAZARDOUS WASTE GENERATION, PONAPE (SHEET 2 OF 5)

Waste Material	Annual Quantity					
	1977		1982		1987	
	Metric	English	Metric	English	Metric	English
Chlorine Containers	160 Units		190 Units		220 Units	
Digested Sewage Sludge (Cubic Meters/Yards)	00	00	1,200	1,600	1,300	1,700
Pathologic Wastes (Kilograms/Pounds)	35,400	77,900	42,000	92,300	48,800	107,200
Pesticide Containers (Units)	60 Units		90 Units		120 Units	
Tank Bottom Sediments (Liters/Gallons)	570	150	1,230	320	1,430	380
Tetraethyl Lead Sludge (Liters/Gallons)	530	140	650	170	760	200
Waste Oil (Liters/Gallons)	24,600	6,500	45,800	12,100	53,300	14,100
Population*		18,304		21,044		23,784

\* Population projections for Majuro, Ponape, and Truk based on data presented in Reference 1. Projections for Yap and Palau assume three percent increase per year, extrapolated from 1973 data.

TABLE 5-3 - FIVE- AND TEN-YEAR PROJECTIONS OF HAZARDOUS WASTE GENERATION, TRUK (SHEET 3 OF 5)

Waste Material	Annual Quantity					
	1977		1982		1987	
	Metric	English	Metric	English	Metric	English
Chlorine Containers	40 Units		50 Units		60 Units	
Digested Sewage Sludge (Cubic Meters/Yards)	00	00	300	1,000	900	1,200
Pathologic Wastes (Kilograms/Pounds)	8,600	18,900	10,700	23,500	12,900	28,300
Pesticide Containers (Units)	30 Units		130 Units		130 Units	
Tank Bottom Sediments (Liters/Gallons)	530	140	1,000	260	1,190	310
Tetraethyl Lead Sludge (Liters/Gallons)	50	10	60	15	80	20
Waste Oil (Liters/Gallons)	16,500	4,300	29,300	7,700	35,200	9,300
Population*		11,337		16,162		16,987

\* Population projections for Majuro, Ponape, and Truk based on data presented in Reference 1. Projections for Yap and Palau assume three percent increase per year, extrapolated from 1973 data.

TABLE 5-3 - FIVE- AND TEN-YEAR PROJECTIONS OF HAZARDOUS WASTE GENERATION, YAP (SHEET 4 OF 5)

Waste Material	Annual Quantity					
	1977		1982		1987	
	Metric	English	Metric	English	Metric	English
Chlorine Containers	180 Units		210 Units		240 Units	
Digested Sewage Sludge (Cubic Meters/Yards)	00	00	600	800	700	900
Pathologic Wastes (Kilograms/Pounds)	9,600	21,200	11,100	24,600	12,900	28,500
Pesticide Containers (Units)	60 Units		60 Units		60 Units	
Tank Bottom Sediments (Liters/Gallons)	280	70	420	110	490	130
Tetraethyl Lead Sludge (Liters/Gallons)	200	50	220	60	250	70
Waste Oil (Liters/Gallons)	20,600	5,400	35,800	9,400	41,200	10,800
Population*	8,857		10,267		11,903	

\* Population projections for Majuro, Ponape, and Truk based on data presented in Reference 1. Projections for Yap and Palau assume three percent increase per year, extrapolated from 1973 data.



TABLE 5-3 - FIVE- AND TEN-YEAR PROJECTIONS OF HAZARDOUS WASTE GENERATION, PALAU (SHEET 5 OF 5)

Waste Material	Annual Quantity					
	1977		1982		1987	
	Metric	English	Metric	English	Metric	English
Chlorine Containers	330 Units		380 Units		440 Units	
Digested Sewage Sludge (Cubic Meters/Yards)	00	00	900	1,200	1,100	1,400
Pathologic Wastes (Kilograms/Pounds)	32,200	70,800	37,100	81,600	43,300	95,100
Pesticide Containers (Units)	300 Units		900 Units		1,500 Units	
Tank Bottom Sediments (Liters/Gallons)	930	240	1,800	500	2,100	600
Tetraethyl Lead Sludge (Liters/Gallons)	580	150	630	170	680	180
Waste Oil (Liters/Gallons)	119,700	31,500	230,300	60,300	267,000	69,300
Population*		14,265		16,537		19,171

\* Population projections for Majuro, Ponape, and Truk based on data presented in Reference 1. Projections for Yap and Palau assume three percent increase per year, extrapolated from 1973 data.

TABLE 5-4 - EVALUATION OF CURRENT HAZARDOUS WASTE MANAGEMENT PRACTICES, MAJURO, 1977 (SHEET 1 OF 1)

Waste Material	Storage Method (Meets Criteria?)	Collection Method (Meets Criteria?)	Treatment Method (Meets Criteria?)	Disposal Method (Meets Criteria?)
Chlorine Containers	None	Hand Carried (Yes)	Rinsed (No)	Burned at Landfill (Yes)*
Hospital Wastes • Pathologic • Expired Medicines	None On-Site (Yes)	Truck (Yes) None	None None	Burned at Landfill (No) Returned to Manufacturer (Yes)
Pesticide Containers	None	None	Rinsed (No)	Buried at Point of Use (Yes)*
Suspended and Unusable Pesticides	Locked Storeroom (Yes)	N/A	N/A	N/A
Tank Bottom Sediment	Steel Drums (Yes)	Truck (Yes)	None	Burned at Landfill (No)
Tetraethyl Lead Sludge	Steel Drums (Yes)	Truck (Yes)	None	Burned at Landfill (No)
Waste Oil • Power Plant • Vehicles - Government • Vehicles - Private	Steel Drums (Yes) Steel Drums (Yes) Steel Drums (Yes)	Truck (Yes) Truck (Yes) None	None None None	Burned at Landfill (No) Burned at Landfill (No) Used for Lubrication and Weatherproofing (Yes); Dumped Indiscriminately (No)

TABLE 5-5 - EVALUATION OF CURRENT HAZARDOUS WASTE MANAGEMENT PRACTICES, PONAPE, 1977 (SHEET 1 OF 1)

Waste Material	Storage Method (Meets Criteria?)	Collection Method (Meets Criteria?)	Treatment Method (Meets Criteria?)	Disposal Method (Meets Criteria?)
Chlorine Containers	Open (No)	None	Non-Evident (No)	Littered Around Treatment Plant (No)
Hospital Wastes				
• Pathologic	None	Hand Carried to Incinerator (Yes)	None	Incineration (Yes)
• Expired Medicines	None	None	None	Returned to Manufacturer (Yes); Incinerated* (Yes)
Pesticide Containers	None	None	Rinsed (No)	Buried at District Agriculture Office (Yes)*
Suspended and Unusable Pesticides	Locked Building (Yes)	N/A	N/A	N/A
Tank Bottom Sediment	Steel Drums (Yes)	Truck (Yes)	None	Buried at Landfill (No)
Tetraethyl Lead Sludge	Steel Drums (Yes)	Truck (Yes)	None	Buried at Landfill (No)
Waste Oil				
• Power Plant	Steel Drums (Yes)	None	None	Dust Control on Roadways (No)
• Vehicles - Government	Steel Drums (Yes)	None	None	Dust Control on Roadways (No)
• Vehicles - Private	Steel Drums (Yes)	None	None	Reutilized for Lubrication and Weatherproofing (Yes)

\* Based on incineration at new hospital.

\*\* Acceptable if properly triple rinsed, punctured and crushed. In addition, certain medicines should not be incinerated because particulates and exhaust gasses emitted are toxic. These wastes can be either separately landfilled or sequestered. Proper disposal requires a case-by-case decision.

TABLE 5-6 - EVALUATION OF CURRENT HAZARDOUS WASTE MANAGEMENT PRACTICES, TRUK, 1977 (SHEET 1 OF 1)

Waste Material	Storage Method (Meets Criteria?)	Collection Method (Meets Criteria?)	Treatment Method (Meets Criteria?)	Disposal Method (Meets Criteria?)
Chlorine Containers	None	Truck (Yes)	Rinsing (No)	Buried at Landfill (Yes)*
Hospital Wastes				
• Pathologic	None	Hand Carried to Incinerator (Yes)	None	Incineration (Yes)**
• Expired Medicines	At Hospital (Yes)	None	None	Returned to Manufacturer (Yes)
Pesticide Containers	None	None	Rinsing (No)	Buried at Point of Use (Yes)
Suspended and Unusable Pesticides	Locked Storeroom (Yes)	N/A	N/A	N/A
Tank Bottom Sediments	Steel Drums (Yes)	Truck (Yes)	None	Buried at Landfill (No)
Tetraethyl Lead Sludge	Steel Drums (Yes)	Truck (Yes)	None	Buried at Landfill (No)
Waste Oil				
• Power Plant	Steel Drums (Yes)	Truck (Yes)	None	Dust Control at Airport (No)
• Vehicles - Government	Steel Drums (Yes)	Truck (Yes)	None	Dust Control at Airport (No)
• Vehicles - Private	Steel Drums (Yes)	None	None	Buried at Service Stations (No)

\* Acceptable if properly triple rinsed, punctured and crushed.  
\*\* Acceptable on... if incinerator is repaired.

TABLE 5-7 - EVALUATION OF CURRENT HAZARDOUS WASTE MANAGEMENT PRACTICES, YAP, 1977 (SHEET 1 OF 1)

Waste Material	Storage Method (Meets Criteria?)	Collection Method (Meets Criteria?)	Treatment Method (Meets Criteria?)	Disposal Method (Meets Criteria?)
Asphaltic Oil	Leaking Drums (No)	N/A	N/A	N/A
Chlorine Containers	Open (No)	None	Rinsing (No)	Distributed to Public (No)
Hospital Wastes • Pathologic • Expired Medicines	None None	Hand Carried to Incinerator (Yes) None	None None	Incineration (Yes)* Returned to Manufacturer (Yes)
Pesticide Containers	None	None	Bottles Rinsed and Broken (Yes)**	Sacks Burned (Yes);*** Bottles Buried at District Agriculture Office (Yes)
Suspended and Unusable Pesticides	Locked Building (Yes)	N/A	N/A	N/A
Tank Bottom Sediments	Steel Drums (Yes)	Truck (Yes)	None	Buried at Landfill (No)
Tetraethyl Lead Sludge	Steel Drums (No)	Truck (Yes)	None	Buried at Landfill (No)
Waste Oil • Power Plant • Vehicles - Government • Vehicles - Private • Coast Guard	Steel Drums (Yes); Concrete Sump (Yes) Steel Drums (Yes) Steel Drums (Yes) Concrete Sump (Yes)	None; Pumped to Tank Trailer (Yes) None None Pumped to Tank Trailers (Yes)	None None None None	Dust Control on Roadways (No) Dust Control on Roadways (No) Reutilized for Lubrication and Weatherproofing (Yes) Dust Control on Roadways (No)

\* Based on incineration at new hospital.

\*\* If triple-rinsed.

\*\*\* Acceptable due to limited quantities.

TABLE 5-8 - EVALUATION OF CURRENT HAZARDOUS WASTE MANAGEMENT PRACTICES, PALAU, 1977 (SHEET 1 OF 1)

Waste Material	Storage Method (Meets Criteria?)	Collection Method (Meets Criteria?)	Treatment Method (Meets Criteria?)	Disposal Method (Meets Criteria?)
Brine Sludge	None	None	None	Pumped to Bay (No)
Chlorine Containers	Outside (No)	Truck (Yes)	None (No)	Buried at Landfill (Yes)*
Hospital Wastes				
• Pathologic	Steel Drum (Yes)	Hand Carried to Incinerator (Yes)	None	Low Temperature Incineration (No)
• Expired Medicines	At Hospital (Yes)	None	None	Low Temperature Incineration (No)
Pesticide Containers	Refuse Bins (Yes)	Refuse Collection Vehicle (Yes)	None	Landfill (Yes)*; Dumped On-Site (No)
Tank Bottom Sediments	Steel Drums (Yes)	None	None	Buried at Landfill (No)
Tetraethyl Lead Sludge	Steel Drums (Yes)	Truck (Yes)	None	Buried at Landfill (No)
Waste Oil				
• Power Plant	Underground Steel Tank (Yes)	Truck (Yes)	None	Dust Control (No); Open Burning (No)
• Vehicles - Government	None	None	None	Percolation into Soil (No)
• Vehicles - Private	Steel Drums (Yes)	None	None	Dust Control (No)

\* If properly triple rinsed, punctured and crushed.

Distribution and PCB Concentration of  
Electrical Transformers Surveyed in the Trust Territory

Location	PCB Concentration			Total
	Less than 50 ppm	50-500 ppm	More than 500 ppm	
Koror, Palau	45	14	13	72
Kolonia, Yap	21	1	1	24
Moen, Truk	25	9	8	42
Kolonia, Ponape	44	8	2	54
Kosrae	20	1	0	21
Majuro	40	3	3	46
TOTAL	231	36	27	294

Source: "Report on PCB Survey of the Trust Territory," Hazardous Waste Survey: Trust Territory of the Pacific, Chem-Security Systems, Oak Brook, Illinois, March 1981.

## PUBLICATIONS IN THE UNEP REGIONAL SEAS REPORTS AND STUDIES SERIES

- No. 1 UNEP: Achievements and planned development of UNEP's Regional Seas Programme and comparable programmes sponsored by other bodies. (1982)
- No. 2 UNIDO/UNEP: Survey of marine pollutants from industrial sources in the West and Central African region. (1982)
- No. 3 UNESCO/UNEP: River inputs to the West and Central African marine environment. (1982)
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- No. 6 UN/UNESCO/UNEP: Marine and coastal area development in the East African region. (1982)
- No. 7 UNIDO/UNEP: Industrial sources of marine and coastal pollution in the East African region. (1982)
- No. 8 FAO/UNEP: Marine pollution in the East African region. (1982)
- No. 9 WHO/UNEP: Public health problems in the coastal zone of the East African region. (1982)
- No. 10 IMO/UNEP: Oil pollution control in the East African region. (1982)
- No. 11 IUCN/UNEP: Conservation of coastal and marine ecosystems and living resources of the East African region. (1982)
- No. 12 UNEP: Environmental problems of the East African region. (1982)
- No. 13 UNEP: Pollution and the marine environment in the Indian Ocean. (1982)
- No. 14 UNEP/CEPAL: Development and environment in the Wider Caribbean region: A Synthesis. (1982)
- No. 15 UNEP: Guidelines and principles for the preparation and implementation of comprehensive action plans for the protection and development of marine and coastal areas of regional seas. (1982)
- No. 16 GESAMP: The health of the oceans. (1982)
- No. 17 UNEP: Regional Seas Programme: Legislative authority. (in preparation)
- No. 18 UNEP: Regional Seas Programme: Workplan. (1982)
- No. 19 Rev. 1. UNEP: Regional Seas Programme: Compendium of projects. (1984)
- No. 20 CPPS/UNEP: Action Plan for the protection of the marine environment and coastal areas of the South-East Pacific. (1983)



- No. 21 CPPS/UNEP: Sources, levels and effects of marine pollution in the South-East Pacific. (1983) (In Spanish only)
- No. 22 Rev. 1. UNEP: Regional Seas Programme in Latin America and Wider Caribbean. (1984)
- No. 23 FAO/UNESCO/IOC/WHO/WMO/IAEA/UNEP: Co-ordinated Mediterranean Pollution Monitoring and Research Programme (MED POL) - Phase I: Programme Description. (1983)
- No. 24 UNEP: Action Plan for the protection and development of the marine and coastal areas of the East Asian region. (1983)
- No. 25 UNEP: Marine pollution. (1983)
- No. 26 UNEP: Action Plan for the Caribbean environment programme. (1983)
- No. 27 UNEP: Action Plan for the protection and development of the marine environment and coastal areas of the West and Central African region. (1983)
- No. 28 UNEP: Long-term programme for pollution monitoring and research in the Mediterranean (MED POL) - Phase II. (1983)
- No. 29 SPC/SPEC/ESCAP: Action Plan for managing the natural resources and environment of the South Pacific region. (1983)
- No. 30 UNDIESA/UNEP: Ocean energy potential of the West and Central African region. (1983)
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