

TUVALU

1. PRELIMINARY

Introduction

Tuvalu is a nation of low-lying coral atolls and is presently listed by the UN as one of the least-developed of nations, with GDP per capita estimated at \$US 800 in 1995 (CIA, 2000).

Tuvalu is essentially bereft of natural resources, with the exception of those provided by the sea. A major component of Tuvalu economy is income generated by licensing international fishing vessels to operate within the nation's EEZ.

Pacific island nations/territories most closely neighbouring Tuvalu are Wallis and Futuna, Samoa and Fiji to the south, and Tarawa, Kiribati in the Gilbert Islands to the north.

Geography

The total land area of Tuvalu is 26 km², with a declared EEZ covering 900,000 km². The nation comprises nine low-lying coral atolls, with the highest point above sea level of the order of five metres. Land is at a premium in Tuvalu, particularly on the island of Funafuti (Fogafale). Almost half of Tuvalu's population of nearly 11,000 lives in Funafuti, which has a total land area of about 2.5 km². Population growth rate was estimated at 1.4% in 2000.

Legislative Issues

Status of IMO Conventions

Tuvalu is not a member of the IMO, although it is a signatory to Annexes I, II, III, IV and V of MARPOL 73/78. The provisions of these annexes have been given effect in national law via the *Marine Pollution Act 1992*. The Act is currently undergoing review with the intention of clarifying any gaps or inconsistencies with

MARPOL 73/78 requirements, plus those proposed in the generic SPREP marine pollution bill. Government officials advised that Port State Controls are exercised by Tuvalu authorities, although the nation is not a Party to the Tokyo MOU.

The nation is not a signatory to the London Convention, although advice from the Marine Department of the Tuvalu government is that the provisions of the Convention are observed, as reflected in the *Marine Pollution Act 1992*. As for MARPOL 73/78, the pending review of the Tuvaluan law is intended to ensure consistency with the latest requirements of the London Convention, as amended.

Local Legislative Issues

In addition to the *Marine Pollution Act 1992*, Chapter 88 of the Laws of Tuvalu, addressing port and marine issues, also provides for various offences related to the discharge of sewage, garbage and similar materials into Tuvalu port waters.

There are currently no specific environmental laws in Tuvalu and no legislative requirement for environmental impact assessment. While latitude exists within existing laws to require due consideration of environmental requirements, the Tuvalu National Environmental Management Strategy proposes the drafting of specific environmental laws in the longer-term.

PORT REPORT: FUNAFUTI

Description of Port and Associated Shipping/Boating Activities

Funafuti is Tuvalu's main, albeit small, port. All ships visiting from overseas call on the capital, and the port is also the base of operations for the inter-island passenger and cargo service operated by the Tuvalu government. This inter-island service visits

all of the other inhabited atolls within Tuvalu, in roadstead operations serviced by small boats.

Port facilities comprise a single L-shaped pier, with the main cargo berth having a length of about 50 m and a depth alongside of 8 m. Anchorages are available within Funafuti Lagoon immediately off from the wharf; ships are sometimes required to lay-off at anchor while awaiting access to the cargo berth. The wharf does not possess any cargo-handling gear, nor does the port have any Pilot vessels or workboats. The 40 tonne training vessel of the Tuvalu Maritime Training College is based at Funafuti, as is the Pacific Patrol Boat *Te Mataili*. About 40 small local fishing boats operate from Funafuti, mostly confining their activity to day or overnight journeys.

A 1,000 tonne combined passenger ferry/cargo-carrier, *Nivaga II*, is based in Funafuti. The ship is registered to carry up to 250 passengers and is engaged on inter-island trading within Tuvalu, with occasional visits to Fiji.

International traffic into and out of Funafuti is predominantly containerised cargo, with some minor amounts of break-bulk items, principally building materials. The typical cargo-run into and out Funafuti originates in either Australia or New Zealand, with calls in Noumea and Suva, then onto the Wallis and Futuna Islands and Apia, or the same general route in reverse. Typical sailing time for container ships into and out of Funafuti is two to three days to/from the next/previous port. International container ships servicing Funafuti are usually of the order of 3,000 tonnes, up to 15 years of age and carry crews in the order of 10 to 15. Over the period 1997 to 2000, an average of 45 such ships have called on Funafuti annually, with port stays typically of the order of a day, although sometimes longer due to slow container-handling rates.

Funafuti also takes delivery of bulk refined oil supplies via light tanker typically

arriving from Vuda Point. Tankers delivering to Funafuti are generally engaged on the Vuda Point, Port Vila, Nuku'alofa service. Tankers come alongside the wharf to discharge cargo.

Cruise vessels do not visit Funafuti on a regular basis, although it is reported that one visit will typically occur every two years. These characteristically involve around 500 passengers or more, plus crew, on a six-hour visit. Major warships, carrying around 200 crew, also visit the port on average every two or so years and usually stay for two to three days.

Funafuti typically hosts three or four foreign fishing vessels (FFVs) each year; some of the many dozens which fish for tuna under licence within Tuvalu's EEZ but do not usually call into port except for urgent repair or medical reasons. A fishing 'mothership' may anchor off Funafuti for two to three days annually for the purpose of trans-shipment of catch from the FFVs.

A small number of itinerant yachts call on Funafuti each year, with most activity during the cyclone season from October to March. It is reported that up to eight to ten yachts may be at anchor off Funafuti at any one time during this period.

A small slipway operates near the wharf. The slipway is capable of taking minor local craft of only a few tonnes displacement.

There are no planned increases to the capacity of the port, although a proposal to compel FFVs to bunker in Funafuti as a licence condition for fishing in the Tuvalu EEZ has been mooted. This has the potential to substantially increase the number of vessels visiting Funafuti annually, and hence demand for waste reception.

Demand for Ship Waste Reception Facilities

The demand for port waste reception facilities in Funafuti is relatively small. Most local vessels generate minimal

amounts of waste and merchant ships spend minimal periods at sea on the trip into Funafuti. The biggest potential demand arises from the regular operations of the inter-island passenger/cargo service, provided by the vessel *Nivaga II*.

Assuming: 80% average passenger capacity (ie. 200 passengers) plus 20 crew, each generating garbage at the rate of 1.5 kg/day; nil discharge of waste either at sea or at other ports of call; and an average 3 day trip around the Tuvalu atolls; then the ferry could potentially have on average 1 tonne of garbage for disposal upon arrival in Funafuti. Cargo-associated waste, such as used packing material and damaged 205 L drums, would add to this amount. Although fitted with an oily water separator, the cargo ferry would also need to dispose of other oily wastes periodically. Inconsequential quantities of garbage and oily wastes would be generated by visiting yachts and resident watercraft.

The irregular visits of cruise liners nevertheless has the potential to present Tuvalu authorities with a substantial amount of waste material. Assuming 600 passengers and crew each generating 2.5 kg/day, on a two-day transit from the previous port, with 50% of garbage (mainly food waste) disposed of to sea en route, then garbage in the order of 1.5 tonnes to 2 tonnes could be landed at Funafuti. This would prove particularly challenging for the existing infrastructure and services, without considering the end-fate of the waste material (Note: These estimates are more refined than those presented in Appendix D which employ more generic modelling data).

No waste management plan exists for the port of Funafuti, and no waste reception facilities or procedures were in evidence (uncontrolled dumping of rubbish was evident within the port area). No specific fees are charged to visiting vessels for waste disposal, although port, wharfage and harbour fees are collected.

Oily Wastes

Oily wastes are collected from shipping on an informal and *ad hoc* basis, albeit a relatively effective one. The local BP agent will accept waste oil from visiting yachts and the Tuvalu patrol boat, provided the waste oil is generally free of detergents and other contaminants. The waste oil is stored in 205 L drums at the oil depot and periodically sent to Vuda Point in drums as deck cargo on visiting tankers. In Fiji the oil is recovered for eventual disposal through use as a fuel in a Fiji steel furnace. This service is provided by BP at no cost. When observed the drums of waste oil were stored in a non-bunded area.

It is reported that only a few hundred litres of waste oil are collected annually through this scheme. No waste oil is understood to be received from local vessels, with the exception of that from the Tuvalu patrol boat. The service is not apparently publicised and relies upon vessels requesting BP to accept their waste oil.

No facilities exist for the collection, treatment and disposal of oily water wastes, such as bilge water.

Garbage

At present, there is no provision for the acceptance of any garbage at Funafuti, whether from international or domestic shipping, including the inter-island ferry. Anecdotal evidence indicates that the usual practice for passengers and crew is to dispose of garbage before leaving the ship; in the case of Funafuti, this is understood to involve passengers disposing of most of their garbage directly to sea while the vessel is alongside Funafuti wharf. Waste foodstuffs are often retained for feeding to the pigs at Funafuti, some of which are free-ranging.

Although no reception facilities are provided for garbage from international shipping, this is not considered to have any great

significance. Noting the usual sailing patterns of the Tuvalu merchant trade it should be a comparatively simple measure for these ships to retain garbage onboard until arrival at another port of call.

In contrast to normal the situation for routine operational garbage from international shipping, the port of Funafuti is adversely affected by cargo-associated wastes. These are mainly in the form of derelict shipping containers and 205 L drums. Unserviceable containers and drums have accumulated in the immediate vicinity of the port, with the number of drums probably exceeding several hundred.

The total absence of garbage reception facilities at Funafuti is an inadequate situation. Although acceptance of waste from all shipping is not appropriate, provision needs to be made for proper collection and disposal of garbage from domestic shipping, particularly the passenger ferry.

Quarantine Wastes

Tuvalu enforces barrier controls, although their effectiveness is uncertain. Only small amounts of quarantine wastes are generated from shipping. This is typically collected from visiting yachts if necessary, although it is understood that this material is often fed to pigs, possibly negating the quarantine controls.

If necessary, any large quantities of quarantine waste are burned in open pits, with diesel used to aid combustion. The effectiveness of such treatment is questionable, and is likely to have adverse environmental consequences, noting the very close proximity of any site within Tuvalu to groundwater and the sea.

Special, Hazardous or Noxious Wastes

No procedures were in evidence for the separate collection and management of hazardous or noxious wastes, and it is

understood that the demand for such services from marine sources is relatively minor. Nevertheless, quantities of these wastes would be generated, mainly from the inter-island trading vessel.

Sewage

Sewage management and general degradation of water quality within Funafuti Lagoon is emerging as an environmental management issue for Tuvalu. The fundamental cause of the deterioration in water quality is ineffective sewage disposal practices in Funafuti, compounded by the presence of over 4,000 pigs within the capital.

The contribution of vessel sourced sewage is relatively minor. Notwithstanding this, *Nivaga II* is likely to be the most substantial point source of sewage discharge within the lagoon. The ship is fitted with sewage holding tanks, and it is reported that sewage is retained while the ship is within the port. Similarly, other ships with holding tanks are required to refrain from discharging while alongside at Funafuti. No shore ablation facilities were in evidence in the port area.

Discussion

With the exception of waste oil collection and some collection of quarantine wastes, no ship waste reception services exist for the port of Funafuti. The non-provision of services is not considered an issue for international shipping, with the exception of unserviceable containers and 205 L drums, and itinerant yachts, but is inadequate for domestic shipping. This is particularly the case for the inter-island trading vessel, which is also the most significant source of waste of all vessels visiting Funafuti on a regular basis. Additionally, there is a need for better procedures for the management and disposal of cargo-related waste.

The waste oil collection service is an effective means of ensuring proper management and disposal of this material. Its effectiveness and environmental

acceptability would be enhanced by raising awareness of its availability, and by providing a banded area for the storage of the waste oil drums.

The demand for collection and disposal of all categories of ship waste, as well as that specifically associated with fishing, can be expected to increase should Tuvalu proceed with the proposal to require bunkering at Funafuti by all foreign fishing vessels licensed to operate within the Tuvalu EEZ.

Current Terrestrial Waste Management Practices

Waste management in Tuvalu, particularly on Funafuti Atoll, is considered one of the most critical issues confronting the nation. This issue is being addressed via the AusAID Pacific Waste Management Project. Limited land, coupled with high population density, 'in-migration' to Funafuti and a growing population make waste management particularly problematic. This is so for all types of waste, including solid waste, putrescibles and sewage. The low-lying nature of the atolls, coupled with their narrowness, means that there is little natural barrier to prevent or attenuate the leaching of pollutants into the sea and fresh groundwater lenses. This is exacerbated by the relatively poor rate of flushing of the internal waters of the atolls. Nutrification of internal waters within Fogafale Atoll has already been noted.

The main waste management problems for Tuvalu have been identified as:

- public health;
- visual amenity;
- water lens quality (brackish to fresh, but not potable);
- lagoon water quality;
- soil condition; and
- ecosystem health.

A Tuvaluan waste study was conducted in 1995. The survey found that each household (av. 7.7 occupants) generates 9.4 kg/day solid waste, equating to 34.2 m³ per annum (by wt: 23% vegetable matter; 1% Al cans;

9% tin cans; 35 plastics; 11% glass bottles; 2% paper; 50% other). The approximately 500 homes on Fogafale (Funafuti) generate about 17,000 m³ to 20,000 m³ waste per annum.

A legacy of American use of Tuvalu during the Second World War is the existence of 10 borrow pits on Funafuti Atoll. These range in size from 677 m³ to 129,000 m³ (AusAID, 1998). The borrow pits have become increasingly used as uncontrolled rubbish dumps. There is also significant visual evidence of uncontrolled dumping of solid wastes on roadsides and within remnant vegetation areas on Funafuti Atoll.

A limited domestic solid waste collection system has been established. This was established with overseas aid and comprises two tractor/trailer combinations for waste collection, combined with the purchase of 120 L mobile garbage bins by participating households and businesses. The service has not met expectations, owing to equipment serviceability and reliability problems (only one tractor remains operational); incomplete take-up of the service by households (only 20% of households paid the \$10 annual collection fee in 1996); and a perception that the cost of the service is in excess of what most residents can reasonably afford.

Cultural issues also augur against comprehensive solid waste management. Rubbish disposal is not generally recognised as a problem by the population, and inappropriate dumping of wastes and littering is endemic. This has obvious adverse effects upon visual amenity, as well as problems with odour, vermin and public health.

A national objective of Tuvalu is to reduce the amount of waste generated, and to better manage that which is disposed to landfill. Such ambitions are hampered by technical, economic and cultural factors. The operation of a landfill employing modern techniques is constrained by the lack of suitable land, the close proximity of any site to groundwater

and the ocean, and the extremely limited supply of suitable material for daily covering of planned landfill.

Putrescible waste is often fed to pigs and poultry, and it is understood that this may also be the fate of some quarantine wastes.

Sea dumping is under active consideration by the Tuvalu government as a disposal option. It is intended that larger, inert items, such as car bodies and unserviceable shipping containers, would be dumped into the deep waters surrounding Tuvalu.

Quarantine waste is currently burned in open pits, with diesel added as necessary to assist combustion. Hospital wastes, including bio-hazardous materials, sharps and drugs are similarly disposed by burning in an open pit.

Some limited recycling is practiced. Aluminium cans are crushed into billets and exported for recycling. About two TEUs are filled for export each year. It is estimated that the recovery and recycling rate for aluminium cans is less than 50% (AusAID, 1998).

Nil sewage treatment facilities exist within Tuvalu, with most sewage going to septic tanks. Sewage is a critical problem for Funafuti, exacerbated by the presence of pigs, many of which are free-roaming.

An incinerator was supplied to Tuvalu by Australia in 1995 for the destruction of medical wastes; the system is yet to be commissioned although the intention is to establish the incinerator at the hospital in the 'near-future'. It is possible that this incinerator could also be used for the disposal of quarantine items. A waste oil incinerator has been installed at the power station, although this has yet to become fully operational due to design flaws.

Nil facilities exist within Tuvalu for the handling of hazardous waste. It is intended to develop a dedicated storage area for the

collection and containment of such materials prior to development of a permanent disposal strategy; this may involve export.

Summary and Conclusions

Tuvalu is a very small nation with limited natural resources and an economy and infrastructure reliant upon overseas technical and financial assistance. Tuvalu is not a member of the IMO but has become a Party to MARPOL 73/78, including Annexes I to V inclusive. The nation is not a signatory to the London Convention. The legal requirements of MARPOL 73/78 are not fully enshrined within national law, although this situation is currently being addressed. Port State Controls are exercised.

Waste management is a major environmental and public health issue for Tuvalu, particularly the capital Funafuti. The disposal of wastes is hampered by severe economic and technical constraints, not least of which is the lack of land suitable for landfill sites.

The current demand for the reception of ship wastes is relatively minor, and generally restricted to vessels operating domestically. International shipping into and out of Funafuti is almost exclusively involved in inter-Pacific island trading; these ships are capable of retaining routine operational wastes for onboard treatment and/or disposal at alternative ports. Domestic vessels, however, have no alternative other than to discharge wastes, mainly garbage, at Funafuti, barring disposal at sea.

In conclusion:

- ship waste reception facilities and procedures at Funafuti are essentially non-existent. This is considered acceptable for international shipping, although minimum facilities for the collection of garbage and oily wastes are required for vessels engaged in domestic activities;
- procedures for the management of cargo-associated waste (primarily

- unserviceable shipping containers and 205 L drums) need to be improved and the existing stockpiles at the port cleared;
- current quarantine waste procedures are inadequate and possibly ineffective;
- the current waste oil collection service is effective, albeit its availability should be more widely publicised;
- the discharge of sewage from ships at the port of Funafuti contributes to the degradation of water quality. Few practical options exist to ameliorate this situation, other than requiring ships with holding tanks to retain sewage onboard until clear of the lagoon;
- waste management facilities in Funafuti are severely taxed by wastes of terrestrial origin. Noting this, Tuvalu should not normally accept waste from overseas vessels, with the exception of visiting yachts; and
- any increase in the number of foreign fishing vessels visiting Funafuti (as mooted as a condition of future fishing licences) will generate increased demand for reception of ship waste, possibly compelling Tuvalu to accept such materials.

RECOMMENDED IMPROVEMENTS

Overall, Tuvalu has inadequate procedures for the management of ship-generated waste, with minimal latitude to improve this situation owing to lack of land and technical and economic constraints. No waste should be accepted from international shipping, except in extenuating circumstances.

Legislative Issues and Status of Relevant Conventions

Although a Party to MARPOL 73/78 Annexes I to V inclusive, national enabling legislation is considered generally deficient. These shortcomings should be addressed either by suitable amendment of existing legislation or adoption of new laws, using the SPREP generic marine pollution bill as a model.

Compliance Monitoring and Enforcement

Opportunities for regional cooperation in the application of Port State Controls should be improved, including information exchange and building of indigenous technical capacity.

Regional Waste Management Opportunities

Tuvalu should:

- evaluate and improve options for export of recyclable materials accepted from domestic shipping (aluminium and other scrap metals) to other ports in the Pacific islands region or further;
- identify and evaluate options for the export to a suitably equipped nation of hazardous wastes accepted from domestic shipping; and
- expand the existing scheme for transfer of waste oil to Vuda Point for recycling to capture more of the waste oil generated by Tuvalu shipping.

Ship-waste Reception and Management Recommendations

Recommended Improvements to Port Waste Reception: Funafuti

Waste Category	Waste Management Recommendations	
	Domestic Shipping	International Shipping
Garbage	Provide bins in wharf area. Include port precinct in municipal collection rounds.	Nil acceptance, except from itinerant yachts. As far as practicable, return cargo-associated wastes (e.g. used drums and ISO containers) to source.
Recyclables	If recycling of aluminium cans found to be viable for nation as a whole, provide suitable collection bins in wharf areas. Encourage vessel operators to dispose of aluminium separately to general garbage.	If recycling of aluminium cans found to be viable for nation as a whole, provide suitable collection bins in wharf areas. Encourage vessel operators to dispose of aluminium separately to general garbage.
Quarantine wastes	n/a	Improve quarantine disposal procedures to ensure all wastes presenting quarantine risk are properly destroyed.
Hazardous/special wastes	Review current procedures to ensure diversion of hazardous/special wastes from general garbage. Link ship-generated hazardous waste measures to national scheme for capture and export.	Nil acceptance.
Oily wastes (waste oil)	Provide waste oil collection drums at facilities used by small boats for refuelling.	Nil acceptance.
Oily wastes (oily water)	Critically review requirement and if deemed necessary, provide oily waste collection (such as barge or truck mounted pump and tank systems), and treatment (such as gravity separation system) facilities, principally for domestic vessels.	Nil acceptance.
Sewage	Investigate feasibility of installing shore ablution facilities in wharf area.	Ensure large ships alongside in Funafuti do not discharge untreated sewage (e.g. ban use of heads if necessary).