Water Quality Management Series SUB-SERIES No MS 13.4

OPERATIONAL POLICY FOR THE DISPOSAL OF LAND-DERIVED WATER CONTAINING WASTE TO THE MARINE ENVIRONMENT OF SOUTH AFRICA

APPENDICES



Department: Water Affairs and Forestry

> EDITION 1 2004

WATER QUALITY MANAGEMENT SERIES

SUB-SERIES No MS 13.4

OPERATIONAL POLICY FOR THE DISPOSAL OF LAND-DERIVED WATER CONTAINING WASTE TO THE MARINE ENVIRONMENT OF SOUTH AFRICA:

APPENDICES

Department of Water Affairs and Forestry



EDITION 1 2004 Published by:

The Department of Water Affairs and Forestry Private Bag X313 Pretoria Republic of South Africa

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This report should be cited as:

Republic of South Africa, Department of Water Affairs and Forestry, 2004. Water Quality Management Series, Sub-Series No. MS 13.4. Operational policy for the disposal of land-derived water containing waste to the marine environment of South Africa: Appendices. Edition 1. Pretoria.

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CSIR Report No.: ENV-S-C 2004-59C





FOREWORD

This operational policy for the disposal of land-derived water containing waste to the marine environment of South Africa outlines the Department of Water Affairs and Forestry's new thinking in relation to discharges to sea.

In line with international trends and our national objectives of efficient and effective management of the nation's resources, priority is given to a receiving water quality management approach. Previously the focus was on 'end-of-pipe' pollution control with little attention to the receiving environment, whereas this new approach focuses on the capacity of the receiving environment to assimilate waste and hence ensure water that is fit for use by all its other intended users.

In recent years, the discharge of land-derived water containing waste to the marine environment has been receiving increasing attention in many parts of the world due to the environmental sensitivity of the oceans and the cumulative impact of these discharges on the marine environment. In South Africa there are more than forty discharges of water containing waste formalised through authorisations issued in terms the Water Act, 1956 (Act 54 of 1956) and the National Water Act, 1998 (Act 36 of 1998). These discharges vary widely from surf zone and estuarine discharges of municipal sewage or industrial wastewater to discharges through well designed offshore marine outfalls fitted with hydraulically efficient diffusers operating in water depths of more than 20 metre.

The aim of this operational policy is to provide Basic Principles and Ground Rules as framework within which disposal practices for land-derived water containing waste could be evaluated when marine disposal is a possible alternative. It also provides a management framework within which such disposal needs to be conducted.

The Department of Water Affairs and Forestry would like to extend our sincere gratitude to all those who contributed to the development of this Operational policy and supporting documents.

APPROVAL

TITLE:	Operational policy for the disposal of land-derived water containing waste to the marine environment of South Africa: Appendices.				
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REPORT STATUS:	Edition 1				
SUB-SERIES NO:	3.4				
FILE NO.:	16/3/4/55/1				
PROJECT NO.:	2001/147				
WEB ADDRESS:	http://www.dwaf.gov.za				
FORMAT:	This document is available in MS Word format				
DATE:	2004				

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DOCUMENTS IN SERIES

Sub-Series MS13.1	Operational Policy for the disposal of land-derived water containing waste to the marine environment of South Africa: Inception Report
Sub-Series MS13.2	Operational Policy for the disposal of land-derived water containing waste to
	the marine environment of South Africa
Sub-Series MS13.3	Operational Policy for the disposal of land-derived water containing waste to
	the marine environment of South Africa: Guidance on Implementation
Sub Sorios MS13 /	Operational Policy for the disposal of land-derived water containing
Sub-Series MS 13.4	waste to the marine environment of South Africa: Appendices

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This document contains the outcome of review studies that was conducted as part of the development of this operational policy. It also contains the feed-back of key stakeholders (obtained through two stakeholder workshops) and the External Reviews (including a national and international review).

Documentation of the above-mentioned was considered important to provide the relevant background information to be considered, for example in future updates of the operational policy.

ACRONYMS

ANZECC	Australian and New Zealand Environment and Conservation Council			
BAT	Best available technology			
BOD	Biochemical oxygen demand			
CEPA	Canadian Environmental Protection Act			
COD	Chemical oxygen demand			
CTD	Conductivity-Temperature-Depth			
CWA	Clean Water Act (United States)			
1-D	One-Dimensional			
2-D	Two-Dimensional			
3-D	Three-Dimensional			
DBSA	Development Bank of South Africa			
DEAT	Department of Environmental Affairs and Tourism			
Defra	Department of Environment, Food and Rural Affairs (UK)			
DPLG	Department of Provincial and Local Government			
DWAF	Department of Water Affairs and Forestry			
EC	European Community			
e.p.	Equivalent population			
EPA (Australia)	Environmental Protection Authority (Australia)			
EPA	Environmental Protection Agency			
GPS	Global Position System			
GRP	Glass reinforced plastic			
HDPE	High density polyethylene			
IEM	Integrated Environmental Management			
KZN	Kwazulu-Natal			
LC ₅₀	Concentration that is lethal to 50% of the test organisms			
LPDE	Low density polyethylene			
MATD	Minimum acceptable toxicant dilution			
MDPE	Medium density polyethylene			
MPa	Mega Pascal (unit)			
NEMA	National Environmental Management Act 107 of 1998			
NOAEC	No-observed-adverse-effect-concentration			
NPDES	National Pollutant Discharge Elimination System			
NTRPC	Natal Town And Regional Planning Commission			
NWA	National Water Act 36 of 1998			
NZWERF	New Zealand Water Environment Research Foundation			
POTW	Public owned treatment works			
PRO	Primary Responsible Officer			
PVC	Polyvinal chloride			
SADCO	South African Data Centre for Oceanology			
SANCOR	South African National Committee for Oceanographic Research			
SEPA	Scottish Environment Protection Agency			
SS	Suspended solids			
SUDS	Sustainable Urban Drainage System			

UNEP	United Nations Environmental Programme			
uPVC	unplasticised Polyvinal chloride			
US-EPA	United States Environmental Protection Agency			
WESSA	Wildlife and Environment Society of South Africa			
WHO	World Health Organisation			
WMS	Water Management System of DWAF			
WRC	Water Research Commission			
WRc	Water Research Centre			
WWF	WWF - formerly know as the World Wildlife Fund			
WWTW	Waste water treatment works			
ZID	Zone of initial dilution			

GLOSSARY OF TERMS

Advective transport	The transport of dissolved or suspended material in a horizontal plane by a current				
Agglomeration	An area where the population and/or economic activities are sufficiently concentrated for urban wastewater to be collected and conducted to an urban wastewater treatment plant or to a final discharge point				
Agricultural run-off	Irrigation tail-water, other field drainage, animal yard, feedlot, or dairy run-off, etc.				
Anthropogenic	Having to do with man, or caused by humans				
Aquifer	Underground layer of permeable rock, sand or gravel that conveys water				
Aquaculture	Breeding and rearing of freshwater and marine (mariculture) organisms, such as fish, including the husbandry, management, nutrition, genetics and controlled propagation of all aquatic organisms for use by humans				
Assimilative capacity	The ability of an ecosystem to absorb substances such as human waste and pollutants				
Bathymetry	Measurement of the depths of water bodies (ocean, estuaries, dams)				
Benchmark	Point of reference				
Benthic organisms	Organisms living in or on sediments of aquatic habitats				
Bioaccumulation	A process whereby chemical substances are accumulated by aquatic organisms, directly from water or through consumption of food containing such chemicals				
Bioavailable	Able to be taken up by organisms				
Biochemical oxygen demand (BOD)	A measurement of the amount of oxygen taken up by micro-organisms in oxidizing reducing material in the water sample. Normally measured over a 5 day period at 37 degrees C				
Biodiversity	The variability among living organisms from all sources including, <i>inter alia</i> , terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within species, between species and of ecosystems				
Catchment	In relation to a watercourse or watercourses or part of a watercourse, this term means the area from which any rainfall will drain into the watercourse or watercourses or part of a watercourse, through surface flow to a common point or common points				
Chemical oxygen demand (COD)	A measure of the amount of potassium dichromate needed to oxidise reducing material in the water sample. It is generally higher than the biochemical oxygen demand.				
Coastal area	The part of the land affected by its proximity to the sea, and that part of the sea affected by its proximity to the land as the extent to which man's land-based activities have a measurable influence on water chemistry and marine ecology				
Collecting system	A system of conduits that collects and conducts urban wastewater				
Community	Assemblage of organisms characterised by a distinctive combination of species that occupy a common environment and interact with one another				

Community composition	All taxa present in a community			
Cumulative impact (or effect)	Cumulative impact is the impact on the environment which results from the incremental or combined effects of one or more developmental activities in a specified area over a particular time period, which may occur simultaneously, sequentially, or in an interactive manner.			
Diffusive transport	When dissolved or suspended material 'flows' from one part within a medium with high concentrations to adjacent parts of the medium with low concentrations			
Dilution	The reduction in concentration of a substance due to mixing with water			
Dissolved oxygen (DO)	Oxygen dissolved in a liquid, the solubility depending upon temperature, partial pressure and salinity, expressed in milligrams/litre or milliliters/litre			
Domestic wastewater	Wastewater arising from domestic and commercial activities and premises, which may contain sewage (as per General Authorisations - GG 20526 GN 1191 of 8 October 1999)			
Echo-sounder	Device that determines depth by measuring the time taken for a pulse of high-frequency sound to reach the sea bed or a submerged object and for the echo to return.			
Ecological integrity	Maintaining a diverse, healthy and productive natural system			
Economic incentive	A motivating financial instrument, such as a tax concession or rebate, used to encourage a particular attitude or action			
Ecosystem	A community of plants, animals and organisms interacting with each other and with the non-living (physical and chemical) components of their environment			
Eddies	The movement of a stream of water in which the current doubles back on itself causing a type of 'whirlpool'. This is typically caused by promontories along a coastline or due to counteractions from driving forces such as wind shear and an ambient current			
Effluent	Liquid fraction after a treatment process (i.e. preliminary, primary, secondary or tertiary) in a wastewater treatment works			
Environmental impact	A positive or negative environmental change (biophysical, social and/or economic) caused by human action			
Environmental quality objective	A statement of the quality requirement for a body of water to be suitable for a particular use (also referred to as Resource Quality Objective)			
Environmental quality standard	The specified concentration of a substance that legally may not be exceeded so as to protect the receiving environment for a particular use			
Equity	Treating all people with dignity, fairness and justice.			
Equivalent population	The population that comprises the resident population, an allowance for holiday visitors and a conversion of industrial pollution loads to population terms, based on flow or biological load			
Estuary	A partially or fully enclosed body of water which is open to the sea permanently or periodically, and within which the seawater can be diluted, to an extent that is measurable, with freshwater drained from land. The upstream boundary of an estuary is the extent of tidal influence.			
Eulerian (current measurements)	Measuring current by means of a geographically fixed meter that measures the velocity of flow of the passing water			

Eutrophication	Enrichment of water with nutrients causing abundant algal or plant growth often leading to subsequent deficiencies in dissolved oxygen				
Far field	Within the context of ocean outfalls, the spatial/volumetric extent of the receiving water body in which the waste field is transported and dispersed after the initial dilution process				
Habitat	A place, characterised by its physical properties and other life forms, where an organism or community occurs				
Head works	The head works receives wastewater from a catchment and treats it to a specified standard prior to discharge.				
Industrial wastewater	Wastewater arising from industrial activities and premises Contaminated stormwater drainage from industrial premises is include in this definition				
Initial dilution	The dilution of the wastewater plume generated by jet momentum and the buoyancy effects that occur between the outlet ports of a marine outfall's diffuser and the sea surface				
Initial mixing zone	During the initial dilution process, ambient water is entrained by jet and buoyancy-induced turbulence and shear, causing dilution of the rising wastewater plume. When the density of the discharge plume approaches the density of the seawater, the initial dilution process will cease and, depending on stratification in the water column, this process may stop below the surface. The spatial/volumetric extent of the initial dilution process is referred to as the initial mixing zone . This process can be manipulated by the hydraulic design of the outfall system (discharge rate and diffuser configuration). Ambient processes will control the further mixing of the wastewater plume. However, these cannot be manipulated and the degree of mixing, when compared with the achievable initial dilutions, is almost insignificant. Only the physical location of the discharge structure can be optimised for achieving required dilutions at distant locations.				
Land-based treatment	The treatment of wastewater at an inland site. Inland treatment, for example includes preliminary, primary, secondary or tertiary treatment of the wastewater prior to discharge.				
Integrated Development Plan	A plan drawn up by local government to prioritise and co-ordinate development activities and investment, and to promote effective use of budgets				
Interstitial water	Water that occurs naturally within the pores or spaces between sediment particles				
Inter-tidal	Zone between high and low tide-marks				
Lagrangian (current measurements)	Measuring currents by recording the path of a neutrally-buoyant float that follows the flowing water mass				
Macroinvertebrates	Animals that have no backbone and are visible without magnification				
Macrophytes	Macrophytes are (aquatic) plants that are large enough to be apparent to the unaided eye				
Mariculture	Cultivation of marine plants and animals in natural and artificial environments				
Marine discharge	Discharging wastewater to the marine environment either to an estuary or the surf zone or through a <i>marine outfall</i> (i.e. to the offshore marine environment)				

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Marine outfall	A submarine pipeline originating on shore, which conveys wastewater	
	from a head works to a submerged discharge location on or near the seabed beyond the surf zone (i.e. to the offshore marine environment). Also referred to in the literature as a long sea outfall/pipeline and ocean outfall/pipeline.	
Measurement parameter	Within the context of this document, any parameter or variable that is measured to find out something about an ecosystem	
Meiofauna	Animals ranging in size from approximately 0.1 mm to 1 mm that live within sediments	
Municipal wastewater	Domestic wastewater or the mixture of domestic wastewater with industrial wastewater and/or urban stormwater run-off	
Nearfield	Within the context of ocean outfalls this refers to the spatial/volumetrextent of the receiving water body in which the initial dilution procestakes place.	
Nearshore	Within the context of ocean outfalls, this is the zone in the sea in whic wave action has a significant effect on water circulation and shorelir processes (erosion and accretion).	
Non-point source pollution	Pollution originating from a number of diffuse sources often associated with run-off from agricultural and urban areas	
Offshore	Within the context of ocean outfalls, this is the zone in the sea in which wave action has an insignificant effect on water circulation and shoreline processes (erosion and accretion)	
Physiography	Description of the natural features of the seabed (physical geography)	
Point-source pollution	Pollution discharged from a specific fixed location, such as a pipe or outfall structure	
Pollution	The direct or indirect alteration of the physical, chemical or biological properties of the natural environment, including the marine environment, so as to make it less fit for any beneficial purpose for which it may reasonably be expected to be used, or to make it harmful or potentially harmful to the welfare, health or safety of human beings or to any aquatic or non-aquatic organisms	
Precautionary principle	Avoiding risk through a cautious approach to development and environmental management	
Preliminary treatment	Involves the removal from wastewater of 'litter' and solids by coars and/or fine screens as well as the removal of 'grit' (particles sizes > 0. mm and with a specific gravity > 2.6) by settling or separation. The effect on the suspended solid concentrations and <i>BOD</i> in the sewage is insignificant.	
Primary treatment	Involves the removal from wastewater of settleable organic and inorganic solids by sedimentation tanks. The solids, which settle as sludge, have to be disposed of or treated. Fats (oil and grease) are also skimmed from the top of the settling tank. During primary treatment > 40% of suspended solids and 20% of <i>BOD</i> are removed.	

Reserve	The quantity and quality of water required:		
	• to satisfy basic human needs by securing a basic water supply, as prescribed under the Water Services Act, 1997 (Act No. 108 of 1997), for people who are now or who will, in the reasonably near future, be relying upon, taking water from, or being supplied from the relevant water resource, and		
	• to protect aquatic ecosystems in order to secure ecologically sustainable development and use of the relevant water resource.		
Resource quality objectives	Management Objectives for a resource relating to quality of all the aspects of a water resource including:		
	• the quantity, pattern, timing, water-level and assurance of instream flow;		
	• the water quality, including the physical, chemical and biological characteristics of the water;		
	• the character and condition of the instream and riparian habitat; and		
	• the characteristics, condition and distribution of the aquatic biota.		
	These objectives are set by the Department of Water Affairs and Forestry in terms of Chapter 3 of the NWA		
Rhodamine-B dye	A fluorescent red basic xanthene dye used in the marine environment to determine transport and dispersion patterns		
Risk-aversion	Active avoidance to possible exposure to loss of human life, or property damage as a result of hazardous events or coastal processes.		
Seashore	The water and the land between the high- and low-water marks		
Secondary dilution or dispersion	The further dilution that occurs after initial dilution when a wastewater plume is advected away from the discharge area		
Secondary treatment	The separation of liquid and solids contained in primary treated wastewater by a stabilizing process, utilizing micro-organisms and oxygen (aerobic biological treatment by biofilters and/or aeration tanks). The liquid and solids are separated through settling and the sludge is disposed of or treated. Normally secondary treatment removes > 70% of suspended solids and BOD.		
Side scan sonar	Sonar is the acronym for so und n avigation and r anging, a technique used for the detection and location of underwater objects by emitting acoustic waves, and by the interception of the reflected acoustic waves from underwater obstacles. A side scan sonar is a sonar system that transmits sound energy and analyses the echo (return signal) which bounces back from irregularities on the sea-floor, providing a black and white 'trace' of the sea-floor. Usually the side scan sonar (housed in a towfish) is towed behind a boat at a predetermined depth in deeper water or it can be mounted on the hull of the boat for use in shallow water.		
Sludge	Residual sludge, whether treated or untreated, from urban wastewater treatment plants		
Subtidal	The zone below the low-tide level, i.e. it is never exposed at low tide		
Sustainability	In terms of water quality management (DWAF), this means: 'Fitness for use by other users and future generations' and the ability to assimilate waste means the ability to receive and process waste to such an extent that the water remains fit for use by its other intended users.		

Surf zone	Also referred to as the 'breaker zone' where water depths are less than half the wavelength of the incoming waves with the result that the orbital pattern of the waves collapses and breakers are formed		
Synergistic effect	When the effect of two chemicals acting together has a greater negative impact on an ecosystem than the impact of each chemical individually, or the sum of the individual impacts		
Tertiary treatment	Involves the further treatment of secondary treated wastewater to remove nitrogen, phosphorus, ammonia, remaining suspended solids, organic compounds, heavy metals and dissolved solids by special treatment processes		
Trade effluent	Term used for industrial wastewater discharged to a WWTW		
Urban stormwater run-off	Stormwater run-off from paved areas, including parking lots, streets, residential subdivisions, of buildings, roofs, highways, etc.		
Waste	Any solid material or material that is suspended, dissolved or transported in water (including sediment) in such volumes, composition or manner that, if spilled or deposited in the natural environment, will cause, or is reasonably likely to cause, a negative impact		
Water containing waste	Water containing solid, suspended or dissolved material (including sediment) in such volumes, composition or manner that, if spilled or deposited in the natural environment, will cause, or is reasonably likely to cause, a negative impact		
Wastewater	See Water containing waste		

APPENDIX A

CURRENT SITUATION IN SOUTH AFRICA: DISPOSAL OF LAND-DERIVED WASTEWATER TO THE MARINE ENVIRONMENT

A.1 INTRODUCTION

In South Africa discharges of land-derived wastewater to the marine environment occurs to:

- Offshore marine environment
- Surf zone
- Estuaries.

For the purposes of this document the *status quo* of the disposal of land-derived wastewater to the marine environment will be briefly discussed under specific themes considered to be of particular relevance in the disposal of land-derived wastewater to the marine environment (similar to those used in the setting of Ground rules in *Operational policy on the disposal of land-derived water containing waste to the marine environment of South Africa* (RSA DWAF Water Quality Management Sub-Series 13.2), namely:

- Receiving Marine Environment (including sensitive areas and environmental quality objectives)
- Development/Activities and Associated Waste Loads (including municipal wastewater and industrial wastewater discharges)
- Scientific and Engineering Assessment
- Monitoring.

The location of existing discharges to the offshore, surf zone and estuaries are indicated in the three following figures (WRC 1988; CSIR, 1991):

				\sim	5
2 - 1	Offshor	e discharges	S	A A	
	Industrial				
	• wwtw				
Shi	Northern Cape	-	-		
	Western Cape	2	4		
	Eastern Cape	- 5	1	Y K	
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	SB Correct	Jo Charles			
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d					





STATUS QUO IN TERMS OF IMPLEMENTATION OF GROUND RULES

A.2.1 Receiving Marine Environment

i. Sensitive Areas

Current operational practices pertaining to the discharge of land-derived wastewater to the marine environment do not explicitly recognise *sensitive areas*. The procedures followed in the planning and design of offshore marine outfalls, however do to some degree address this issue, where design technologies are applied to ensure compliance to environmental quality objectives (based on designated beneficial uses).

ii. Environmental Quality Objectives

In the case of offshore marine outfalls, the Environmental Quality Objective concept is applied where procedures followed in the planning and design of outfalls require compliance to predetermined Environmental Quality Objectives, based on designated beneficial uses. To assist in setting Environmental Quality Objectives pertaining to water quality, the 'South African Water Quality Guidelines for Coastal Marine Waters', was published by the Department of Water Affairs and Forestry in 1995 (RSA DWAF, 1995).

To date the Receiving Water Quality Objectives Approach has not been applied to discharges of landderived wastewater to estuaries and the surf zone. The reason for this is that historically, under the previous Water Act 54 of 1956 water had to be returned to the original water resources after use following a uniform effluent standard approach, where effluents were required to meet the *General Standards* prior to discharge. Under the old Water Act application for an exemption to the rule that freshwater had to be returned to the point of origin could be obtained in which case it was allowed to discharge *General Standard* treated effluent to estuaries or the surf zone. Therefore, in following the uniform effluent standard approach (i.e. treatment to *General Standard* were considered suffice), Environmental Quality Objectives were never considered and Environmental Impact Assessment Studies were never a requirement, for example potential impacts of 'freshwater' on a largely saline receiving environment were ignored. It is therefore strongly recommended that the Receiving Water Quality Objectives Approach also be applied to existing discharges to estuaries and the surf zone should the DWAF allow those to continue.

A.2.2 Development/Activities and Associated Waste Loads

i. Municipal Wastewater

In South Africa, larger urban areas along the coast have collecting systems in place for municipal wastewater although problems are often encountered in older areas where deterioration of the structures results in regular spillage and seepage. The supply of effective collecting systems in the rapidly expanding informal settlements in coastal urban areas is also difficult.

In smaller coastal communities along the South African coast, collecting systems are often not supplied and non-sewered systems such as septic tanks and French drains are typically used for the treatment of domestic wastewater. Where collecting systems are installed in smaller coastal communities, the large seasonal fluctuation in the service population (i.e. service population during the holiday season usually increase markedly compared with the numbers in off-season). A concern with non-sewered systems used in these communities, usually situated next to sensitive areas such as estuaries, is the potential impact that spillage or seepage from these systems could have on the aquatic ecosystem and other users (e.g. recreation) of the water resource.

The risk of impact on water resources often increases markedly with the increase in number and density of non-sewered systems in a particular area.

Currently all municipal wastewater discharges to the offshore marine environment (i.e. marine outfalls) receives preliminary treatment (i.e. coarse screens and fine screens) only. A list of offshore marine outfalls discharging municipal wastewater is provided below (Fijen, 1988, CSIR, 1991; G. McConkey, DWAF Western Cape Regional Office, pers. comm.):

LOCATION	PIPELINE LENGTH (km)	DISCHARGE DEPTH (m)	ESTIMATED FLOW (m ³ /day)
Robben Island, Cape Town	0.45	8	550
Green Point, Cape Town	1.70	27	34856
Camps Bay, Cape Town	1.35	24	3 846
Hout Bay, Cape Town*	1.8 (0.61 from shore)	37	6 724
Fish Water Flats (Port Elizabeth)*	0.17	2	45 000
Durban South, Durban*	4.20	50	140 000
Durban, Central, Durban*	3.20	60	70 000

* Receives industrial wastewater inputs

There are numerous municipal wastewater discharges to the surf zone and estuaries along the South African coast. Treatment varies from secondary to tertiary treatment to meet *General Standards* (Government Notice No. 991 – 18 May 1984), with a few exceptions receiving only pre-treatment, e.g. Hood Point.

A list of municipal wastewater discharges to the surf zone and estuaries is provided below (CSIR, 1991; G. McConkey, DWAF Western Cape Regional Office, pers. comm.):

SURF ZONE: LOCATION	ESTIMATED FLOW (m ³ /day)
St Helena Bay (St Helena Bay)	420
Llundudno (Cape Town)	283
Simons Town (Cape Town)	2 632
Cape Flats (Cape Town)	194 439
Mitchells Plain (Cape Town)	43 513
Gordons Bay (Cape Town)	3 583
Hermanus	3 544
Mossel Bay	3 900
Cape Receife (Port Elizabeth)	7 700
Hood Point (East London)	5 700
Eastern Beach (East London)	30 000
Shelley Beach	800
Port Shepstone	500
Port Edward	100
Scottburgh	1500

LOCATION	ESTUARY	ESTIMATED FLOW (m ³ /day)
Milnerton (Cape Town)	Diep	44 126
Kommetjie (Cape Town)	Wildevoëlvlei	11 577
Macassar (Cape Town)	Eerste	54 494
Mossel Bay	Hartenbos	6 471
Knysna	Knysna	3 955
Ramsgate	Mvutshini	100
Margate	Kongweni	1 900
Uvongo	Vungu	100
Park Rynie	Mpambanyoni	1 000
Umkomaas	Umkomaas	500
Mhlanga	Mhlanga	25 000
Mdloti	Mdloti	400
Stanger	Mvoti	1 800
Tongaat	Tongaat	200
Ballitoville (including Sheffield sewage)	Mhlali	500

ii. Industrial Wastewater

In South Africa, the approach that has been followed in the planning and design of industrial waste water discharges to the marine environment, in particular the offshore marine outfall, was to design the marine outfall to accommodate the quantity and quality of the effluent in terms of meeting Environmental Quality Objectives, rather than also investigating other options along the Pollution Prevention route, such as recycling, re-use or the application of waste reduction and minimization technologies at source. A list of offshore marine outfalls discharging industrial wastewater is provided below (Fijen, 1988; CSIR, 1991; G McConkey, DWAF Western Cape Regional Office, pers. comm.):

LOCATION	ТҮРЕ	PIPELINE LENGTH (km)	DISCHARGE DEPTH (m)	ESTIMATED FLOW (m ³ /day)
Caltex, Milnerton (Cape Town)	Oil refinery	0.52	11	3 185
PetroSA, Vleesbaai (Mossel Bay)	Oil	1.40	27	5 069
PetroSA, Voorbaai (Mossel Bay)	Oil - Ballast	Currently not operational		
Sappi Saiccor, Umkomaas	Pulp	6.50	45	80 000
AECI, Umbogintwini	Chemical	1.70	30	2 400
SA Tioxide, Umbogintwini	Chemical	1.70	30	2 500
Mhlatuze Water, Richards Bay (buoyant)	Pulp, Aluminium smelter, Fertilizer, (Domestic)	4.95	30	120 000
Mhlatuze Water, Richards Bay (dense)	Gypsum	3.80	25	86 000

Current practice followed in terms of the management and control of industrial discharges to the surf zone and estuaries are not clear. In most instances these are still operated under exemption permit conditions issued under the previous Water Act 54 of 1956, typically based on *General Standard* requirements.

Industrial wastewater discharges to the surf zone and estuaries are listed below (Fijen, 1988, CSIR, 1991, Taljaard *et al*, 2000; G. McConkey, DWAF Western Cape Regional Office, pers. comm., V Venfolo, DWAF Northern Cape Regional Office, pers. comm.):

SURF ZONE: LOCATION	ТҮРЕ	ESTIMATED FLOW (m ³ /day)
De Beers Namaqualand Mines (Kleinzee)	Coastal mine	47 x 10 ⁶ m ³ /annum
Koingnaas (6 km north of Hondeklipbaai)	Coastal mine	?
De pump (Olifants/Doorn WMA)	Coastal mine	?
North Bay Canning, Doring Bay	Fish	?
Lamberts Bay Canning, Lamberts Bay	Fish	?
Sandy Point Fishing, St Helena Bay	Fish	?
Suid Oranje Vissery, St Helena Bay	Fish	3 600
Drommedaris Fisheries, St Helena Bay	Fish	560
West Point Fishing, St Helena Bay	Fish	55
St Helena Bay Fishing, Stomneusbaai	Fish	18 000
Sea Harvest, Saldanha Bay	Fish	3 546
Southern Sea, Saldanha Bay	Fish	7 307
SOMCHEM, Somerset West	Chemical	360
Marine Products, Gans Bay	Fish	11 682
Tuna Marine, Hermanus	Fish	12
Walker Bay Fisheries, Hermanus	Fish	36
Sea Plant Products, Hermanus	Fish	36
Cyril Lord, East London	Textile (mainly)	1 800
Smith Chemicals, Sezela	Chemical	1 800
AECI, Umbointwini	Chemical	3 000
David Whithead Textiles, Tongaat	Textile	3 600
Mondi, Felixton	Paper and sugar	7 000

LOCATION	TYPE	ESTUARY	ESTIMATED FLOW (m ³ /day)
Marine Product, Laaiplek	Fish	Berg	130 000

Common to operational policies in most countries is a list of substances that '*must be eliminated*' and a list of substances that '*must be controlled and reduced*" in wastewater prior to disposal to the environment, including marine waters. Currently such lists are not available for the disposal of land-derived wastewater to the marine environment in South Africa. However, the substances listed in the South African water quality guidelines for coastal marine waters (RSA DWAF, 1995) and the associated target values or ranges, can probably be interpreted as the list of substances that '*must be controlled and reduced*'.

A.2.3 Scientific and Engineering Assessment

Currently, only marine discharges to the offshore environment in South Africa can be classified as 'designed marine outfalls' (i.e. a <u>pipeline</u> conveying wastewater from a <u>treatment plant</u> and discharging through a <u>diffuser</u>). At the time of design and construction the best available techniques were applied. However, many of the existing outfalls have been constructed prior to the mid 1990's and since then outfall design techniques have improved markedly, particularly in terms of the application of numerical (far field) modelling.

In South Africa, the discharges of land-derived wastewater to estuaries and the surf zone are basically wastewater outlets from WWTW or industries, where treatment processes in the WWTW or industry solely controls the ultimate quality, with no means of manipulating the quality of the wastewater during the discharge process, as is the case with a properly designed marine outfall.

A.2.4 Monitoring

Current practice with regard to the monitoring, assessment and reporting of data and information pertaining land-derived waste discharges to the marine environment varies greatly and are not uniform across the four coastal provinces.

In most cases the licences of the offshore marine outfalls contains specifications on monitoring and reporting, but again these specifications varies from province to province. Typically monitoring specifications include source monitoring, i.e. the effluent as well as environmental monitoring.

In the case of waste discharges to the surf zone and estuaries, only source monitoring is conducted and environmental monitoring usually does not exist for these types of discharges.

An inventory of the land-derived wastewater discharges (quantity and composition of effluent) to the marine environment of South Africa was compiled in 1991 (CSIR, 1991). However, the data contained in the report is likely to be outdated. Such inventories should be regularly updated to provide an ongoing record of the status for management and control purposes.

A.3 REFERENCES

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APPENDIX B

LEGISLATIVE CONTEXT (INTERNATIONAL AND NATIONAL)

In developing an operational policy for the disposal of land-derived wastewater to the marine environment, it is important to ensure that such policy is aligned with existing statutory requirements, both international and national, as well as with other related operational policies and strategies.

The principles, goals, objectives and requirements contained in relevant international conventions, national policies and legislations, as well as other related operational policies and strategies are discussed in this Chapter.

B.1 KEY INTERNATIONAL CONVENTIONS

B.1.2 Agenda 21

Agenda 21 is the internationally accepted strategy for sustainable development, decided upon at the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992 (<u>www.un.org/esa/sustdev/agenda21text.htm</u>). Agenda 21 is a plan for use by governments, local authorities and individuals to implement the principle of sustainable development contained in the Rio Declaration. This document has significant status as a consensus document adopted by about 180 countries. Some of the main themes include:

Agenda 21: Main themes

- **Reforming policies** to bring together environmental and economic issues. It calls for environmental considerations to be built into policy-making from the start rather than being added as an afterthought
- **Controlling wasteful consumption and production** the wasteful consumption and production associated with industrialisation and wealth acquisition as the most serious current cause of global degradation of the environment
- *Improving technologies* through promotion of greater use of environmentally sound technologies that use resources more efficiently and generate minimal levels of waste
- **Integrating trade and environment** to make these mutually supportive. It is recognised that as trade can be adversely affected by the unjustifiable use of environmental concerns as technical barriers, so trade can adversely affect the environment if it leads to unsustainable production or unsustainable use of resources.

B.1.3 Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities

The Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA) was adopted in November 1995 (www.gpa.unep.org/). The GPA is designed to assist states in taking action individually or jointly within their respective policies, priorities and resources that will lead to the prevention, reduction, control or elimination of the degradation of the marine environment, as well as to its recovery from the impacts of land-based activities. The GPA builds on the principles of Agenda 21. The GPA identifies the Regional Seas Programme of United Nations Environmental Programme (UNEP) as an appropriate framework for delivery of the GPA at the regional level.

South Africa has recently asked to join the Regional Seas Programme for Eastern Africa, i.e. the *Convention on the Protection, Management and Development of the Marine and Coastal environment of the East African region,* also referred to as the *Nairobi Convention* (1985). (www.unep.ch/seas/main/eaf/eafconv.html and www.unep.ch/seas/main/eaf/eafap.html) Particularly relevant to this operational policy is Article 7 of this Convention:

Article 7: Pollution from land-based sources

'The Contracting Parties shall endeavour to take all appropriate measures to prevent, reduce and combat pollution of the Convention area caused by coastal disposal or by discharges emanating from rivers, estuaries, coastal establishments, outfall structures or any other sources within their territories.'

In December 2002, the UNEP also published practical guidance for implementing the GPA on sewage – referred to as the *Guidelines on municipal wastewater management* (UNEP, 2002). The document lists 10 key principles of local and national action on municipal wastewater.

Key Principles: UNEP (GPA) Action on municipal wastewater

- Secure political commitment and domestic financial resources as absolute prerequisites for appropriate wastewater management.
- Create an enabling environment for sustainable solutions at both national and local levels.
- Develop integrated and demand-driven management systems combining the collection and treatment of wastewater with drinking water supply and the provision of sanitation services.
- Prevent pollution at the source; use and re-use water efficiently; and apply appropriate low cost technologies for wastewater treatment.
- Make water users and polluters pay for services based on social equity and solidarity to reach costrecovery.
- Use time-bound targets and indicators for environmental integrity as well as on public health or economic welfare to make actions successful.
- *Implement measures step-by-step while exploring alternatives to reach long-term management goals.*
- Involve all stakeholders through partnership from the very beginning to secure their commitment.
- Link the municipal wastewater sector to other economic sectors to ensure financial stability and sustainability.
- Introduce innovative financial mechanisms, including private sector involvement.

B.1.4 1996 Protocols to the London Convention 1972, as amended

South Africa is a signatory to the 1996 Protocols to the Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter 1972, as amended (London Convention) (<u>http://www.londonconvention.org/London Convention.htm</u>). The Protocols defines dumping, amongst others as 'any deliberate disposal into the sea of waste or other matter from vessels, aircraft, platforms or other man-made structures at sea'. From the definition the London Convention primarily deals with dumping of waste that occurs <u>at sea</u>, and does not explicitly list disposal of land-derived wastewater to coastal marine waters via a marine outfall or pipe as part of the definition of dumping. Nevertheless, towards achieving a unified and integrated approach in pollution control and waste management of South Africa's marine environment, it is important that the objectives and general obligations of these Protocols be considered. These are listed below.

Article 2: Objectives

'Contracting Parties shall individually and collectively protect and preserve the marine environment from all sources of pollution and take effective measures, according to their scientific, technical and economic capabilities, to prevent, reduce and where practicable eliminate pollution caused by dumping or incineration at sea of wastes or other matter. Where appropriate, they shall harmonize their policies in this regard.'

Article 3: General Obligations

- 'In implementing this Protocol, Contracting Parties shall apply a <u>precautionary approach</u> to environmental protection from dumping of wastes or other matter whereby appropriate preventative measures are taken when there is reason to believe that wastes or other matter introduced into the marine environment are likely to cause harm even when there is no conclusive evidence to prove a causal relation between inputs and their effects'.
- 'Taking into account the approach that the polluter should, in principle, bear the cost of pollution, each Contracting Party shall endeavour to promote practices whereby those it has authorized to engage in dumping or incineration at sea bear the cost of meeting the pollution prevention and control requirements for the authorized activities, having due regard to the public interest.'
- 'In implementing the provisions of this Protocol, Contracting Parties shall act so as not to <u>transfer</u>, <u>directly or indirectly, damage or likelihood of damage from one part of the environment to another</u> or transform one type of pollution into another.'
- 'No provision of this Protocol shall be interpreted as preventing Contracting Parties from taking, individually or jointly, more stringent measures in accordance with international law with respect to the prevention, reduction and where practicable elimination of pollution.'

Article 4 and Annex 1: Dumping of waste or other matter

Contracting Parties shall prohibit the dumping of any wastes or other matter with the exception of those listed above (Article 4).

The following wastes or other matter are those that may be considered for dumping being mindful of the Objectives and General Obligations of the Protocol (Annex 1) :

- dredged material
- sewage sludge
- *fish waste, or material resulting from industrial fish processing operations*
- vessels and platforms or other man-made structures at sea
- inert, inorganic geological material
- organic material of natural origin
- bulky items primarily comprising iron, steel, concrete and similarly unharmful materials for which the concern is physical impact, and limited to those circumstances where such wastes are generated at locations, such as small islands with isolated communities, having no practicable access to disposal options other than dumping.

'The wastes or other matter listed above may be considered for dumping, provided that material capable of creating floating debris or otherwise contributing to pollution of the marine environment has been removed to the maximum extent and provided that the material dumped poses no serious obstacle to fishing or navigation'

'Notwithstanding the above, materials listed above containing levels of radioactivity greater than de minimis (exempt) concentrations as defined by the IAEA and adopted by Contracting Parties, shall not be considered eligible for dumping; provided further that within 25 years of 20 February 1994, and at each 25 year interval thereafter, Contracting Parties shall complete a scientific study relating to all radioactive wastes and other radioactive matter other than high level wastes or matter, taking into account such other factors as Contracting Parties consider appropriate and shall review the prohibition on dumping of such substances in accordance with the procedures set forth in the Protocol'.

Article 4 and Annex 2: Assessments for Permits

'The dumping of wastes or other matter listed in Annex 1 shall require a permit. Contracting Parties shall adopt administrative or legislative measures to ensure that issuance of permits and permit conditions comply with provisions of Annex 2. Particular attention shall be paid to opportunities to avoid dumping in favour of environmentally preferable alternatives' (Article 4).

Important aspects that need to be dealt within the assessment process include (Annex 2):

- Waste Prevention Audits, where the initial stages in assessing alternatives to dumping should, as appropriate, include an evaluation of:
 - types, amounts and relative hazard of wastes generated;
 - details of the production process and the sources of wastes within that process; and
 - feasibility of the following waste reduction/prevention (product reformulation, clean production technologies, process modification, input substitution and on-site, closed-loop recycling.
- Waste Management Options, given appropriate consideration to the following hierarchy of waste management options:
 - re-use
 - off-site recycling
 - destruction of hazardous constituents
 - treatment to reduce or remove the hazardous constituents
 - *disposal on land, into air and in water.*
- *Chemical, Physical and Biological Properties of the Waste, taking into account:*
 - origin, total amount, form and average composition
 - properties: physical, chemical, biochemical and biological
 - toxicity
 - persistence: physical, chemical and biological
 - accumulation and biotransformation in biological materials or sediments.
- Development of an Action List to provide a mechanism for screening candidate wastes and their constituents on the basis of their potential effects on human health and the marine environment.
- Information required to select the dump-site, including:
 - physical, chemical and biological characteristics of the water-column and the seabed
 - location of amenities, values and other uses of the sea in the area under consideration
 - assessment of the constituent fluxes associated with dumping in relation to existing fluxes of substances in the marine environment
 - economic and operational feasibility.
- Assessment of Potential Effects
- Monitoring
- Permit and Permit Conditions, where any permit issued shall contain data and information specifying:
 - types and sources of materials to be dumped
 - *location of the dump-site(s)*
 - method of dumping
 - monitoring and reporting requirements.

B.2 KEY NATIONAL POLICIES

B.2.1 White Paper: National Water Policy

In November 1996 the South African government accepted 28 Fundamental Principles and Objectives which guided the subsequent process of revising its Water Law (<u>http://www.polity.org.za/html/govdocs/white papers/water.html</u>). The following principles need to be taken into account in deriving an operational policy for the disposal of land-derived wastewater to the marine environment:

Principle 5:

In a relatively arid country such as South Africa, it is necessary to recognise the unity of the water cycle and the interdependence of its elements, where evaporation, clouds and rainfall are linked to groundwater, rivers, lakes, wetlands and the sea, and where the basic hydrological unit is the catchment.

Principle 7:

The objective of managing the quantity, quality and reliability of the nation's water resources is to achieve optimum, long term, environmentally sustainable social and economic benefit for society from their use.

Principle 9:

The quantity, quality and reliability of water required to maintain the ecological functions on which humans depend shall be reserved so that the human use of water does not individually or cumulatively compromise the long- term sustainability of aquatic and associated ecosystems.

Principle 12:

The national Government is the custodian of the nation's water resources, as an indivisible national asset. Guided by its duty to promote the public trust, the National Government has ultimate responsibility for and authority over, water resource management, the equitable allocation and usage of water and the transfer of water between catchments and international water matters.

Principle 13:

As custodian of the nation's water resources, the National Government shall ensure that the development, apportionment, management and use of those resources is carried out using the criteria of public interest, sustainability, equity and efficiency of use in a manner which reflects its public trust obligations and the value of water to society while ensuring that basic domestic needs, the requirements of the environment and international obligations are met.

Principle 14:

Water resources shall be developed, apportioned and managed in such a manner as to enable all user sectors to gain equitable access to the desired quantity, quality and reliability of water. Conservation and other measures to manage demand shall be actively promoted as a preferred option to achieve these objectives.

Principle 15:

Water quality and quantity are interdependent and shall be managed in an integrated manner, which is consistent with broader environmental management approaches.

Principle 16:

Water quality management options shall include the use of economic incentives and penalties to reduce pollution; and the possibility of irretrievable environmental degradation as a result of pollution shall be prevented.

Principle 17:

Water resource development and supply activities shall be managed in a manner which is consistent with the broader national approaches to environmental management.

Principle 18:

Since many land uses have a significant impact upon the water cycle, the regulation of land use shall, where appropriate, be used as an instrument to manage water resources within the broader integrated framework of land use management.

The 28 Fundamental Principles and Objectives are also embedded in the White Paper on a National Water Policy for South Africa (April 1997) of which the primary goals are 'Some For All, For Ever' (www.polity.org.za/html/govdocs/white_papers/water.html):

'Some, For All, For Ever':

Some, For All, For Ever, sums up the goals of:

- access to a limited resource (some)
- on an equitable basis (for all)
- *in a sustainable manner, now and in the future (for ever).*

Some of the key proposals in the National Water policy that will guide water management in South Africa in future and that need to be taken into account in deriving an operational policy for the disposal of land-derived wastewater to the marine environment include:

Proposals (relevant to the disposal of land-derived wastewater to the marine environment):

- Only that water required to meet basic human needs and maintain environmental sustainability will be guaranteed as a right. This will be known as the Reserve.
- All other water uses will be recognised only if they are beneficial in the public interest.
- These other water uses will be subject to a system of allocation that promotes use which is optimal for the achievement of equitable and sustainable economic and social development.
- The use of rivers and other water resources to dispose of wastes will also be made subject to a catchment management charge which will cover actual costs, and a resource conservation charge where there are competing beneficial uses for such use and/or such use significantly affects other users.

B.2.2 White Paper: Environmental Management Policy

The purpose of the White Paper on Environmental Management Policy (July 1997) is to: (www.polity.org.za/govdocs/white papers/envir.html).

- inform the public what government's objectives are and how it intends to achieve its objectives on environmental management
- inform government agencies and state organs what their objectives are and what they must do to achieve those objectives.

Specific Aims:

The overarching goal is sustainable development. The intention is to move from a previous situation of unrestrained and environmentally insensitive development to sustainable development with the aim of achieving a stable state economy in balance with ecological processes.

The strategic goals include:

• *Effective Institutional Framework and Legislation.* Create an effective, adequately resourced and harmonised institutional framework and an integrated legislative system, and build institutional capacity.

- Sustainable Resource Use and Impact Management. Promote equitable access to, and sustainable use of, natural and cultural resources, and promote environmentally sustainable lifestyles. Integrate environmental impact management with all economic and development activities to achieve sustainable development with the emphasis on satisfying basic needs and ensuring environmental sustainability.
- Holistic and Integrated Planning. Develop mechanisms to ensure that environmental considerations are effectively integrated into the development of government policies and programmes, all spatial and economic development planning processes, and all economic activity.
- **Participation and Partnerships in Environmental Governance.** Establish mechanisms and processes to ensure effective public participation in environmental governance.
- **Empowerment and Environmental Education.** Promote the education and empowerment of South Africa's people. Increase their awareness of, and concern for, environmental issues, and assist in developing the knowledge, skills, values, and commitment necessary to achieve sustainable development.
- **Information Management.** Develop and maintain mechanisms to increase access to information and ensure effective management of environmental information.
- **International Cooperation.** Develop mechanisms to deal effectively and in the national interest with international issues affecting the environment.

Principles:

- Accountability. Government is accountable for policy formulation, monitoring and enforcement.
- Allocation of Functions. Government will allocate functions within the framework of the Constitution to the institutions and spheres of government that can most effectively achieve the objective of a function within the context of environmental policy
- Alienation of Resources. Renewable and non-renewable natural resources, cultural resources and land are public assets and belong to all the people of South Africa. Government must ensure that the alienation of these resources and land, in particular to foreigners, will be done with circumspection, in the best interests of the people's environmental rights and to ensure the wise use of such resources and land.
- **Capacity Building and Education.** All people must have the opportunity to develop the understanding, skills and capacity for effective participation in achieving sustainable development and sustainable resource use.
- **Conflict of Interest.** Actual or potential conflicts of interest between responsibilities for resource exploitation, and any responsibilities or powers affecting environmental quality or impact management, must be resolved. Solutions to such conflicts of interest must ensure effective implementation of environmental policy and provide for the role of the lead agent in monitoring and ensuring the maintenance of norms and standards.
- **Coordination.** Environmental concerns affect all aspects of life and must be integrated into the work of all government institutions. This requires intergovernmental harmonisation of policies, legislation, monitoring, regulation and other environmental functions in accordance with the requirements of environmental policy.
- **Cradle to Grave.** Responsibility for the environmental and health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle. It starts with conceptualisation and planning and runs through all stages of implementation to reuse, recycling and ultimate disposal of products and waste or decommissioning of installations.
- **Demand Management.** In managing resources and environmental impacts, demand management must be considered along with other control measures.

- **Due Process.** Due process must be applied in all environmental management activities. This includes adherence to the provisions in the Constitution dealing with just administrative action and public participation in environmental governance.
- **Equity.** There should be equitable access to environmental resources, benefits and services to meet basic needs and ensure human wellbeing. Each generation has a duty to avoid impairing the ability of future generations to ensure its well being.
- **Environmental Justice.** To comply with the requirements of environmental justice, government must integrate environmental considerations with social, political and economic justice and development in addressing the needs and rights of all communities, sectors and individuals.
- **Full Cost Accounting.** Decisions must be based on an assessment of the full social and environmental costs and benefits of policies, plans, programmes, projects and activities that impact on the environment.
- **Global and International Cooperation and Responsibilities.** Government must recognise its shared responsibility for global and regional environmental issues and act with due regard for the principles contained in this policy and applicable regional and international agreements.
- **Good Governance.** Good governance depends on mutual trust and reciprocal relations between government and people. This must be based on the fulfilment of constitutional, legislative and executive obligations, and acceptance of authority, responsibility, transparency and accountability.
- **Inclusivity.** Environmental management processes must consider the interests, needs and values of all interested and affected parties in decision making to secure sustainable development. This includes recognising all forms of knowledge including traditional and ordinary knowledge.
- **Integration.** All elements of the environment are linked and management must therefore take account of the connections between them.
- **Open Information.** Everyone must have access to information to enable them to protect their health and well-being, protect the environment, participate effectively in environmental governance and comply with environmental policy, legislation and regulation.
- **Participation.** Government must encourage the inclusion of all interested and affected parties in environmental governance with the aim of achieving equitable and effective participation.
- **Precaution.** Government will apply a risk averse and cautious approach that recognises the limits of current knowledge about the environmental consequences of decisions or actions.
- **Prevention.** Government must anticipate problems and prevent negative impacts on the environment and on people's environmental rights.
- **Polluter Pays.** Those responsible for environmental damage must pay the repair costs both to the environment and human health, and the costs of preventive measures to reduce or prevent further pollution and environmental damage.
- Waste Management. Waste management must minimise and avoid the creation of waste at source, especially in the case of toxic and hazardous wastes. Government must encourage waste recycling, separation at source and safe disposal of unavoidable waste.

B.2.3 White Paper: Integrated Pollution and Waste Management

The White Paper on Integrated Pollution and Waste Management for SA (March 2000) <u>www.polity.org.za/html/govdocs/notices/2000/not0227a.html</u> outlines the government's new thinking in relation to pollution and waste management. This policy is a subsidiary policy of the overarching environmental management policy, as set out in the *White Paper on Environmental Policy for South Africa*.

Specific Aims:

The policy represents a paradigm shift from dealing with waste only after it is generated towards:

- Pollution Prevention
- Minimisation of Waste
- Cross-media integration (ensuring the integrity and sustained 'fitness of use' of, all environmental media, *i.e. air, water and land*)
- Institutional integration on a local, provincial and national level
- *Involvement of all sectors of society.*

B.2.4 White Paper: Sustainable Coastal Development

The *White Paper for Sustainable Coastal Development* in South Africa (April 2000) (<u>www.polity.org.za/html/govdocs/white papers/coastal/index.html</u>) provides policy for the sustainable development of the coast. The following principles and goals need to be taken into account in deriving an operational policy for the disposal of land-derived wastewater to the marine environment:

Principles (relevant to an operational policy for disposal of land-derived wastewater to marine waters):

- **Ecological integrity:** The diversity, health and productivity of coastal ecosystems must be maintained and, where appropriate, rehabilitated.
- *Holism:* The coast must be treated as a distinctive and indivisible system, recognising the interrelationships between coastal users and ecosystems and between the land, sea and air.
- **Risk aversion and precaution:** Coastal management efforts must adopt a risk-averse and precautionary approach under conditions of uncertainty.
- Accountability and responsibility: Coastal management is a shared responsibility. All people must be held responsible for the consequences of their actions, including financial responsibility for negative impacts.
- **Duty of care:** All people and organisations must act with due care to avoid negative impacts on the coastal environment and coastal resources.

Pollution control and waste management (Theme E): Goals and Objectives

<u>Goal 1:</u> To implen strictly control harr	nent pollution control and waste-management measures in order to prevent, minimise and nful discharges into coastal ecosystems
<u>Objective E1.1</u>	The discharge of all land-based point and diffuse sources of pollution that are likely to end up in coastal ecosystems shall be prevented, or at least minimised and strictly controlled.
<u>Objective E1.2</u>	The discharge of marine pollutants and waste and waste products from ship operations and maintenance into coastal waters shall be prevented, or at least minimised and strictly controlled.
Objective E1.3	Adequate and effective anticipatory and reactive measures shall be implemented to reduce the adverse consequences of human-induced coastal pollution disasters and hazards.
<u>Goal E2:</u> To mana	ge polluting activities to ensure that they have minimal adverse impact on the health of

<u>Goal E2:</u> To manage polluting activities to ensure that they have minimal adverse impact on the health coastal communities, and on coastal ecosystems and their ability to support beneficial human uses.

<u>Objective E2.1</u>	Pollution-control and waste-management measures shall be implemented to ensure that discharges of organic and biodegradable substances are minimal and that the assimilative capacity of coastal ecosystems is not exceeded.
Objective E2.2	The discharge of pollutants and waste into coastal ecosystems shall not be allowed to reach levels that adversely affect human health, use and enjoyment of coast.

B.3 KEY NATIONAL LEGISLATION

B.3.1 Constitution

The Constitution Act 108 of 1996 is relevant to pollution and waste management for two reasons (<u>www.polity.org.za/html/govdocs/constitution/saconst.html</u>). Firstly, the Bill of Rights (Chapter Two of the Constitution) contains a number of rights relevant to integrated pollution and waste management. To the extent that an act or particular statutory provision does not uphold these rights, it may be unconstitutional. Secondly, the Constitution provides the legal basis for allocating powers to different spheres of government, and is thus relevant to the institutional regulation of integrated pollution and waste management.

The most pertinent fundamental right in the context of integrated pollution and waste management is the Environmental Right (section 24) which provides that:

"Everyone has the right

- to an environment that is not harmful to their health or well-being; and
- to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that
 - prevent pollution and ecological degradation;
 - promote conservation; and
 - secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

This section of the Bill of Rights guarantees the people of South Africa the right to an environment not detrimental to human health or well-being, and specifically imposes a duty on the State to promulgate legislation and take other steps to ensure that the right is upheld and that, among other things, pollution and ecological degradation is prevented.

B.3.2 National Water Act

Section 21 of the *National Water Act 36 of 1998* (NWA) lists activities that are water uses (<u>http://www.polity.org.za/html/govdocs/legislation/1998/index.html</u>). To conduct any of these activities, a license needs to be obtained from the Department of Water Affairs and Forestry (section 40).

Section 21: Water uses

For the purposes of this Act, water use includes –

(a) taking water from a water resource

- (c) impeding or diverting the flow of water in a watercourse;
- (d) engaging in a stream flow reduction activity contemplated in section 36;
- (e engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
- (f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;

⁽b) storing water;
- (g) disposing of waste in a manner which may detrimentally impact on a water resource;
- (h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- (i) altering the bed, banks, course or characteristics of a watercourse;
- *(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and*
- (k) using water for recreational purposes.

Section 21(f) governs discharges to estuaries. Although section 21(f) also classify *discharging of waste or water containing waste into a water resource through a <u>sea outfall</u> as a water use, this created legal problems since the 'sea' is not listed as a water resource under the NWA. The Department of Water Affairs and Forestry, however, are in the process of amending the NWA to rectify these inconsistencies (Suzan Oelofse, Water Quality Management, Department of Water Affairs and Forestry, Pretoria, pers. comm.). Disposal of land-derived wastewater from industrial concerns (including stormwater runoff from industrial premises) to the marine environment is currently governed under governed under section 21(h) of the NWA:*

Section 41 of the NWA specifies that in the application for a license, a responsible authority (e.g. regional office of the Department of Water Affairs and Forestry) may require an impact assessment that must comply with the EIA-regulations promulgated under section 26 of the Environment Conservation Act (Act No. 73 of 1989):

Section 41: Impact Assessments

(2) A responsible authority -

(a) may, to the extent that it is reasonable to do so, require the applicant, at the applicant's expense, to obtain and provide it by a given date with -

(i) other information, in addition to the information contained in the application

(ii) an assessment by a competent person of the likely effect of the proposed licence on the resource quality

(iii) an independent review of the assessment furnished in terms of subparagraph (ii), by a person acceptable to the responsible authority

(b) may conduct its own investigation on the likely effect of the proposed licence on the protection, use development, conservation, management and control of the water resource

(c) may invite written comments from any organ of state which or person who has an interest in the matter

(d) must afford the applicant an opportunity to make representations on any aspect of the licence application.

(3) A responsible authority may direct that any assessment under subsection (2)(a)(ii) must comply with the

requirements contained in regulations made under section 26 of the Environment Conservation Act, 1989 (Act No.73 of 1989).

Similar to the previous Water Act, the new NWA also requires that water be returned to its original source after use, unless the relevant authorisation not to do so has been granted.

Section 22: Impact Assessments

Section 22. (2)(e)must return any seepage, run-off or water containing waste which emanates from that use, to the water resource from which the water was taken, unless the responsible authority directs otherwise or the relevant authorisation provides otherwise....

To ensure that water managers are clear as to what their responsibilities and the requirements are in terms of license applications, the Department of Water Affairs and Forestry has published a guideline document entitled *Water use authorization process for individual applications* (RSA DWAF, 2000a). The process to authorise the use of water under section 21 of the NWA consists of three integrated components, namely:

• A procedure to generate sufficient information regarding the *assessment* of potential impacts in terms of the quantity and quality that would facilitate the *estimation* of potential impacts of the use against the resource requirements (key to this component is the technical assessment)

- A procedure for the *evaluation* of the application in order to reach a *decision* regarding whether to authorise a water use or not
- A procedure for the *administration* of the application for a licence to use water.

B.3.3 Water Services Act

The main objectives of the Water Services Act 108 of 1997, relevant to this operational policy are listed below (www.polity.org.za/html/govdocs/legislation/2000/index.html):

Section 2: Main objectives (relevant to an operational policy for disposal of land-derived wastewater to marine waters):

- To provide for the right of access to basic water supply and the right to basic sanitation necessary to secure sufficient water and an environment not harmful to human health and well-being
- To provide for the preparation and adoption of water services development plans by water services authorities, resource management and conservation.

The Water Services Act deals with industrial use of water, specifying the following with regard to water quality.

Section 7: Industrial use (pertaining to water quality matters)

(1) Subject to subsection (3), no person may obtain water for industrial use from any source other than the distribution system of a water services provider nominated by the water services authority having jurisdiction in the area in question, without the approval of that water services authority.

(2) Subject to subsection (3), no person may **dispose** of industrial effluent in any manner other than that approved by the water services provider nominated by the water services authority having jurisdiction in the area in question.

(3) A person who, at the commencement of this Act, obtains water for industrial use or disposes of industrial effluent from a source or in a manner requiring the approval of a water services authority under subsection (1) or (2), may continue to do so-

(a) for a period of 60 days after the relevant water services authority has requested the person to apply for approval; and

(b) if the person complies with a request in terms of paragraph (a) within the 60 day period, until-

(i) the application for approval is granted, after which the conditions of the approval will apply; or (ii) the expiry of a reasonable period determined by the water services authority, if the application for approval is refused.

(4) No approval given by a water services authority under this section relieves anyone from complying with any other law relating to-

(a) the use and conservation of water and water resources; or (b) the disposal of effluent.

The Act also requires that at water service provider, which could be a local municipality, prepare water services development plans as part of Integrated Development Plans in terms of the Local Government Transition Act 209 of 1993. This is important in terms of this operational policy because it requires, as a ground rule that assessments addressing disposal of land-derived wastewater be done within the context of a Master Plan, including water supply and demand.

Section 12: Water services development plan

(1) Every water services authority must, within one year after the commencement of this Act-(a) as part of the process of preparing any integrated development plan in terms of the Local Government Transition Act, 1993 (Act No. 209 of 1993); or

(b) separately, if no process contemplated in paragraph (a) has been initiated, prepare-(i) a draft water services development plan for its area of jurisdiction; and (ii) a summary of that plan.

(2) The Minister may extend the one-year period in respect of a water services authority in consultation with the Minister for Provincial Affairs and Constitutional Development and the relevant Province.

Section 13: Content of a water services development plan

13. Every draft water services development plan must contain details-

(a) of the physical attributes of the area to which it applies;

(b) of the size and distribution of the population within that area;

(c) of a time frame for the plan, including the implementation programme for the following five years;

(d) of existing water services;

(e) of existing industrial water use within the area of jurisdiction of the relevant water services authority;

(f) of existing industrial effluent disposed of within the area of jurisdiction of the relevant water services authority;

(g) of the number and location of persons within the area who are not being provided with a basic water supply and basic sanitation;

(h) regarding the future provision of water services and water for industrial use and the future disposal of industrial effluent, including-

(i) the water services providers which will provide those water services;

(ii) the contracts and proposed contracts with those water services providers;

(iii) the proposed infrastructure necessary;

(iv) the water sources to be used and the quantity of water to be obtained from and discharged into each source;

(v) the estimated capital and operating costs of those water services and the financial arrangements for funding those water services, including the tariff structures;

(vi) any water services institution that will assist the water services authority;

(vii) the operation, maintenance, repair and replacement of existing and future infrastructure;

(i) of the number and location of persons to whom water services cannot be provided within the next five years, setting out-

(i) the reasons therefore; and

(ii) the time frame within which it may reasonably be expected that a basic water supply and basic sanitation will be provided to those persons; and

(*j*)of existing and proposed water conservation, recycling and environmental protection measures.

B.3.4 National Environmental Management Act

In essence, the purpose of National Environmental Management Act 107 of 1998 (NEMA) (<u>www.polity.org.za/html/govdocs/legislation/1998/index.html</u>), is to give effect to the section 24 right contained in the Constitution, create an enabling framework for governance in the environmental sector and to give effect to the environmental principles in the White Paper on Environmental Management.

Important environmental principles listed in NEMA that need to be taken into consideration in developing an operational policy for the disposal of land-derived wastewater to the marine environment:

Principles (relevant to an operational policy for disposal of land-derived wastewater to marine waters):

- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
- Development must be socially, environmentally and economically sustainable.
- Sustainable development requires the consideration of all relevant factors including the following:
 - that the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied
 - that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied
 - that waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner
 - that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and
 - that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.
- Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.
- Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.
- The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.
- The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.
- Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.
- The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.
- Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.

B.3.5 Environment Conservation Act

Although NEMA has repealed many of the provisions of the Environmental Conservation Act 73 of 1989 (www.elaw.org/resources/text.asp?ID=2339) the Environmental Impact Assessment (EIA) regulations (implementing Sections 21, 22 and 26 of the Act) remain in force until they are replaced with new regulations under the NEMA (EIA Regulations - Government Notice No. R.1182 of 5 September 1997). Licence requirements in terms of Environmental Impact Assessments for water uses are dealt with in section 41 of the NWA. The Department of Environmental Affairs and Tourism published a guideline document on implementation of the EIA regulations in 1998 (DEAT, 1998).

B.3.6 Health Act

Health Act 63 of 1977

(<u>www.iucnrosa.org.zw/elisa/Environmental%20Law/south_africa/health_act.html</u>) deals with the control and management of waste mainly in respect of the protection of human health. Although the Act falls under the jurisdiction of the Department of Health, most of the related functions have been delegated to provincial and local authorities.

According to Section 14 of the act, one of the functions of the Department of Health is:

…to take steps for the promotion of a safe and healthy environment.

This provides the Department with the authority to intervene in situations where pollution or waste discharges pose a risk to human health.

Health Act also empowers the Minister of Health to promulgate regulations pertaining to the provision of sewage and drainage systems.

B.3.7 Minerals Act

The Minerals Act 50 of 1991 (<u>hwww.lawsoc.co.za/members/legalresources/usefulleg/mineralsact.htm</u>) is administered by the Department of Minerals and Energy and contains the statutory requirements that enforce environmental protection and the management of impacts of mining in South Africa, including coastal mining.

Among its key principles are that the mining industry will comply with national environmental management policies and the principles of Integrated Environmental Management; will be encouraged to promote the reduction, re-use and recycling of waste, will limit pollution and will be subject to the 'polluter pays' principle.

According to the Minerals Act an Environmental Management Programme (EMP) must be prepared in which a mine's impact on the environment are identified and in which a clear programme is provided on how these will be managed, based on an Environmental Impact Assessment (EIA). To ensure that all aspects of the environment are considered, section 39 of the Act stipulates that consultation shall take place with each Department charged with the administration of any law that relates to any matter affecting the environment before an EMP may be approved.

B.3.8 Hazardous Substances Act

Hazardous Substances Act 15 of 1973 (www.doh.gov.za/docs/legislation/acts/1973/act15.html) of which the purpose is 'to provide for the control of substances which may cause injury or ill health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature.... to provide for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and product...'. In this Act human health, rather than environmental health, is the primary consideration. The Act is administered by the Department of Health.

B.3.9 Marine Living Resource Act

Section 43 of the Marine Living Resource Act 18 of 1998 (www.polity.org.za/html/govdocs/legislation/1998/index.html), gives the Minister of Environmental Affairs and Tourism the mandate to declare marine protected areas. Section 43 also prohibits the discharge of any waste to areas declared as marine protected areas:

Section 43: Marine Protected Areas

- (1) The Minister may, by notice published in the Gazette, declare an area to be a marine protected area:
 (a) for the protection of fauna and flora or a particular species of fauna or flora and the physical features on which they depend;
 - *(b) to facilitate fishery management by protecting spawning stock, allowing stock recovery, enhancing stock abundance in adjacent areas, and providing pristine communities for research; or*
 - (c) to diminish any conflict that may arise from competing uses in that area.
- (2) No person shall in any marine protected area, without permission in terms of subsection (3):
 - (a) fish or attempt to fish
 - (b) take or destroy any fauna and flora other than fish
 - (c) dredge, extract sand or gravel, discharge or deposit waste or any other polluting matter, or in any way disturb, alter or destroy the natural environment
 - (d) construct or erect any building or other structure on or over any land or water within such a marine protected area
 - (e) carry on any activity which may adversely impact on the ecosystems of that area.

(3) The Minister may, after consultation with the Forum, give permission in writing that any activity prohibited in terms of this section may be undertaken, where such activity is required for the proper management of the marine protected area.

B.3.10 Draft National Environmental Management: Coastal Zone Bill

The National Environmental Management: Coastal Zone Bill (Draft 7) (available from the DEAT) lists a number of coastal management principles. Those that need to be considered in developing an operational policy for the disposal of land-derived waste to the marine environment include:

Principles (relevant to an operational policy for disposal of land-derived wastewater to marine waters):

- The coastal zone must be managed and regulated in an integrated and co-ordinated manner that: - treats the coastal environment as a distinct and indivisible system;
 - encourages the participation of persons that have a material interest pertaining to decision-making that will affect or is likely to affect that particular part of the coastal zone;
 - fosters co-operation between all organs of state and other bodies or persons involved in the management of coastal resources
 - increases administrative efficiency.
- Coastal public property is the common heritage of the people of South Africa who are:

- subject to any reasonable restrictions prescribed by the state, entitled to have reasonable access to it and to the opportunities provided by coastal resources; and
- individually and collectively responsible for protecting, conserving and enhancing it in the interests of everyone.
- Those responsible for managing coastal public property must ensure that coastal public property, including the organisms inhabiting it, is managed, protected and conserved in the interests of everyone.
- Decision-making concerning the use of the coastal zone must take account of the:
 - special legal status of coastal public property;
 - high ecological, cultural and economic value of the coastal zone;
 - need to adopt a risk averse and cautious approach, especially when the consequences of such decision-making are not entirely known or agreed upon; and
 - need to adopt a long-term perspective in making decisions affecting it.
- The diversity, health and productivity of coastal ecosystems must be maintained and, where they have been degraded, must be rehabilitated and restored to a level that existed prior to the degradation by the person responsible for degradation and at its cost.
- All persons must act with due care and caution to avoid causing adverse effects on the coastal environment.
- Those who cause adverse effects to the coastal environment must be held liable for the consequences of their actions, including bearing the cost of remedying any degradation of the coastal environment.

Although earlier versions of the Bill specifically addressed marine outfalls, Chapter 8 of Draft 7, in essence, gives legal status to the 1996 Protocols to the London Convention, i.e. it addresses the dumping of waste and other matter *at sea*, with no explicit reference to the disposal of land-derived wastewater through marine outfalls. Schedule 2 of the Bill lists Guidelines for the Assessment of wastes or other material that may be considered for dumping at sea (referred to as the *Waste Assessment Guidelines*) in accordance with Annex 2 of the 1996 Protocols to the London Convention (refer to Section A.1.3).

B.4 RELATED NATIONAL OPERATIONAL POLICIES/STRATEGIES

B.4.1 Proposed National Water Resource Strategy

The proposed National Water Resource Strategy (NWRS) provides the implementation framework for the National Water Act (<u>http://www.dwaf.gov.za/Documents/Policies/NWRS/Default.htm</u>). The main objectives of the NWRS are listed below.

Main objectives of NWRS:

- To establish the national framework for managing water resources
- To establish the framework for the preparation of catchment management strategies
- To provide information
- To identify development opportunities and constraints.

As part of the NWRS, specific strategies are set in terms of:

- Protection of Water Resources
- Water Use
- Water conservation and water demand management
- Water pricing and financial assistance
- Water management institutions
- Monitoring and information

- Public safety
- Programmes of implementation activities
- Financial implementations.

The implementation of Resource Directed Measures and Water quality management form an integral part of the strategy around the *Protection of Water Resources*. The issues that are specifically relevant to water quality management are highlighted below.

Resource Directed Measures:

Resource-directed measures include the following elements:

- Development of a National Classification System and determination of the class of specific water resources
- Establishment, for each significant water resource, of resource quality objectives and determination of the Reserve in accordance with the class of the resource.

NOTE: The full set of resource-directed measures is still under development, and will be established after public consultation in terms of other provisions in the Act - <u>not</u> via the NWRS - in due course. A summary of the current proposals is provided here for completeness (refer to B.4.7).

Water Quality Management:

General issues specifically relevant to water quality are:

- *Receiving water quality objectives approach will continue to be used for non-hazardous substances*
- Pollution minimisation and prevention approach will continue to be used for hazardous substances
- Source–directed controls for water quality will include identification of emerging threats to the water resource, and priorities for appropriate action.
- Receiving Water Quality Objectives: The Receiving Water Quality Objectives approach assumes that the
 water environment has a finite capacity to assimilate non-hazardous wastes discharged into it without
 violating water quality objectives. Consideration of applications to discharge wastes will be preceded by
 assessments of the impacts of the proposed discharges. To facilitate the process standards for discharges
 will be prescribed by regulation, and relaxation of standards will be contemplated only where there are
 pressing social or economic reasons to do so, and only if the resource will not be unacceptably impacted.
- Water Quality Management Approaches to promote the water quality dimension of resource protection will be:
- The prevention, reduction, recovery and treatment of waste will be encouraged by applying best management practice measures as part of source-directed controls
- If the application of best management practice measures still results in a need for discharge of water containing waste or the disposal of waste, a minimum requirement or standard will apply
- Until applicable waste standards are developed for implementation, the current General and Special *Effluent Standards will apply*
- If the applicable minimum requirements or standards are not sufficient to ensure suitable water quality as required by resource quality objectives, requirements or standards stricter than the minimum requirements or standards will be applied.
- Deviation from minimum requirements or standards, or from special or site-specific source-directed controls, will receive consideration if enforcement of these measures could have significant negative social or economic impact which outweighs the ecological benefits
- Reclassification of the water resource, due to irreversible water resource impairment, will be considered only under very special environmental value requirements

- For other water uses that impact on water quality, such as impeding or diverting the flow of water in a watercourse, measures required to meet resource quality objectives will be stipulated by guidelines or directives.
- Remediation Measures: Remediation strategies will address impaired, degraded and contaminated land areas and water resources. Clean-up levels and targets, remediation approaches and measures as well as prioritisation of remediation focus and effort will be primarily dictated by appropriate risk-based approaches. Application of the relevant financial provisions of the NWA to cover remedial action will form part of the remediation strategy. Until the remediation strategy has been developed and implemented, current regulatory instruments will be used for specific situations.

B.4.2 Catchment Management Strategies

The underlying purpose of Catchment Management Strategies (CMS) is to facilitate water management at Water Management Area (WMA) level. The main objective of a CMS is to facilitate the management of the water resource environment and to influence human behaviour in ways that would achieve equitable, efficient and sustainable use of water for the benefit of all users, i.e. providing the holistic and comprehensive 'business plan' for integrated water resource management in a WMA.

A CMS primarily consists of three components (RSA DWAF, 2000a; RSA DWAF, 2003a; RSA DWAF, 2003b) which are listed below. This operational policy, on the disposal of land-derived wastewater to the marine environment South Africa, probably best fits in the '*Supporting strategies*' component.

Main components of a CMS:

- A situation assessment, which characterizes the various features and aspects of a Water Management Area, thereby providing adequate and relevant information for formulating strategies and planning.
- **Foundation strategies** that provide the over arching framework for managing water resources in the WMA but do not deal with specific aspects of water resource management. These strategies create the framework for human and financial resources and the institutional development necessary to involve and deal with stakeholders as well as to implement the supporting strategies.
- **Supporting strategies** to protect, use, develop, conserve, manage and control water resources in the WMA. These strategies are viewed as the minimum requirements for covering as many aspects as possible of water resource management of the WMA.

To provide guidance at the domain of water quality management as part of a CMS, the DWAF developed a trio of inter-related documents, namely:

- A Conceptual Introduction to the Nature and Content of the Water Quality Management and Assessment Components of Catchment Management Strategies (RSA DWAF, 2003a)
- Guideline to the Water Quality Component of a Catchment Management Strategy (RSA DWAF, 2003b)
- A Guide to Conduct Water Quality Catchment Assessment Studies (RSA DWAF, 2000b).

Catchment water quality management must give effect to the requirements of the Resource Directed Measures and the NWRS. Together these establish the water quality, water quantity and aquatic ecosystem attributes that are required to ensure a given level of protection for the resource, to meet basic human needs, and to meet the requirements of strategically important water users. The process of developing a CMS may also identify stakeholders' needs with respect to use of the water resource over and above these requirements. The framework proposed in the above-mentioned documents is based on identifying the stakeholders' needs with respect to use of the water resource over and above

these requirements. This is attained through following an iterative and incremental process that answers four generic questions.

Proposed approach (framework) for Water quality Management within a CMS:

What are the goals for water quality management?

Establish resource water quality objectives for use of the resource to dispose of water that contains waste, based on the needs expressed by the stakeholders.

How must water quality loads change to achieve the goals?

Determine source management objectives to meet these needs.

How will this be managed across the WMA?

Formulate a WMA-wide water quality management framework-plan that indicates the management priorities, requirements, CMS linkages and sectoral responsibilities to achieve these objectives.

How, where, by whom and when will this be implemented?

Develop individual water quality management implementation plans, which may be source-, issue- or sector-specific, or even, multi-sectoral, to give effect to the water quality management framework-plan.

B.4.3 National Water Quality Management Framework Policy

In 1991 the Department of Water Affairs and Forestry (DWAF) published *its water quality management policy entitled Water Quality Management Policies and Strategies in the RSA* (RSA DWAF, 1991). This was further elaborated on in Procedures to assess effluent discharge impacts, published in 1995 (RSA DWAF 1995). The DWAF's water quality management policies are currently being updated (RSA DWAF, 2002).

At the time the DWAF changed its approach to water pollution control from the Uniform Effluent Standards (i.e. enforcing compliance to General and Special Standard) to the Receiving Water Quality Objectives approach (i.e. focusing on the fundamental water management goal, namely maintaining fitness for use). This was necessary to counter continuing deterioration of water quality and to meet the challenges of the future. The DWAF, however, recognised that without the necessary precaution, the Receiving Water Quality Objectives approach, will inevitably lead to the deterioration of water resources to the point where they will be marginally fit for the recognised uses. To counter the limitations of this approach and consistent with environmental policy worldwide, the DWAF decided to embody in its water quality management policy a hierarchy of decision making which contains elements of the Receiving Water Quality Objectives approach, as well as the precautionary principle to environmental protection through source reduction and minimum effluent standards.

This hierarchy of decision-making can be summarised as follows:

- 1) <u>Pollution Prevention</u>, preventing waste production and pollution wherever possible.
- 2) <u>Minimisation of pollution and waste at source</u>, minimizing unavoidable waste through:
 - Recycling
 - Detoxification
 - Neutralisation
 - Treatment and re-use of waste streams
 - Cleaner technologies and best management practices.

3) <u>Responsible disposal</u>, applying the precautionary approach:

- Apply wastewater standards as a minimum requirement
- If wastewater standards are not sufficient, maintain fitness for use of the receiving water body in accordance with the Receiving Water Quality Objective approach
- Exemption from compliance to wastewater standards will only be considered in exceptional circumstances provided that the receiving water body remains fit for use in accordance with the Receiving Water Quality Objective approach.

The water quality management framework policy applies to all components of the water resource, namely watercourses, surface and groundwater bodies, wetlands and estuaries. The policy also covers marine resources in so far as the water quality of these resources could be affected by water use. Specific arrangements between DWAF and the Department of Environmental Affairs and Tourism will be put in place in order to manage the interface of responsibilities in this regard (RSA DWAF, 2002).

The revised policy proposes the following:

Water quality management goal

Achieving water quality that is 'fit for use' and maintaining aquatic ecosystem health on a sustainable basis by protection the country's water resources (including marine waters), in a manner allowing justifiable social and economic development.

Core and cross cutting strategies

Core Strategies:

- Establish and enhance the key aspects underpinning sustainable water use from an international to local scale
- Maintain and improve the quality of the country's water resources within a framework that comprises of interrelated measures in terms of source-directed, resource directed and remediation measures (which is in strong alignment with the water quality component in the NWRS)

Cross cutting strategies:

- Partnership strategies from an international to local scale
- *Communication strategy*
- Capacity building strategy.

Proposed operational strategies:

- Water quality planning, as a dedicated and structured function, and as part of the overall water quality management function, will be implemented.
- Decision-making must be conducted in a defined framework. Specific areas within which decision-making are required include:
 - consideration of water use authorisation
 - setting of water resource quality objectives and related water quality targets
 - consideration of financial investments by the DWAF to aid with water quality management
 - evaluation of the adequacy of information presented for decision-making

The hierarchy of decision-making is (supporting the principles of the ISO 14000 series [RSA DWAF, 1999a]):

Prevent waste production and pollution of water resources wherever possible.

Minimise unavoidable waste production through:

- *Recycling/ Re-use of waste or water containing waste*
- Detoxifying
- Neutralisation and/ or
- Treatment of waste streams and/ or
- Introduction of cleaner technologies and best management practices

Dispose of waste and/ or discharge of water containing waste according to the precautionary principle where no alternatives exist to the disposal of waste and/or the discharge of water containing waste.

Dispose of waste and/or discharge of water containing waste according to the differentiated approach, which takes into account catchment specific conditions and includes the determination of Resource Quality Objectives and the setting of standards that must ensure compliance to Resource Quality Objectives.

- Water use charges and related mechanisms will be implemented
- Greater influence over land uses and associated planning will be enforced
- Compulsory licensing could be considered for water resources that are water quality stressed
- *Co-operative governance*
- Departmental capacity enhancement
- Enforcement
- *Conflict resolution*
- *Research and technological development*
- Information management
- Stakeholder consultation

An important matter that needs to be considered in water quality management is the principles of Integrated Environmental Management (IEM) through operational instruments such as Strategic Environmental Assessment (SEA) and Environmental Impact Assessment (EIA).

It is envisage that this operational policy for the disposal of land-derived wastewater to the marine environment of South Africa will form an integral part of the overall water quality management framework.

B.4.4 Source Management

A draft document (dated 29 October 2003) contains a first edition of the DWAF's Source Management Strategy for South Africa (RSA DWAF, 2003c). The vision and strategic objectives of the Source Management Strategy are as follows:

Vision:

"The Department will employ focussed and co-ordinated actions to manage potential threats to the water environment so as to effect real water quality improvements to South Africa's water resources"

Objectives:

- Stop the deterioration of the water quality of the country's water resources,
- Improve the water quality of the country's water resources, and
- Affect water use authorisation coverage of priority sources throughout the country in the shortest possible time.
- The Department has identified the following operational objectives:
- Ensure that all water users adopt and apply Best Practice as a minimum requirement in the management of sources of pollution,
- Implement approaches to source management appropriate to the nature and severity of the threat to the water resource in such a manner as to reduce risk to an acceptable level,
- Implement a comprehensive water use authorisation process, including a Management Information System for data capture, data management and license tracking,
- Provide for effective enforcement of the requirements of the National Water Act through a hierarchical approach and to define the operational procedures for such enforcement, and
- Define the relationship with the various government departments concerned with source management in order to facilitate efficient co-governance.

High-level principles of this strategy include:

High-level Principles:

- **Equity**: The regulatory system ensures fairness to people and communities who do not have equal access to natural resources and/or to social and economic goods
- **Participation**: All interested and affected parties have a right to participate in the management of sources.
- **Freedom of information**: The regulatory system provides for openness and transparency in decisionmaking and information is available to the regulated community and the public.
- **Sustainability**: The strategy promotes actions and practises that focus on conservation and sustainable use of the water resource, such that future generations have access to the resource that is fit for use.

Practical Principles that are particularly applicable to source management include:

Practical Principles:

- **Best Practice:** Best Practice will be developed by a regulator and must be implemented by the regulated community as a minimum for responsible source management and to protect the water resource from unnecessary threat
- **Consistent Performance:** All water users/impactors within the regulated community are required to ensure and strive for the same water quality goals at the same risk levels
- **Flexibility in approach:** The regulator, in undertaking the task of implementing the Source Management Strategy, has the flexibility to consider the application of different alternatives and approaches, provided each of these is capable of meeting the desired objectives and requirements of the strategy
- **Precautionary approach:** The regulatory system adopts a risk-averse and cautious approach that recognises that the water resource is vulnerable to threats from pollution sources and that there are certain limitations on the current knowledge base. The precautionary approach is followed in the water use authorisation and enforcement process unless the risks involved can be demonstrated to be within acceptable level
- Continuous improvement (Systematic movement of the "goal posts"): The strategy focuses on encouraging continual improvement in the actions and practices of both government and the regulated community
- **Thinking strategically whilst implementing locally:** The Department focuses on placing responsibility for achieving source management at the lowest (most local) level possible while still maintaining effective performance.

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B.4.5 Waste Discharge Charge System

The DWAF is in the process of formulating a national strategy for the *Waste Discharge Charge System* (WDCS) which forms part of the Pricing Strategy to be established in terms of Chapter 5 of the NWA (RSA DWAF, 2003f) (<u>www.dwaf.gov.za/Documents/</u>). The WDCS is based on the polluter-pays principle.

A **discharge** for the purposes of the NWA is any waste stream that enters a water resource or marine environment. Discharges into municipal sewers are not regulated under the NWA, and are therefore not included in the WDCS, but are instead regulated by the Water Services Act (Act 108 of 1997). Discharge into municipal sewers is also regarded as a Schedule 1 water use in terms of the NWA.

Aims:

- Promote the sustainable development and efficient use of water resources . Promote the internalisation of environmental costs by impactors
- Recover some of the costs of managing water quality
- Create financial incentives for dischargers to reduce waste and use water resources in a more optimal way.

Supporting and additional objectives:

- To encourage efficient resource utilisation (incentive objective)
- To recover costs of activities aimed at pollution abatement and damage caused by pollution (financial objective)
- *To discourage excessive pollution (deterrent objective)*
- *To promote sustainable water use (social objective)*
- Abatement pollution can be reduced through changes in the way water is used in various processes, the materials used in the process, the process itself, or treatment before discharge
- *Recycling Industries should be encouraged to recycle water containing waste through industrial processes*
- *Re-use of waste Industries should also be encouraged to extract waste from water, in order that the water can be used for other purposes*
- Water conservation The recycling of water will have the effect of reducing the need for abstraction
- Return of water to source Users should be encouraged to return as much of the abstracted water as possible to the source from which it came, which could be either surface water or groundwater in the same catchment.

B.4.6 Resource Directed Measures for Protection of Water Resources

Under the NWA, resource directed measures are aimed at providing a water resource with the appropriate level of protection so as to remain fit for use. This is done within a resource classification system, where the ecological category and socio-economic importance is used as parameters to allocate management classes to water resources reflecting the level of protection required (<u>http://www.dwaf.gov.za/Documents/Policies/WRPP/default.htm</u>). As part of the classification system, Resource Quality Objectives are established for water resources.

Resource Quality Objectives may include ecological, economic and social objectives. The procedures for water resource classification and allocation of Resource Quality Objectives are described in the *Water Resource Protection Policy Implementation - Resource Directed Measures for protection of Water Resources* (RSA DWAF, 1999b).

B.4.7 Resource Water Quality Management Framework

In 2002, the DWAF commissioned a project for the Development of Resource Directed Water Quality Management Policies (RSA DWAF, 2003d). This project focuses on water quality management and specifically resource directed water quality management. The goal of this project is:

By March 2006, the policies procedures and decision-support framework (management instruments) will be in place to enable water resource managers to implement resource directed water quality management.

Specific objectives of this project are:

- Integrating water quality management policies and methodologies into water resource management by developing a resource directed water quality management policy
- Develop instruments and mechanisms for regional offices to include resource directed water quality issues into licence allocations so as to make the policy operational.

B.4.8 Strategic Framework for Water Services

The Strategic Framework for Water Services (USA DWAF, 2003e) sets out a comprehensive approach with respect to the provision of water services in South Africa, ranging from small community water supply and sanitation schemes in remote rural areas to large regional schemes supplying water and wastewater services to people and industries in our largest urban areas. It outlines the changes of approach needed to achieve our policy goals as a result of the progress South Africa has made in establishing democratic local government and developments in the sector since 1994.

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APPENDIX C

INTERNATIONAL TRENDS IN DISPOSAL OF LAND-DERIVED WASTEWATER TO THE MARINE ENVIRONMENT

To provide international perspective on the operational policy (rules) for the disposal of land-derived wastewater to the marine environment, the policies of the following regions or countries were mainly based on information accessible on the Internet:

- United States of America
- European Community (with specific references to the United Kingdom and Scotland)
- Australia
- New Zealand
- Canada
- Hong Kong
- Mediterranean Countries
- Republic of China.

In particular, a number of focus areas were assessed, namely:

- Receiving Marine Environment, including:
- Sensitive areas
- Environmental quality objectives
- Initial mixing zone.
- Development/Activities and Associated Waste Loads, including:
 - Municipal wastewater
 - Industrial wastewater
 - Urban stormwater.

Where information on any of the above focus areas could be obtained for a particular country or region, such information was extracted and briefly discussed in this Appendix.

C.1 UNITED STATES OF AMERICA

In 1972, Congress passed the Federal Water Pollution Control Act, commonly known as the Clean Water Act (CWA) (<u>www.epa.gov/r5water/cwa.htm</u>). Under CWA section 402, any discharge of a pollutant from a point source (e.g. a municipal or industrial facility) to the navigable waters of the United States or beyond must obtain a National Pollutant Discharge Elimination System (NPDES) permit, which requires compliance with technology- and water quality-based treatment standards. The United States Environmental Protection Agency (US-EPA) and authorized States, Tribes, and Territories administer the NPDES program.

Two sections of the CWA deal specifically with discharges to marine and ocean waters. Under CWA section 403, any discharge to the territorial seas or beyond must also comply with the ocean discharge criteria as established under CWA section 403 (refer to *Code of Federal Registrations, Title 40: Protection of Environment, Part 125: Criteria and Standards for the National Pollutant Discharge Elimination program, Subpart M: Ocean Discharge Criteria*).

Section 301(h), added to the CWA in 1977, provides for a publicly owned treatment works (POTW) that discharge to marine waters to apply for a waiver of the Act's secondary treatment requirements, provided they can show compliance with stringent criteria, assure that the discharge will not adversely affect the marine environment. (www.epa.gov/owow/oceans/regulatory/sect301hwaivers.html).

A summary of the requirements in terms of the specific focus areas listed earlier is provided below.

C.1.1 Sensitive Areas

Although sections 403 and 301 (h) of the CWA and associated documentation do not explicitly list sensitive areas, requirements stipulated in terms of the following, indicate that these are considered sensitive areas in the USA (www.epa.gov/owow/oceans/regulatory/sec301tech/).

- <u>Marine water where the dilution water contains significant amounts of previously discharged effluent for treatment works.</u> Section 301(h) modified permits may not be issued for discharges into marine waters where the dilution water contains 'significant amounts of previously discharged effluent from such treatment works'. Re-entrainment of previously discharged effluent is often a potential problem in receiving waters that exhibit poor flushing characteristics, such as semi-enclosed bays or long, narrow estuaries. This section 'flatly prohibits issuance of section 301(h) modified permits for discharges into the New York Bight Apex.'
- <u>Stressed ocean waters and saline estuaries</u>. Stressed waters defined as those ocean waters in which the absence of a balanced indigenous population of shellfish, fish, and wildlife is caused solely by human perturbations other than the applicant's modified discharge. Re-issuance of section 301(h) modified permits is prohibited if the discharge alone or in combination with pollutants from other sources adversely impacts the balanced indigenous population, water quality, or recreational activities. In addition, 301(h) modified permits may not be reissued for discharges to stressed saline estuarine waters.
- Distinctive habitats of limited distributions. These include marine environments whose protection is of special concern because of their ecological significance or value to humans, including, but not limited to, coral reefs, kelp beds, sea grass meadows, salt marshes, spawning or nursery areas for commercial species, sites of aesthetic appeal, and rocky intertidal habitats (where they are uncommon). Distinctive habitats of limited distribution may be highly susceptible to the potential effects of discharged suspended solids and nutrients on the unique floral (e.g., kelp, sea grass) or faunal (e.g., coral) components of the communities. The potential for adverse effects of bioaccumulation of toxic substances is also relatively high because sessile floral and faunal organisms may constitute important trophic pathways within these communities. These attached communities are also susceptible because of the potential for continuous exposure to the effluent plume. Permit applications require that an applicant describe distinctive habitats of limited distribution within the receiving water environment in detail, including:
 - Kinds of distinctive habitats that occur in the general vicinity of the discharge;
 - Aerial extent and location of the habitats in the region (shown on a map);
 - Approximate distance from the discharge to sensitive habitats;
 - Physical characteristics of each distinctive habitat (water column and substrate);
 - Species composition of the flora and fauna;
 - Abundance or percent cover (as applicable) of resident species; and
 - Spatial and temporal variations in the biotic and abiotic components of each distinctive habitat present.
- <u>Commercial or recreational fisheries</u>. Assessment of impacts on fisheries is important because of their economic significance, their recreational potential, and the potential for human consumption of contaminated organisms. The applicant should provide information on all fishery resources, both harvested and unharvested, near the outfall and in other areas potentially influenced by the discharge. Emphasis should be placed on regulatory or health-related factors that prevent utilization of the resource, especially if such factors are related to contamination.

- <u>Estuarine waters</u>. The Water Quality Act of 1987 prohibits the issuance of section 301(h) modified
 permits for discharges into saline estuaries with any of the following characteristics regardless of
 the causes of any of those conditions:
 - Estuary does not support a balanced indigenous population of shellfish, fish, and wildlife
 - Estuary does not allow for recreational activities.
 - Estuary exhibits ambient water quality characteristics that are not adequate to protect public water supplies; protect shellfish, fish, and wildlife; allow for recreational activities; and comply with standards that assure and protect such uses.

Estuaries are generally more productive than non-estuarine coastal areas and are often more sensitive to pollutants. They also serve as spawning and nursery grounds for many invertebrates and fishes. Moreover, the flushing characteristics of estuaries may be considerably less than those of open coastal areas, especially during periods of reduced freshwater input. Thus, for a given discharge size, there is generally a higher potential impact in estuaries than in open coastal environments.

C.1.2 Environmental Quality Objectives

Applicants for an amended section 301(h) permit under the CWA are required to demonstrate compliance with water quality criteria established under section 304(a)(1) of the Clean Water Act (<u>www.epa.gov/waterscience/criteria/</u>). Where a corresponding state's numerical water quality standard exists for a specific pollutant, applicants would need to meet this standard instead of the section 304(a)(1) criterion of the Clean Water Act.

C.1.3 Mixing zone

The Amended Section 301(h) Technical Support Document defines the zone of initial dilution (ZID) is the region of initial mixing surrounding or adjacent to the end of the outfall pipe or diffuser, including the underlying seabed (<u>www.epa.gov/owow/oceans/regulatory/sec301tech/</u>). The ZID describes an area in which marine ecosystems may be chronically exposed to concentrations of pollutants in violation of water quality standards and criteria. The ZID is not intended to describe the area bounding the entire mixing process for all conditions or the total area impacted by the sedimentation of settleable material.

C.1.4 Municipal Wastewater

In 1972, Congress passed the Federal Water Pollution Control Act Amendments, which required that effluent from a POTW receive secondary treatment. At the time, coastal municipalities argued that secondary treatment may not be necessary when discharging via a deep sea outfall into a dynamic environment where high dilutions are achieved. As a result section 30 (h) was added to the Clean Water Act, which allowed for a case-by-case review of the treatment requirements for discharges to the marine environment. Eligible POTW applicants that met the set of environmentally stringent criteria in section 301(h) received a modified NPDES permit waiving the secondary treatment requirements for the conventional pollutants biochemical oxygen demand (BOD), suspended solids (SS), and pH (www.epa.gov/owow/oceans/regulatory/sec301tech/).

To fulfil the requirements of section 303 of the Water Quality Act, the EPA revised the section 301(h) regulations, which included (<u>www.epa.gov/owow/oceans/discharges/301h.html</u>):

- POTW receiving a 301(h) modified permit must achieve **primary or equivalent treatment**, i.e. implementing screening, sedimentation, and skimming adequate to remove at least 30 percent of the biochemical oxygen demanding material and of the suspended solids in the treatment works influent, and disinfection, where appropriate.
- POTW with a service population of 50,000 or more (and industrial sources of toxic pollutants) must
 meet the requirements of an urban area pre-treatment program. For each toxic pollutant
 introduced by a discharger, the applicant had to demonstrate that it has in effect either a) an
 applicable pre-treatment requirement or (b) a programme that achieves secondary removal
 equivalency. To fulfil the urban pre-treatment requirement, a POTW also had to demonstrate
 compliance with all pre-treatment requirements and that the requirements are enforced.

Applicants and permit holders that had tentative or final approval prior to the enactment of the Water Quality Act of 1987 had to meet the primary and urban area pre-treatment requirements by August 1996 or upon permit renewal which ever was later.

Although the CWA require primary treatment for smaller service populations, some areas, e.g. Los Angeles, smaller POTW provide higher level of treatment prior to discharge. Most of agencies provide secondary treatment, ranging from a combination of primary/secondary with disinfection to tertiary. Despite the high level of treatment, the discharges are about 10 to 30 m water depth, at least 300 m offshore and well beyond the surf zone. Also, in Los Angeles the four largest outfalls, receives secondary treatment (as required for larger service populations), but despite this higher level of treatment the outfalls were extended from 60 m offshore to beyond 90 m (www.sccwrp.org/pubs/annrpt/94-95/contents.htm).

C.1.5 Industrial Wastewater

Amendments to section 301[h] of the Clean Water Act (to fulfil the requirements of section 303 of the Water Quality Act) contained the following regulation pertaining to industrial wastewater (<u>www.epa.gov/owow/oceans/discharges/301h.html</u>):

POTW with a service population of 50,000 or more and industrial sources of toxic pollutants must meet the **requirements of an urban area pre-treatment program**. For each toxic pollutant introduced by an industrial discharger, the applicant must demonstrate that it has in effect either a) an applicable pre-treatment requirement or b) a programme that achieves secondary removal equivalency. To fulfil the urban pre-treatment requirement, the POTW must also demonstrate that industrial sources are in compliance with all pre-treatment requirements and that the requirements are enforced.

The main components for an approved industrial pre-treatment programme are:

- Applicants must conduct an industrial waste survey, as the basis for characterizing industrial sources by industry type, types and concentrations of toxic pollutants in discharge(s), wastewater flow to the POTW, and other factors as outlined in guidance provided by EPA.
- All industrial sources should be identified separately as categorical or non-categorical industries.

 Once the toxic pollutants being introduced by industrial sources and those sources have been identified, the applicant can choose between two methods to comply with the urban area pretreatment requirements, addressing each toxic pollutant introduced by industrial sources separately:

First method: Applicable Pre-treatment Requirement Approach. The applicant would demonstrate that it has in effect applicable pre-treatment requirements for each toxic pollutant discharged to the POTW by industry.

<u>Second method</u>: Secondary Removal Equivalency Approach. The applicant would demonstrate that the existing POTW treatment process (including any existing pre-treatment) removes at least the same amount of that toxic pollutant as would have been removed by secondary treatment if there were no pre-treatment for that toxic pollutant.

Applicants and permit holders that had tentative or final approval prior to the enactment of the Water Quality Act of 1987 had to meet the primary and urban area pre-treatment requirements by August 1996 or upon permit renewal which ever was later.

Section 307(a) (1) of the Clean Water Act, requires that a list of toxic pollutants be published by the EPA, which from time to time may be revised. The revision to the list should take into account:

- Toxicity of pollutant
- Its persistence and degradability
- Usual or potential presence of the affected organisms in any waters
- Importance of affected organisms
- Nature and extent of the effect of the toxic pollutant on such organisms.

Section 307(a)(2) of the Clean Water Act states that toxic pollutants shall be subject to effluent limitations resulting from the application of the best available technology economically achievable. The EPA may publish effluent standards (which may include a prohibition) for these substances. The following comprise the list of toxic pollutants (and pesticides) designated pursuant to section 307(a) (1) of the Act (CFR 40, Part 401.15; Part 125.58*p*) (www.epa.gov/epahome/cfr40.htm):

PESTICIDES			
Demeton	Malathion	Mirex	
Guthion	Methoxychlor	Parathion	

TOXIC POLLUTANTS			
Chlorinated Benzenes:	Chlorinated Ethanes:	Chlorinated Phenols:	
Chlorobenzene	Chloroethane	2-Chlorophenol	
1,2-Dichlorobenzene	1,1-Dichloroethane	2,4-Dichlorophenol	
1,3-Dichlorobenzene	1,2-Dichloroethane	2,4,6-Trichlorophenol	
1,4-Dichlorobenzene	1,1,1-Trichloroethane	4-Chloro-3-methyl phenol	
1,2,4-Trichlorobenzene	1,1,2-Trichloroethane		
Hexachlorobenzene	1,1,2,2-Tetrachloroethane		
	Hexachloroethane		
Other Chlorinated Organics:		Haloethers:	
Chloroform (trichloromethane)		4-Chlorophenyl phenyl ether	
Carbon tetrachloride (tetrachloromethane)		2-Bromophenyl phenyl ether	
bis(2-Chloroethoxy)methane		bis(2-Chloroisopropyl) ether	
bis(2-Chloroethyl)ether			
2-Chloroethyl vinyl ether (mixed)			
2-Chloronaphthalene			

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	TOXIC POLLUT	ANTS	
2-Chloronaphthalene 3,3-Dichlorobenzidine 1,1-Dichloroethylene trans-1,2-Dichloroethylene 1,2-Dichloropropane 1,2-Dichloropropylene (1,3-dichloropropene) Tetrachloroethylene Trichloroethylene			Halomethanes: Methylene chloride (dichloromethane) Methyl chloride (chloromethane) Methyl bromide (bromomethane) Bromoform (tribromomethane) Dichlorobromomethane Chlorodibromomethane
Vinyl chloride (chloroethylene) Hexachlorobutadiene			
2,3,/,8-1etrachloro-dibenzo-p-di	ioxin (ICDD) Phonols (other than chloringto	ad).	
Nitrosamnes. N-Nitrosodimethylamine N-Nitrosodiphenylamine N-Nitrosodi-n-propylamine	2-Nitrophenol 4-Nitrophenol 2,4-Dinitrophenol 4,6-Dinitro-o-cresol (4,6-dinitro-2-methylphenol) Pentachlorophenol Phenol 2 4-dimethylphenol		
Phthalate Esters: bis(2-Ethylhexyl)phthalate Butyl benzyl phthalate Di-n-butyl phthalate Di-n-octyl phthalate Diethyl phthalate Dimethyl phthalate	Polynuclear Aromatic Hydrocarbons (PAHs) Acenaphthene 1,2-Benzanthracene (benzo(a)anthracene) 3,4-Benzo(a)pyrene (benzo(a)pyrene) 3,4-Benzofluoranthene (benzo(b)fluoranthene) 11,12-Benzofluoranthene (benzo(k)fluoranthene) Chrysene Acenaphthalene Anthracene 1,12-Benzoperylene (benzo(g,h,i)perylene) Fluorene Fluoranthene Polynuclear Aromatic Hydrocarbons (PAHs) 3,4-Benzofluoranthracene (benzo(a)pyrene) 11,12-Benzofluoranthene (benzo(k)fluoranthene) Chrysene Acenaphthalene Anthracene 1,12-Benzoperylene (benzo(g,h,i)perylene) Fluorene Fluoranthene Phenanthrene 1,2,5,6-Dibenzanthracene (dibenzo(a,h) anthracene) Indeno(1,2,3-cd)pyrene (2,3-o-phenylene pyrene) Purana		
Pesticides and Metabolites: Aldrin Dieldrin Chlordane (technical mixture an alpha-Endosulfan beta-Endosulfan Endosulfan sulfate Endrin Endrin aldehyde Heptachlor Heptachlor	d metabolites) chlorocyclohexane)	Polychlor PCB-1 PCB-1 PCB-1 PCB-1 PCB-1 PCB-1	rinated Biphenyls (PCBs): 1242 (Arochlor 1242) 1254 (Arochlor 1254) 1221 (Arochlor 1221) 1232 (Arochlor 1232) 1248 (Arochlor 1248) 1260 (Arochlor 1260) 1016 (Arochlor 1016)
alpha-BHC beta-BHC gamma-BHC (Lindane) delta-BHC Toxaphene		DDT and 4,4-D 4,4-D 4,4-D	Metabolites: DT DE (p,p-DDX) DD (p,p-TDE)
Other Organics: Acrolein Acrylonitrile Benzene Benzidine 2,4-Dinitrotoluene 1,2-Diphenylhydrazine Ethylbenzene Isophorone Naphthalene Nitrobenzene Toluene		Inorganic Antim Arsen Asbest Beryll Cadm Chron Coppe Cyani Lead Mercu Nickel Seleni Silver Thalli	es: ony and compounds ic tos ium and compounds ium and compounds mium and compounds er and compounds de, total and compounds um and compounds um and compounds um and compounds um and compounds um and compounds

C.1.6 Stormwater

In 1987 the US congress amended the Clean Water Act to establish the section 319 Non-point Source Management Programme as it recognized the need for greater federal leadership to help focus non-point source management efforts (<u>www.epa.gov/owow/nps/cwact.html</u>). Section 319 requires that each State prepare a Non Point Source Management report. States, Territories and Indian Tribes are required to receive grant money which support a wide variety of activities in this regard, including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific non-point source implementation projects. The report that has to be prepared needs to include:

- Identification of navigable waters within the State which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain applicable water quality standards or other water quality related goals.
- Identification of categories and sub-categories of non-point sources or, where appropriate, particular non-point sources which add significant pollution to navigable waters, in amounts which contribute to such waters not meeting water quality standards or other water quality related goals.
- Description of the process, including inter-governmental coordination and public participation, for identifying best management practices and measures to control each category and sub-category of non-point sources and to reduce, to the maximum extent practicable, the level of pollution.
- Identification and description of State and local programs for controlling pollution added from nonpoint sources to, and improving the quality of, navigable waters, including but not limited to those programs which are receiving Federal assistance.

More specific, stormwater discharges are also governed under section 402 of the Clean Water Act, as part of the NPDES programme (<u>www.epa.gov/r5water/cwa.htm</u>). The general rule is that the EPA does not require a permit for discharges composed entirely of stormwater except in the following cases:

- A discharge associated with industrial activities
- A discharge from a municipal separate storm sewer system serving a population of 100 000 or more
- A discharge for which the EPA or relevant State determines that the stormwater discharge contributes to a violation of a water quality standard or is a significant contributor of pollutants to the waters of the United States.

From the legislation it is also apparent that the issuing of a permit for stormwater discharges to the marine environment is also subject to section 43 of the Clean Water Act, similar to point source discharges.

An example of a permit for stormwater discharges in the USA, under the NPDES, is that of the Los Angeles County in California (<u>http://lacounty.info/environment.htm</u>), formally known as the "Order for Waste Discharge Requirements for Municipal Stormwater and Urban Runoff Discharges within the County of Los Angeles". Los Angeles County is the principle permit holder and with 85 municipalities being permit holders. The permit designates responsibilities for managing and executing stormwater pollution reduction activities between the principal permit holder (Los Angeles County) and permit

holders (Los Angeles Count and 85 municipalities). Within this framework, the principal permit holder must carry out responsibilities as a permit holder, as well as responsibilities on behalf of all permit holders, but the principal permit holder, however, is not responsible for ensuring compliance of any individual permit holder).

In general, the permit requires implementation of both the Stormwater Management Programme contained in the permit, and the elements of the Countywide Stormwater Management Plan or Watershed Management Area Plans. The goals of the municipal stormwater permit are:

- To attain and protect the beneficial uses of water bodies in Los Angeles County;
- To reduce pollutants in stormwater to the maximum extent practicable; and
- To evaluate compliance with the objectives and requirements contained in the permit.

Key objective of the stormwater management programme are to:

- Effectively manage and coordinate implementation of the stormwater programme
- Identify and eliminate illicit connections and illicit discharges to the storm drain system and facilitate the public's ability to report illicit connections and discharges.
- Reduce stormwater impacts associated with development and redevelopment projects (i.e. ensure that stormwater management considerations are integrated into planning, permitting and construction of development projects).
- Reduce stormwater quality impacts associated with public agency activities through:
 - Procedures to prevent and respond to spills or leaks from sewage system operations
 - Proper management, design and practices to prevent stormwater impacts from public construction projects
 - Pollution prevention plans and best management practices for public vehicle maintenance/material storage facilities that may discharge pollutants into stormwater
 - Procedures to minimize stormwater pollution associated with landscaping activities pools and recreation areas
 - Best management practices for catch basin and storm drain maintenance
 - Street sweeping and road maintenance programs
 - A programme to reduce pollutants from municipal parking lots
 - Procedures to implement best management practices at permittee-owned or operated industrial facilities.
- Increase public knowledge and understanding about the quality, quantity, sources and impacts of stormwater runoff and about actions that can be taken to prevent pollution through education and outreach programs targeting specific audience such as residents, industrial facility operators, commercial businesses, school children and public agency employees.
- Develop a stormwater quality monitoring programme that will:
 - Track water quality status and trends;
 - Identify watershed-specific pollutants of concern
 - Improve understanding of the relationship between land uses and pollutant loads
 - Identify sources of pollutants and evaluate significant stormwater quality problems
 - Evaluate the effectiveness of stormwater management programs, including pollutant reductions achieved by best management practices
 - Increase knowledge about the impacts of runoff on receiving waters.

• Report and evaluate the effectiveness of implementing stormwater management programs.

The City of Norfolk (Virginia) also implements a Stormwater Management Programme as part of their NPDES permit requirements. Revenue for implementation of the programme is derived primarily from storm water fees charged to residential and non-residential properties. Fees are based on the property's contribution to stormwater runoff. The runoff contribution is determined according to a property's amount of impervious area (impenetrable surfaces such as concrete and asphalt that do not allow stormwater to infiltrate). Impervious surfaces adversely impact the volume, quality, and speed with which runoff and pollutants reach the stormwater system and our local waterways (www.norfolk.gov/publicworks/stormwater.asp#fees).

In 1990 Congress also expanded the Coastal Zone Management Act to include a new section 6217 entitled "Protecting Coastal Waters". Section 6217 requires that states with approved coastal zone management programs develop Coastal Non-point Pollution Control Programs. In keeping with the successful state-federal partnership to manage and protect coastal resources achieved by the Coastal Zone Management Act, section 6217 envisioned that non-point source programs developed under section 319 of the Clean Water Act (CWA) would be combined with existing coastal management programs. By combining the water quality expertise of state 319 agencies with the land management expertise of coastal zone agencies, section 6217 was designed to more effectively manage non-point source pollution in coastal areas. To facilitate development of state coastal non-point programs and ensure coordination between states, administration of section 6217 at the federal level was assigned the National Oceanic and Atmospheric Administration and the **US-EPA** to (www.ocrm.nos.noaa.gov/czm/6217/).

C.2 EUROPEAN COMMUNITY

Disposal of land-derived wastewater to the marine environment is considered an option in the European Union. Policy pertaining to treatment requirements and disposal of wastewater in the countries of the European community, including that to the marine environment, is addressed in:

- Directive on establishing a framework for Community action in the field of water policy
 (2000/60/EC) (<u>http://europa.eu.int/comm/environment/water/water-framework/index_en.html</u>)
- Directive concerning urban waste water treatment (91/271/EEC, as amended in 98/15/EEC) (http://europa.eu.int/comm/environment/water/water-urbanwaste/directiv.html)
- Directive on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (76/464/EEC) (<u>http://europa.eu.int/comm/environment/water/waterdangersub/76_464.htm</u>)
- Directive on integrated pollution prevention and control IPPC Directive (96/61/EC) (<u>http://europa.eu.int/comm/environment/ippc/</u>)

A summary of the policy in terms of specific focus areas listed earlier is provided below.

C.2.1 Sensitive Areas

Annex II of the *Directives concerning urban wastewater treatment* (91/271/EEC) addresses issues pertaining to sensitive areas. The directives list:

- <u>Sensitive areas</u>. Estuaries, bays and other coastal waters which are found to have a poor water exchange, or which receive large quantities of nutrients are classified as sensitive areas, amongst others.
- <u>Less sensitive areas</u>. A marine water body can be identified as a less sensitive area if the discharge of wastewater does not adversely affect the environment as a result of morphology, hydrology or specific hydraulic conditions, which exist in the area. Typically less sensitive areas are open bays and other coastal areas with a good water exchange, which are not subject to eutrophication or oxygen depletion.

In the United Kingdom 76 of less sensitive areas were designated, but in 1998 most of these designations were revoked and work put in hand to provide secondary treatment for discharges to these areas. Northern Ireland has recently revoked its last two less sensitive areas (www.defra.gov.uk/environment/water/guality/uwwtd/report02/default.htm). Scotland in 1998 dedesignated 12 of the 24 original less sensitive areas (also referred to as High Natural Dilution Areas with subsequent requirements for treatment related sensitive to areas (www.scotland.gov.uk/library2/doc06/wqs-00.htm).

C.2.2 Environmental Quality Objectives

The European Community applies the Receiving Water Quality Objectives Approach, where the standards to which discharge need to comply depends on the ability of the receiving water to accommodate contaminants with out detrimentally affecting the use of the waters. For example, the, the Bathing Water Directive (76/160/EEC) set binding standards for bathing waters throughout the European Union (<u>http://europa.eu.int/water/water-bathing/index_en.html</u>).

C.2.3 Mixing Zone

As far as could be established there is no EC Directive stipulating policy regarding the mixing zone. Such requirements are usually set by the State Members themselves. An example is the policy set by the Scottish Environment Protection Agency's (SEPA) - *Policy No 28, Initial Dilution and Mixing Zones for Discharges from Coastal and Estuarine Outfalls, Version 1 (September 1998)* (www.sepa.org.uk/policies/index.htm).

The SEPA defines initial dilution as the dilution which the plume receives as it rises from the point of discharge to form a surface 'boil'. The policy requires that new or modified sewage discharges with greater than 100 population equivalent are designed and constructed to provide:

- minimum initial dilution of 100 times (95 percentile) for primary treated effluents
- minimum initial dilution of 50 times (95 percentile) for secondary treated effluent, including septic tank effluent.

The above are based on the estimated requirements to reduce to acceptable levels both the visibility of density slicks and the occurrence of smell nuisance.

A minimum initial dilution of 50 times (95 percentile) is also expected for new or modified industrial discharges, although these are judged on a case by case basis.

The policy applies to all coastal waters, although the SEPA accepts that discharges made at certain estuarine locations may not be able to achieve these minimum criteria.

Exceptions may also be considered where the discharger can demonstrate satisfactory that the costs associated with compliance are excessive in relation to the environmental benefit.

The SEPA defines a **mixing zone** as an area of sea surface surrounding a surface boil, comprising an early part of the secondary mixing process, within which the environmental quality standard will be exceeded. The zone is prescribed to ensure that no environmental damage will be encountered outside its boundaries. An individual mixing zone is only defined with respect to an environmental quality standard for a particular polluting substance.

The SEPA's policy requires that the mixing zone meet all of the following criteria that are relevant:

- It is expected that the mixing zone around the effluent surface boil would normally be set at a maximum distance of 100m in any direction (that the plume may travel) from the centre of the boil, or from the nearest individual diffuser boil where there is a multiport arrangement. The dilution this allows must be calculated for each site.
- The concentration of dispersing effluent must be such that no established relevant UK or SEPA chemical Environmental Quality Standard is breached outside the mixing zone. This must take account of the individual standards which may be expressed as annual mean values, or percentile exceedence values, or maximum allowable concentrations.
- Where an effluent requires control through toxicity-based criteria then the concentration of dispersing effluent must be such that there is no residual toxicity out with the defined mixing zone i.e. the residual concentration of the toxic substance shall comply with the *Predicted No Effect Concentration* lethal or sub-lethal, acute or chronic, determined from an appropriate SEPA approved toxicity test.
- After initial dilution there should be no point within the mixing zone where the residual concentration of effluent exceeds the 3-hour acute *No Observed Effects Concentration* for any SEPA approved lethal or sub-lethal test. Twenty-four hour acute tests may be substituted where such test data cannot be obtained.
- Two or more mixing zones from different neighbouring outfalls must not merge or take up all the diluting capacity of any receiving water body. It is recommended that the edges of the mixing zones be at least 100m apart. If, for any reason, this criterion cannot be met, then the toxicity of the mixed effluents must be considered.
- Normally no mixing zone would be expected to impinge on the MLWS shoreline, although SEPA recognises that this may be varied in narrow estuarine locations.
- A mixing zone should generally not plug an estuary, sea loch or small bay. It is expected that a mixing zone in such a situation should take up no more than a half of the narrowest dimension.

The mixing zone is illustrated as follows:



C.2.4 Municipal Wastewater

Article 3 of the *Directives concerning urban wastewater treatment* (91/271/EEC) requires that collecting systems is provided for urban wastewater as follows:

- Agglomerations greater than 15 000 population equivalent (p.e.) (by December 2000)
- Agglomerations greater than 2000 p.e. (by December 2005)
- Agglomerations greater than 10 000 p.e. discharging into receiving waters which are considered 'sensitive areas' (by December 1998).

Article 4 of the *Directives concerning urban wastewater treatment* (91/271/EEC) requires that urban wastewater be subject to secondary treatment prior to discharge. This included existing discharges which had to conform by the following dates:

- All discharges from agglomerations > 15 000 p.e. (by December 2000)
- All discharges from agglomerations between 10 000 and 15 000 p.e. (by December 2005)
- Discharges to estuaries from agglomerations between 2 000 and 10 000 p.e. (by December 2005).

Articles 6 and 8 of the *Directives concerning urban wastewater treatment* (91/271/EEC) stipulate that discharges into less sensitive areas may be subject to less stringent treatment (but still with **primary treatment** as a minimum) under the following conditions:

- Agglomerations between 10 000 and 150 000 p.e. discharging into 'less sensitive areas' in coastal waters
- Agglomerations between 2 000 and 10 000 p.e. discharging into 'less sensitive areas' in estuaries
- For Agglomerations greater than 150 000 p.e. less stringent treatment (i.e. primary treatment only) will only be considered in exceptional cases, when it can be demonstrated that more advance treatment will not produce any environmental benefits into less sensitive areas.

All of the above is subject to comprehensive studies indicating that the environment will not be adversely affected.

The Department for Environment, Food and Rural Affairs (Defra) in the UK states that the risk potential to human health through an effective ocean outfall is low, even with only preliminary treatment, however with a short outfall only tertiary treatment with disinfection is considered as a low risk (<u>www.defra.gov.uk/environment/water/quality/bathing/bw_study2.htm</u>). To this end Defra required all significant coastal discharges (that is serving 2000 population equivalent or more) receive a minimum of secondary treatment by 2005. The target is for all works serving 15 000 population equivalent or more to have secondary treatment by 31 March 2002.

(www.defra.gov.uk/environment/water/quality/guide/water.htm#Water%20policy%20in%20england)

C.2.5 Industrial Wastewater

Article 3 of the Directives concerning urban wastewater treatment (91/271/EEC) requires that the discharge of industrial wastewater into collecting systems and wastewater treatment plants is subject to prior regulations and/or specific authorizations by the competent authority (by December 1993) (http://europa.eu.int/comm/environment/water/water-urbanwaste/index_en.html).

Annex I C of the *Directives concerning urban wastewater treatment* (91/271/EEC) addresses requirements in terms of industrial wastewater discharges in the countries of the European Community. In particular, industrial wastewater entering collecting systems and treatment plants shall be subjected to pre-treatment to ensure that:

- Health of staff is protected
- Collecting systems and treatment plants/equipment are not damaged
- Operation of wastewater treatment plant and sludge treatment is not impeded
- Discharges from the treatment plant do not adversely affect the environment or prevent the receiving water to comply with the Directive objectives
- Sludge can be disposed of safely in an environmentally acceptable manner.

Article 13 of *Directives concerning urban waste water treatment* (91/271/EEC) requires that biodegradable industrial wastewater form industries that do not enter urban wastewater treatment plants before discharge to the receiving environment respect conditions established in prior regulations/specific authorization by competent authorities. The directive also requires that each member state set such requirements appropriate to the nature of the industry concerned. The directive further lists specific industries to which this applies (Annex III):

- Milk-processing
- Manufacturing of fruit and vegetable products
- Manufacturing/bottling of soft drinks
- Potato-processing
- Meat industry

- Breweries
- Production of alcoholic beverages
- Manufacture of animal-feed from plant products
- Manufacture of gelatine/glue of hides, skins or bones
- Malt-houses
- Fish-processing industries.

The Directive on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (76/464/EEC) was adopted for regulating potential aquatic pollution by chemicals produced in Europe and covers discharges to inland surface waters, territorial waters and inland coastal waters (groundwater is dealt with in a separate Directive - 80/68/EEC). The Directive on pollution caused by certain dangerous substances discharged into the aquatic environment of the Ш Community introduced the concept of List and List substances (www.europa.eu.int/comm/environment/water/water-dangersub/76 464.htm) The purpose of the Directive is to eliminate pollution from List I substances and to reduce pollution from List II substances.

List I contains certain individual substances which belong to the following families and group of substances, selected mainly on the basis of their toxicity, persistence and bioaccumulation, with the exception of those which are biologically harmless or which are rapidly converted into substances which are biologically harmless:

- organohalogen compounds and substances which may form such compounds in the aquatic environment,
- organophosphorus compounds,
- organotin compounds,
- substances in respect of which it has been proved that they possess carcinogenic properties in or via the aquatic environment
- mercury and its compounds,
- cadmium and its compounds,
- persistent mineral oils and hydrocarbons of petroleum origin, and
- (for the purpose of implementing Articles 2, 8, 9 and 14 of this Directive) persistent synthetic substances which may float, remain in suspension or sink and which interfere with any use of the water.

In 1982, the Commission communicated a list to the Council (that included 129 'candidate List I substances'.

Three more substances were subsequently added to the list to bring the total up to 132. These are listed below:

LIST 1 SUBSTANCES			
Aldrin	Cadmium and its compounds	Carbon tetrachloride	
Chloroform	<i>DDT (including metabolites DDD and DDE)</i>	1,2-Dichloroethane	
Dieldrin	Endrin	Hexachlorobenzene	
Hexachlorobutadiene	Hexachlorocyclohexane (including all isomers and Lindane)	Mercury and its compounds	
Pentachlorophenol	Tetrachloroethylene	Trichlorobenzene (technical mixture)	
1,2,4-Trichlorobenzene	Trichloroethylene	Isodrine	
CANDIDATE LIST I SUBSTANCES (NOW LIST II)			
Azinphos-ethyl	Azinphos-methyl	Dichlorvos	
Endosulfan	Fenitrothion	Fenthion	
Malathion	Parathion (including Parathion-methyl)	Simazine	
Tributyltin oxide	Trifluralin	Triphenyltin acetate (Fentin acetate)	
Triphenyltin chloride (Fentin chloride)	Triphenyltin hydroxide (Fentin hydroxide)	Atrazine	

CANDIDATE LIST I SUBSTANCES ("99 SUBSTANCES") - NOW LIST II			
2-Amino-4-chlorophenol	Anthracene	Arsenic and its mineral compounds	
Benzene	Benzidine	Benzylchloride (Alpha-chlorotoluene)	
Benzylidenechloride (Alpha, alpha- dichlorotoluene)	Biphenyl	Chloral hydrate	
Chlordane	Chloroacetic acid	2-Chloroaniline	
3-Chloroaniline	4-Chloroaniline	Mono-Chlorobenzene	
1-Chloro-2,4-dinitrobenzene	2-Chloroethanol	4-Chloro-3-methylphenol	
1-Chloronaphthalene	Chloronaphthalenes (technical mixture)	4-Chloronitroaniline	
1-Chloro-2-nitrobenzene	1-Chloro-3-nitrobenzene	1-Chloro-4-nitrobenzene	
4-Chloro-2-nitrotoluene	Chloronitrotoluenes (other than 4-Chloro-2- nitrotoluene)	2-Chlorophenol	
3-Chlorophenol	4-Chlorophenol	Chloroprene (2-Chloro-1,3-butadiene)	
3-Chloropropene (Allylchloride)	2-Chlorotoluene	3-Chlorotoluene	
4-Chlorotoluene	2-Chloro-p-toluidine	<i>Chlorotoluidines (other than 2-Chloro-p-toluidine)</i>	
Coumaphos	<i>Cyanuric chloride (2,4,6-Trichloro-1,3,5- triazine)</i>	2,4-D (including 2,4-D-salts and 2,4-D- esters)	
Demeton (including Demeton-O, Demeton-S, Demeton-S-methyl and Demeton-S-methyl-sulphone)	1,2-Dibromoethane	Dibutyltin dichloride	
Dibutyltin oxide	Dibutyltin salts (other than Dibutyltin dichloride and Dibutyltin oxide)	Dichloroanilines	
1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	
Dichlorobenzidines	Dichloro-di-isopropyl ether	1,1-Dichloroethane	
1,1-Dichloroethylene (Vinylidene chloride)	1,2-Dichloroethylene	Dichloromethane	
Dichloronitrobenzenes	Dichloronitrobenzenes	2,4-Dichlorophenol	
1,2-Dichloropropane	1,3-Dichloropropan-2-ol	1,3-Dichloropropene	
2,3-Dichloropropene	Dichlorprop	Diethylamine	
Dimethoate	Dimethylamine	Disulfoton	
Epichlorohydrin	Ethylbenzene	Heptachlor (including Heptachlorepoxide)	
Hexachloroethane	Isopropyl benzene	Linuron	
MCPA	Mecoprop	Methamidophos	
Mevinphos	Monolinuron	Naphthalene	
Omethoate	Oxy-demeton-methyl	<i>PAH</i> (with special reference to: 3,4- <i>Benzopyrene and 3,4-Benzofluoranthene</i>)	
PCB (including PCT)	Phoxime	Propanil	
Pyrazon	2,4,5-T (including 2,4,5-T salts and 2,4,5-T esters)	Tetrabutyltin	
1,2,4,5-Tetrachlorobenzene	1,1,2,2-Tetrachloroethane	Toluene	
Triazophos	Tributyl phosphate	Trichlorfon	
1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichlorophenols	
1,1,2-Tri-chloro-tri-fluoro-ethane	Vinyl chloride (Chloroethylene)	<i>Xylenes (technical mixture of isomers)</i>	
Bentazon			

List II includes groups and families of substances that have a deleterious effect on the aquatic environment. It also consists of all the individual list I substances that have not been regulated on Community level yet. As there are only 18 'real' List I substances, all the other 114 substances of the 'candidate List I' and those groups and families of substances must, in the interim, be considered as List II substances. According to Article 7 of the *Directive on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community* (76/464/EEC), Member States must establish pollution reduction programmes, including water quality objectives, for List II substances.

LIST II SUBSTANCES

- substances belonging to the families and groups of substances in list I for which the limit values referred to in Article 6 of the Directive have not been determined
- certain individual substances and categories of substances belonging to the families and group of substances listed below, which have a deleterious effect on the aquatic environment, which can, however, be confined to a given area and which depend on the characteristics and location of the water into which they are discharged. Families and groups of substances referred to here include:
 - Metalloids and metals and their compounds

Zinc	Selenium	Tin	Vanadium
Copper	Arsenic	Barium	Cobalt
Nickel	Antimony	Beryllium	Thallium
Chromium	Molybdenum	Boron	Tellurium
Lead	Titanium	Uranium	Silver

- Biocides and their derivatives not appearing on list I. (N.B. including pesticides)
- Substances which have a deleterious effect on the taste and/or smell of the products for human consumption derived from the aquatic environment and compounds liable to give rise to such substances in water
- Toxic or persistent organic compounds of silicon, and substances which may give rise to such compounds in water, excluding those which are biologically harmless or which are rapidly converted in water into harmless substances
- Inorganic compounds of phosphorus and elemental phosphorus
- Non persistent mineral oils and hydrocarbons of petroleum origin
- Cyanides and fluorides
- Substances which have an adverse effect on the oxygen balance, particularly: ammonia, nitrites.

The regulation of other "candidate List I substances" was suspended in the beginning of the 1990s due to the preparation of a more comprehensive and integrated permitting system for industrial installations. In 1996, the *Directive on integrated pollution prevention and control* (96/61/EC) was adopted (www.europa.eu.int/comm/environment/ippc). Through this directive the EU has a set of common rules on permitting for industrial installations. All installations listed below are required to obtain an authorisation (permit) from the authorities in the EU countries, unless they have a permit, they are not allowed to operate (*Annex 1 of the ICCP Directive*):

- Energy industries
- Production and processing of metals
- Mineral industry
- Chemical industry
- Waste management installations
- Industrial plants for the production of pulp and paper
- Tanneries
- Slaughterhouses
- Treatment and processing intended for the production of food products from animal raw materials with a finished product production capacity greater than 75 tonnes per day and vegetable raw materials with a finished product production capacity greater than 300 tonnes per day
- Treatment and processing of milk, the quantity of milk received being greater than 200 tonnes per day

- Installations for the disposal or recycling of animal carcases and animal waste with a treatment capacity exceeding 10 tonnes per day
- Installations for the intensive rearing of poultry or pigs with more than (a) 40 000 places for poultry (b) 2 000 places for production pigs (over 30 kg), or (c) 750 places for sows
- Installations for the surface treatment of substances, objects or products using organic solvents, in particular for dressing, printing, coating, degreasing, waterproofing, sizing, painting, cleaning or impregnating, with a consumption capacity of more than 150 kg per hour or more than 200 tonnes per year
- Installations for the production of carbon (hard-burnt coal) or electrographite by means of incineration or graphitization.

The main polluting substances to be taken into account for setting emission limits in water are (*Annex III of the ICCP Directive*):

- Organohalogen compounds and substances which may form such compounds in the aquatic environment
- Organophosphorus compounds
- Organotin compounds
- Substances and preparations which have been proved to possess carcinogenic or mutagenic properties or properties which may affect reproduction in or via the aquatic environment
- Persistent hydrocarbons and persistent and bioaccumulable organic toxic substances
- Cyanides
- Metals and their compounds
- Arsenic and its compounds
- Biocides and plant health products
- Materials in suspension
- Substances which contribute to eutrophication (in particular, nitrates and phosphates)
- Substances which have an unfavourable influence on the oxygen balance (and can be measured using parameters such as BOD, COD, etc.).

The permits must be based on the concept of *Best Available Techniques* (or *BAT*). However, in many cases BAT means quite radical environmental improvements which could jeopardise many European jobs. The Directive therefore grants listed installations an 11-year transition period.

Considerations to be taken into account when determining best available techniques, (bearing in mind the likely costs and benefits of a measure and the principles of precaution and prevention) include (*Annex IV of the ICCP directive*):

- use of low-waste technology
- use of less hazardous substances
- furthering of recovery and recycling of substances generated and used in the process and of waste, where appropriate
- comparable processes, facilities or methods of operation which have been tried with success on an industrial scale
- technological advances and changes in scientific knowledge and understanding
- nature, effects and volume of the emissions concerned
- commissioning dates for new or existing installations
- length of time needed to introduce the best available technique
- consumption and nature of raw materials (including water) used in the process and their energy efficiency
- need to prevent or reduce to a minimum the overall impact of the emissions on the environment and the risks to it

• need to prevent accidents and to minimize the consequences for the environment.

Article 7 of the ICCP directive also requires that Member States take the measures necessary to ensure that the conditions of, and procedure for the grant of, the permit are **fully coordinated where more than one authority is involved**, in order to guarantee an effective integrated approach by all authorities involved.

C.2.6 Urban Stormwater

As far as could be established there are no EC Directive addressing stormwater related issues in particular. These are dealt with on a Member State-by-Member State basis (e.g. see UK below).

The National Suds (**Sustainable Urban Drainage Systems**) Working Group (NSWG) has been established to address the perceived issues impeding the widespread use of SUDS in England and Wales. NSWG has produced a Framework Document which is available from the Environment Agency. Consultation with relevant stakeholders has been carried out in autumn 2003. The Group is now working to produce an Interim Code of Practice for SUDS based on the Framework Document and taking account of comments received during the consultation stage. The code of practice should be published by the end of May 2004. Refer also to <u>www.environment-agency.gov.uk</u> (John Steel, Vidama Ltd, UK, pers comm.).

The Scottish Environment Protection Agency's (SEPA) policy with regard to surface water runoff is stipulated in *SEPA, Policy No 15, Regulation of Urban Drainage, Version 2 (May 2001)* and was designed to protect water quality from pollution caused by surface water runoff through active legislation (www.sepa.org.uk/policies/index.htm). In Scotland, SUDS are applied to protect water quality from pollution by surface (or storm) water runoff. SUDS allow water to be treated prior to release in surface waters and also allow water to soak away into soil. In 1997, the Sustainable Urban Drainage Scottish Working Party (SUDSWP) was established which has been instrumental in changing attitudes towards sustainable urban drainage systems in Scotland.

The SEPA also regard SUDS as the best practical means of protecting water quality from pollution by surface water runoff. Therefore the SEPA remains an active member to SUDSWP as they fully recognise that a partnership approach is essential to resolve the problems of urban drainage and that no single organization can act alone to secure improvements in the quality and impacts associated with urban stormwater runoff.

The Sustainable Urban Drainage Systems - Design Manual for Scotland and Northern Ireland (Martin, 2000), produced through CIRIA (a UK-based research association concerned with improving the performance of all involved in construction and the environment) provides a guide to design the SUDS within the confines of existing legislation and the SEPA considers this manual as their primary source of authoritative information. They also promote SUDS as the preferred solution for drainage of surface water runoff, including roof water, for all proposed developments. Further details can also be obtained from the CIRIA website: www.ciria.org/suds.

In Scotland, the SEPA has statutory powers under the Control of Pollution Act 1974 to issue a consent or a conditional prohibition notice for discharges made to controlled waters – additionally it is recommended that conditional prohibition notices are served on the developer **prior to construction** to ensure that the SUD system is constructed to the agreed design.

C.3 AUSTRALIA

Australia's three tiers of government (local, State and Commonwealth) are all involved in managing the coastal and marine environments. In response to the need for national coordination and consistency of policy in marine and coastal management, the *Australia's Oceans Policy* was released in 1998 (www.oceans.gov.au/the oceans policy overview.jsp). The Policy recognises that ocean ecosystem health and integrity is fundamental to ecologically sustainable development, essentially a triple bottom line approach that recognises the environmental, economic and social dimensions of the oceans. The principles in Australia's Oceans Policy are being integrated into legislative and other Commonwealth management initiatives. The policy does not deal with the disposal of wastewater to the marine environment in detail, but incorporate this into a general statement:

'Australia is party to the Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities (GPA) which establishes a voluntary framework of actions to be taken at national, regional and global levels to deal with marine pollution from various land-based sources, such as sewage, wastewater, oil and hydrocarbons, nutrients, sediments, litter and port waste. Australia is cooperating with nine other South East Asian Governments in developing and implementing a regional GPA strategy for the East Asia seas'.

C.3.1 Sensitive Areas

In Australia sensitive areas, in terms of the discharge of wastewater appears to be addressed on State level. For example in New South Wales (NSW) the Clean Waters Regulations 1972 (updated July 2000), that are in force under the *Protection of The Environment Operations Act 1997*, prescribes different classes of water, each with specific requirements in terms of allowable waste discharges (www.epa.nsw.gov.au/legal/envacts.htm). The classes include:

- Class S: Specially Protected Waters
- Class P: Protected Waters
- Class C: Controlled Waters
- Class O: Ocean Outfall Waters
- Class U: Underground Protected Waters.

Requirements in terms of Class O: Ocean outfall waters include:

- wastes are so discharged that the rate and volume or the nature and concentration thereof will not adversely affect beaches
- wastes are to be so discharged that the maximum effect of the wastes on the waters shall be confined to the 'mixing zone'
- wastes are not to be discharged unless the wastes are visually free from grease, oil and solids and free from settleable matter, and where the pH value of the wastes is more than 8.5 or where the discharge induces a variation of more than 0.1 in the pH value of any waters outside the mixing zone
- wastes are not to be discharged if the resulting concentration of the wastes in the waters is or is likely to be harmful (whether directly or indirectly) to aquatic life or water-associated wildlife, gives rise to or is likely to give rise to abnormal concentrations of the wastes in plants or animals, or gives rise to or is likely to give rise to abnormal plant or animal growth.
C.3.2 Environmental Quality Objectives

The Australian and New Zealand Guidelines for Fresh and Marine Water Quality (www.deh.gov.au/water/quality/nwqms/introduction/) provides comprehensive information and procedures for setting specific water quality targets for a range of pollutants or indicators and may be used to further customise water quality targets for local conditions. However, setting water quality targets can be a complex process and to assist regional groups to set environmental values and water quality targets for their catchments/region the Water quality Targets: A Handbook was published by Environment Australia in 2002 (www.deh.gov.au/water/quality/targets/handbook/). The handbook outlines the steps to be followed to set default targets derived from the published guidelines in *The Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. When used in conjunction with *Water Quality Targets: On Line* (www.ea.gov.au/water/quality/targets), this handbook simplifies the task of setting water quality targets. It is not prescriptive and is intended as a tool to assist the planning process.

C.3.3 Mixing Zone

The mixing zone concept is extensively discussed in *Australian and New Zealand Guidelines for Fresh* and Marine Water Quality - Volume 2, Appendix 1 (www.deh.gov.au/water/guality/nwgms/introduction/).

Mixing zones are designated to manage the controlled discharge of soluble, non-bioaccumulatory toxicants whose impacts on local biota are primarily related to their concentration. However, the use of mixing zones is not considered appropriate for managing the discharge of nutrients, compounds that bioaccumulate or particulate substances. With respect to nutrients, for example, stimulation of algae (e.g. phytoplankton) may occur considerable distances away from the outfall and is mediated by the biological characteristics of the water body as a whole.

The boundary of the mixing zone is usually defined in terms of the concentrations of indicator species in the effluent. The extent and nature of mixing zones depend on hydrological conditions at the outfall site.

The section further discusses the difficulties associated with the mixing zone concept, as well as the management thereof.

C.3.4 Municipal wastewater

No reference could be obtained on the level of treatment required for the disposal of municipal wastewater in Australian in policy or legislation documents.

Statements in this regard were found in the State of the Environment Report of State of *New South Wales* (www.epa.nsw.gov.au/soe/soe2000/index.htm) (Chapter 5). The report states that most of the treated sewage and industrial trade waste in NSW is discharged into the ocean via 34 coastal outfalls and that:

- large ocean outfall, at a minimum receive primary treatment
- most other coastal outfalls discharge **secondary or tertiary-treated** effluent

 discharges to estuaries receive tertiary treatment or are in the process of being to upgraded to tertiary level. Most effluent discharged to estuaries is disinfected, but via maturation ponds rather than by chlorination or ultraviolet irradiation.

In Western Australia, for example the bulk sludge from three main outfalls in this State is removed and applied to land where health criteria is met, suggesting that these also receive at least **primary treatment** (http://www.watercorporation.com.au/publications/7/marine_disposal.pdf).

In Tasmania treatment is based on emission limit guidelines which according to the maximum concentrations specified for BOD (20 mg/l), Ammonia Nitrogen (5 mg/l) and Total Phosphorous (5 mg/l) requires a **high degree of treatment** for disposal to marine waters (www.dpiwe.tas.gov.au/inter.nsf/WebPages/LBUN-53L7SW?open).

C.3.5 Industrial Wastewater

No reference could be obtained on the references in Australian policy and legislation that specifically related to the disposal of industrial wastewater to the marine environment.

The Clean Waters Regulations 1972 (updated July 2000) of New South Wales, however do provide a list of restricted substances that may not be discharged to certain classes of water if the concentration of a restricted substance in the **waste** is greater than the concentrations listed (Schedule 2 of the Clean Waters Regulation) (www.epa.nsw.gov.au/legal/envacts.htm):

RESTRICTED SUBSTANCE	CONC. (mg/l)	RESTRICTED SUBSTANCE	CONC. (mg/l)
Arsenic	0.05	Pesticides (individual or total in group)	
Barium	1.0	Endrin, chlordane, toxaphene	0.001
Cadmium	0.01	Other organochlorides	0.01
Chromium (hexavalent	0.05	Organophosphates	0.05
Copper	1	Carbamates	0.1
Cyanide	0.05	Fluorinated hydrocarbons	0.001
Iron (filterable)	0.05	Substituted phenols and cresols	0.001
Lead	0.05	Weedicides including 2.4-D (including salts and esters)	
Manganese (filterable)	0.05	2,4,5-T (including salts and esters), Phenyl ureas, Triazines,	0.1
Mercury	0.001	Amides, Quaternary salts, Dipyridyls, Acrolein	
Methylene blue active substances	0.5	Phenolic compounds	0.001
Nitrogen (ammonia)	0.5		
Nitrogen (nitrate plus nitrite)	10		
Selenium	0.01		
Silver	0.05		
Uranyl ion	5		
Zinc	5		

In New South Wales, a new licence system known as the load-based licensing scheme has been Protection introduced under the of the Environment Operations Act 1997 (www.epa.nsw.gov.au/licensing/index.htm) The new system progressively introduces 'emission load limits' and links licence fees to the total pollutant loads emitted from each licensed premises. The purpose of the pollution load fees is to provide rewards and incentives to industry to reduce their emissions-the smaller the load, the lower the fee. The load fee varies to reflect the loads and types of pollutants discharged and conditions in different receiving environments.

C.3.6 Urban Stormwater

In Australia the **Urban Stormwater Initiative (USI)** is targeted at enhancing water quality in the waterways of major coastal cities by improving stormwater management (<u>www.deh.gov.au/coasts/pollution/usi/index.html</u>). To achieve this target project partnerships within catchments are formed between:

- Local Government
- State agencies
- Water authorities
- Industry
- The commercial sector
- Research organisations
- Catchment groups
- Community bodies.

Commonwealth funding acts as a catalyst for consortia to construct infrastructure that is innovative and exemplifies best practice in managing the quality of urban stormwater. Such projects then serve as demonstrations of best practice to encourage uptake of improved urban stormwater management across Australia.

C.4 NEW ZEALAND

New Zealand is in the process of implementing a strategy (covers solid, liquid and gaseous waste) entitled *The New Zealand Waste Strategy: Towards zero waste and a sustainable New Zealand.* It has three core goals (<u>http://www.mfe.govt.nz/publications/waste/waste-strategy-mar02/index.html</u>):

- lowering the social costs and risks of waste
- reducing the damage to the environment from waste generation and disposal
- increasing economic benefit by more efficient use of materials.

C.4.1 Sensitive Areas

Legal protection of New Zealand's coastal waters is mostly administered under the Marine Reserve Act (<u>www.mfe.govt.nz/publications/ser/ser1997/</u>) (Chapter 7), administered by the Department of Conservation.

The Act allows areas of territorial sea (up to 12 nautical miles off-shore) to be preserved for scientific study where they "contain underwater scenery, natural features or marine life of such distinctive quality, or so typical, or beautiful, or unique, that their continued preservation is in the national interest. Discharges of any sort are prohibited to such areas.

In addition, the protected area provisions of the Wildlife Act (refuges and management reserves), and the Reserves Act (scenic, scientific, nature, and recreation), have been used to create inter-tidal protected areas in estuaries. Regional councils use regulatory measures, such as Estuarine Protection Zones, to control damaging activities in coastal waters and on their margins.

C.4.2 Environmental Quality Objectives

The Australian and New Zealand Guidelines for Fresh and Marine Water Quality provides comprehensive information and procedures for setting specific water quality targets for a range of pollutants or indicators and may be used to further customise water quality targets for local conditions. However, setting water quality targets can be a complex process and to assist regional groups to set environmental values and water quality targets for their catchments/region the Water quality Targets: А Handbook was published by Environment Australia in 2002 (www.ea.gov.au/water/guality/targets/handbook). The handbook outlines the steps to be followed to set default targets derived from the published guidelines in The Australian and New Zealand Guidelines for Fresh and Marine Water Quality. It was prepared. When used in conjunction with Water Quality Targets: On Line (www.ea.gov.au/water/quality/targets), this handbook simplifies the task of setting water quality targets. It is not prescriptive and is intended as a tool to assist the planning process.

C.4.3 Mixing Zone

In New Zealand, the Ministry of the Environment provides best practice guidelines including guidelines on the mixing zone (<u>www.mfe.govt.nz/publications/water/</u>). The mixing zone is defined as areas according to the degree of achievable dilution and subsequent compliance to environmental objectives:

- 'Near-field' mixing zone (where initial dilution is brought about)
- Non-compliance zone (secondary dilution and decay while constituent concentrations are reduced before compliance to environmental objectives)
- Point of complete mixing (Constituent compliance to environmental objectives).

The Ministry of the Environment also discourages the use of vague and uncertain phrases with regard to qualifiers of the mixing zones, these should be better quantified than using words like 'reasonable', 'reasonably in accordance', etc (www.mfe.govt.nz/publications/rma/enforceable-consents-jun01/index.html).

C.4.4 Municipal Wastewater

The Resource Management Act 1991 is the core of the legislation intended to help achieve sustainability in New Zealand. The Minister of Conservation needs to produce a New Zealand Coastal Policy Statement (<u>www.mfe.govt.nz/publications/ser/ser1997/</u>). Regional councils are then required to prepare regional coastal plans that must be consistent with this coastal policy statement (<u>www.mfe.govt.nz/issues/resource/participation/plans/regional-policy.html</u>). One of the aspects that needs to be addressed in those plans, is sewage discharges (the policy statement discourages coastal discharges in favour of land disposal options).

Primary treatment for effluents as a minimum requirement for service populations (communities) of more than 20,000 is demonstrated in the 1997 State of Environment Report (Chapter 7.7) where a summary of the sewage treatment practices for discharges to the sea and harbour areas in New Zealand refers to **primary treatment** as the minimum process. However, it appears as if about 70% of the discharges receive higher treatment than primary (www.mfe.govt.nz/publications/ser/ser1997/).

Improvement in wastewater treatment is also reflected in the case of the Whangarei Harbour in New Zealand which used to receive raw and partially treated wastewater, uncontrolled stormwater and industrial wastes. In the late 1980s, the Whangarei Main Wastewater Treatment Plant was upgraded by the construction of additional secondary treatment stages, ultraviolet (UV) disinfection, and the country's largest wetland treatment system. As a consequence, water quality in the vicinity of the discharge from the plant has been significantly improved. For example, there has been a 10-fold reduction in median faecal coliform concentration of the waters in this area of the harbour (www.mfe.govt.nz/publications/ser/ser1997/).

Land disposal and disposal into constructed wetlands are becoming increasingly favoured options for sewage. In situations where land disposal is not feasible, some local authorities are planning and building more sophisticated treatment systems to provide better quality effluent. For example, the Kapiti Coast District Council (north of Wellington) has recently installed ultraviolet (UV) treatment to kill bacteria before effluent is discharged. The coordinated effort to treat wastewater, stormwater and industrial effluents by introducing better treatment and alternatives such as wetlands is also mentioned Environment 7.8) in the 1997 State of the Report (Chapter (www.mfe.govt.nz/publications/ser/ser1997/).

Through the *New Zealand Waste Strategy*, national targets for waste minimisation in priority waste areas are specified (<u>www.mfe.govt.nz/publications/waste/waste-strategy-mar02/index.html</u>). To this end local authorities are required to report on their progress on waste minimisation and management on an annual basis,

C.4.5 Industrial Wastewater

Regarding industrial activities the Ministry of Environment in New Zealand compiled a document entitled What is in your Waste (<u>www.mfe.govt.nz/publications/waste/whats-in-your-waste-mar02/toc.shtml</u>). The purpose of this report is to provide trade businesses with information to help them deal with their waste by:

- identifying processes giving rise to wastes
- identifying the key constituents in the wastes that have the potential to affect the environment
- identifying how businesses currently manage the disposal of industry waste and where applicable, identifying alternative options
- categorising wastes according to the New Zealand Waste List (L-code), with new entries added if necessary
- where available, providing cleaner production examples used by businesses.

The L-Code was adapted from international lists, and has been modified to reflect typical waste streams in New Zealand. The purpose of the L-Code is to provide guidance on identifying wastes in a consistent manner. The L-Code will also serve as the basis for record-keeping systems, particularly for hazardous wastes. It categorises waste as follows

(www.mfe.govt.nz/issues/waste/hazardous/index.html):

- Wastes resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals
- Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing
- Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard
- Wastes from the leather, fur and textile industries
- Wastes from petroleum refining, natural gas purification and pyrolytic treatment of coal

- Wastes from inorganic chemical processes
- Wastes from organic chemical processes
- Wastes from the manufacture, formulation, supply and use of coatings (paints, varnishes and vitreous enamels), adhesives, sealants and printing inks
- Wastes from the photographic industry
- Wastes from thermal processes
- Wastes from chemical surface treatment and coating of metals and other materials; non-ferrous hydro-metallurgy
- Wastes from shaping and physical and mechanical surface treatment of metals and plastics
- Oil wastes and wastes of liquid fuels (except edible oils, 05 and 12)
- Waste organic solvents, refrigerants and propellants (except 07 and 08)
- Waste packaging; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified
- Wastes not otherwise specified in the list
- Construction and demolition wastes (including excavated soil from contaminated sites)
- Wastes from human or animal health care and/or related research (except kitchen and restaurant wastes not arising from immediate health care)
- Wastes from waste management facilities, off-site wastewater treatment plants and the preparation of drinking water and water for industrial use
- Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions.

As part of its national targets for priority waste areas, the Ministry of Environment specifies that in terms of waste minimisation (<u>www.mfe.govt.nz/issues/waste/hazardous/index.html</u>):

- by December 2005, all regional councils will ensure that new or renewed industrial resource consents include a recognised waste minimisation and management programme and will report on the percentage of all consents under their jurisdiction that have such a clause
- by December 2010, all regional councils will ensure that at least 25 percent of all existing industrial resource consent holders have in place a recognised waste minimisation and management programme

C.4.6 Stormwater

The difficulty to manage diffuse pollution sources is mentioned in the 1997 State of the Environment Report (Chapter 7.9) (www.mfe.govt.nz/publications/ser/ser1997/). It appears as if progressive actions are being taken for the retrofitting of stormwater treatment systems in **retail/industrial areas** as well as **new residential areas** and other new land use activities.

C.5 CANADA

C.5.1 Environmental Quality Objectives

Canada also follows the receiving water quality objectives approach and has developed a set of water quality guidelines to assist in this regard (<u>www.ec.gc.ca/ceqg-rcqe/English/Ceqg/Water/default.cfm</u>). The guidelines should not be regarded as blanket values for national water quality as variations in environmental conditions across Canada will affect water quality in different ways and many of the guidelines may need to be modified according to local conditions such as assimilative capacity, sensitivity of endangered species and habitat.

Site-specific water quality objectives are established to reflect the local environment and may be adopted by a jurisdiction into legislation to become standards.

The use of Canadian Water Quality Guidelines for site-specific water quality objectives requires an understanding of the chemical, physical, and biological characteristics of the water body and an understanding of the behaviour of a substance once it is introduced into the aquatic environment.

C.5.2 Municipal Wastewater

In Canada, provincial governments have primary responsibility for regulating and constructing municipal sewage treatment facilities (www.gvrd.bc.ca/sewerage/plans.htm). The Waste Management Act allows municipalities and regional districts to develop Liquid Waste Management Plans for approval by the Minister of Water, Land and Air Protection (http://wlapwww.gov.bc.ca/epd/epdpa/mpp/gfdalwmp.html). The Liquid Waste Management Plan (LWMP) consists of:

- operational certificates, which replace waste discharge permits
- a strategy to ensure liquid waste disposal conforms with Ministry objectives
- an implementation schedule
- measures to accommodate future development.

In most cases, LWMPs will prove more economical and more effective than the permit system, and it is anticipated that municipalities and regional districts will develop plans voluntarily. However, a recent change to the *Waste Management Act* allows the minister to direct a municipality to prepare or revise a waste management plan. LWMPs must be consistent with the ministry's long-term waste management objectives. These guidelines will help municipalities determine what should be addressed in a Liquid Waste Management Plan. For example, In the Great Vancouver Regional District prepared a Liquid Waste Management Plan that was adopted by all municipalities and the Greater Vancouver Sewerage and Drainage District Board, and approved by the Province of British Colombia under the Waste Management Act (<u>www.gvrd.bc.ca/sewerage/plans.htm</u>). The plan is designed to protect the region's environmental quality and includes:

- Receiving environment
- Treatment plants
- Combined sewer systems
- Separate sanitary sewer systems
- Source control and demand management
- Stormwater management
- Non-point source pollution management.

In British Columbia, Municipal Sewage Regulations were also developed in consultation with stakeholders to produce a comprehensive and progressive regulation governing all aspects of municipal wastewater management (<u>http://wlapwww.gov.bc.ca/epd/epdpa/mpp/msreg.html</u>). The regulation provides:

- environmental benefits to improve water quality
- economic benefits to stimulate infrastructure renewal and economic growth
- administrative benefits to cut red tape and improve efficiency.

With reference to treatment levels, the regulations state the following:

'If facilities are used, and primary and secondary treatment are available, the discharger must:

- provide at least primary treatment for the flows greater than 2.0 times the average dry weather flow
- utilize the full secondary capacity of the treatment plant
- combine the primary and secondary effluent prior to discharge
- maintain a minimum receiving environment to discharge dilution ratio of 40:1
- *if disinfection is required, provide adequate excess disinfection capacity to ensure disinfection of the entire discharge flow'.*

C.5.3 Industrial Wastewater

Liquid Waste Management Plans also include industrial discharges into municipal sewers (http://wlapwww.gov.bc.ca/epd/epdpa/mpp/gfdalwmp.html). The possibilities of using source control to reduce the organic loads, toxicity and volume of industrial waste should be fully explored. Bylaws to control quality of discharges to sewers may be required. Load reduction can mean significant cost savings in constructing and operating the treatment plant and in sewage sludge reuse or disposal. In Canada, industries also have to be classified according the North American Industry Classification System (or NAICS) which replace the Standard Industrial Classification (SIC) system (www.bcstats.gov.bc.ca/data/BUS STAT/busind/NAICSint.htm).

Specific standards and guidelines are set in regulations (under the Canadian Environmental Protection Act of 1999) for specific industrial activities (<u>laws.justice.gc.ca/en/C-15.31/index.html</u>), for example the regulations set for *Pulp and Paper Mill Defoamer and Wood Chip*.

Substances that are declared 'toxic' under Canadian Environmental Protection Act (CEPA), 1999 are placed on Schedule 1 of the Act. They are then considered for risk management measures, such as regulations, guidelines or codes of practice to control any aspect of their life cycle, from the research and development stage through manufacture, use, storage, transport and ultimate disposal. When a substance is determined to be 'toxic' or capable of becoming "toxic", is persistent, bioaccumulate, results primarily from human activity, and there is not a naturally occurring radionuclide or naturally occurring inorganic substance, then it is proposed for virtual elimination under CEPA 1999. Schedule 1 substances are listed below (www.ec.gc.ca/CEPARegistry/subs_list/):

SCHEDULE I: LIST OF TOXIC SUBSTANCES

Chlorobiphenyls that have the molecular formula $C_{12}H_{(10-n)}Cl_n$ in which "n" is greater than 2 Dodecachloropentacyclo [5.3.0.0^{2,6}.0^{3,9}.0^{4,8}] decane (Mirex) Polybrominated Biphenyls that have the molecular formula $C_{12}H_{(10-n)}Br_n$ in which "n" is greater than 2 Chlorofluorocarbon: totally halogenated chlorofluorocarbons that have the molecular formula $C_nCl_xF_{(2n+2-x)}$ Polychlorinated Terphenyls that have a molecular formula $C_{18}H_{(14-n)}Cl_n$ in which "n" is greater than 2 Asbestos Lead Mercury Vinyl Chloride Bromochlorodifluoromethane that has the molecular formula CF_2BrCl Bromotrifluoromethane that has the molecular formula CF_3Br Dibromotetrafluoroethane that has the molecular formula $C_2F_4Br_2$ Fuel containing toxic substances that are dangerous goods within the meaning of section 2 of the Transportation of Dangerous Goods Act, 1992 and that a) are neither normal components of the fuel nor additives designed to improve the characteristics or the performance of the fuel; or b) are normal components of the fuel or additives designed to improve the

characteristics or performance of the fuels, but are present in quantities or concentrations greater than those generally

SCHEDULE I: LIST OF TOXIC SUBSTANCES

accepted by industry standards Dibenzo-para-dioxin that has the molecular formula of $C_{12}H_8O_2$ Dibenzofuran that has the molecular formula $C_{12}H_8O$ Polychlorinated dibenzo-para-dioxins that have the molecular formula $C_{12}H_{(\beta,n)}O_2Cl_n$ in which "n" is greater than 2 Polychlorinated dibenzofurans that have the molecular formula $C_{12}H_{(8-n)}OCl_n$ in which "n" is greater than 2 *Tetrachloromethane (carbon tetrachloride)* CCl₄ 1,1,1-trichloroethane (methyl chloroform) CCl₃-CH₃ Bromofluorocarbons other than those set out in items 10 to 12 *Hydrobromofluorocarbons that have the molecular formula* $C_nH_xF_yBr_{(2n+2-x-y)}$ *in which* $0 \le n \le 3$ Methyl Bromide Bis(Chloromethyl) ether that has the molecular formula $C_2H_4Cl_2O$ Chloromethyl methyl ether that has the molecular formula C_2H_5ClO Hydrochlorofluorocarbons that have the molecular formula $C_nH_xF_yCl_{(2n+2\cdot x\cdot y)}$ in which $0 \le n \le 3$ Benzene that has the molecular formula C_6H_6 $(4-Chlorophenyl)cyclopropylmethanone, O-[(4-nitrophenyl)methyl] oxime that has the molecular formula C_{17}H_{15}ClN_2O_3$ Inorganic arsenic compounds Benzidine and benzidine dihydrochloride, that have the molecular formula $C_{12}H_{12}N_2$ and $C_{12}H_{12}N_2$ ·2HCl, respectively *Bis(2-ethylhexyl)phthalate* Inorganic cadmium compounds Chlorinated wastewater effluents Hexavalent chromium compounds Creosote-impregnated waste materials from creosote-contaminated sites 3,3'-Dichlorobenzidine 1,2-Dichloroethane Dichloromethane Effluents from pulp mills using bleaching Hexachlorobenzene Inorganic fluorides Refractory ceramic fibre Oxidic, sulphidic and soluble inorganic nickel compounds Polycyclic aromatic hydrocarbons Tetrachloroethylene Trichloroethylene Tributyltetradecylphosphonium chloride that has the molecular formula $C_{26}H_{56}P \cdot Cl$ Bromochloromethane, that has the molecular formula CH₂BrCl Acetaldehyde, which has the molecular formula C_2H_4O 1,3-Butadiene, which has the molecular formula C_4H_6 Acrylonitrile, which has the molecular formula C_3H_3N Respirable particulate matter less than or equal to 10 microns Acrolein, which has the molecular formula C_3H_4O Ammonia dissolved in water Nonvlphenol and its ethoxylates *Effluents from textile mills that use wet processing* Inorganic Chloramines, which have the molecular formula $NH_nCl_{(3-n)}$, where n = 0, 1 or 2ethylene oxide N-Nitrosodimethylamine Formaldehyde Gaseous Ammonia, which has the molecular formula $NH_3(g)$ Ozone, which has the molecular formula O_3 Nitric oxide, which has the molecular formula NO Nitrogen dioxide, which has the molecular formula NO_2 Sulphur dioxide, which has the molecular formula SO₂ Volatile organic compounds that participate in atmospheric photochemical reactions, excluding the following: methane; ethane; methylene chloride (dichloromethane); 1,1,1-trichloroethane (methyl chloroform); 1,1,2-trichloro-1,2,2trifluoroethane (CFC-113); trichlorofluoromethane (CFC-11); dichlorodifluoromethane (CFC-12); chlorodifluoromethane (HCFC-22); trifluoromethane (HFC-23); 1,2-dichloro-1,1,2,2-tetrafluoroethane (CFC-114); chloropentafluoroethane (CFC-115); 1,1,1-trifluoro-2,2-dichloroethane (HCFC-123); 1,1,1,2-tetrafluoroethane (HFC-134a); 1,1-dichloro-1-fluoroethane (HCFC-141b); 1-chloro-1,1-difluoroethane (HCFC-142b); 2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124);

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pentafluoroethane (HFC-125); 1,1,2,2-tetrafluoroethane (HFC-134); 1,1,1-trifluoroethane (HFC-143a); 1,1-difluoroethane (HFC-152a); parachlorobenzotrifluoride (PCBTF); cyclic, branched or linear completely methylated siloxanes; acetone; perchloroethylene (tetrachloroethylene); 3,3-dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca); 1,3-dichloro-1,1,2,2,3pentafluoropropane (HCFC-225cb);(z.1) 1,1,2,3,4,4,5,5,5-decafluoropentane (HFC 43-10mee);(z.2) difluoromethane (HFC-32);(z.3) ethylfluoride (HFC-161); (z.4) 1,1,1,3,3,3-hexafluoropropane (HFC-236fa);(z.5) 1,1,2,2,3pentafluoropropane (HFC-245ca); (z.6) 1,1,2,3,3-pentafluoropropane (HFC-245ea); (z.7) 1,1,1,2,3-pentafluoropropane (*HFC-245eb*);(*z*.8) 1,1,1,3,3-pentafluoropropane (*HFC-245fa*);(*z*.9) 1,1,1,2,3,3-hexafluoropropane (*HFC-236ea*);(*z*.10) 1,1,1,3,3-pentafluorobutane (HFC-365mfc);(z.11) chlorofluoromethane (HCFC-31);(z.12) 1-chloro-1-fluoroethane (HCFC-151a);(z.13) 1,2-dichloro-1,1,2-trifluoroethane (HCFC-123a);(z.14) 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-butane $(C_4F_9OCH_3)$; (z.15) 2-(difluoromethoxymethyl)-1,1,1,2,3,3,3-heptafluoropropane $((CF_3)_2CFCF_2OCH_3)$; (z.16) 1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluorobutane ($C_4F_9OC_2H_5$); (z.17) 2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane $((CF_3)_2CFCF_2OC_2H_3)$; and (z.18) methyl acetate and perfluorocarbon compounds that fall into the following classes, namely,cyclic, branched or linear completely fluorinated alkanes, cyclic, branched, or linear completely fluorinated ethers with no unsaturations, cyclic, branched or linear completely fluorinated tertiary amines with no unsaturations, or sulfur containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine. Hexachlorobutadiene, which has the molecular formula C_4Cl_6 Particulate matter containing metals that is released in emissions from copper smelters or refineries, or from both

Particulate matter containing metals that is released in emissions from copper smellers or refineries, or from both Particulate matter containing metals that is released in emissions from zinc plants

C.5.4 Urban Stormwater

Provincial governments have primary responsibility for regulating and constructing municipal sewage treatment facilities. In British Columbia, stormwater management is addressed as part of the Liquid Waste Management Plan, for example those for the Capital Regional District (<u>www.crd.bc.ca/es/lwmp/</u>). Towards achieving effective management the following are listed as key commitments of regional districts:

- Work in partnership with municipalities and community to achieve goals
- Act as planning and coordinating body
- Collect and provide stormwater quality data and information
- Provide input and information on stormwater quality to the harbours environmental enhancement and marine assessment programs
- Provide information and assist municipalities with the creation, updating and enforcement of bylaws
- Coordinate and provide assistance with stormwater related environmental protection initiatives
- Carry out watershed assessments and coordinate the development of watershed management plans
- Promote the reporting of spills in stormwater and the marine environment
- Provide public education and promote public involvement
- Conduct a stormwater source control programme with municipalities to carry out additional sampling and investigations to assist municipalities to identify and eliminate sources of contamination and to enhance and accelerate the business and residential educational programs.

C.6 HONG KONG

Policy governing effluent disposal in Hong Kong is contained in the Water Pollution Control Ordinance (<u>www.epd.gov.hk/epd/english/environmentinhk/water/guide_ref/guide_wpc_tm_pw.html</u>), in particular the Technical memorandum standards for effluent discharged into drainage and sewerage systems, inland and coastal waters.

C.6.1 Sensitive Areas

The policy identifies different water control zones each zone requiring separate effluent standards. Within coastal waters there are special areas that need specific restrictions, including bathing beaches sites of special scientific interest, marinas and mariculture sites. Identifies areas where effluent disposal is prohibited, include:

- within 100 m of the boundaries of a gazetted beach in any direction
- within 200 of the seaward boundary of a marine fish culture zone or a site of specific scientific interest
- in any typhoon shelter
- in any marina
- within 100 m of a seawater intake point.

C.6.2 Environmental Quality Objectives

In Hong Kong the Environmental Protection Department controls waste water discharges through the Water Pollution Control Ordinance. Operators are required to ensure their discharges meet standards specified by the Department, and these specifications are contained in licences allowing them to discharge their wastewater into receiving water bodies.

The Ordinance also allows the Government to declare water control zones and to set water quality objectives. The objectives describe the water quality that will promote the conservation and best use of the waters in the public interest.

C.6.3 Municipal Wastewater

Hong Kong applies the concept of Sewerage Master Plans. These provide a blueprint of the sewerage infrastructure required to collect the sewage on a catchment-by-catchment basis. The entire territory has been divided into 16 areas, and plans have been produced for all of them. The recommendations of these master plans are being implemented progressively to cater for the present and future development needs of Hong Kong.

C.6.4 Industrial Wastewater

The following substances are prohibited in wastewater discharges to coastal waters (according to Water Pollution Control Ordinance):

- polychlorinated biphenyls (PCB)
- polyaromatic hydrocarbons (PAH)
- fumigant, pesticide or toxicant
- radioactive substances

- chlorinated hydrocarbons
- flammable or toxic solvents
- petroleum oil or tar
- calcium carbide
- waste liable to form scum, deposits or discolouration
- sludge, floatable substances or solids larger than 10 mm.

In some cases, factories do not have the space to treat their own effluents properly. The components that can be treated in this way are measured as biochemical oxygen demand, chemical oxygen demand, and suspended solids. All other effluent components have stricter standards and those who produce effluents must control these other components in their own premises. A charge is levied for the safe disposal of the treatable effluent components (according to Water Pollution Control Ordinance).

C.7 MEDITERRANEAN COUNTRIES

The Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities (1980, as amended in March 1996) (www.unep.ch/seas/main/med/mlbsprot.html) states the policy applicable to Mediterranean countries that are parties to the Convention for the Protection of the Mediterranean Sea against Pollution, adopted at Barcelona on 16 February 1976 and amended on 10 June 1995 (under GPA) (www.unep.ch/seas/main/med/medconvii.html).

C.7.1 Municipal Wastewater

Article 7 of the Mediterranean Land-Based Sources Protocol that parties progressively formulate and adopt, in co-operation with the competent international organizations (such as the European community), common guidelines and, as appropriate, standards or criteria dealing in particular with (www.unep.ch/seas/main/med/mlbsprot.html):

- The length, depth and position of pipelines for coastal outfalls, taking into account, in particular, the methods used for pre-treatment of effluents
- Special requirements for effluents necessitating separate treatment
- The quality of seawater used for specific purposes that is necessary for the protection of human health, living resources and ecosystems
- The control and progressive replacement of products, installations and industrial and other processes causing significant pollution of the marine environment
- Specific requirements concerning the quantities of the substances listed in Annexes I and II discharged, their concentration in effluents and methods of discharging them.

In Malta, for example sewerage systems are presently being upgraded and within the next few years, it is expected that all domestic (and industrial wastes) will be treated to secondary level and that the effluents will be discharged into the marine environment through submarine outfalls equipped with proper diffusers. A Stormwater Master Plan is also presently being implemented to make full and efficient use of stormwater and to prevent overloading of the sewerage system, which would have negative environmental impacts (www.mepa.org.mt/environment/).

C.7.2 Industrial Wastewater

As with municipal waste the Mediterranean countries undertook to progressively formulate and adopt common guidelines and, as appropriate, standards or criteria dealing in particular with (<u>www.unep.ch/seas/main/med/mlbsprot.html</u>):

- The length, depth and position of pipelines for coastal outfalls, taking into account, in particular, the methods used for pre-treatment of effluents
- Special requirements for effluents necessitating separate treatment
- The quality of seawater used for specific purposes that is necessary for the protection of human health, living resources and ecosystems
- The control and progressive replacement of products, installations and industrial and other processes causing significant pollution of the marine environment
- Specific requirements concerning the quantities of the substances listed in Annexes I and II discharged, their concentration in effluents and methods of discharging them. Annex I and Annex II substances are listed below:

PROHIBITED LIST (ANNEX I)

The following substances, families and groups of substances are listed, not in order of priority, for the purposes of Article 5 of this Protocol. They have been selected mainly on the basis of their Toxicity, Persistence and Bioaccumulation. The present annex does not apply to discharges which contain substances listed in section A that are below the limits defined jointly by the Parties, with the exception of those which are biologically harmless or which are rapidly converted into biologically harmless substances (marked *) (www.unep.ch/seas/main/med/mlbsprot.html).

- Organohalogen compounds and substances which may form such compounds in the marine environment*
- Organophosphorus compounds and substances which may form such compounds in the marine environment*
- Organotin compounds and substances which may form such compounds in the marine environment
- Mercury and mercury compounds
- Cadmium and cadmium compounds
- Used lubricating oils
- Persistent synthetic materials which may float, sink or remain in suspension and which may interfere with any legitimate use of the sea
- Substances having proven carcinogenic, teratogenic or mutagenic properties in or through the marine environment
 Radioactive substances, including their wastes, when their discharges do not comply with the principles of radiation protection as defined by the competent international organizations, taking into account the protection of the marine environment.

CONTROLLED LIST (ANNEXII)

The following substances, families and groups of substances, or sources of pollution, listed not in order of priority for the purposes of Article 6 of this Protocol, have been selected mainly on the basis of criteria used for Annex I, while taking into account the fact that they are generally less noxious or are more readily rendered harmless by natural processes and therefore generally affect more limited coastal areas. The control and strict limitation of the discharge of substances referred to in section A above must be implemented in accordance with Annex III (www.unep.ch/seas/main/med/mlbsprot.html).

• Following elements and their compounds:

Zinc	Arsenic	Barium	Vanadium
Copper	Antimony	Beryllium	Cobalt
Nickel	Molybdynum	Boron	Thallium
Lead	Titanium	Chromium	Tellurium
Selenium	Tin	Uranium	Silver

• Biocides and their derivatives not covered in Annex I.

• Organosilicon compounds and substances which may form such compounds in the marine environment, excluding those which are biologically harmless or are rapidly converted into biologically harmless substances

CONTROLLED LIST (ANNEXII)

- Crude oils and hydrocarbons of any origin
- Cyanides and fluorides
- Non-biodegradable detergents and other surface-active substances
- Inorganic compounds of phosphorus and elemental phosphorus
- Pathogenic micro-organisms
- Thermal discharges
- Substances which have a deleterious effect on the taste and/or smell of products for human consumption derived from the aquatic environment and compounds liable to give rise to such substances in the marine environment
- Substances which have, directly or indirectly an adverse effect on the oxygen content of the marine environment, especially those which may cause eutrophication
- Acid or alkaline compounds of such composition and in such quantity that they may impair the quality of sea-water
- Substances which, though of a non-toxic nature, may become harmful to the marine environment or may interfere with any legitimate use of the sea owing to the quantities in which they are discharged.

C.8 PEOPLE'S REPUBLIC OF CHINA

Prevention of pollution from land-based sources is addressed in the *Marine Environmental Protection Law of the People's Republic of China* (Chapter IV). (www.novexcn.com/marine_environemental_prot.html)

C.8.1 Sensitive Areas

According to the *Marine Environmental Protection Law* sewage discharges will no longer be allowed within **marine sanctuaries, aquacultural grounds and seashore scenic and tourist areas**. Existing discharges to these areas, before the promulgation of this Law, that are not in conformity with the state standards, have to be improved within a prescribed period of time. The discharge of industrial wastewater and domestic sewage containing organic and nutrient matter into **bays, semi-closed seas and other sea areas with low capacities of absorption** must be controlled so as to prevent eutrophication (i.e. requires a licence).

C.8.2 Municipal Wastewater

According to the *Law of the People's Republic of China on Prevention and Control of Water Pollution* (article 19) requires that urban sewage be centrally treated. Relevant departments under the State Council and the local people's governments at various levels must incorporate protection of urban water sources and prevention and control of urban water pollution in their respective plans for urban construction, construct **and improve networks of urban drainage pipelines, construct facilities for central treatment of urban sewage** according to plans, and improve all-round treatment and control of urban water environment.

Central treatment facilities for urban sewage charge a fee so as to ensure normal operation of the facilities. Those who discharge sewage to the central treatment facilities and pay the fees are exempted from the pollutant discharge fee.

C.8.3 Industrial Wastewater

According to the *Marine Environmental Protection Law* the following applies to industrial wastewater discharges:

- The discharge of **harmful substances** into the sea by coastal entities must be conducted in strict compliance with the standards for discharge and relevant regulations promulgated by the state or the people's governments of provinces, autonomous regions, and municipalities directly under the Central Government (article 28)
- It is prohibited to discharge wastewater containing high-level **radioactive** matter into the sea. Wastewater containing low-level radioactive matter into the sea, when actually necessary, shall be carried out in strict compliance with the state regulations and standards concerning radioactive protection (article 19).
- **Medical sewage or industrial waste water carrying pathogens** may not be discharged into the sea until it is properly treated and strictly sterilized with the pathogens therein exterminated (article 20).

APPENDIX D

OVERVIEW OF LEGISLATION RELATED TO MARINE WATER QUALITY MANAGEMENT, IN GENERAL

Sub-Series No. MS 13.4

ASPECTS	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITIES	
Management and control	Seashore Act (No. 21 of 1935)	DE 4T	
	National Environmental Management Act (No 107 of 1998)		
	White Paper on Integrated Pollution and Waste Management for South Africa (March 2000)	DEAT	
of pollutant sources, in	Hazardous Substances Act (No. 15 of 1973)	Dept. Health	
general	Health Act (No. 63 of 1977)		
	Minerals Act (No 50 of 1991)	Dept Mineral and Energy	
	National Water Act (No 36 of 1998)	DWAF	
Management and control	Waste Discharge Charge System (under the National Water Act)		
of sewage and industrial	Environmental Conservation Act (No. 73 of 1989	DEAT	
ejjiueni aischurges	Various industrial effluent, sewage and drainage by-laws	Local	
	National Building Regulations and Building Standards Act (No 103 of 1977)	Delegated to	
	Physical Planning Act (No 88 of 1967)	Provincial Governments	
Management and control	Conservation of Agricultural Resources Act (Act 43 of 1983)	Dept Agricultural	
of stormwater runoff	Health Act (No 63 of 1977)	Dept Health	
5 55	Western Cape Planning and Development Act (No 7 of 1999)	Provincial	
	Municipal Ordinance (Ordinance No 20 of 1974)	Provincial	
	National Water Act (No 36 of 1998)	DWAF	
	Various industrial effluent, sewage and drainage by-laws	Local	
	Atmospheric Pollution Prevention Act (No 45 of 1965)	DEAT	
Air pollution	Different by-laws on, for example on smoke control	Local	
I ::	Sea Shore Act (No 21 of 1935)	DEAT	
Liller	Various regulations under the Sea Shore Act	Local	
	International Convention for Prevention of Pollution from Ships Act (No. 2 of 1986)		
	nternational Convention relating to Intervention on High Seas in Cases of Dil Pollution Act (No. 64 of 1987)		
Pollution from shipping	Merchant Shipping Act (No. 57 of 1951)		
activities	Marine Traffic Act (No. 2 of 1986)		
	Prevention and combating of Pollution of the Sea by Oil Pollution Act (No. 6 of 1981)	DEAT and Dept. Transport	
	Coastal Oil Spill Contingency Plan No. 3 Cape Zone (under the Prevention	DEAT	
	and combating of Pollution of the Sea by Oil Pollution Act)		
	Dumping at Sea Control Act (No. 73 of 1980) gives legal effect to London	DEAT	
Dumping at sea	Convention		
Pollution from wrecks	Merchant Shipping Act (No. 57 of 1951)	Dept. Transport	
	National Monuments Act (No. 28 of 1969) to be replaced by National Heritage Resources Act (No. 25 of 1999)	DEAT	
Harbour pollution, in particular	Legal Succession to the South African Transport Services Act (No. 9 of	— Dept. Transport	
	1989)		
	Harbour Regulations of 1982 (under the Legal Succession to the South		
	African Transport Services Act)		
	International Health Regulations Act (No. 28 of 1974)	Dept. Health	

Sub-Series No. MS 13.4

ASPECTS	RELEVANT LEGISLATION	RESPONSIBLE AUTHORITIES
Specification of Environmental quality Objectives for marine ecosystems	Marine Living Resources Act (No. 18 of 1998) Sea Birds and Seals Protection Act (No. 46 of 1973) National Parks Act (No. 57 of 1976) Sea Fishery Act (No. 12 of 1988) Environmental Conservation Act (No. 73 of 1989) White Paper on the Conservations and sustainable use of South Africa's Biological Diversity (July 1998) White Paper on sustainable coastal Development in South Africa (December 1999)	DEAT
	South African Water Quality Guidelines for Coastal Marine Waters. Volume 1: Natural Environment (1995)	Not clear, used to be under DWAF
Specification of	National Health Act (No. 63 of 1977)	Dept. Health
Énvironmental quality Objectives for Recreational Use	South African Water quality Guidelines for Coastal Marine Waters. Volume 2: Recreational Use (1995)	Not clear, used to be under DWAF
Specification of Environmental quality Objectives for	Foodstuffs, Cosmetics and Disinfectants Act (No. 54 of 1972) Regulations – Marine Foods, 2 November 1973 Regulations related to metals in foodstuffs, 9 September 1994	Dept. Health
Mariculture or Collection of marine organisms for human consumption	South African Water quality Guidelines for Coastal Marine Waters. Volume 4: Recreational Use (1995)	Not clear, used to be under DWAF
Specification of Environmental quality Objectives for Industrial Use, e.g. harbour area	South African Water quality Guidelines for Coastal Marine Waters. Volume 3: Industrial Use (1995)	Not clear, used to be under DWAF

APPENDIX E

RESPONSE TO COMMENTS FROM KEY STAKEHOLDER WORKSHOP (12 AUGUST 2003, STELLENBOSCH)

PURPOSE OF THIS WORKSHOP

To obtain feed-back and input from key stakeholders on the proposed <u>basic principles</u> and ground rules that will forms part of an Operational Policy for the treatment and disposal of land-derived wastewater in the coastal areas of South Africa

OVERVIEW OF KEY POINTS OF DISCUSSION

The structure of the operational policy is illustrated below:



The Goal of this operational policy fits within the overall water quality management goal for South Africa, as presented in the National Water Quality Management Framework namely:

Achieving water quality that is 'fit for use' and maintaining aquatic ecosystem health on a sustainable basis by protection of the country's water resources (including marine waters), in a manner allowing justifiable social and economic development.

Basic Principles provide the broad reference framework or direction within which to develop Ground Rules on the treatment requirements and disposal practices of land-derived wastewater in coastal areas, as well as for the Practical Procedures for the disposal of land-derived wastewater to the marine environment. The basic principles were distilled from the broader international and national legislative context

Ground Rules, derived within the broader reference framework of the Basic Principles, provide more specific rules that will be applied by Government when, for example considering licence applications to dispose of land-derived wastewater to the marine environment. For this operational policy, the Ground Rules are addressed under specific themes considered to be of particular relevance to the treatment and disposal of land-derived wastewater to the marine environment, namely:

- Holistic Assessment
- Sensitive Areas
- Environmental Quality Objectives (including mixing zone)
- Urban/Municipal Wastewater (requirements re collecting systems and degree of treatment)
- Industrial Wastewater (including list of prohibited or controlled substances)
- Discharge practices and prediction
- Monitoring, Assessment and Reporting.

The Practical Procedures (to be addressed in next phase) provide a practical framework within which to conduct marine environmental aspects during feasibility studies, as well as the construction and operations stages of marine outfall facilities for the disposal of land-derived wastewater. The practical procedures also provide guidance on the administrative procedures.

BASIC PRINCIPLES

Basic principles considered relevant to an operational policy for treatment requirements and disposal of land-derived wastewater in coastal areas of South Africa are listed below:

PRINCIPLE 1: POLLUTION PREVENTION AND WASTE MINIMISATION

Pollution prevention will be achieved through elimination or minimisation of waste at source. Disposal of specific hazardous or toxic substances to the marine environment will be prohibited. Where waste production is unavoidable minimization should occur through:

- Recycling and/or Re-use of waste or water containing waste
- Detoxifying
- Treatment of waste stream
- Introduction of cleaner technologies and best management practices.

PRINCIPLE 2: RISK-AVERSION AND PRECAUTIONARY APPROACH

Activities that potentially pose a high risk to the sustainability of the marine environment, or activities where the effect on the marine environment is uncertain or difficult to predict, will be avoided.

PRINCIPLE 3: RECEIVING WATER QUALITY OBJECTIVES APPROACH

The requirements of the aquatic ecosystem of the water resource, as well as the requirements of the beneficial uses of the water resource determine the objectives that need to be adhered to (rather than following a uniform effluent standard approach as was the case with the General and Special standard under the previous Water Act 54 of 1956). This principle will also apply to the marine environment.

PRINCIPLE 4: INTEGRATED ASSESSMENT APPROACH

The operational policy will adhere to the principles of Integrated Environmental Management through operational instruments such as Strategic Environmental Assessment and Environmental Impact Assessment studies, as regulated by environmental legislation in South Africa, e.g. Environment Conservation Act 73 of 1989.

PRINCIPLE 5: POLLUTER PAYS PRINCIPLE

The responsibility for environmental costs will be shifted to the potential impactors through, for example the implementation of a waste discharge charge system.

PRINCIPLE 6: PARTICIPATORY APPROACH

Stakeholder participation will be promoted, not only as part of the decision-making process (e.g. Environmental Impact Assessment process), but also through ongoing transparent and open communication on status quo during operations.

PROPOSED GROUND RULES

NOTE:

The Ground rules listed in this section should be seen as a first draft to be refined through wider stakeholder consultation.

Holistic Assessment

1.1 Where disposal of land-derived wastewater to the marine environment is considered, a holistic process must be followed where potential impacts on the receiving environment is investigated both in the near and far field, i.e. an ecosystem based approach and where existing waste inputs or other anthropogenic activities in the receiving environment is taken into account so as to address synergistic/cumulative interactions (Integrated Assessment Approach).

Sensitive Areas

- 2.1: In principle, discharges to estuaries and the surf zone will not be considered (Pollution Prevention and waste minimisation; Risk-aversion and Precautionary approach).
- 2.2: Discharges of land-derived wastewater to the offshore marine waters through a marine outfall will be considered provided that the suitability of the areas to accommodate such activities is properly assessed (Risk-aversion and precautionary approach).
- 2.3: Discharge of land-derived wastewater to any area declared a Marine Protected Area under the Marine Living Resources Act 18 of 1998 is prohibited (Risk-aversion and precautionary approach).

APPLICATION OF GROUND RULES TO EXISTING DISCHARGES:

The Ground Rules will be phased in for existing lawful discharges to estuaries and the surf zone. The DWAF will review all of these which may imply that alternative means of treatment and disposal may be required.

All existing lawful discharges will on application for new licence or review of current licences be subject to the Ground Rules.

Environmental Quality Objectives

- 3.1: Site-specific Environmental Quality Objectives for the marine environment (excluding estuaries) must be based on the South African Water Quality Guidelines for coastal marine waters (Receiving water quality objectives approach).
- 3.2 Site-specific Environmental Quality Objectives for estuaries must be determined according to the methodology developed by the Directorate: Resource Directed Measures. Since estuaries are included in the definition of the water resource in the National Water Act, 1998, all Sections of the NWA is applicable.
- 3.3 As a rule, environmental quality objectives need to be complied with beyond the initial mixing zone (Risk-aversion and Precautionary approach).

Urban/Municipal Wastewater

- 4.1 Because South Africa is a water scarce country, marine disposal of urban/municipal wastewater will only be considered if it is presented in the context of an overall Master Plan on Water Supply and Sanitation and for a particular Coastal Municipal area (Integrated assessment approach).
- 4.2 An application for a licence for marine disposal of urban/municipal wastewater will only be considered where an Environmental Impact Assessment has proved it to be the preferred route (Integrated assessment approach).

- 4.3 All coastal areas with a service population of greater than 2000 (e.g. EC Directives) will be provided with collecting systems (Risk aversion and Precautionary approach).
- 4.4 Urban/Municipal wastewater from coastal areas with a service population of greater than 10 000 (e.g. EC Directives) shall at a minimum receive primary treatment prior to consideration for disposal to the marine environment through a marine outfall (Risk aversion and Precautionary approach).
- 4.5 Urban/Municipal WWTW receiving industrial effluent will be subject to the Ground rules specified under Section 5.5. Authorities operating such treatment works will be required to prepare Industrial wastewater management plans (as part of the Master Plan).
- 4.6 Urban/municipal WWTW discharging wastewater to the marine environment may be subject to a waste discharge charge (Polluter pays principle).

APPLICATION OF GROUND RULES TO EXISTING DISCHARGES:

The Ground Rules will be phased in for existing lawful water uses. The DWAF will review all discharges which may imply that alternative means of treatment and disposal may be required.

All existing lawful discharges will on application for new licence or review of current licences be subject to the Ground Rules.

Existing urban/municipal WWTW discharging wastewater to the marine environment may also be subject to a waste discharge charge (Ground Rule 4.6).

Industrial Wastewater

- 5.1 An application for a licence to dispose of industrial wastewater (including stormwater runoff from industrial areas) to the marine environment will only be considered where an Environmental Impact Assessment has proved it to be the preferred option (Integrated assessment approach).
- 5.2 An industry, discharging to a WWTW or directly to the marine environment (or whether applying for a licence to do so) will be required to provide a detailed description of the waste stream both in terms of volume (quantity) and quality (i.e. listing <u>all</u> substances present and their concentrations and loads). Where industries discharge into WWTW, the WWTW authority is responsible to obtain this information form the industry (Pollution prevention and waste minimisation; Risk-aversion and precautionary approach).
- 5.3 Industrial wastewater into urban/municipal WWTW disposing to the marine environment will be subject to appropriate pre-treatment (Pollution prevention and waste minimisation). It is the responsibility of the local authority operating the WWTW to ensure compliance in this regard.
- 5.4 Industrial wastewater discharged directly to the marine environment will be subject to a waste discharge charge (Polluter pays principle).
- 5.5 List I substances are regarded as being particularly dangerous because of their toxicity, persistence and bioaccumulation Pollution by List I substances must be eliminated (Pollution prevention and waste minimisation).
- 5.6 List II substances are considered less dangerous but nevertheless have a deleterious effect on the aquatic environment. Pollution by List II substances must be controlled and reduced (Pollution prevention and waste minimisation).

APPLICATION OF GROUND RULES TO EXISTING DISCHARGES:

The Ground Rules will be phased in for existing lawful water uses. The DWAF will review all discharges which may imply that alternative means of treatment and disposal may be required.

All existing lawful discharges will on application for new licence or review of current licences be subject to the Ground Rules.

Existing industrial wastewater discharges to the marine environment will be subject to a waste discharge charge (Ground Rule 5.4).

Discharge Practice and Predictions

- 6.1 Marine disposal will only be considered where a marine outfall is designed in accordance with defined hydraulic/structural guidelines/codes to meet resource quality objectives (Risk-aversion and precautionary approach).
- 6.2 It will be expected that recognised numerical modelling techniques be applied in the design and assessment of a marine outfall (Risk-aversion and precautionary approach).
- 6.2 A conservative approach must be followed in the design and assessment of a marine outfall where the temporal and spatial coverage and accuracy of physical and chemical oceanographic data do not adequately describe site-specific conditions (Risk-aversion and precautionary approach).

Monitoring, Assessment and Reporting

- 7.1 Any authority or industry responsible for the operation and management of a marine disposal system will be subject to the implementation of a monitoring programme (Pollution Prevention and waste minimisation; Integrated assessment approach; Participatory approach).
- 7.2 Authorities operating WWTW that receive industrial wastewater (trade effluents) shall ensure that monitoring programmes are implemented to record the individual flow and composition of such waste streams prior to entering the WWTW, as part of their industrial wastewater management plan (Pollution Prevention and waste minimisation; Integrated assessment approach; Participatory approach).
- 7.3 Any authority or industry responsible for the operation and management of a marine disposal system will be required to provide the DWAF with regular assessment on the performance of the marine disposal system (Pollution Prevention and waste minimisation; Integrated assessment approach; Participatory approach).
- 7.4 Where performance assessments (Rule 6.2) indicate non-compliance to pre-determined specifications (including environmental quality objectives), the responsible authority or industry will be required to proposed mitigating actions to ensure compliance (i.e. rehabilitation) and will be required to implement such actions on approval of the DWAF at their own cost (Pollution prevention and waste minimisation).

Proposal for Urban Stormwater

Urban stormwater discharged to the marine environment should not have any detrimental negative impact on the Environmental Quality Objectives of the receiving environment (Pollution prevention and waste minimisation).

The vast volumes and runoff characteristics of non-point sources of land-derived wastewater such as urban stormwater runoff make treatment prior to disposal extremely difficult and expensive. Mitigating at source, i.e. preventing pollution rather than treatment is usually a more cost-effective route to follow in the case of these non-point sources of pollution. An approach that appears to be effective in this regard, in the establishment of Stormwater Management Programmes, as implemented for example in Scotland and the United States of America.

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Permitting of stormwater discharges in the United States of America:

The general rule is that the US-EPA does not require a permit for discharges composed entirely of stormwater except in the following cases:

- Discharges associated with industrial activities
- Discharges from a municipal separate storm sewer system serving a population of 100 000 or more
- Discharges for which the US-EPA or relevant State determines that the stormwater discharge contributes to a violation of a water quality standard or is a significant contributor of pollutants to the waters of the United States.

Example of Key objectives of a Stormwater Management Program:

- Map of stormwater reticulation systems, including discharge points into water resources
- Identify and eliminate illicit connections and illicit discharges to the storm drain system and facilitate the public's ability to report illicit connections and discharges.
- Reduce stormwater impacts associated with development and redevelopment projects (i.e. ensure that stormwater management considerations are integrated into planning, permitting and construction of development projects).
- *Reduce stormwater quality impacts associated with public agency activities through:*
- Increase public knowledge and understanding about the quality, quantity, sources and impacts of stormwater runoff and about actions that can be taken to prevent pollution through education and outreach programs targeting specific audience such as residents, industrial facility operators, commercial businesses, school children and public agency employees.
- Develop a stormwater quality monitoring programme that will:
- Report and evaluate the effectiveness of implementing stormwater management programs.

Therefore operational policy pertaining to stormwater will not be further addressed in this document. It is however proposed that an operational policy for the management and control of urban stormwater be developed, taking into account international trends highlighted above, as well as existing national initiatives such as:

- A framework for implementing non-point source management under the National Water Act
- Guidelines for human settlement planning and design The Red Book
- Set of documents on Managing the Water Quality Effects of Settlements
- Waste Discharge Charge System.

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RESPONSE TO STAKEHOLDER COMMENTS

BASIC PRINCIPLES

<u>General</u>

 Constitutional right of the individual to a clean and healthy environment – Add to Basic Principles? (D Nel)

We are of the opinion that the existing list of basic principles underpins the constitutional right to a clean and wealthy environment. However, this is explicitly dealt with in Appendix B where key legislation relevant to this operational policy is discussed, including the Constitution

• Support all principles – Do not dilute the principles (A Boyd)

Statement – no reply required

• Provide upfront the context of this project. (H Karodia)

Links to other departments will be discussed in more detail in the 'Guidance on Implementation', but an organogram will be included in the Introduction

• 'Goal' of the project is too broad – should be more focused to marine/coastal (H Karodia)

The project is focused to the marine/coastal environment. This will become clear once the 'Guidance on Implementation' becomes part of the document.

• Will policy carry same weight as legislation? (F Hickley)

The Operational Policy does not have weight such as legislation but it form part of the decision taking framework within which legislation is applied. This policy is a tool to give effect to the intention of the National Water Act and to guide the evaluation of licence applications. It is however possible that the ground rules could be converted into Regulations which will have the same weight as legislation. Furthermore, the outcome of the policy will be incorporated into the National Water Resources Strategy which does have legal weight.

- History on the management (e.g. legislation) of sea outfall pipelines (nationally and internationally) must be elaborated on (Strategic direction i.t.o. past, present and future) (P Herbst)
- The overall strategic direction w.r.t. sea outfalls must receive much more attention, and development (international/national strategic direction, e.g. promotion, reduction, alternative disposal practices, phasing out, short-, medium-, long-term vision/goal (bigger picture?) (P Herbst)

An overview of marine disposal in SA is provided in Appendix A. The Department is currently working on an official standpoint of the DWAF on marine disposal – at a strategic level (as well as the Departments viewpoint on current international practices) for inclusion in the document. The long-term goal is however compliance to international trends regarding sea disposal.

 The heading of the doc includes the word "treatment". Treatment is however not mentioned enough in the doc. It seems as if treatment is considered to be part of the design of the pipe only. (P Herbst)

We propose that the title of the project is not changed as treatment requirements will be addressed to some degree. Although this operational policy focuses on the discharge of wastewater to the marine environment, land-based treatment options for wastewater, in particular municipal wastewater, will be dealt with.

- This project must provide policy, less of an Impact Assessment approach (P Herbst)
- General Ground rules for all discharges must first be developed, thereafter gr. rules for specific discharges (if necessary) (P Herbst)

This is an <u>operational</u> policy which captures the essence of what is required in the Basic Principles and Ground Rules. The EIA approach is promoted as a mechanism of dealing with the assessment and evaluation of specific discharges, as is required in the NWA.

• Policy must be applied equally to Local Authorities and industries and mining. (G McConkey)

Statement – no reply required

Enforcement of rules ought to be the primary principle! Involves SAPS and legal fraternity (No author)

Agreed, but this should be addressed by the DWAF as part of their enforcement operations, in general.

• Please try to keep procedures simple – administratively. (No author)

Agreed, we will try our best!

 Scope: DWAF versus DEAT responsibility (Integration?) Can't you form a partnership in this initiative?) (No author)

Recommendation in this regard will be provided as part of the Administrative procedures in the 'Guidance on Implementation'.

- Essential to cross-relate to adequacy of capacity to implement (socio-economic institutional arrangements) (S Lane)
- Capacity of DWAF and other regulators (L Gravelet-Blondin)

Recommendation in this regard will be provided as part of the Administrative procedures in the 'Guidance on Implementation'. However, providing adequate capacity to implement is ultimately a Departmental responsibility.

- B.P./G.R. (Basic Principles/Ground Rules). Suggest → link G.R. to B.P. being applied. (H Karodia)
- Link principles and ground rules, the latter being more specific (S Schneier)

Links have been indicted in the documentation, but this will be done more explicitly in the final version.

 B.P./G.R. The B.P & G.R. are generic → the words "coastal"/"marine" should appear more often. (H Karodia)

Will take this into considerations and revise where appropriate.

• Use of term 'waste water' introduces a bias away from the value of the resource. (S Lane)

A definition of wastewater will be included in the definitions section. The use of the word wastewater is acceptable due to its use in the General Authorisations as published in the Government Gazette. The value of the resource is highlighted in the application of the decision taking hierarchy promoting re-use and recycling of water. This will be documented more explicitly in the Ground Rules.

• Refer to Health Act and Source control. (L Gravelet-Blondin)

Will incorporate Health Act in Legislation review (refer to Appendix B in main documentation)

• Existing discharges – problems. (L Gravelet-Blondin)

Will discuss the implication for existing discharges in more detail in final version

• All media versus energy consumption (2nd Law of Thermodynamics) (L Gravelet-Blondin)

This issue (i.e. considering all media) is inherently part of the EIA/SEA approach

- EIA is too generic term. Where mentioned the requirements must be stated. (P Herbst)
- Fit for purpose EIA legislation is the responsibility of DEAT, but it is extensively referred to here. Is the EIA legislation comprehensive, effective (or even too onerous) for this policy? (No author)

The 'Guidance on Implementation' will be describing specific requirements pertaining to the assessment and evaluation of disposal of land-derived water containing waste to the marine environment within the context of the EIA process in more detail (However an EIA may well deal with many other issues besides these).

Terminology

• 'Marine' and 'coastal' being used interchangeably used (H. Karodia)

Suggest that we standardise on 'marine environment'

- Definition of "wastewater" and 'mixing zone'. (J Koekemoer)
- Definitions not clear (No author):
 - Land derived water
 - Land derived water containing waste
 - Land derived wastewater
- Use single terminology with definition. (B Pfaff)
 - Environmental impact
 - Preliminary/primary treatment

Will add/clarify definitions of the above in the Glossary of terms.

 Need consistent use of 'precautionary' or 'conservative' throughout doc. Precautionary – has an agreed meaning – preferred. (No author)

Will standardise on 'precautionary'.

Stakeholders

• Representation from industry? The process may be interpreted as confrontational if minimal opportunity to participate. (G Branston)

Most industrial concerns discharging land-derived water containing waste to the marine environment have been invited to participate as 'Key Stakeholders' (although they may not have attended the workshop, they are still given the opportunity to participate via e-mail) • Composition of Key Stakeholders (Committee): Are there reps from design consultants? (J Koekemoer)

The Institute of Civil Engineers will be invited to send a representative for the Key Stakeholder Committee in this regard.

Principle 1: Pollution Prevention and Waste Minimisation

• Cost-benefit analysis to include externalities (additional to EIA regs.). (A Carter)

This concept is inherently contained in the Principle 4: Integrated assessment approach *and* Principle 5: Polluter pays' principles

• Time frames? Are they negotiable to reduce effluent concentrations (D Airey)

The reduction of effluent concentrations will be negotiated and a plan with time frames will be part of the individual licence conditions. The White Paper on a national Water Policy for South Africa states that "efforts to introduce source control will be strengthened, through permits and standards and through changes in technologies and land-use, with the final aim of getting as close as possible to a situation in which there is no discharge of pollutants into our water (including sea water)".

Principle 2: Risk-aversion and Precautionary Approach

 Procedures/hierarchy for deciding on sea outfall pipelines as disposal option must be developed/ elaborated on. (P Herbst)

The hierarchy of decision-making will be addressed more explicitly under Principle 1: Pollution Prevention and Waste Minimisation. This will be similar to the Department's generic hierarchy of decision making pertaining to waste disposal. Perhaps a flow diagram will be of help in this regard.

Principle 3: Receiving Water Quality Objectives Approach

• Need to expand WQO's for marine environment. (J Pitts)

Updating/expanding of the WQ guidelines for coastal marine waters is not part of this brief, but a Recommendation in this regard will be included in the current document.

• Regional aspects of assimilative capacity. Important (cumulative effects). (No author)

Principle 4: Integrated Assessment Approach, as well as the Ground Rules on Holistic Assessment requires that this be addressed.

 How do we balance water re-use with impact minimisation issues? (Reduce H₂O to sea but increased concentrations.) (J Pitts)

Principle 3: Receiving Water Quality Objectives approach requires that concentration limits are determined by the beneficial use assigned to a particular water body. This implies that any effluent must be treated to acceptable concentrations before discharge, thus reducing water in the effluent may require further pre-treatment. on effluent constituents

Principle 4: Integrated Assessment Approach

• Must include all media – not just water (to air and land). (J Pitts)

This issue (i.e. considering all media) is inherently part of the EIA/SEA approach

 Existing discharges – need an EIA? Cost and "heat" in "high activist" areas – do you also include "no go" option? (J Pitts)

The 'no go' option will apply to all new applications for discharge of wastewater. An EIA as such will not necessarily be needed for existing discharges unless it involves upgrades. Specific studies could however be required. Unacceptable impacts or water demand in the catchment could lead to revision of decisions and possible "no go" option. These issues need to be addressed in the 5 yearly revision of licences. Revisions will be motivated on grounds of impact to environment and compliance to licence conditions.

• Good, but emphasis is quality, not quantity. Potential bias due to location within DWAF's ops. structure (S Lane)

This aspect is considered to be covered under a Ground Rule under Municipal/Urban wastewater which requires that the disposal of water containing waste to the marine environment be considered as part of a Master Plan including water supply and demand.

Principle 5: Polluter Pays Principle

 Need to find a way to minimise costs for assessing cumulative impacts and using effective tools. (J Pitts)

Agreed, the use of for example numerical modelling tools will be discussed in the 'Guidance on Implementation'.

• Waste discharge charge system (WDCS): Is purpose only to be a deterrent or will funds be used in waste stream minimisation, environmental rehabilitation, etc. (R Carter)

The aim of the WDCS is to provide both a deterrent not to pollute and an incentive to reduce waste (volume and load). In the regional context waste treatment facilities could be funded. Some of the funds generated by the Waste discharge charge will be used for rehabilitation and remediation activities.

Principle 6: Participatory Approach

- Surfers are the primary stakeholder, but have not been involved in process to date. (J Veldsman)
- Surfers can monitor compliance. (J Veldsman)

Surfers could be invited to the different catchment and pipeline forums. They should be encouraged to report on visual/aesthetic and health issues to the authorities and the forums. They should also be invited to become involved in the EIA processes of existing and new pipeline developments.

• Which NGO's in this stakeholder forum? Were most significant organisations consulted? (J Pitts)

NGO's are part of the Key Stakeholder committee, e.g. WESSA, SANCOR, Earth Life Africa, WWF-SA

Additional Principle: Cradle to Grave Approach

• Assessments and monitoring. (No author)

This policy does not address onsite source related issues. The policy does however support all the principles contained in the White Paper on Integrated Pollution and Waste Management for South Africa (May 2000). These principles need to be implemented prior to any discharge.

GROUND RULES

General Comments

 Please include more specific details on how these apply to existing users, e.g. will existing users be required to carry out an EIA when applying for new licence and take full responsibility for farfield studies? (J St Leger)

An EIA is a requirement for upgrades or extensions of existing pipelines in terms of environmental legislation. Licence applications due to expiry of exemption permits may however require studies to be carried out in order to reduce/minimise impacts. Such studies need to consider the inclusion of far-field studies. All licences will be reviewed every 5 years. Site-specific conditions may require far field studies to be undertaken on review.

• Need more specific details on how these would apply to existing uses (J St Leger)

Implication to existing lawful water uses will be addressed more explicitly in the final version for all Ground Rules.

- Defining usage of words (G Branston):
 - May
 - Will
 - Need
 - Shall
 - Must
 - Should not.

The use of these words in the basic principles and ground rules will be checked to reflect the status of the topic under discussion appropriately. The DWAF will give guidance in this regard.

For example, all references to the Waste Discharge Charge system should be 'may' because it will not yet be operational by May 2004. A statement will be included under the Glossary of terms: "WDCS is under development. The impact of the Charge system on this policy is still unclear and therefore no definitive statements in this regard can be made as part of this policy".

 An indication of measures to adopt in cases of failure to comply with phasing in of the rules for existing discharges. (L Puling)

The phasing in of the rules to existing discharges will be done by inclusion of certain conditions in licences. Failure to comply with any conditions will be a violation of the licence conditions. The 5 yearly revisions of licences will assist in the phasing in of the rules.

Holistic Assessment [Rule 1.1]

• Very good approach, but can only be done with explicit and ongoing acknowledgement of other legislation and structures (not just DWAF legislation and EIA's). (A Boyd)

Recommendations on Institutional arrangements will be addressed in more detail as part of the Management and Administrative Responsibilities (in 'Guidance on Implementation').

• Incorporate EIA here (basic ground rule to all disposal) (No author)

A sub-section of Ground Rules: Statutory Requirements will be added to deal with such issues e.g. the requirement of an EIA.

• Require address ecological, social, financial sustainability too (No author).

This is inherently included in the EIA process.

• Will existing users be required to start doing far-field studies? (J St Leger)

An EIA is a requirement for upgrades or extensions of existing pipelines in terms of environmental legislation. Licence applications due to expiry of exemption permits may however require studies to be carried out in order to reduce/minimise impacts. Such studies need to consider the inclusion of far-field studies. All licences will be reviewed every 5 years. Sit- specific conditions may require far field studies to be undertaken on review.

• Far-field assessments cannot be responsibility of single outfall operator first in queue. Need to be coordinated by DWAF (but impacts then on DWAF lack of resources). (B Pfaff)

A single outfall operator will be responsible to determine it's own 'footprint of impact'. Where existing discharges are already present in the area, the inputs form those concerns (quantity and quality) MUST be taken into account. Joint effort is the logical approach to the management of a number of discharges into a common area e.g. Saldanha WQ Forum Trust (e.g. coordinate monitoring and auditing programmes).

• Bio-accumulation must be seriously considered at beyond "far-field". (S Lane)

Based on the Pollution Prevention principle, substances that can bio-accumulate should not be discharged. Such substances should be listed as either List I and II substances (see Ground Rules pertaining to Industrial Wastewater).

• Routine monitoring of the receiving environment should be done (No author)

The 'Guidance on Implementation' will expand on monitoring requirements related to the disposal of landderived water containing waste to the marine environment. Also monitoring programmes and efforts need to be coordinated e.g. DEAT, DWAF, client monitoring, etc.

 Guidelines are to be drawn up in parallel process to O.P. Policy to give industry insight and practical cost-effective options in real situations and set out cleaner production technologies. (G Branston)

This is not within the brief of the project, but a recommendation for future implementation in this regard will be included.

Sensitive Areas: Estuarine and Surf zone Discharges [Rule 2.1]

• In principle, discharges to these will not be considered. If they are however, the provisions of the MLRA would need to be considered. (A Boyd)

The Ground Rules state that 'No discharges to MPA will be allowed'. In considering licences for disposal to the marine environment, the DWAF must clear this issue with the DEAT, in particular – will highlight this in the Administrative Procedures.

- Discharges to estuaries and surf zone will not be included (Vatiswa)
 - More clarity
 - Surf zone mixing how will it be handled?
 - Will it be prohibited or treated as a special case?

Too restrictive - Discharge of fully treated effluent "upstream" (?) of estuary must be considered using RDM approach (B Pfaff)

Surf zone could be better than estuary (L Gravelet-Blondin)

No discharge to estuaries is great, but surf zone discharges to be considered subject to EIA and detailed investigations. (W Kloppers)

Define surf zone discharge and differentiate estuary by-pass as an option (i.e. it is not an effluent discharge. (A Connell)

'Estuaries' and 'surf zone' will be dealt with under separate Ground Rules to accommodate the RDM aspects and requirements as required under the National Water Act (particularly relevant to estuaries) and to allow for surf zone discharges pending EIA outcome, i.e. assuming that the RQO approach will be the determining factor.

 Discharge to estuaries, what about discharges to rivers draining into estuary? Included? (P B King)

Such discharges are managed and controlled under the operational policy that deals with discharges to rivers (freshwater environments). Obviously, where such discharges may have an impact on the estuary, the requirements of the estuary, as stipulated by the RQO for the estuary, must also be addressed.

• Has an assessment of the cost implications, particularly to the Local Authority, been undertaken w.r.t. Implementation of the proposal (No author)

Cost implications have not been taken into account as yet. This will become an issue with the phasing in of the policy which will coincide with the review of the licence. Phasing in of the policy does not necessarily imply that there will be huge cost implications to local authorities.

• When does a river become an estuary? (T Aab)

The upstream boundary of an estuary is the extent of tidal influence – this is listed in the Glossary of Terms

 What happens in the event of inadvertent discharge of wastewater into a sensitive area where all the precautionary measures were in place (J Mungoshi)

This is dealt with on a case-by-case basis in consultation with the DEAT and DWAF.

Sensitive Areas: Suitability to discharge to Offshore Marine Environment [Rule 2.2]

No comments

• Too restrictive. Will result in confrontation between pipeline operators and those proposing Marine Protected Areas. Should be room for co-operative approach. (B Pfaff)

Ensure synergy with the "particularly sensitive sea areas" (PSSA) proposal 70 IMO. (D Nel)

The Ground rule currently refers to existing MPA under the MLRA. A comment will be added to request a cooperative approach between operators and the DEAT where proposed MPA's potentially overlap with the footprint of existing discharges.

Environmental Quality Objectives: Marine environment [Rule 3.1]

• Control based vs effect based? Are local coastal areas viewed as specific/unique or is this issue generalised in terms of entire coastline? (G Branston)

The SAWQ guidelines are effect based, i.e. target values specify the levels that should be achieved in the receiving environment to support a specific use sustainably. Where target values are site-specific (e.g. nutrients), the guidelines are narrative, i.e. local knowledge and understanding need to be collected to derive those.

• Chemical bio-availability issues? (G Branston)

Based on the Pollution Prevention principle, substances that can bio-accumulate should not be discharged. Such substances should be listed, for example as either List I and II substances (see 'Guidance on Implementation')

 Ignores potential effects of deposition sites in far-field. Approach may not be fully precautionary. (R Carter)

This issue is addressed in the text, but this will be highlighted more prominently as part of a specific Ground Rule in the final version.

Environmental Quality Objectives: Estuaries [Rule 3.2]

 All sections of the NWA apply, but so does the MLRA (to estuaries), and so will the Coastal Bill. (A Boyd)

Agreed, this is more explicitly dealt with in Appendix B where the legislative framework is discussed in more detail.

Environmental Quality Objectives: Mixing zone [Rule 3.3]

 Initial mixing zone to be quantified for each discharge – as part of practical procedures? (W Kloppers)

Yes, the concept of the mixing zone will be dealt with more explicitly as part of the 'Guidance on Implementation'.

Urban/Municipal Wastewater: General

• Existing discharges: Apply Principle 6 and create system for public to participate (J Veldsman)

Existing licence stakeholder involvement in environment evaluation (J Koekemoer)

This will be recommended discussed as part of the Administrative procedures for discharges (including existing lawful water uses).

• Concern about an EIA being done for an urban waste/sewage outfall, then being incrementally used for industrial wastewater, without new EIA. (A Boyd)

A licence is issued based on a specific effluent volume and composition. If this changes the dischargers legally needs to re-apply. The discharge is licensed and the operator of the outfall needs to ensure that the quality of the discharge meets the set limits.

• Issue of sludge discharge needs assessment and policy (R Carter)

Where an effluent receives preliminary treatment, sludge is not yet separated from the effluent and thus discharged according to the discharge standards prescribed in the licence. In instances where the receiving environment can absorb such inputs, sludge disposal is essentially taken care of. However, where effluents receive primary (partly separated) or higher treatment, sludge is separated from the effluent and needs to be dealt with separately. Sludge removed from the effluent during primary or higher treatment must be disposed of on land according to the minimum requirements for waste disposal.

• Will existing discharge require EIA for licence application? (R Carter)

Existing discharges applying for a licence will not require a full EIA but at least an indication of the environmental impact (monitoring results) and a plan on how to improve the discharge quality and reduce the volumes of fresh water discharged. However if the discharge will be increased or the quality altered, an EIA may be required. All licences will be subject to a 5 yearly review period which may require additional studies to be undertaken.

• WW and industrial WW discharges: Combination provides vector for contaminants into food/web/ecology. Should they be prohibited? (R Carter)

The synergistic effects must be addressed as part of th impact assessment studies(refer to Ground Rule 5.2)

• Need to distinguish between raw and treated wastewater. (K Fawcett)

The policy distinguishes between levels of treatment, e.g. preliminary, primary, secondary and tertiary treatment. Because the receiving environment determines the objectives it implies that any effluent needs to be treated prior to discharge until it meets those requirements (i.e. Environmental Quality Objectives)

• Urban/municipal wastewater can contain large proportion of industrial waste. (L Gravelet-Blondin)

Agreed, but the Ground Rules state that where WWTW receive industrial effluents, the Ground Rules pertaining to industrial discharges also apply.

Urban/Municipal Wastewater: Master Plan [Rule 4.1]

• Master Plan on water supply and sanitation versus water services development plans. (M Hinsch)

The 'Master Plan' actually refers to an extension of the water services development plans to include wastewater discharges, rather than reinventing the wheel. The text will be amended accordingly to eliminate misconception.

Sub-Series No. MS 13.4

Urban/Municipal Wastewater: EIA Requirements [Rule 4.2]

• The EIA process is described by DEAT legislation. Is this legislation sufficiently comprehensive and workable for the operational objectives? (A Boyd)

Although this operational policy is underpinned by the broad EIA philosophy and process, the process to be followed as part of this operational policy will be addressed more comprehensively as part of the 'Guidance on Implementation'.

• Discharge to sea will probably never be preferred option environmentally but may be financially only option. (P B King)

Statement – no reply required

• Who decides on the preferred route? Economics versus ecology (T Aab)

Although processes like the EIA process (and the more comprehensive procedures provided as part of this policy) provides the information on which to base such a decision, it is ultimately the responsible Department's decision.

• Upgrade EIA Reg. NB! (No author)

This is not part of the brief of this project. This needs to be taken up wit the DEAT.

Urban/Municipal Wastewater: Collecting Systems [Rule 4.3]

- This statement is contradictory to the department's policy regarding services- (this policy) Prescribing a higher level of service (M Hinsch)
- This statement should rather be linked to 'groundwater zoning/protection' and not to marine necessarily (need to discuss this with you) (M Hinsch)
- RDP standards dictate VIP's for communities as minimum requirement! Who funds the upgrade cost? (J Koekemoer)
- Apart from providing a number for population, the population density should be considered as well as other factors. (H Karodia)
- Reference to estuary standards should be treated with caution even an affluent country like UK has problems with compliance. (Derek Vorster)
- This is good to strive for but should it be a "ground rule"? (G McConkey)
- VIPS and RPP: We are not EC. (L Gravelet-Blondin)
- EC directives too strict for SA environment! (Economic/Social, etc.) (M Hinsch)
- Too prescriptive: Alternatives to water-borne sewage must be listed and promoted. (A Connell)
- Too prescriptive: Seepage risk? Soil type? Topography, etc. (A Connell)
- Does the "collecting system" include stormwater? (Thorston Aab)
- Clarification: How do you define "coastal community"? (M Hinsch)
- Also based on density, e.g. units/ha of erf size. (Wilna Kloppers)
- Septic tanks, VIPs are a viable sewage disposal system. (Bill Pfaff)
This is an operational policy stipulating the basic principles and ground rules that will apply in the event of a wastewater discharge to the marine environment being considered, as well as to existing operations. Any land-based activity associated with such discharges that are regulated by other policies such as the National Sanitation Policy or the Source Management Policy will be subject to the principles and ground rules of those policies.

As a result is was decided that this operational policy will not be prescriptive on land-based activities associated with marine disposal, e.g. criteria for collecting systems. Reference will be made to the relevant policies, where appropriate.

• What is a "coastal area"? (Bill Pfaff)

A definition of 'coastal area' will be included in the Glossary of Terms.

Urban/Municipal Wastewater: Treatment Requirements [Rule 4.4]

- All reticulation WW systems need at least preliminary treatment, no matter how small. (A Connell)
- Impact of Hout Bay outfall minimal yet, guideline says need primary treatment. If no impact, why upgrade? (P B King)

An upgrade will be required when an impact is shown upon review, however, the long term goal of this policy is to become in line with international trends.

- Surf zone discharges of WWTW and treatments, i.e. 1° or 2° required. (D Airey)
- Pre/Primary treatment requirement to be based on SEA/EIA (e.g. dynamics of receiving environment and likely risk of adverse impacts). (W Kloppers)
- Apart from providing a number for population, the population density should be considered as well as other factors. (H Karodia)

Land-based activities such as sanitation services are governed by specific policies. This policy is considered to be complimentary to those and reference in this policy to issues covered under sanitation services policies will be aligned in the final version.

- Why? Is not always a problem We are not EC. (L Gravelet-Blondin)
- Why so prescriptive if E.Q. objectives, etc. can be shown to be met. (B Pfaff)

For the above, the general feeling is that the Ground Rules should not be prescriptive re treatment level of municipal wastewater (except that preliminary treatment should be the minimum requirement), but rather that the EQO dictate the level of treatment. It is, however, government policy (White Paper on a National water Policy for SA, 1997) to strengthen source controls with the final aim of getting as close as possible to a situation in which there is no discharge of pollutants to the environment. In light of this policy statement, DWAF can make recommendations with regard to the level of treatment required for discharges to the sea depending on the outcome of the EIA.

Sub-Series No. MS 13.4

Urban/Municipal Wastewater: Industrial inputs [Rule 4.5]

• Will certain pre-treatment be permitted? That is, will practical procedures cover different levels of permissible screening? Course → fine? (A Carter)

Pre-treatment options of municipal/urban wastewater will be discussed in the 'Guidance on Implementation'.

Urban/Municipal Wastewater: Waste Discharge Charge [Rule 4.6]

- 4.6 versus 5.4 'may' or 'will' be subject to Polluter Pays Principle? (G Branston)
- Change from 'may' to 'shall/must' (enforceable) (No author)

All references to the Waste Discharge Charge system should be 'may' at this stage because it will not yet be operational by May 2004 (when this particular operational policy is completed).

 Will increase cost to residents – responsible use of outfalls for domestic effluent is economical option. What is purpose of introducing charge? (B Pfaff)

It is government policy that "all significant use will be charged for, regardless of where it occurs, and including the use of water for effluent disposal" in order " to achieve optimum, long term, environmentally sustainable social and economic benefit for society from their use". The WDCS is therefore both an incentive to reduce waste discharged and a deterrent not to pollute.

• A local authority could have no funds to upgrade yet has to pay discharge charge – will there be national funds available for upgrades? (P B King)

Funds generated by the Waste Discharge Charge could be used by CMAs to subsidise upgrades.

Industrial Wastewater: General Comments

• Concern about an EIA being done for an urban waste/sewage outfall, then being incrementally used for industrial wastewater, without new EIA. (A Boyd)

A licence is issued based on a specific effluent volume and composition. If this changes the dischargers legally needs to re-apply.

• Will existing discharges require EIA for licence application? (R Carter)

If the discharge volume and composition remains the same, then not, but otherwise, yes. Other studies may however be required on an individual basis.

• WW and industrial WW discharges: Combination provides vector for contaminants into food/web/ecology. Should they be prohibited? (R Carter)

The synergistic effects must be addressed as part of the impact assessment studies (refer to Ground Rule 5.2)

• Financiers and economists must set and vet the levels of charges to encourage less pollution. (J Veldsman)

Statement – no reply required

• If your permit to discharge has expired and your licence application has been submitted, are you still regarded as a lawful water user? (F Hickley)

Yes, you are still within your lawful rights if your discharge is in compliance with the conditions of the expired permit on condition that the application was submitted timeously.

• Does the disposal of industrial WW through the groundwater system pose to the coastal areas constitute a marine outfall? (J Mungoshi)

No, this will be treated as a diffuse source of pollution, i.e. it will be treated similar to storm water. Therefore, if the disposal of waste through groundwater affects EQO in the marine environment, the responsible person should considered treatment or cleaner technologies.

Industrial Wastewater: EIA Requirements [Rule 5.1]

• What happens to a licence application, already submitted before policy initiation/implementation which did not have an EIA done and who may do an EIA? (F Hickley)

A licence application submitted will be treated as any application and if there is information lacking, additional studies may be required. If the results of an EIA become available before the finalisation of the licence, those results should be made available to DWAF for evaluation of the licence conditions. This draft policy will be applied to all new licence application received.

According to the EIA regulations EIA's can only be undertaken by independent consultants.

• Discharge to sea will probably never be preferred option environmentally but may be financially only option. (P B King)

Statement – no reply required

• The EIA process is described by DEAT legislation. Is this legislation sufficiently comprehensive and workable for the operational objectives? (A Boyd)

Although this operational policy is underpinned by the broad EIA philosophy and process, the process to be followed as part of this operational policy will be addressed more comprehensively as part of the 'Guidance on Implementation'.

Industrial Wastewater: Characterisation of waste stream [Rule 5.2]

• "All substances" – may be difficult to predict/identify all components (and carry out testing). Can this not be based on List I / II substances as mentioned? (J St Leger)

Although List I and II will cover a large fraction of such substances and could be used as a reference framework, it will still be the responsibility of the industry to identify harmful substances even if not listed (i.e. difficult to make List I and II exhaustive).

• WWTW authority must be given teeth to force industry to supply info. (D Vorster)

This is one of the Ground Rules and should therefore be prerequisite for licensing.

 Listing all substances in WW not possible, many industries use, e.g. compound X and do not know ingredients. (P B King)

This should not be used as an excuse. If an industry cannot identify constituents in its waste stream, (i.e. anticipate impact on the receiving environment) it should not be allowed to dispose of effluent in any manner.

Industrial Wastewater: Pre-treatment prior to discharge to WWTW [Rule 5.3]

• 'Local authority to ensure compliance' - Who will check, finance this? (A Boyd)

It is the local authority that has to ensure compliance with their own by-laws etc. that rule this. Local authorities also have to find their own funding mechanisms. It could be required that records be kept by local authorities should DWAF want to inspect.

• Who decides on what pre-treatment is required for industrial discharges to WWTW? (P B King)

Ultimately the EQO of the receiving marine environment (which the WWTW needs to be adhered to), as well as operational parameters of the facility dictates the level of treatment required.

Industrial Wastewater: Waste discharge charge [Rule 5.4]

- RWQO for a water resource (f/w) very different to marine. Therefore different set of charges is necessary. (D Airey)
- Any thoughts as to what the charge will be made up? (F Hickley)
- Will there be a charge anyway irrespective of "quality" of discharge? (F Hickley)
- Polluter pays principle OK but needs to be phased as many effluent generating industries earn foreign exchange for SA. Must remain internationally competitive. (D Vorster)
- Basis or criteria to be used for waste discharge charge? (S Sokupa)
- Is the disposal of industrial wastewater through the groundwater system subject to a waste discharge charge? (J Mungoshi)
- Has incentive based structure been considered to stimulate reductions? Puts onus (and cost) on polluter to prove reduction. (D Nel)

The WDCS is in phase 3 of development. All the above issues still needs to be considered and, therefore, cannot be answered in this policy. All those interested should become involved in the project. Consult the DWAF website for further detail on the project.

• In terms of shipping impacts consideration to be given to issues other than oil and ship garbage/waste, i.e., to include dry dock operations. (G Branston)

Runoff from dry dock operations can be classified as water containing waste originating from an industrial area (Section 21 of the NWA) in which case it will require a licence to discharge and fall within this operational policy. The National Ports authority is responsible for the management of activities within the ports. Any activity that constitutes a water use in terms of Section 21 of the NWA needs a licence and is subject to this and other DWAF policies.

Industrial Wastewater: Controlled/prohibited substances [Rule 5.5 & 5.6]

 Do not rely on overseas information – use local for local discharge areas. (Buy South African!!) (D Airey)

Globalisation is a reality, therefore even though South Africa may not always be able to afford 1st world approaches, we should strive for higher standards, i.e. 'stretching but not unrealistic'. Also, the country does export to the EC and these stricter 1st world requirements may become relevant, e.g. for mariculture activities.

Discharge Practice and Predictions [Rules 6.1 – 6.3]

• This should not be too prescriptive due to diversity of conditions in SA. (D Vorster)

This will be discussed in greater detail as part of the 'Guidance on Implementation', showing how sitespecific issues should be taken into account.

• Are there adequate specific rules for nuclear waste? (J Veldsman)

No, but this will be incorporated in a specific Ground Rule under Industrial Wastewater. This will refer to specific nuclear material management legislation.

• How does one monitor herbicide and pesticide run-off? (J Veldsman)

Analytical techniques to monitor these substances in the environment are available. Because these are extremely expensive, it is seldom part of routine long-term monitoring programmes. These are most cost-effectively managed by controlling at source, e.g. effective dosing or restriction/limits on use controlled by product protocols and legislation (Eurogap, IPW, IPF, etc.)

• Will discharge practice and procedures cover emergency preparedness and response? Where will this fit in if at all? (A Carter)

A Ground Rule will be added in this regard, i.e. an authority or industry discharging wastewater to the marine environment, either to an estuary, surf zone or offshore marine environment, will have a contingency plan in place detailing emergency procedures and response. This will also form a requirement for the application of a licence.

• Impacts of shipping activities to include stakeholders, including ship repair and dry dock operations – stormwater? Pipeline? Opening sluice gates? Define? Permiting. (G Branston)

Runoff from dry dock operations can be classified as water containing waste originating from an industrial area (Section 21 of the NWA) in which case it will require a licence to discharge and fall within this operational policy. The National Ports authority is responsible for the management of activities within the ports. Any activity that constitutes a water use in terms of Section 21 of the NWA needs a licence and is subject to this and other DWAF policies.

Monitoring, Assessment and Reporting: General Comments

• 'Duplication' of monitoring costs, e.g. Saldanha Bay Water Quality Trust monitoring versus company monitoring versus polluter pays principle. Opportunity to streamline? (F Hickley)

The operational policy will provide recommendations on the design and implementation of monitoring programmes associated with disposal of wastewater to the marine environment. It will be the responsibility of individual dischargers to develop their individual monitoring programmes in consultation with DWAF and relevant experts. In order to prevent unnecessary duplication DWAF encourages dischargers within a common area to rationalise their monitoring efforts. This could be achieved through catchment and sea outfall forums, for example the Saldanha Bay Water Quality Forum.

- State monitoring alone will be useless (J Veldsman)
- Transparency of contraventions and prosecutions required. (J Veldsman)
- Public participation. (J Veldsman)

The operational policy will include a component on auditing and reporting as part of the management framework for a marine disposal facility, which will address communication to the wider community.

• Will monitoring, etc. cover scope of Environmental Management Plans (EMP) and provide practical procedures? (A Carter)

The operational policy will provide guidelines in this regard as far as it pertains to the discharge practice to the marine environment. It will however, not address the EMP in its entirety.

Monitoring, Assessment and Reporting: Monitoring Programmes [Rule 7.1]

• No comments.

Monitoring, Assessment and Reporting: Monitoring of Inputs to WWTW [Rule 7.2]

No comments

Monitoring, Assessment and Reporting: Reporting format [Rule 7.3]

• Regular assessments: In addition to monthly monitoring of industrial effluent already being submitted, how often and define extent of performance assessments required. (F Hickley)

Guidelines in this regard will be provided as part of the 'Guidance on Implementation', but this needs to be defined site specifically depending on the variability of impact expected.

Monitoring, Assessment and Reporting: Mitigation [Rule 7.4]

No comments

Urban Stormwater [Rule 8.1]

- Clarity that stormwater is excluded (B Pfaff)
- Stormwater policy problem (L Gravelet-Blondin)
- Perhaps we need to consider collection of stormwater low flows or % of run-off where stormwater enters sensitive areas. (G McConkey)

Stormwater is not completely excluded from the operational policy and this will be explained below:

Stormwater runoff is very difficult to manage at end-of-pipe and should therefore be treated at source. Although this policy states that: 'Urban stormwater discharged to the marine environment should not have any negative impact on the EQO of the receiving environment', it does not provide <u>specification on</u> <u>treatment-at-source or land-based treatment</u> which is considered to be generic and not just specific to marine disposal of stormwater runoff.

However, current input from stormwater runoff MUST be taken into account when conducting the scientific and engineering assessments for either an existing or new marine disposal facility. This concept will be added as a Ground Rule. <u>Means of quantifying the input from stormwater runoff</u> is also not addressed in this operational policy, but reference will be provided on where such guidelines can be obtained.

 Include sewage overflows Generically ----, i.e. "effect of stormwater on vulnerable operating facilities". (A Boyd)

Contingency plans for all WWTW (including marine disposal) should address sewage overflow issues, this will be discussed in detail in the 'Guidance on Implementation'.

• Define/distinguish: detrimental impact / negative impact / detrimental negative impact. (F Hickley)

Propose that we standardise on negative impact (using the EIA terminology).

APPENDIX F

RESPONSE TO COMMENTS FROM KEY STAKEHOLDER WORKSHOP (10 FEBRUARY 2004, STELLENBOSCH)

PURPOSE OF THIS WORKSHOP

To obtain feed-back and input from key stakeholders on the draft Operational Policy for the treatment and disposal of land-derived wastewater to the marine environment of South Africa

OVERVIEW OF KEY POINTS OF DISCUSSION

The feed-back provided at the workshop was based on Draft 2 (Version 2) – January 2004 of the Document.

The Department of Water Affairs and Forestry's strategic view on the treatment and disposal of landderived wastewater to the marine environment is as follows:

Responsible disposal of land-derived water containing waste (also referred to as wastewater) to the marine environment is an option in the South African context due to the geographical location of the subcontinent and the generally favourable, dynamic physical conditions along the coastline. Site specific conditions, determined for example by geology, tides, currents and waves are however limiting factors that must be taken into account.

However:

- Because South Africa is a water scarce country, the loss of freshwater to the marine environment must be limited in terms of water conservation and demand management strategies.
- According to the White Paper on a National Water Policy for South Africa 'efforts to introduce source control will be strengthened, through permits and standards and through changes in technologies and land-use, with the final aim of getting as close as possible to a situation in which there is no discharge of pollutants into our water (including the marine environment)'.
- Evaluation of the treatment and disposal of land-derived wastewater to the marine environment will be undertaken in accordance with the Basic Principles (Section 3 of this document), Ground Rules (Section 4) and Management Framework (Section 5) stipulated in this operational policy. These underpin, for example the principles of integrated environmental management (IEM).

The structure of this operational policy for treatment and disposal of land-derived wastewater to the marine environment of South Africa is illustrated below:



The Goal of this operational policy fits within the overall water quality management goal for South Africa, as presented in the National Water Quality Management Framework (RSA DWAF, 2002a), namely:

Achieving water quality that is 'fit for use' and maintaining aquatic ecosystem health on a sustainable basis by protection of the country's water resources (including marine waters), in a manner allowing justifiable social and economic development.

Basic Principles (Section 3) provide the broad reference framework or direction within which to develop ground rules on the treatment and disposal practices of land-derived wastewater to the marine environment, as well as the management thereof. The basic principles were distilled from the broader international and national legislative context to give international and national credibility to the policy.

Ground Rules (Section 4), derived within the broader reference framework of the Basic Principles, provide more specific rules that will be applied by Government when, for example considering new licence applications or review existing licences to dispose of land-derived wastewater to the marine environment.

The Management Framework (Section 5) provides the generic and structured approach within which the management and control of disposal of land-derived wastewater to the marine environment of South Africa needs to be conducted. Such a framework typically consists of the following components, (discussed in more detail in Section 5):



Cross-cutting to the above-mentioned, are the specific Administrative Procedures and Institutional Responsibilities required for successful implementation of the operational policy. These are discussed in Section 6, using the Water Use Authorisation Process as the reference framework. Alignment with, for example the Environmental Impact Assessment Regulations promulgated under Sections 21, 22 and 26 of the Environmental Conservation Act, is also illustrated.

Sub-Series No. MS 13.4

RESPONSE TO STAKEHOLDER COMMENTS

GENERAL COMMENTS

- How strict will DWAF apply this? We will apply the NWA first, the NWR stat, secondly, ??? thereafter this doc. Get it right! (P Herbst)
- Reference must be made to the NWRS which states that a lot of water is wasted through discharges, including sea outfall pipelines. The documents, from goal, basic principles, ground rules and management framework then jump and only addresses sea outfall pipelines and, for example the engineering designs thereof, instead of addressing in a systematic manner the long term strategy which is then to eventually phase it out (for example), including goals, basic principles, ground rules and management framework for dealing with the short and long term (P Herbst).

The operational policy for the treatment and disposal of wastewater to the marine environment falls within the latter category, i.e. Best Practice Guidelines. It is therefore subsidiary to overarching policies and strategies as illustrated below (refer to Document MS 13.2):



The aim of this operational policy document is rather to provide 'down-to-the-ground' rules and practical guidance on how to ensure that such criteria will be adhered to when <u>disposing of land-derived water</u> <u>containing waste</u> to the marine environment (i.e. through sea outfall pipelines) where these are selected as the Best Practical Environmental Option (based on the DWAF hierarchy of decision making).

 Clarify/measure this operational policy against legal requirements (test the concepts in this document against legal requirements) (P Herbst).

As stated above, this <u>operational policy</u> falls in the category of Best Practice Guidelines, i.e. at this stage it is not a statutory obligation (unless at a later stage it is incorporated into, e.g. regulations). However, the principles and ground rules take into account specific requirements stipulated in the overarching legislation, e.g. the National Water Act, Water Services Act, as well as other national acts and policies (i.e. White Papers). Relevant international conventions and treaties were also taken into account. An overview on this legislative context is provided in Appendix B (Document MS 13.4). Sub-Series No. MS 13.4

• <u>Eliminate</u> "wastewater" from the title and text – replace with "effluent" (or other similar?) (S Lane)

The Steering Committee agreed that the more suitable term would be 'water containing waste'. The term 'water containing waste' will therefore be used in the title. However, for ease of reading and for consistency in terminology used elsewhere in water resource management documentation of the DWAF, the term 'wastewater' will be used in the text. The glossary of terms will be revised to reflect that for the purposes of this policy 'water containing waste' is equivalent to 'wastewater'.

- Receiving water quality objectives <u>cannot</u> be the only primary driver, as it's "end of pipe". How about goals of what you want to do with the 'inputs' to the pipe, e.g. conserve water, remove pollution, recycle sludge, etc whether its 'stormwater', indirect or WWTW (S Lane)
- Utopia is not achieved in a day! Is development towards the goal of water conservation and pollution reduction an acceptable strategy for both current and future outfalls? If the caveats of DWAF strategic view are accepted (i.e. conserve fresh water and control pollution at source) under what circumstances will <u>marine</u> discharges be allowed? (R Carter)
- I am very concerned that once a pipeline is licensed, there will be no incentive to reduce waste loads and improve performance. (How does the policy promote <u>continual</u> improvement in performance?, i.e. pipeline should not be seen as a <u>final</u> solution. Some DWAF agencies may be more progressive than others, by setting future EQO's, thus promoting continual improvement. Other less progressive DWAF agencies may NOT require authorities to improve performance. This difference in agency progressiveness is a reality. (A Carter)

Referring to Principle 1, the hierarchy of decision-making of the DWAF will always apply in the decisionmaking process, i.e.:

- 1) <u>Pollution Prevention</u>: Prevent waste production and pollution wherever possible, particularly
- 2) <u>Minimisation of pollution and waste at source</u>: Minimise unavoidable waste through:
 - Recycling
 - Detoxification
 - Neutralisation
 - Treatment of waste streams
 - Cleaner technologies and best management practices

3) <u>Responsible disposal</u> according to precautionary approach:

- Apply waste discharge standards as minimum requirement
- Minimum requirements of DWAF for solid waste disposal also apply

The receiving water quality objectives will become a primary driver at level 3, i.e. where responsible disposal has been identified as the 'Best Practical Environmental Option'.

• Co governance is very important – in addition to consulting Justice & Police – also Health, Environment, Industry, Agriculture, etc. (as appropriate) (S Lane)

Statement, no reply required

 Sustainability criteria should be used – ecology, socio-economic, financial, governance, and equity and environmental justice (S Lane)

The overarching policies (e.g. White Papers, NWRS, Water Resource and Source Strategies), that underpin this 'Best Practice Guideline', support such sustainability criteria (see above – also refer to Appendix B in Document Ms 13.4). Such criteria are therefore inherently part of this operational policy even if it is not repeated explicitly. The aim of this operational policy document is rather to provide 'down-to-the-ground' rules and practical guidance on how to ensure that such criteria will be adhered to when disposing of landderived water containing waste to the marine environment. • Beware of the "footprint" concept – it is important that 'far field' can consider changes caused at a global level – including cumulative (S Lane)

To prevent confusion the term 'foot print' will be taken out of the documentation. To describe this concept the near and far field will be used of which the meanings are explained in the Glossary of Terms.

 Overall concern – this operational policy in places tries to 'define' things too precisely i.e. limits peoples thinking about solving problems (perhaps). In my opinion what needs to be encouraged is 'cross cutting' issues and cumulative efforts, and inclusiveness in goal setting, etc. (S Lane)

This is an operational policy (i.e. Best Practice Guidelines) that, in our opinion requires more 'defining of things', than for example would be the case of a policy (i.e. White Paper) or strategy (NWRS).

 Conditions need to be written in policy for de-commissioning of pipelines when no longer required (D Dold)

Ground rules will be amended to include this.

 A charge needs to be levied on an annual basis on all pipeline owners and NPA to fund a synergistic and cumulative impact on an ongoing basis. We don't understand enough of what is happening in the marine environment which might have long-term effects on the environment and the tourist industry (D Dold).

Any land-derived wastewater discharge to the marine environment may be subject to a waste discharge charge, through the Waste Discharge Charge System currently being developed under section 56 of the National Water Act.

• In the light of DWAF's limited power to prosecute local authorities can we perhaps recommend in this document that the pipeline be operated by a 'service provider', i.e. a private company rather than the local authority (M Hinsch).

According to the NWA Section 19, the owner of land will ultimately be responsible in cases of pollution and therefore it will not serve much purpose to have an independent operator.

- Ten points on how to be a responsible funder (e.g. DBSA) (J Clarke):
 - Legal compliance plus EA best practice.
 - Comply with environmental sustainability criteria.
 - Follow guideline docs (e.g. Johan Koekemoer's point about cross subsidisation) (name them).
 - Ensure synergistic cumulative impact assessments (the principle of subsidiary applies).
 - Quality control re: EIA's, EMP's, EMS's. All funders have a qualified environmentalist appraise quality of these processes and their subsistence.
 - Funder must monitor project implementation and operations.
 - Must have demonstrated public acceptance for the project.

This operational policy provides Best Practice Guidelines where the disposal of land-derived wastewater to the marine environment is considered. However, the disposal of wastewater is but one component of the activity or development under consideration. For example, a WWTW or industry has a vast array of landbased activities also need to be taken into account. 'How to be a responsible funder' is therefore much more generic and not specific to the disposal of the wastewater. This policy can, however, provide valuable input towards developing such criteria.

• Who is the lead agent? Offshore resource? (J Bell)

The DWAF is the lead agent in controlling the disposal of land-derived wastewater to the marine environment (under Section 21 of the NWA 1998). However, the DWAF are required to perform this role in consultation with other related Departments, e.g. DEAT, DME, DoH, etc.

• What <u>makes</u> other regulatory stakeholder participate? (J Bell)

There is no means to force participation. At best deadlines for comments can be given with the provision that if no comments are received by the deadline, consent is assumed.

• Who pays initially, until pollution and impacts defined? Scoping/SEA fund? (J Bell)

For a new licence application the applicant is responsible to pay for any assessment studies. In the case of existing lawful uses, where two or more developments/activities may be responsible for pollution a funding mechanism need to be decided upon at the local management forum (as proposed in Ground Rule 1).

 Permit/Licence limits – not comprehensive – don't include <u>ALL</u> hazardous constituents, e.g. list 1 & 2 substances – how to address? No requirement on emitters to do comprehensive constituent scan (J Bell)

Ground Rule 19 states: 'An industry, discharging to a wastewater treatment works (WWTW) or directly to the marine environment (or whether applying for a licence to do so) will be required to provide a detailed description of the waste stream both in terms of volume (quantity) and quality (i.e. listing all substances present and their concentrations and loads). Where industries discharge into WWTW, the water services provider is responsible to obtain this information from the industry.'

• ECO re *E. coli* seem to be based on current or historical direct contact recreation areas. 'Wet bikes', 'kite surfing', etc. are expanding these. What are implications for existing and future outfalls? (R Carter)

In applying the beneficial use concept, areas used, for example for wet bikes and kite surfing also need to be taken into account. The definition of direct contact recreation (as defined in the South African Water Quality Guidelines for Coastal Marine Waters) does accommodate the inclusion of such activities.

- Are you including agricultural runoff (sediment, heavy metals, and pesticides) in any stormwater criteria? (license for agricultural runoff.) Even the non-point source pinpoint is further up the estuary it has a major impact especially on temporary open estuaries! (S Bollmohr)
- The vision being to phase out/eliminate all pipelines in the future is one matter and can be described in the goal, however, what about diffuse pollution quantity/quality?? (M Hinsch)

Agricultural runoff, similar to urban stormwater runoff, is a diffuse source of pollution which is very difficult to manage and control at 'end-of-pipe' or 'point-of-entry'. These are best managed and control at the source, i.e. where the pollution originate. This operational policy, therefore recommends that operational policies and procedures for the management and control of urban stormwater (and for that matter agricultural runoff) be set at catchment level, as such policies are not specific to runoff to the marine environment, but should apply to runoff to any watercourse, including rivers, groundwater and wetlands. There are already developments underway in SA to set operational policy for control of pollution of water resources from agricultural activities urban storm water runoff.

• Use of the term "treatment" in the heading is still problematic. Policy is still about disposal. The environmental quality objectives in the policy cover the term "treatment" adequately. The EIA will also cover this (H Karodia).

The only reference to 'treatment' is the minimum treatment requirements in the case of WWTW. This policy does not deal with technical information on land-based 'treatment' designs prior to discharge. In the case of industrial wastewater this is not addressed at all (outside the scope of this project). We therefore propose that 'treatment' be taken out of the title.

 Under heading "Structure of this Ops Policy" – <u>suggest</u> that the diagram is placed first – it will immediately give the overview (H Karodia).

Will add the diagram of the management framework upfront.

• Approval page: my opinion is that this page is not required. All that is required that the forward is signed by the Minister/D-G. Suggestion: The list of "Key Stakeholder Committee consists of rep. from: "should have headings, e.g. NGOs, Industry, Gov., etc. (H Karodia)

It is standard WQM practise to have this kind of document approved

Suggestion: "Glossary of Terms" – where a term is used to describe another term, the former should be in bold in order to provide a reference, e.g. the term "initial dilution" is used in the description of "Far Field" so "initial dilution" should be in bold. (H Karodia)

This will be done in the final version.

• Appendix C. An analysis would be more useful under the various headings rather than a countryby-country perspective. (H Karodia)

Information can either be sorted per subject or per geographical region, as this was in the Appendix and not part of the main document it was decided to keep as is (time and budgetary constraints)

 <u>Suggestion</u>: Prof C Buckley (UKZN) already has "Waste Trading" directory for solid wastes – propose utilise this directory for liquids (D Airey)

Will take this into account in the recommendation re 'Code of Practice' for specific industries

 <u>References</u>: Implementation Doc MS 13.3. Van Eeden 1982 – discharge to marine environment. <u>No reference to</u>: Eckart Schumann – ed. – Springer-Verslag 1988. Series – chapt on discharges to marine environment (KZN coast). Somewhere in your documents the discharges to marine offshore, surfzone and estuaries are list. You have AECI (not present name) as surf discharge – this changed some years ago (D Airey).

The information of discharges to the marine environment was sourced from most recent available literature (Appendix A in Document MS 13.4). We, however, have requested the regional DWAF offices to review these to reflect the current status. Where input is provided from them, these will be included in the final version.

• <u>Comment</u>: Oceanariums are referred to in the inception report and operation policy documents, but nowhere else. Is this an oversight or deliberately left out (D Airey).

Return flow from oceanariums is an example of seawater used on land and then discharge to sea again. These are classified as industrial discharges. Where such return flow is polluted, the same principles, ground rules etc. apply as would be the case for industrial wastewater discharges. Ocenarium return flow will be added as an activity to consider later documents

• <u>Comment</u>: Implementation of this policy document series may be problematic. What capacity building is taking place in DWAF (and DEAT) to be able to fully implement this policy? (D Airey)

It will be included in the DWAF WQM function capacity building plan and communicated according to their communication strategy.

- Definition of preliminary treatment includes "grit" as > 0,2 mm. Why not 3 mm as is normally accepted (J Koekemoer). Grit
 - inorganic =
 - = not soluble
 - not pollution problem in marine =
 - why worry if it is 3 mm. =

Glossary of Terms: Preliminary Treatment: - "Grit" <0,2 mm? (J Koekemoer)

Sedimentation is the main cause for the hydraulic malfunctioning of a diffuser. Grit (SG > 2,6) with a diameter of 3 mm can almost be classified as gravel. It is very likely that sedimentation in the diffuser will occur during low flow and no flow conditions (e.g. in the case of intermittent discharges). This concept is discussed in more detail in: WATER RESEARCH CENTRE (WRc) (1990) Design guide for marine treatment schemes. Volume I: Introduction, Volume II: Environmental design and data collection, Volume III: Materials, construction and structural design and Volume IV: Operations and maintenance and cost functions. Report No. UM 1009. Swindon, UK (refer to Document MS 13.3).

Surf Zone ... where water depths are less than half the length/height of a wave (J Koekemoer)

'Length' is the right terminology.

Water containing waste, or is reasonably likely to cause negative impact. (Not defined, why not use pollution that is defined.) (J Koekemoer)

Will include a definition of 'negative impact'

WQM MS 13.3: Graphs p 5-76 and p 5-77, no legends - what do lines mean? (J Koekemoer)

Will correct this in the final version

Definition of an estuary: DWAF (Saline =freshwater) versus MLRA tidal influence when open (see Appendix E) (A Boyd)

A revised definition of estuary will be included, i.e.: 'A partially or fully enclosed body of water which is open to the sea permanently or periodically, and within which the sea water can be diluted, to an extent that is measurable, with freshwater drained from land. The upstream boundary of an estuary is the extent of tidal influence.'

Will this policy address groundwater infiltration: Local scale - septic tank seepage from coastal settlements into estuaries/surf zone. Larger scale - aquifers with recharge areas way inland that discharge into the sea = regulations for groundwater guality? Is this adequately addressed in other policies and should it be linked to this? (S Mitchell)

Groundwater seepage, like stormwater is a diffuse source of pollution. Although, in the assessment of wastewater discharge/s to a specific receiving environment inputs from such sources must be taken into account, operational policy for the management and control of groundwater needs to be set at catchment level, as such policies are not specific to runoff to the marine environment, but should apply to runoff to any watercourse, including rivers, groundwater and wetlands. This will be highlighted more clearly in the documentation.

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STRATEGY AND GOAL

- <u>Strategy</u> only SA's <u>open</u>, <u>exposed</u> coast is, generally favourable for discharge (A Boyd)
- Principles and Ground rules should reflect 'goals' one is striving for realistic and best practice and don't get mixed up with technical and legal requirements at this point - Laws change or setting minimum standards (S Lane)
- Strategic view: conservation of water and elimination of pollutants YES, but "adhering to this policy" is not an equivalent principle 1 to 3 (S Lane)
- The goal needs much elaboration in terms of a short, medium and long term vision, strategy, goal, objective, etc. for dealing with "water containing waste" (P Herbst)
- The "point of departure" needs to be clarified in terms of the Water Act of 1956. For that Act all
 "effluent" had to be <u>treated</u> to meet General or Special Standards, including effluent that went to
 sea. The 1956 Act made provision for <u>exemptions</u> (section 21[4]) in terms of treatment and
 subsequent compliance to such standards. This is how sea outfalls came about. The goal must
 link up with this as well as any other/new legal requirements in terms of the NWA of 1998,
 National Water Resource Strategy etc. to deal with the future. The above needs to be <u>developed</u>
 whereafter greater clarity will be provided on the issues, e.g. stormwater, estuaries, general
 effluent standards versus RWQO, etc. (P Herbst)

To address the above, it was agreed at the Steering Committee meeting (11 February 2004) that the PMC will meet with Mr Herbst and Ms Hinsch to discuss the alignment between the strategic view and goals. The outcome will be communicated to the Steering Committee before finalization of the operational policy documentation.

 <u>Definite</u> need for intergovernmental co-ordination – vertical (natl, prov & local) as well as horizontal (DWAF, DEAT, DoH, DTi, etc.). Integrated approach all around, not only for monitoring and assessment (J Bell)

Agreed, this is fully supported in Principle 4: Integrated Assessment Approach.

PRINCIPLES

• Principle 1(4): What does 'assimilate' and 'sustainable' mean? (R Carter)

Assimilate: Ability of the receiving environment take up certain pollutant loads without affecting sustainability.

Sustainability i.t.o. WQM means "Fitness for use by other users and future generations" and the ability to assimilate waste means the ability to receive and process waste to such an extent that the water remains fit for use by its other intended users.

- Principle 2: Why is 'avoided' used and not, e.g. prohibited? Does this infer your flexibility here? (R Carter)
- Principle 2: Should include acknowledgement of cumulative impacts at this point. Otherwise hidden in Ground rule section (P Dowling).
- Principle risk averse: given dynamic, variable nature of estuaries, closing, flooding, etc. this ground rule is very appropriate to them (A Boyd).

Principle will be modified as follows: Activities that potentially pose a high risk to the sustainability of the marine environment or activities where the effect on the marine environment is uncertain or difficult to predict (taking into account cumulative effect) will not be considered.

• Principle 5: Polluter pays. The onus should be on any manufacturing industry to prove that it does not contribute to wastewater going into marine environment. This could be via its products ending up in the wastewater stream (e.g. washing powder, shampoo, abattoirs, fast foods, pharmaceuticals, detergents, motor oil, etc. Each should pay levy to help clean up act, minimise and including usage guidance to consumers (P Dowling).

This is a valid comment that applies to waste disposal to any environment, including land, freshwater sea and atmosphere. Being a generic issue it is not considered appropriate to address the issue in detail as part of this operational policy. This, however, is to an extent covered in the recommendation that a Code of Practice' be developed for specific industries in South Africa (as has been done e.g. for Canada and New Zealand.

Need cross-sectoral goal setting, strategies for implementation (check is "will it work?"). Therefore
add to Principle 6: <u>Start</u> with getting local stakeholders to set goals and priorities for their area.
This also fit into Ground Rule 1 (S Lane)

The Principle will be modified as follows: Transparent stakeholder participation will be required, not only as part of the decision-making process (e.g. Environmental Impact Assessment process and setting of Environmental Quality Objectives), but also through ongoing transparent and open communication on status quo during design, construction and operations. Local management institutions (e.g. pipeline or catchment forums), for example can be used for transparent stakeholder involvement throughout the process from application through to report back on monitoring results.

GROUND RULES

- GR 1: Under "Local Management Institutions". Clarity required differentiate between "role players" and "management institution" with jurisdiction (H Karodia).
- GR 1: "Local management institution" must be driven by DWAF and membership (and financial contribution to in order to fund far field studies) must be compulsory for all pipeline operators via a license condition (B Pfaff)
- GR 1: Who sets up local management forums where they do not exist? (J St Leger)

The GR will be revised as follows: Disposal of land-derived wastewater to the marine environment (offshore, surf zone or estuaries) needs to be managed through a local management institution. These can be existing institutions, such as pipeline forums, water quality committees or catchment forums. Representation needs to include government authorities (i.e. that have the jurisdiction), as well as non-government role players (e.g. industries, users of the marine environment and NGO's).

Where a suitable local management institution has not been established, the lead agent, in this case the DWAF (in particular the regional office or CMA), should facilitate the set up of such an institution, ensuring that the relevant authorities and role players are included.

• GR 3: Under "Note": Last line should read "is very important that the applicant is ..." (H Karodia)

Will correct this in final version.

• Time frame required to force local authorities to up-grade sewerage works so that estuaries are not compromised and artificial breaching needs to be done to clean out the estuary due to high *E. coli* counts (D Dold)

• Will there be a time period within which the existing discharges to estuaries and surf zone be required to comply with? (P Reddy)

The process whereby existing lawful water uses will be aligned with this operational policy will primarily be through the 5-yearly licence review required in terms of the NWA. However, where there is reasonable evidence that existing lawful water uses are impacting on the receiving environment or where there is non-compliance, immediate investigations can be commissioned by the DWAF.

The legal opinion by DWAF legal Services is:

Since permits were issued in terms of the Water Act 1956, no review is legally required unless there is a permit condition allowing amendment of the permit. This will be rectified by an amendment of the National Water Act, 1998. Such an amendment is currently in process.

• Ground rule 6 & 7: Debate about stormwater and estuaries is confused by use of 'treated wastewater' in both ground rule 6 and 7 (and wastewater in Ground rule 11). Needs clarification in the above and throughout the document (B Pfaff)

As discussed at the Key Stakeholder the GR will be more explicit in terms of the type of 'wastewater', i.e. whether it applies to one or all of:

Municipal wastewater (i.e. from a WWTW) Industrial wastewater (i.e. as defined in GR 18) Urban Stormwater (and other diffuse sources such as river runoff and groundwater seepage)

- GR 6: Strong support of concept of "disposal of wastewater to these (estuaries) will not be considered". Re-evaluation will lead to gradual erosion of regulations and degradation of these systems (P Dowling)
- GR 6: "Will therefore not be considered" is too prescriptive. Allowance for responsible (beneficial) (not significantly damaging) discharge needed as financial costs re existing AND future discharge alternatives are considerable. Environment, social and economic considerations required (B Pfaff)
- GR 6: Dynamic zones are open in pristine areas. This could lead to attrition of such natural marine areas (P Dowling)
- GR 6: which applies: No discharge in estuaries (power point presentation) or no <u>new</u> discharges in estuaries (and operation policy measures (oral explanation) are to regulate this ...) (acceptable) "In general", disposal in estuaries will not be considered (written version) (**not** acceptable to DEAT basically means very little). NEW discharges will only be considered under **exceptional** circumstances (to be defined) with the concurrence of DEAT and Dept of Health (possible way forward). Need full Ecological Reserve Determination to meet objectives. (also comes back to definition) where this applies. MLRA protects up to tidal influence.) (A Boyd)
- GR 6: Estuary discharges If secondary treatment achieved and water quality ECO is met <u>and</u> water was abstracted from the catchment/river in the first place why should estuary discharge <u>not</u> be allowed? (R Carter)
- GR 6: I agree with <u>no</u> discharge into estuary, surf zones unless a really powerful sustainable development case for it can be demonstrated (exception to the rule). Same applies – primary treatment for outfalls <u>unless</u> a sustainable development arrangement (fool proof) for a lesser standard can be made. Precautionary principle applied (J Clark)
- How far upstream from an estuary will a discharger be allowed to dispose of water containing waste? (P Reddy)

- GR 6: We need to clarify the "return to source" rule in estuaries. Some are saying "no discharge into estuaries" but what about the return to source. When does this constitute an effluent discharge? Maybe need to make this distinction (A Connell).
- GR 6: Estuary issue must include catchment. Any definition of the physical limits to an estuary cannot ignore the fact that discharges into the catchment end up in the estuary, or pass through it into the sea (A Connell).
- GR 6: Responded in respect of the discussion on discharges to estuaries and the surf zone that the fish processing industry in the Western Cape had long established vested interests in discharging <u>sea</u> water to both estuaries and the surf zone on the basis of receiving water assimilative capacity and could not thus entertain a "blanket ban" on such discharges (W Barnes).
- GR 6: No discharge to estuaries and surf zones. Current ones should be phased out asap (D Dold).
- GR 6: Strong support of concept of "disposal of wastewater to these (estuaries) will not be considered". Re-evaluation will lead to gradual erosion of regs + degradation of these systems (P Dowling).

Taking the above into account the Ground Rule 6 will be rephrased as follows: Estuaries are classified as 'sensitive areas'. Disposal of municipal and industrial wastewater to these systems will therefore not be considered unless in exceptional circumstances where such inflows are required to <u>improve or maintain</u> the resource quality objectives (also taking into account effects of water quantity) or where the ecological functioning has been irreversibly modified to support commercial harbours. In the latter case, the resource quality objectives of other designated beneficial uses of the area, however, must be met as a minimum.

Municipal and industrial wastewater discharges to estuaries, that were classified as existing lawful water uses as on 31 May 2004, will be re-evaluated during the 5-yearly licence review process. Revisions can also be motivated on grounds of negative impact to environment and non-compliance to licence conditions (Pollution Prevention and waste minimisation; Risk-aversion and Precautionary approach).

• GR 6: Add point under estuaries – Estuaries are by nature low lying and very subject to episodic events such as flooding, which can have a short-term disastrous effect on the release of pollutants into a system (in a manner which cause ecological damage). Equally important the floods can destroy the wastewater processing infra-structure leading to long-term non-compliance with requirements. Thus, in order to be risk adverse new processing plants should not be in estuaries at all.

Potentially negative impact of flooding also holds for discharges into rivers and is therefore not a specific issue with regard to estuaries (although it is a very important aspect to take into account in the design and construction of WWTW along such watercourses). As a result general engineering practice, and associated guidelines for planning and development of the land-based structures of a WWTW is subjected to return periods of natural events, e.g. the 1:100 year flood line.

• GR 7: What about "unofficial" discharge via seepage, leakages, groundwater, wetlands, etc. (P Dowling)

• GR 7: Freshwater >40 Mt/d over one day/week/year not to surfzone (J Koekemoer)

ww/freshwater not to estuaries. Coegha [East London IDZ (250 ha)] 4 000 ha? Say 50% runoff i.e. 50 mm rain/day¹/₂(4 000 x 10 000 x 0,05) = 2 000 x 500 m³/d = 100 000 M³/d

= 100 M{/d.

<u>Question</u>: Must they treat to secondary, disinfect and discharge offshore? (J Koekemoer)

Taking the above into account, Ground Rule 7 will be rephrased as follows: The surf zone is classified as a 'sensitive area'. Disposal of municipal and industrial wastewater to the surf zone should therefore be avoided. Where legitimate motivation can be provided (e.g. in cases where seawater used on land is returned to source), the environmental quality objectives for the study area must be met as a minimum. This includes objectives pertaining to alteration of the natural salinity regime (in the case of freshwater discharges) and aesthetic impacts associated with the visibility of the discharge practice on land.

Municipal and industrial wastewater discharges to the surf zone, that were classified as existing lawful water uses as on 31 May 2004, will be re-evaluated during the 5-yearly licence review process. Revisions can also be motivated on grounds of negative impact to environment and non-compliance to licence conditions (Pollution Prevention and waste minimisation; Risk-aversion and Precautionary approach).

 GR 8: Assessment of marine environment for assimilating wastewater will always use a baseline evaluation of existing state – not ideal. So environment could gradually deteriorate with additional use (P Dowling)

Where responsible disposal of municipal or industrial wastewater to the marine environment has been identified as a potential option (referring to the DWAF's hierarchy of decision), the receiving water quality objectives (RWQO) approach (as one of the basic principle of this operational policy) has to be followed, i.e. the baseline is not set as the benchmark, but rather the requirements for sustaining the natural ecosystem as well as other designated beneficial uses. In the case of existing discharges, the RWQO approach may even result in these having to implement rehabilitation measures (i.e. 'improve' baseline conditions).

• GR 10: How will large harbours with myriad industrial activities be treated? (P Dowling)

At the Steering Committee meeting (11 February 2004) it was decided that activities within harbour areas that qualify as a water use under the National Water Act 1998 was the responsibility of the DWAF and may require a licence. The National Port Authority is the land-owner and will therefore be responsible to ensure that developments and activities within its boundaries meet the requirements of national law, e.g. the NWA.

Where a harbour is an estuary (i.e. East London, Durban and Richards Bay harbours) the ground rules pertaining to estuaries apply.

- GR 16: Municipality wastewater Why is ground rule re required minimum level of treatment reduced to preliminary? This is counter to modern practice <u>especially</u> when sludge may be vector for other contaminants, e.g. in trade effluents, i.e. if sludge is discharged it should not be from a mixed domestic/trade effluent. <u>Note</u>: Policy should reflect an aspiration, not current reality (R Carter).
- GR 16: Will preliminary treatment be further defined? Is there any conflict with the Coastal Zone Bill: Schedule 2. (A Carter)

At the Steering Committee meeting (11 February 2004) it was decided that the minimum treatment for WWTW prior to discharging to the offshore marine environment is preliminary treatment. Although the committee recognised that, internationally, primary and even secondary treatment is becoming the norm, they were of the opinion that preliminary treatment was more appropriate for the South African situation at this stage, provided that the environmental quality objectives are met. Preliminary treatment is defined in more detail in the 'Glossary of Terms'. In Document MS 13.3 (Guidance on Implementation) different treatment levels are also described in more detail.

• GR 17: Disposal of sludge – how will the rule apply to a situation where sludge generated by one land based WWTW is transported to an outfall pipe at another location? (A Carter)

Ultimately the environmental quality objectives for the receiving environment must be met. It is very likely that where sludge loads are increased above the normal sludge content in wastewater from WWTW, suspended solid concentrations and subsequent deposition of sludge (which is also a vector for the accumulation of toxicants in sediments) will result in these not being met. This can even be interpreted as 'dumping of sludge'.

- GR 17: Disposal of sludge is governed by the 'Sludge Guidelines' of 1997 as amended in 2002. Only the disposal of sludge to a landfill site is governed by Minimum Requirements (W Kloppers).
- GR 17: The dept is not promoting the disposal of sludge. We would rather it be used beneficially, and if not possible when dispose in accordance with minimum requirement, see WRC doc: Beneficial use of sewage sludge with new addendum (M Hinsch).
- GR 17: Somehow, the one paragraph on the overheads today (10/02/04), that referred to sludge seemed to indicate that the only option was to dispose on land. I think this was just an oversight in the presentation, but needs to be checked. Surely land-based disposal can include composting and soil conditioning, not just "land fill site". There must be small business opportunities in sludge composting in SA (A Connell).

The Ground rule will be revised to include reference to the 'Sludge Guidelines' of 1997 as amended in 2002.

- GR 18: Stormwater runoff from industrial area = industrial wastewater (J Koekemoer)
- GR 18: Not all stormwater runoff from industrial premises needs to be defined as 'industrial waste'
 – only if it comes from areas where it can be contaminated by industrial activity or has been used
 in industrial activity according to Section 21(h) of Water Act (J St Ledger).

With reference to stormwater from industrial premises, a distinction will be made between 'normal' stormwater and 'polluted' stormwater (i.e. containing pollutants derived from the industrial process). In this instance the 'polluted' stormwater is classified as a water use section 21 (h) of the NWA of 1998 and may require a licence to dispose of. The ground rules will be revised accordingly.

- GR 21: List 1 substances will detection limits be set for listed criteria? (J St Leger)
- GR 21: For clarification: ?? Bioaccumulation hazardous list. Don't you mean biomagnification rather? = Substances that concentrate the higher up the food chain you go, e.g. PCB's, DDT, organometals. (J Bell)
- G.R. 22: Relating to Receiving Marine Environment: No. 22. The list should also include mercury and mercury derivatives (G Kiviets).
- GR 21 & 22: List I List II substances: EDC (endocrine disrupting, contaminants, compounds). Internationally, research is showing that EDC are a much bigger problem than we have been aware of. They need to be controlled (List II), although we do not have a handle on the full suite of substances yet. The Global Water Research Coalition (GWRC) (SA contract – WRC) have the up to date picture (S Mitchell).

At the Steering Committee meeting (11 February 2004) the South African Water quality Guidelines for Coastal Marine Waters were considered to be the appropriate platform for the specification of List I and List II substances for South Africa, not this operational policy. The decision was therefore that this policy should make recommendations on proposed substances for inclusion in Lists I and II, but not specify these. A recommendation will be include that List I and II substances be addressed in the future revisions of the South African Water quality Guidelines for Coastal Marine Waters.

• Dumping at sea of harbour spoil <u>must</u> be included and harbour authorities <u>must</u> be part of "local management institution" and be subject to **all** the aspects of this policy.

Notwithstanding this being of DWAF initiative dredge spoil dumping MUST form part of the scope of this project and the necessary "co-operative governance" initiative needs to take place (B Pfaff).

• GR 26: Cumulative impacts from a number of pipelines, dredge spoil and stormwater (to pipelines in eTekweni area). Who pays to have this type of work done? Who is responsible? (D Dold)

It is not within the mandate of the DWAF to develop operational policy for dredge dumping. This falls within the jurisdiction of the DEAT, which administer the Dumping at Sea Control Act 73 of 1980. However, Ground rule 26 states that 'where disposal of land-derived wastewater to the marine environment is considered, a holistic process must be followed where potential impacts on the receiving environment is investigated both in the near and far field (i.e. an ecosystem based approach) and where existing waste inputs or other anthropogenic activities in the receiving environment is taken into account so as to address synergistic/cumulative interactions.' This includes inputs associated with harbour activities such as dredge dumping. Also, where such activities overlap with the receiving environment of wastewater disposal practices, the NPA becomes a role player that needs to be included in the local management institution. Where two or more developments/activities may be responsible for pollution a funding mechanism need to be decided upon at the local management forum (as proposed in Ground Rule 1).

• GR 26: Dredge spoil from harbour <u>which is dumped</u> at sea – who monitors this as it often contains toxic substances?

It is not within the mandate of the DWAF to develop operational policy for dredge dumping. This falls within the jurisdiction of the DEAT, which administer the Dumping at Sea Control Act 73 of 1980.

- GR 33: Who will determine frequency of "regular assessment"? This should not be left too open! Should set a minimum frequency (A Carter)
- GR 33: Peer review of monitoring report and programme (A Connell).
- Cumulative effects can (and should) be included in "local monitoring" projects. It need not be expensive since it should focus on local <u>depot centres</u> and accumulated organisms such as mussels and ?crayfish?? selected fish species. <u>Depo centres</u> area areas in the sea where fine sediments collect e.g. on KZN coast, Tugela Banks, Illovo Bank, off Mhlanga Rocks. Monitoring of pollutants in sediment profiles from these depo centres is an excellent long term gauge of cumulative trends (A Connell).
- It is important to set monitoring targets. In sediments, trace metals, these might be the ERL values (environmental risk low) of Long *et al.* But for benthic community work, need also to have some measure of community change, which would require management intervention if exceeded. Of course this is the **prime** objective of monitoring (advise for management interventions) and in an integral part of the sea disposal licence (A Connell).

Guidance on the design and implementation of monitoring programmes is provided in the "Guidance on Implementation (Document MS 13.3). For example, it provides guidance on how to decided on monitoring targets (objectives) sampling parameters, frequencies and reporting format.

• GR 34: Mitigation actions (example rehabilitation) also include "alternative treatment options" as an example. Rehabilitation is not an ideal mitigatory measure (A Carter)

The Ground rule will be revised as follows: ...to ensure compliance (e.g. rehabilitation or alternative treatment options)...

 GR 34: The Ground Rules ought to include interaction with South African Police Services and National Prosecuting Authority so that the appropriate authority (NOT DWAF) may make decisions as to prosecutions (criminal charges). DWAF ought to be compelled to report all non-compliance to the appropriate authority (J Veldsman). Sub-Series No. MS 13.4

"In my view, even under the current system, the individuals of DWAF (and others involved) who do not in each instance involve the prosecuting authorities in the assessment and follow-up of failures to comply with relevant statutes (polluters), ought at least to be disciplined. Amongst other issues, the absence of such involvement and disciplinary action contributes to the generally jaundiced view that civil society has of official environmental management and related matters.

At the Workshop I stressed that DWAF (and others involved) ought as a firm and enforced policy to involve the prosecuting authorities in the assessment and follow-up of failures to comply with relevant statutes [also to give publicity to such failures in order to involve and inform the public].

My impression was that at the Workshop the overwhelmingly scientific and industrial audience viewed the idea with bemusement and bewilderment. Based on a recent article published in the Cape Times, it seems that the Minister of Environmental Affairs has grasped that environmental crimes are actually crimes and ought to be investigated, prosecuted, etc and that the foregoing requires inter-departmental cooperation.

I urge that the Operational Policy: Treatment & Disposal of Land-Derived Wastewater to the Marine Environment of SA include clear and specific provisions obliging DWAF (and others involved) as a firm policy to involve the prosecuting authorities in the assessment and follow-up of failures to comply with relevant statutes" (e-mail received from J Veldsman).

It is not possible or good practice to prosecute all non-compliance. Authorisations contain a variety of conditions and prosecuting every contravention of every condition is not necessarily fair or in the best interest of the water resource. The Department rather work together with water users in order to improve compliance but Directives could be issued to the licensee for non-compliance. Only after failure to react to such a directive, prosecution will follow. DWAF work together with the Police Service and Public Prosecutor in order to prosecute a case of non-compliance or pollution. The police is unfortunately low on manpower and does not regard pollution as a priority unless it is a severe or high profile case. Evidence is needed for successful prosecution and dealing with water, the evidence is often no longer present when the investigation is undertaken. Samples must be taken in the presence of a witness and analysed in order to obtain evidence of a pollution incident. By the time an incident is reported it is often too late to gather the necessary evidence. Once evidence is collected the police service will take over the investigation. This is long process and can take a year or longer before it comes to court.

• GR -? new one? What about an industrial discharge receiving WWTW effluent? (D Airey)

The principles applying to individual WWTW will apply (refer to Ground Rules)

MANAGEMENT FRAMEWORK AND ADMINISTRATIVE PROCEDURES

 What is covered under "Institutional Responsibility" is actually "Public Participation". Forums, etc. are just such structures that facilitate I&AP participation. Institutional responsibility arrangements are something else (P Herbst)

We are of the opinion that Section 6 of the Document (MS 13.2) does address institutional responsibilities (although this may not have been that clear from the presentation at the meeting of 10 February 2004).

• Can a licence replace an EIA? (Anon)

No, the EIA process must be followed for Schedule I activities under the EIA regulations. However, to save time and money, assessment studies should be coordinated and designed to meet requirements of both processes.

 Does the review process of a licence (after 5 years) have to follow the same application process and timeframe? (Anon)

No, it should be a less cumbersome process. Reviews are provided for under Section 49 of the Act. Upon review of a licence, any condition of the licence, other than the licence period, may be amended if -

- (i) it is necessary or desirable to prevent deterioration or further deterioration of the quality of the resource/ sea
- (ii) there is insufficient water in the water resource to accommodate all authorised water uses after allowing for international obligations and the Reserve, the latter of which consists of the amount and quality of water necessary to satisfy basic human needs and to protect aquatic ecosystems; or
 (iii) it is necessary or desirable to accommodate demands brought about by changes in socio-economic
- circumstances, and it is in the public interest to meet those demands.
- What is the proposed time frame that an applicant can expect from initial proposal to final authorisation from DWAF? Does DWAF have the capacity to accomplish? (Anon)

The proposed time frame is 100 working days at DWAF from the application is received until the licence is issued. It should however be noted that every time the application needs to be referred back to the applicant for whatever the reason (additional information, etc) the clock stops and only continues once the revised application or additional info has been received.

 DWAF has a "2-stage" process for licence applications (amounts + quality which may be possible) [present + future requirements]. A possible problem if an EIA is only done for the present level, but the DWAF licence includes future requirements. In this case the EIA should also be for future requirements. In other words, avoid a mismatch between the two processes (A Boyd)

A note in the text referring to this will be amended to reflect the above concern.

Need for the policy process to link with the departments of Environment (+ Health) more explicitly

 not just "another Govt Deps" as in a number of instances (both planning + monitoring plus others). Also need to take cognisance of the future links with the Coastal Management Bill (now a DEAT-DWAF co-operative process) as (the CMB) is/will be co-ordinating policy/legislation for the Coastal Zone (particularly w.r.t. estuaries) (A Boyd).

Section 6 of the Document (MS 13.2) are much more explicit on which Departments to involve (although this may not have been that clear from the presentation at the meeting of 10 February 2004).

One of the policies (White Papers) that was considered is the White Paper on Sustainable Coastal Development which will be given legal status through the National Environmental Management: Coastal Zone Bill (it was difficult to refer to the Bill as it is continuously amended – i.e. 'in flux')

• In terms of the thinking in the NWRS regarding delegations of licensing to CMA, where does that fall? Strategic and remains a DWAF function? (M Hinsch)

To facilitate uniformity in the process, licensing of wastewater discharge to the marine environment should remain a national DWAF function and not be delegated to regional levels, e.g. CMA's.

 Implies applicant "determines reserve" (Stage 4). As far as I am aware DWAF insists on conducting the Reserve but will accept funding from the Applicant to increase priority of study (B Pfaff)

Referring to Section 6 of Document 13.2 this is the responsibility of the Manager: Resource Directed Measures of the DWAF (although this may not have been that clear from the presentation of 10 February 2004).

- (Review) A deep-sea marine outfall combined with preliminary treatment is probably the greatest investment that a local authority will make. The decision can only be made within a degree of certainty that the original assumptions on which the decision was made will remain valid for the life-time of the pipeline (30 years plus) (B Pfaff)
- If a review by Best Practical Environmental Option introduces a need for secondary treatment (say) then the investment will be wasted. The final decision – Stage 6 – therefore needs to introduce a degree of certainty for the applicant (B Pfaff).

One of the main purposes of this operational policy is to ensure that a holistic and structured process is followed in the planning, design and implementation of a wastewater treatment and disposal system to prevent, for example that the investment be wasted. The expected lifetime of a system is therefore an important factor that needs to be taking into account from the planning stage, through to the review process of the DWAF.

In this regard, it is therefore crucial to ensure that <u>all</u> future scenarios, that are likely to fall within the expected life span, be taken into account even at the planning (or pre-assessment) stage. This, for example includes alignment with water demand and supply scenarios for specific areas (e.g. if after 5 years recycling will be required to meet water demands then this needs to be accommodated in the design) (referring to Ground Rule 13). Similarly, if the wastewater quality and/or quantity are likely to changes over the life-span of the system, the design criteria must ensure compliance of all possible scenarios (thus the importance of including all future expansions in the initial licence application - referring to Section 6 of Document MS 13.3).

Decisions (and the reasons thereof) on the above-mentioned matters must be documented in the Record of Decision and included in the Licence Agreement.

NOTE: Although preliminary treatment is stipulated as the minimum treatment for an offshore marine outfall (referring the Ground Rule 16), site-specific conditions (e.g. physical dynamics, environmental quality objectives and socio-economic factors) will ultimately determine the design criteria of a wastewater treatment and disposal system. For example, water scarcity in a specific area may require higher treatment (tertiary) to enable re-use or recycling.

• <u>Management Framework</u>: Add as a "logical component": Design procedures to ensure that all non-compliance is correctly reported to the appropriate government departments (e.g. SAPS and NPA) so that such non-compliance can be visited with the correct sanction (J Veldsman).

As a standard condition in licences non-compliance must be reported to the Regional Director and actions taken to ensure compliance. As stated earlier, it is not possible or reasonable to prosecute every act of non-compliance.

 <u>Admin Procedures, etc</u>. Final Item: Monitoring, etc. Non-compliance must be reported to the appropriate other government departments, so also at this item such other governments (e.g. SAPS and NPA) will be involved (J Veldsman)

Other government departments such as the SAPS are involved in prosecutions.

• Principle of Subsidiarity: Right level to deal with the problem. Different levels are required to cope with local and synergistic impacts (Anon)

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• Feedback from monitoring to management plan implementation needs to be a continual process, <u>not</u> occasional. While you have this, I think it needs to be (a) far more explicit; and (b) easily incorporated into the management plan where the monitoring results indicate changes need to be made, i.e. the review process that has been discussed – the policy needs to deliberately incorporate this process. – adaptive management(S Mitchell)

The flow diagram on the management framework does indicate the continual process feedback loop to the relevant management bodies. This will, however, be explicitly stated in written section associated with the flow diagram.

• DWAF Licence Application: Can this section be made shorter and simpler and refer to the original DWAF "water use" document, which needs to be referenced with Section 6 (Anon).

The idea was to make this, as far as possible a 'lone standing' document. This section will be stream lined as far as possible without compromising on this.

• Licence Process: Defined requirements, defined process, defined time frame. No insertions after agreement and no changing goalposts (J Bell).

The aim of establishing an operational policy is to ensure just this.

 Administrative procedures and inst. Responsibilities. Pre-assessment should come before Stage 1 (H Karodia)

This is derived from the DWAF document: Authorisation of Individual Licence Applications and cannot be changed as part of this operational policy, i.e. it needs to be amended in the source document which is outside the scope of this project.

• Suggestion for flow diagram. Stage 6: Decision (H Karodia)



The diagram is taken from the DWAF document: Authorisation of Individual Licence Applications and cannot be changed as part of this operational policy, i.e. it needs to be amended in the source document that is outside the scope of this project.

• EIA process flow diagram page 6-4 – suggest a slight change (H Karodia):



The diagram is taken from the EIA regulation document and cannot be changed as part of this operational policy, i.e. it needs to be amended in the source document that is outside the scope of this project.

APPENDIX G

EXTERNAL REVIEWS

Specialist Review

Operational policy for the disposal of land derived water containing waste to the marine environment of South Africa (Draft 2 - Version 2)

by

Dr Robin Carter, MSc (Natal), PhD (Cape Town) Specialist Consultant – Applied Marine Sciences

1. Introduction

The Department of Water Affairs and Forestry (DWAF) commissioned the CSIR and WAM Technology to compile an Operational Policy to guide the disposal of land derived effluents into the marine environment. The preparation of the policy included the technical aspects of compiling drafts, discussing these at specialist workshops with stakeholders, environmental NGOs and environmental scientists, and making appropriate modifications and/or additions to the draft documents. This process has produced a 'final' draft Operational Policy. A further step in the process of completing the compilation of the Operational Policy is specialist review. On behalf of DWAF CSIR commissioned Dr Robin Carter to conduct one of the reviews. This report presents the findings of that review.

2. Review Terms of Reference

The set terms of reference for the review were:

- Assess and comment on the structure and content of the Operational Policy in terms of international approaches followed in this regard with due recognition of regional circumstances. Identify apparent gaps, omissions or inaccuracies that need to be addressed.
- Assess and comment on the structure and main sections addressed in the Guidance on Implementation with focus on the overall applicability of the practical guidelines and identify apparent gaps, omissions or inaccuracies that should be addressed.
- Compile a letter report with the review findings

3. Approaches and Structure of the Review

For the review two levels of approach were used. The first considered the adequacy of the documents in guiding a prospective discharge operator through the steps and assessments that would need to be made in applying for a licence. This focused on whether the structure was coherent and logical and the content sufficiently informative for the prospective applicant to gain an understanding of the Operational Policy's rationale. The second compared the context and the content of the Operational Policy with current international practice to determine whether the latter had been taken into account in the compilation of the documents.

The review is structured in three parts. The first two consider structure and content, and alignment with current best international practice for each of the documents and the third draws the review findings together in a 'conclusions and recommendations' section.

4. Operational Policy Assessment

4.1 Structure and Content

The structure of the Operational Policy is coherent and logical. The structure comprises the goal of the Operational Policy, the basic principles underpinning the goal and associated ground rules that should be followed. The management framework indicates how control is achieved and thereby ensures that overall objectives of the policy can be met. This is followed by a section on administration and institutional responsibilities that shows who is responsible for each of the steps in the discharge licensing stage. The Operational Policy document concludes with a 'recommendation' section.

The goal and principles are strongly linked as are the ground rules and management framework. However the latter appear to be decoupled as it is difficult to follow links with specific principles. Cross referencing would improve this section of the document.

Links with the Basic Principles are indicated in brackets behind each Ground Rule in the document. This has been displayed more explicitly in the final document for each of the Ground Rule blocks as follows:

Supporting principles: Pollution Prevention and Waste Minimisation

The administration and responsibilities section is helpful but goes into too much detail on which specific officer in DWAF is responsible for each step in the process. This information exists in Aides Memoir and need not be repeated here. Also, such processes are prone to change as a result of redistributions of responsibilities within institutions and the detail presented in this particular section may become outdated.

Agreed. This section has been moved to the document on 'Guidance on Implementation', which addresses technical components and which more regular updates can be expected.

Finally the recommendation section should not be part of the Operational Policy. If the recommendations are valid and worthwhile then they should have been incorporated in the policy; if they are invalid then there is no point in listing them.

Agreed. The recommendations are valid, but are more related to addressing technical short falls related to the implementation of the operational policy and has therefore been incorporated in the document on 'Guidance on Implementation', where more regular updates can be expected.

In terms of content the overall Goal correctly recognises the amenity value of the marine environment in terms of beneficial uses and their dependence on an ecological functioning system (sustainability). The goal falls within the overriding bounds of RSA's Constitution and the Environmental Conservation Act (1989).

The six <u>Basic Principles</u> are aligned with the overarching goal. However, it is not clear if there is any hierarchy of the principles. Eg does #2 (Risk-aversion and precautionary approach) underlie all of the decisions or is it a catch all at the end? The implications of the rigid application of this principle are severe. In science, and specifically marine science, there is always uncertainty so any action to discharge any effluent, apart from clean seawater, may be questioned under this principle. The critical question is what degree of uncertainty is acceptable? This needs resolution.

Within the context of existing strategies and policies of DWAF the context of this operations policy is illustrated below:



The overarching principles of these strategies and policies therefore also apply and were taken into account in the development of the strategy, goals, basic principles and ground rules. The 6 basic principles listed were considered to be of particular relevance to this operational policy in terms of providing a <u>broad</u>, <u>practical reference framework or direction</u> within which to develop, for example the ground rules, rather than applying the principles rigidly. For example in the case of Risk Aversion and Precautionary Approach, ground rules and management practices proposed under this operational policy need to ensure that best practise is followed to support the principle.

With respect to a hierarchy, the DWAF's hierarchy of decision-making, embodied in the Department's National Water Quality Management Policy (RSA DWAF, 1991, revised RSA DWAF, 2002) - which is overarching to this operational policy - applies. This hierarchy of decision-making is as follows:

- 1) <u>Pollution Prevention</u>, preventing waste production and pollution wherever possible.
- 2) <u>Minimisation of pollution and waste at source</u>, minimizing unavoidable waste through:
 - Recycling
 - Detoxification
 - Neutralisation
 - Treatment and re-use of waste streams
 - Cleaner technologies and best management practices.
- 3) <u>Responsible disposal</u>, applying the precautionary approach:
 - Apply wastewater standards as a minimum requirement
 - If wastewater standards are not sufficient, maintain fitness for use of the receiving water body in accordance with the Receiving Water Quality Objective approach
 - Exemption from compliance to wastewater standards will only be considered in exceptional circumstances provided that the receiving water body remains fit for use in accordance with the Receiving Water Quality Objective approach.

The hierarchy of decision-making and the overarching importance thereof, also for consideration of marine disposal, has been addressed more explicitly in the final document.

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The <u>Ground Rules</u> are coherent but are explicitly structured around the management framework. This does not imply a developmental approach from goal through principles, rules and application systems. There is also some circulatory here where the document refers to itself (pg 4-2). Also, a ground rule is defined as a procedural or fundamental principle. Some of the definitions given indicate that there is space for interpretation in the application of the rule. An example is the use of 'needs to' as opposed to 'will/shall' in ground rule #1.

The list of Ground Rules are organised according to the main components of the Management framework (this will be explained more clearly in the final document). The reason for this is to provide the applicant with some guidance on alignment and relevance between the Ground Rules and the Management framework. It is felt that the Ground rules are aligned with the Management framework at the 'generic level' rather than at the specific application level (dealt with in detail in 'Guidance on Implementation'). This should therefore not hamper a developmental approach.

Ground Rule 1 has been amended to remove 'space for interpretation'. Other ground rules have been amended where appropriate by replacing 'need to be' with 'must'. However, all references to the Waste Discharge Charge system should be 'may' because it will not yet be operational by May 2004.

Some of the content in the Ground Rule section is unnecessarily duplicated. For example the Section 4.3 ground rules are preceded by a justification section, which is basically repeated under the respective ground rules (6-9). This needs to be corrected.

Unnecessarily duplication has been corrected in the final document.

In terms of detail some of the sections and ground rules may need or benefit from elaboration. Examples are:

Ground rule #8 indicates that the 'morphology of the seabed' needs consideration. This actually
refers to the proximity of depositional areas where pollutants/contaminants may accumulate. This
is actually part of a wider level assessment as to whether the proposed outfall is located in a high
natural dispersion or accretion area which may have implications for outfall design and permitted
waste loads and concentrations (cf DEFRA practice).

The Ground rule has been revised as follows:

'- morphology of the seabed (with specific reference to the proximity of depositional areas where pollutants/contaminants may accumulate)

Section 4.3.2 and associated ground rules (#10-#12) address Environmental Quality Objectives (EQO). The approach is acceptable and accords with most other practices. The section provides a tentative list of List I and List II substances for RSA. These are apparently valid but perhaps the overall approach is not sufficiently cautious in that new compounds should be regarded as List I substances until concrete evidence that effects are linked to concentrations is produced and that they are otherwise not persistent and bio-accumulatable. This implies that the effects can be controlled through managing maximum concentration levels in the environment. If so, the new substance can be moved to List II. Given the rapidly expanding number of new compounds produced in industrial processes (eg Santillo *et al.* 1998) I consider such an approach to be essential in providing some measure of safeguard for the environment.

At the Steering Committee meeting (11 February 2004) the South African Water quality Guidelines for Coastal Marine Waters were considered to be the appropriate platform for the specification of List I and List II substances for South Africa, not this operational policy. The decision was therefore that this policy should make recommendations on proposed substances for inclusion in Lists I and II, but not specify these. A recommendation has been included that List I and II substances be addressed in the future revisions of the South African Water quality Guidelines for Coastal Marine Waters.

- The detail in the Section 4.4 lead in is good. It sets the requirement for higher treatment options and shows how this will be developed. However, perhaps the reverse is required in that higher treatment options should be required by default and the proponent then argues for relaxation of conditions. The way the ground rules (13, 14 &16) are set out indicates that onus is on public/NGOs/regulators to force the proponent upwards! This is the reverse of international best practice (see below)!
- It is not clear why ground rule #15 is included here.

This was a request from the DWAF to direct applicants to existing 'ground rules' or best practise guidelines indirectly linked to the disposal of wastewater to the marine environment, although not addressed in detail as part of this operational policy. A similar case is the Ground rule related to sludge disposal.

• The whole issue on stormwater (4.4.3) should be in section 4.5.

Stormwater is considered as one of the three main sources of land-derived wastewater to the marine environment, along with municipal and industrial wastewater. It is therefore discussed under 'Development/activities and associated waste loads'. Ground rules under section 4.5 apply to ALL sources, of which stormwater is but one type.

• Is ground rule #25 (pg 4-20) a rule or advice?

Agreed. This has been added into the text rather than a Ground rule.

• The ground rules on monitoring and contingency planning are good.

The <u>Management Framework</u> section is not entirely clear. As pointed out above clear cross referencing to the specific basic principles and associated ground rules would help.

We are of the opinion that this has been achieved through improved cross-referencing between Basic Principles and Ground rules and with clearer alignment of the Ground rules with the generic components of the Management Framework (as suggested earlier).

As pointed out above the <u>Administrative Procedures and Institutional Responsibilities</u> section is too detailed. It would help if it was made more generic with the detail either in the implementation guide or in revisable aides memoir issued by DWAF. The flow charts are useful as the basis for explaining the processes and their relationships. Note that the flow chart given in figure 6.1 indicates that the ROD is irrelevant to the License issue; is this true? Despite the overly detailed content here a worrying exclusion is that of requiring the prospective applicant to demonstrate that he (i.e. the institution/organisation) has the management and technical capacity to manage and control a marine discharge within the conditions set by the discharge licence and the provisions of the Operational Policy. An important part of this is the ability and mechanisms (including legal provisions) to deal with illegal, non-conforming effluents discharged to the sewerage system. Without this capacity the risks to the marine environment are unconstrained and no discharge licence should be issued. This is a fundamental issue that needs consideration.

Agreed. This section has been moved to the document on 'Guidance on Implementation', which addresses application systems in more detail. The simplified version of the flow chart, which omits important components, will be removed from the final document (Figure 6.1).

With respect to ...'Requiring the prospective applicant to demonstrate that he has the management and technical capacity to manage and control a marine discharge within the conditions set by the discharge licence...', the Aide Mémoire requires that an applicant provide details on their abilities. A note to this end has been included in the final document.

With respect to '...ability and mechanisms (including legal provisions) to deal with illegal, non-conforming effluents discharged to the sewerage system...'. A licence legally binds a WWTW operator to meet specific wastewater quantity and quality specification on the final wastewater stream entering the marine environment. It is the responsible of the water service provider obtain details on industrial wastewater (or trade effluent) discharged to a WWTW (refer to Ground Rule 20) and to ensure that such wastewater do not result in non-compliance with licence specifications. In addition, the Water Services Act 108 of 1997 (section 13) requires that a water service authority (e.g. local municipality) provide details of existing industrial effluents disposed of in its area of jurisdiction as part of a draft water services development plan. Furthermore, the Act (section 21) requires that a water services authority that controls a systems through which industrial effluent is disposed of, must make bylaws providing for at least: the standards of service, the technical conditions of provision and disposal, the determination and structure of tariffs, the payment and collection of money due, and the circumstances under which the provision and disposal may be limited or prohibited. Therefore, in our opinion the legal provisions to deal with illegal or non-conforming industrial wastewater discharges are there, it is a matter of how strictly the DWAF will enforce these provisions.

Although the <u>Recommendations</u> section should not be in the operational policy document (above) the recommendations that are made are sensible and deserve consideration.

Agreed. The recommendations are valid, but are more related to addressing technical short falls related to the implementation of the operational policy and has therefore been incorporated in the document on 'Guidance on Implementation'.

4.2 Comparison with current international best practice

Most of the issues addressed in the Operational Policy are either best practice themselves or can be considered as such when compared to practices in Australia, USA (EPA), Canada (EPA), European Community (Directives), UK (DEFRA) and Scotland. Certainly the intent of exposition of the goals, guiding principles and ground rules follows best practice in terms of transparency and in fostering understanding as opposed to simple rule following. The latter has been weakened to an extent, however, in the Operational Policy through the non-linking of the requirements set out in the Management Framework (Section 5) with the basic principles and ground rules. Accepting that the Management Framework steps are integrated responses to a number of the ground rules, cross referencing at least would enhance their acceptance by demonstrating the related consequences.

We are of the opinion that this has been improved through better cross referencing between Basic Principles and Ground rules and with clearer alignment of the Ground rules with the generic components of the Management Framework (as suggested earlier).

Notwithstanding the above there are two specific issues where compliance with actual or emerging best practice is not ideal; these are the level of treatment of principally municipal wastewater prior to discharge and the (related) conservation of fresh water.

None of Australia, USA, Canada, England, Scotland, New Zealand, the World Bank or the European Community accepts anything less than primary treatment for deepwater marine outfalls. USA (and west coast Mexico, South Bay Ocean outfall, southern California) requires secondary treatment prior to discharge and, as stated in the Section 4 of the document, USA, Australia and the EC require secondary treatment for large urban centres (> 150 000 population). Even Mumbai, facing huge demands for sewerage systems in impoverished sections of the city (cf all major RSA coastal municipalities) recognises the advantages of primary and secondary treatment prior to ocean discharge (eg World Bank 2000). Hence the apparent acceptance by DWAF (ground rule #16) that preliminary treatment only is a basic requirement for RSA marine discharge is surprising.

Despite the 'hedging' statements on changing licence conditions in response to changing (environmental) circumstances with possible requirements for higher treatment levels than preliminary treatment the Operational Policy treatment level acceptance has the following drawbacks:

- It implies that lower environmental 'care' standards are acceptable for the marine environment which reinforces the generally held belief (amongst dischargers and environmental conservation NGOs) that discharge with minimal treatment levels to the ocean is the 'default' option for coastal municipalities.
- Moreover it does not abide with the requirement for a precautionary approach as the behaviour of sludge, plus probably attached contaminants if the WWTW receives trade wastes (as they usually do), is unknown. The so-called sludge experiment conducted for the Durban marine outfalls in the 1980s (Livingstone 1990) really only focused on concentration issues and possible ecological effects in essentially the near field. No monitoring of far field deposition centres was carried out. Therefore the conclusion reached by that study is not totally convincing.
- Further, the lack of insistence on higher treatment levels is not consistent with Basic Principle #1. The removal of some of the sewage sludge in the primary treatment facility will reduce both TSPM and BOD levels of the effluent. But, more importantly, it can also reduce trace metal and other contaminant loads due to their propensity to adsorb or attach to organic (= sludge) particles.
- A secondary benefit of primary treatment would be the ability to dilute spikes of toxin concentrations passing through the WWTW through the extra volume held in the settlement tank. Such spikes may arise from illegal discharges into the sewerage system, industrial plant malfunction etc. and have the danger of causing short term non-compliance with receiving water quality criteria. Due to non-continuous monitoring of effluent constituents such spikes may not be detected in standard monitoring programmes. However, the ecological effects that may be generated by them might be detected. This has the potential to cause all sorts of complications such as unnecessary re-evaluations of receiving water quality guidelines etc.

Therefore, in my opinion, the 'allowance' of preliminary treatment for ocean outfalls is a mistake and should be revised.

It is proposed that the Ground Rule re treatment be amended as follows:

In support of i) the DWAF's strategic view of 'enforcing source controls to get as close as possible to a situation in which there is no discharge of pollutants into our water' (referring to the Strategic view), ii) the hierarchy of decision-making (as reflected in Principle 1) and iii) international practice, <u>primary treatment</u> will be required as a minimum for disposal of municipal wastewater to the offshore marine environment. This minimum requirement will apply to all marine outfalls to be authorised after 31 May 2004. For marine outfalls that were already authorised by 31 May 2004, <u>preliminary treatment</u> will be accepted as a minimum requirement, provided that the receiving environment is suitable for marine disposal and that the environmental (or resource) quality objectives are met.

However, future expansions or upgrades to such existing marine outfalls will be subject to the former minimum requirement, unless it can be proven that key socio-economic factors require otherwise.

As a minimum <u>secondary treatment with disinfection</u> will be required for disposal to the surf zone and estuaries. This applies to wastewater discharges to the surf zone that existed in 31 May 2004 and those to be authorised thereafter.

NOTE: The above set minimum requirements. Where such levels of treatment still do not meet the requirements of the receiving environment, as defined in terms of the environmental (or resource) quality objectives, higher levels of treatment will be required.

Ground rule # 13 correctly notes that RSA is a water scarce country and that any planned WWTW needs to be considered within the overall water supply 'master plan' for the specific municipal area. However, it does not explicitly place fresh water conservation, reclamation and recycling in its list of issues that need consideration, unless these are caught under 'Water supply and future demand'. Reclamation and recycling has been shown to be feasible (eg Vivendi in Durban) and even applicable in Industrial Development Zones (eg Stewart Scott, Inc. 2000). Planning for water reclamation (and recycling) is also a central tenet of World Bank policy and has been adopted in New South Wales, Australia (see Marine Pollution Bulletin 33(7-12), 1996) and is practiced in Namibia (Dr B Oelefson MFMR, pers comm), Cyprus (World Bank 1996) etc. Given the possible changes in rainfall distribution through anticipated climate change access to raw water sources for municipalities and industries may be uncertain. This may have significant implications for socio-economic development. Therefore it would be precautionary now to insist, through the operational policy, that applicants for marine discharge licences demonstrate why reclamation and recycling is not practical for their particular circumstances. Arguments put forward that are based on cost advantages should include analyses of direct and indirect costs associated with raw water augmentation schemes that 'make up' the reclaimable fresh water discharged to sea.

The need to conserve freshwater in a water scarce country like South Africa, it explicitly stated in the <u>strategy</u> of this operational policy. This strategic view is supported in the DWAF's hierarchy of decisionmaking. In the hierarchy 'Waste Minimisation' (including 'treatment and re-use of waste streams') has higher priority that 'Responsible Disposal' (including disposal to the marine environment).

5. Assessment of Guidance on Implementation

5.1 Structure and content

The structure is coherent in that it follows that of the management framework set out in the Operational Policy. Each of the sections provides detail on the specific components with flow diagrams indicating precisely where the component lies within the overall framework. This is very clear and informative and enhances the document.

As the Operational Policy structure was judged to be pragmatic and largely applicable to the purpose of the policy it follows that the Guidance on Implementation meets these criteria.

The content is comprehensive but the detail given is not uniform across all of the topics addressed and there are some instances where issues may have been overlooked. Each of the sections is assessed below.

Section 1: Introduction - This draws the links between the Guidance on Implementation and the Operational Policy. It succinctly states the purpose of the document and provides clear flow charts showing the links between the sections. This is more than adequate.

Section 2: Local management institutions & legislative framework – Overall this section is good. However, the list of ground rule categories includes urban stormwater. As pointed out in for the Operational Policy this may be more appropriately placed in the Scientific and Engineering Assessment section.

The list of Ground rule categories in this section is incorrect. It has been aligned with categories in the Operational Policy.

Section 3: Boundaries, important ecosystems & uses of the marine environment and environmental quality objectives – There are two main subsections here:

<u>Identification of boundaries</u> – This is a contentious issue and would be improved by explicit guidance on how boundaries can be set appropriately. This because the spatial scales of impact can be very large. For example Ferraro et al (1991) demonstrate ecological effects of a Californian outfall 15 km distant from the outfall. Also potential deposition areas may be considerable distances from outfall sites but, because of long operational time scales (eg > 30 years for Durban outfalls), may accumulate contaminants with potential disruption of biogeochemical processes.</u> These may have important effects because depositional areas generally support high biological productivity because they receive and sequestrate significant amounts of organic carbon.

The following has been added:

'The selection of study area boundaries is site specific, depending on the physical and biogeochemical processes, as well as the quantity and quality of the waste inputs to the area. Important issues that need to be taken into account in the selection of the study boundaries include:

- Proximity of depositional areas that could result in cumulative effects associated with waste inputs to the area
- Possible synergistic affects where the negative impact from a wastewater discharge could be aggravated through interactions with other waste inputs to the area, or even natural processes.

Recognised and approved technologies applied by qualified scientist, such as numerical modelling, have been successfully used to assist in the determination of study area boundaries. These models integrate physical and biogeochemical processes in the marine environment and their interaction with waste inputs over space and time, providing a quantitative means of determining the extent of significant influence.

 <u>Identification of important ecosystems and beneficial uses</u> – This subsection gives a concise description of the issues. However, it appears that 'maintenance of ecosystems', a beneficial use defined in the RSA marine water quality guidelines (DWAF 1995) has been omitted from the list of beneficial uses. As RSA is a signatory to the Biodiversity Convention and has international commitments to biodiversity conservation (in all of its forms) the re-inclusion of this specific beneficial use may be warranted.

Although the RSA marine water quality guidelines, listed 'Maintenance of Ecosystems' as a beneficial use, a more recent approach is to recognise the aquatic ecosystems (including marine ecosystems) as the resource, which need protection in its own right so as ultimately support designated beneficial uses. For this reason, the document deals with the resource (i.e. 'Marine Ecosystem') and its requirements separately from the 'Beneficial uses'.
- Sub-Series No. MS 13.4
- Note that the only factual 'error' that could be found in the document occurs on page 3-9. Abalone farming now extends to immediately north of East London!

This has been corrected in the final document.

Section 4: Description of activities and waste loads – Uniformly good. Subsections 4.2 and 4.5 provide excellent, succinct technical descriptions.

Section 5: Scientific and engineering assessments – Accepting that this section is by definition technical in nature a level of detailed information is expected. However, some of the subsections have gone overboard in this regard and it is unclear what the intent is. The offending subsections are specifically 5.1, 5.5 and 5.9 with 5.2 being a marginal offender. The technical level of these sections is quite deep for a lay person (e.g. the discharge applicant) but insufficient for use by those responsible for the technical design of outfalls. Thus the danger is that these sections can intimidate or frustrate readers. Shorter, more generic expositions such as that in subsection 5.3 would help here.

The 'Guidance on Implementation' document is aimed at a wide audience range and we therefore tried to keep it as 'user-friendly' as possible. This became quite a difficult task for Section 5: Scientific and Engineering assessment, as this section is actually aimed at the scientists and engineers (technical experts) that need to conduct these studies. Therefore, in components where the controlling processes involved and technologies applied internationally, were largely generic to marine wastewater discharges (e.g. Physical processes, Hydraulic design and Construction considerations) these were expanded upon. The level to which we expanded on these was largely based on the needs expressed by scientists and managers in the field. In the case of biogeochemical assessments, and even more some for the ecological assessments, these become much more complex and site specific. It was therefore much more difficult to generically expand these to the same level. Our approach is this respect was therefore to provide guidance on 'what needs to be taken into account and what needs to be done', rather than 'how to do it'. Therefore, the imbalance.

The environmental evaluation of any wastewater discharge to the marine environment depends on the actual reduction of constituent concentration in the wastewater stream in the in the near field (ZID), as well as the transport and fate of wastewater constituents in the far field. As this is a key 'driver' in the evaluation process, it is crucial that best available techniques be applied (For example, for their project the World Bank requires that such techniques applied be explicitly define and where these deviate from the recognised ones [as provided in this document] clear motivations be provided).

An attempt was made in the final document to improve the 'user-friendliness' of this section, where possible.

Another problem is a lack of uniformity of approach across all of the subsections. Not all of the subsections have a purpose statement (5.4, 5.5, 5.6 & 5.7) and some refer to pre-assessment and detailed investigations and others do not.

This lack in uniformity, regarding the 'purpose' and reference to 'pre-assessment' and 'detailed investigations' has been corrected in the final document.

Further the subsection on microbiology (5.4) essentially just tells us that effluents have microbiological populations and that some of these may die-off in seawater and sunlight. There is no advice on implementation aspects. As pathogens are the most significant human health risk associated with outfalls this really needs elaboration.

An attempt was made to expand on this section by providing notes on the use of indicators for the South African situation. Issues around the statistical analysis of monitoring data (which also include microbiological data) have been expanded upon in the Section on Monitoring.

This section (5) would benefit from a revision that bears the target audience in mind.

Section 6: Monitoring – Overall this is an acceptable exposition of monitoring practices in that important issues are highlighted. It is noted that the approach being described is generic and that case specific monitoring design needs to be applied. However, despite this there is a surprising lack of emphasis of the scientific basis of monitoring (ie hypothesis testing as opposed to 'survey and explain'). The scientific approach is discussed in NRC (1990), ANZECC (2000), Krogh and Koop (1996) amongst many others. The benefits of adopting scientific approaches are clear in that scientific rigour is applied to monitoring programmes and scientific insights are advanced. These can be used to efficiently direct monitoring programmes. Corresponding with this lack of scientific emphasis the complete absence of any statements on the requirements for incorporating effective statistical design in monitoring programmes is an issue of concern. Both of these aspects are addressed under international best practice below. A further point here is the non-acknowledgement of identifying management responses to non-compliance detected by monitoring *a priori*. This is a critical issue in discharge management.

Although it is important that this document provide the applicant with guidance to address monitoring issues pertaining to wastewater discharges to the marine environment, it is not meant to be prescriptive or to provide detailed evaluations on different statistical procedures etc. To provide guidance on such specific (considered to be generic to any environmental monitoring programme) reference will be made to appropriate information sources, such as these listed above. A general overview on basic statistic principles, however, will be included, including hypothesis testing.

Management responses to non-compliance: Although the flow diagram of the management framework does identify a 'route' for non-compliance (see diagram of Management Framework), this has been expanded on more explicitly in the text as part of the final document, along the following lines:

'Local management institutions will play a leading role in identifying non-compliance (i.e. they will become the local 'watchdogs'), based on information provided by scientifically sound monitoring programmes. In the case of non-compliance, this information will provide the local management institution with an informed, scientific base from which to challenge the responsible authority (e.g. DWAF) to respond appropriately (e.g. prosecuting the offender) where such authorities are reluctant to do so.'

Resource Monitoring (sub-section 6.2) can be conveniently divided into pre-cautionary and effects components. The former focuses exclusively on whether case specific water quality target values are exceeded outside of the ZID and/or whether recreational or shell-fish harvesting beneficial uses are compromised. Given that the outfall design has been adequate this should not occur or, if it does, be infrequent. Obviously if there are frequent or persistent exceedances then the outfall design is inadequate or the effluent character has changed and management intervention is required. Effects monitoring, on the other hand, looks to determine whether the general predictions of no adverse ecological effects if the outfall performs to design specifications are valid. If the predictions are shown to be invalid, even if the water quality target values or investigations into the causative factor(s) in the discharged effluent. Clear subdivision of resource monitoring into these categories brings advantages in that the type of management intervention is distinguishable and can even be prescribed at the outset of monitoring.

The monitoring section has been revised to the following sub-sections:

• Compliance monitoring, to determine the effectiveness of management strategies and actions to comply with licence conditions, e.g. the limits set for the volume and composition of the wastewater

- System Performance monitoring to determine the effectiveness of management strategies and actions to comply with the design criteria, such as the hydraulic performance of the discharge system
- Environmental monitoring, to determine the trends and status of changes in the receiving marine environment, in terms of the health of important ecosystems and designated beneficial uses. Also, to assess whether the environmental responses, predicted during the assessment process, match the actual responses. This is necessary to respond, where appropriate, in good time to potentially negative impacts, including cumulative effects. Results should be evaluated against pre-determined environmental quality objectives which can be stated in terms of:
 - Specific target values (preferred approach in assessing potential negative impacts at designated 'beneficial use' area, i.e. 'early warning' signals)
 - Biological objectives/hypotheses (preferred approach in assessing negative impact on 'marine ecosystems', i.e. assessing 'longer-term responses')

Sub-section 6.2.2 correctly emphasises the benefits that appropriate numerical modelling brings to guiding (and evaluating) monitoring activities. This is strongly endorsed as are sub-sections 6.2.2.ii and iii which advocate a progressive approach compared to past approaches in RSA which have been more static. Some of this has been in response to permit conditions which specify 'minimum' monitoring requirements. Hopefully a more dynamic, responsive approach can be followed in future.

The subsections on 'evaluation and reporting' and 'data storage facilities and quality control' highlight critically important components of monitoring programmes that have not always been satisfied in the past. The steps and procedures are valid and I strongly endorse them. In my opinion it will be beneficial if standardised format, quality controlled monitoring data can be placed in the public domain to provide opportunity for analysis, evaluation and debate by the broader scientific community. This facilitates the scientific peer review mechanism and broadens the perspectives from which analyses of impacts or effects may be made. This can only benefit RSA's marine and coastal environmental management.

Section 7: Contingency planning – The guidance given here is clearly set out and valuable.

5.2 Comparison with current international best practice

To my knowledge there is no other Guidance on Implementation document that integrates legislation, science, engineering and best practice. The closest parallels are guidance documents from the World Bank, the European Commission and the suites of 'fact sheets' from NSW. ANZECC (2000) differs from the DWAF document in that it provides detail on water and sediment quality and monitoring issues as opposed to covering the full range of issues related to discharges. Therefore the DWAF document can be regarded as setting international best practice standards in terms of approach.

There are areas, however, where the Guidance on Implementation document falls short of international best practice. This is specifically in the scientific basis that should be applied in monitoring and associated requirements for effective statistical designs. ANZECC (2000) has excellent guidance on this and should be referred to.

See comments on Section 6: Monitoring. A list of useful references will be added which the reader can consult for more detailed guidance on such matter.

6. Conclusions and recommendations

DWAF and its scientific team (CSIR and WAM Technology) have produced a credible set of documents for guiding marine disposal of land-derived wastewater in South Africa. The process that has been followed accords with best environmental practice in that stakeholders/I&APs have been regularly consulted on the technical and legal/administrative aspects of the Operational Policy. It is evident that excellent scientific and technical skills have contributed to the compilation of the practices set forth in the documents. The approach and the documents appear to be leading best international practice in this specific area. DWAF should be congratulated on this.

The structure and content of both the Operational Policy and Guidance on Implementation is largely suitable for the purposes of the documents. There are some areas of shortcoming in terms of detail (both too much and in one case too little) and uniformity of approach as pointed out above. These should be easily remedied.

Further to the balancing of detail etc there are some more significant issues that I recommend the project team consider for incorporation in, or modification of the Operational Policy and its associated Guidance on Implementation. These are listed below.

- Make a definitive statement on the hierarchy of the basic principles. Are they all equal or is the pre-cautionary approach of overriding importance?
- If the pre-cautionary approach does play a pivotal role (in my opinion it should) in deciding on discharge options qualify uncertainty or else DWAF will be extremely limited in the disposal options it can allow.
- Consider the re-inclusion of 'maintenance of ecosystems' as a defined beneficial use to support our national commitment to the international Biodiversity Convention.
- Revise the 'default' sewage treatment level to primary from preliminary in accord with the requirements of the basic principles and international best practice.
- Force applicants for discharge licences to show that the chosen option is sustainable in terms of fresh water supply and demand over the anticipated life span of the outfall.
- Get discharge license applicants to provide proof that they have the administrative, legal (bylaws), management and technical capacity to manage and control a marine discharge <u>prior</u> to the granting of a license.
- The section on monitoring should explicitly advocate, or even demand, that all resource monitoring components be scientifically based with an effective hierarchy of monitoring designs and procedures that take statistical inference requirements into account.
- The Operational Policy should require that there is a mechanism in place that can decide a priori on management interventions should non-compliance occur or if deleterious environmental impacts occur. Probably the best mechanism for this is the 'Local Management Committee/forum', and
- Formalise data formats and reporting requirements and ensure appropriate data management. In addition make the monitoring data available so that scientists other than those involved in the actual monitoring have the opportunity to access it for independent analyses and evaluations.

This is a summary of the amendments and revision proposed by the reviewer. It was considered more appropriate to provide the response of the Project Management Committee directly after each of the sections where they are discussed in detail in the review report.

Dr Robin Carter 31/03/2004

7. References

Sub-Series No. MS 13.4

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Specialist Review

Operational policy for the disposal of land derived water containing waste to the marine environment of South Africa (Draft 2- Version 2)

by

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1. Documents Reviewed

Document No.1 - Operational Policy for the treatment and disposal of land-derived wastewater to the marine environment of South Africa. This document defines the <u>operational policy</u>.

Document No.2. - Operational Policy for the treatment and disposal of land-derived wastewater to the marine environment of South Africa: <u>Guidance on Implementation</u> (RSA DWAF Water Quality Management Sub-Series MS13.3), providing practical guidance on the implementation of the operational policy.

Supporting documentation provided:

Operational Policy for the treatment and disposal of land-derived wastewater to the marine environment of South Africa: <u>Inception report</u> (RSA DWAF Water Quality Management Sub-Series MS13.1).

Operational Policy for the treatment and disposal of land-derived wastewater to the marine environment of South Africa: <u>Appendices</u> (RSA WDAF Water Quality Management Sub-Series MS 13.4), containing supplementary information that was collated as part of the project.

Purpose of the Project

I understand that the purpose of the project is as outlined in the Inception Report:

'to fulfil its legal obligations in terms of management and control of land derived wastewater in coastal waters, the Department of Water Affairs and Forestry (DWAF) commissioned this project to develop an operational policy, specifically focusing on the treatment and disposal of land derived wastewater in the coastal marine environment (including estuaries, the surf zone and offshore coastal waters) of South Africa'

I take this to be the terms of reference of the project.

Note:

'marine disposal should not be seen as the automatic option in coastal areas, but rather as one of a series of possible options such as land based treatment, recycling or re-use.' Therefore it is important for alternative forms of treatment to be addressed in the policy and guidelines – the later emphasis seems to be on marine outfall disposal and less on alternative forms of wastewater treatment.

The introductory section has been rewritten in the final document to provide a clearer context of where marine disposal fits within a hierarchy of decision-making regarding waste treatment and disposal options.

2. Comments on Document No. 1 - Operational Policy Document

Section 1

1.1 *Context* – Well set out and clearly gives relationship between waste sources, routes for disposal and key authorities responsible for the management of these.

In the last paragraph, I consider it may be useful to give some indication of the timescale for development of operational policies for shipping traffic and dredge dumping under control of DEAT.

This is difficult to do at this stage, but a recommendation has been added to this end.

1.2 *Specific focus*. In the last two paragraphs, emphasise that this study does not include operational policy for diffuse (non-point discharges) – what is the linkage to a complementary policy on diffuse discharges? This also needs to be effective in order to reduce pollution of the marine environment. It is left a bit vague to say this will be on a catchment basis – how will this be done and who by?

Also reference is made in 3.1 of Inception Report that focus will be 'to develop principles and ground rules for consideration of the <u>marine</u> treatment and disposal option. Principles and ground rules pertaining to <u>land based treatment options or disposal to fresh water</u> resources will not be addressed'.

The statement on '...operational policy focuses on point source sources of land-derived wastewater and in particular municipal wastewater and wastewater from industries...' (to which this comment refers) is somewhat misleading in that it implies that the policy does not address stormwater. The principles, ground rules and management framework put forward in this operational policy apply to any discharge of land-derived wastewater to the marine environment (including contaminated stormwater runoff). Excluded from this operational policy is the 'land-based' control and treatment of stormwater runoff which need to be addressed at the catchment level, rather than a sub-section of this operational policy. The relevant paragraphs have been amended in the final document to reflect the above-mentioned.

The same applies to the land-based treatment of municipal wastewater and industrial wastewater, treatment of such wastewater is a more generic aspect and not specific for wastewater disposed of to the marine environment. To prevent further confusion in this regard the word 'treatment' has also been removed from the title of this operational policy.

I became confused as to what the main aim is of the operational policy actually is. Am I right in thinking that the <u>exclusions</u> are as follows?

- Pollution associated with shipping activities
- Dumping at sea
- Diffuse wastewater (e.g. urban stormwater run off, agriculture, mining return flows)
- Land-based treatment options (not discharging to marine environment)
- Disposal to freshwater sources.

Therefore the specific focus is on land-derived wastewater discharges to the <u>marine</u> environment which are <u>point discharges</u>, i.e. discharges which the volume and quality can be readily controlled.

Yes, this is correct.

It may be useful for the reader who is not familiar with the situation in South Africa to have some background information on the extent of the problem caused by these point discharges. For instance, Newsletter No.1 dated July 2003, identified:

'there are currently about 14 marine outfalls discharging to the off shore marine environment and approximately 50 wastewater outlets to the surf zone and estuaries around the South African coastline. Of these point source discharges, about 35 discharge wastewater from municipal wastewater treatment works, while about 29 discharge industrial wastewater (a large quantity being from fish processing plants).

It seems to me therefore that the operational policy is aimed specifically at these discharges and the need to review the current licenses for these, as well as redefine the policy for any future discharges to the marine environment.

It may make it clearer for a wider audience by explaining in the first instance:

- Aim of Policy
- Background
- Roles and responsibilities, in particular DWAF and DEAT together with other government departments and stakeholders. DEAT seem to be hardly mentioned, yet they have, for instance, responsibility for the Environmental Impact Assessment, a process which is very closely allied to the license process.

The introductory section has been rewritten in the final document to provide a historical perspective and provide a clearer context of where this operational policy fits. A statement has also been made in terms of the target audience of these documents (e.g. Is it planners, designers, discharge license applicants, municipalities or Government Departments).

1.3 Approach

1.4 **Documentation**

These two items are clearly set out.

Section 2

The objectives are well set out in terms of Goals; Basic Principles; Ground Rules and Management Framework.

Diagram under management framework Page 2-3 – consider using same diagram as in Section 5.

A diagram showing the management framework has been included in the final document at this point.

Section 3

The examples are well set out.

I would suggest combining Principle 2 Risk Aversion/ Precautionary Approach with Principle 1, since it seems to be a sub division of Pollution Prevention and Waste Minimization.

Agreed. This has been amended in the final document

Local management institution – states that Lead Agent sets up this organization. Who is the Lead Agent? Is this a Government department, municipality or a private developer applying for a license?

The lead agent is the Department of Water Affairs and Forestry (either the regional office or the catchment management agency. This has been clarified in the final document (see 'Guidance on Implementation').

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Section 4

It may be beneficial to provide a diagram showing relationship of local management institution with DWAF, government departments and other stakeholders.

An attempt will be made to provide clearer guidance on this matter ('Guidance on Implementation' document). However, the formalisation of local management structure around land-derived wastewater discharges to the marine environment is a matter that still needs to be addressed by the DWAF. At this stage only recommendations can be made in this regard.

4.4 Ground Rule 16 – I suggest adding 'facilities to up-grade WWTW should be provided in the design of the plant/outfall'.

It is not clear why a minimum requirement of preliminary treatment is being stated as more appropriate for the South African situation. In my view, the minimum requirement should be moving towards secondary/tertiary treatment. Experience in the United Kingdom over the past fifteen years has shown significant improvements in the quality of bathing waters affected by the discharge of sewage effluents.

Figures collected by Water UK [1] show that for 1997/98, of a total population equivalent of about 9.5 million connected to sewage treatment works discharging to sea outfalls [2], 11 % received no or preliminary treatment, 68 % received primary or secondary treatment and 21 % received tertiary treatment. The EU Urban Waste Water Treatment Directive required secondary treatment by 31 December 2000 for all sewage discharges over 15,000 pe. The Directive also requires secondary treatment by 31 December 2005 for coastal sewage discharges greater than 10,000 pe. In England and Wales, in accordance with Government policy, coastal discharges greater than 2,000 pe will have secondary treatment by 31 December 2005.

It should be noted that as a result of these policies, the percentage of coastal bathing beaches reaching mandatory standards in the United Kingdom improved from 66 % in 1988 to 98 % in 2003 and the percentage complying with guideline standard increased from 23 to 75 % between 1990 and 2003. Refer to <u>www.defra.gov.uk/environment/statistics</u>.

It is proposed that the Ground Rule re treatment be amended as follows:

In support of i) the DWAF's strategic view of 'enforcing source controls to get as close as possible to a situation in which there is no discharge of pollutants into our water' (referring to the Strategic view), ii) the hierarchy of decision-making (as reflected in Principle 1) and iii) international practice, <u>primary treatment</u> will be required as a minimum for disposal of municipal wastewater to the offshore marine environment. This minimum requirement will apply to all marine outfalls to be authorised after 31 May 2004. For marine outfalls that were already authorised by 31 May 2004, <u>preliminary treatment</u> will be accepted as a minimum requirement, provided that the receiving environment is suitable for marine disposal and that the environmental (or resource) quality objectives are met. However, future expansions or upgrades to such existing marine outfalls will be subject to the former minimum requirement, unless it can be proven that key socio-economic factors require otherwise.

As a minimum <u>secondary treatment with disinfection</u> will be required for disposal to the surf zone and estuaries. This applies to wastewater discharges to the surf zone that existed in 31 May 2004 and those to be authorised thereafter.

NOTE: The above set minimum requirements. Where such levels of treatment still do not meet the requirements of the receiving environment, as defined in terms of the environmental (or resource) quality objectives, higher levels of treatment will be required.

4.4.2 Ground Rule 20 – I suggest mentioning an industrial effluent charging system is usually adopted in conjunction with pre-treatment.

The Waste Discharge Charge System is handled outside this operational policy. The DWAF (which also deals with that policy) required that we refer to the relevant documentation/web site where such matters are addressed in detail.

4.4.3 Urban Stormwater – work has also been undertaken on SUDS in the UK in England and Wales as well as Scotland. Refer to CIRIA Report and website <u>www.ciria.org/suds</u>.

The National Suds Working Group (NSWG) has been established to address the perceived issues impeding the widespread use of SUDS in England and Wales. NSWG has produced a Framework Document which is available from the Environment Agency. Consultation with relevant stakeholders has been carried out in autumn 2003. The Group is now working to produce an Interim Code of Practice for SUDS based on the Framework Document and taking account of comments received during the consultation stage. The code of practice should be published by the end of May 2004. Refer also to www.environment-agency.gov.uk.

Although not addressed in detail in the operational policy document, the concept of the SUDS is expanded on in the Appendix C.

Section 5

Management Framework – Figure 5.1 I suggest linking the diagram to sections in Section 5.

The diagram has been amended (simplified) to provide clearer linkages with the sub-sections.

Section 6

Figure 6.1 is extremely useful to compare DWAF Authorisation Process and EIA procedures under DEAT.

6.1 to 6.9 seem to be detailed guidance notes for submitting an application for licence. I suggest that these are included in Document No. 2 Guidance Notes.

Agreed, this has been moved to the 'Guidance on Implementation'.

Section 7

Why have a Recommendations section? If the document comprises the policy then recommendations would not be required. I suggest this section is redrafted:

- as 'Way Forward' to outline how the Operational Policy and Guidance Notes are to be implemented;
- adding a paragraph on criteria for Policy Review;
- transfer content to Executive Summary.

The recommendations are more related to addressing technical short falls related to the implementation of the operational policy. This section has therefore been moved to 'Guidance on Implementation'.

3. Comments on Document No. 2 – Guidance on Implementation

Section 1

1.3 Road map diagram – doesn't clearly relate to the sections which follow. I suggest identifying the boundaries of Sections 2 to 6 as overlays on the diagram.

The diagram has been amended (simplified) to provide clearer linkages with the sections.

Section 2

Joint local management institutions

- set up under Chapter 8 of National Water Act.
- it may be helpful if this was outlined with a diagram and description of the process and purpose of a local management institution together with the mechanism for it setting up. For example, what are the terms of reference, what powers does the body have, who is represented, whom does it report to? It could be that this is already covered in detail in the NWA, but would be worth summarizing here, since it is referred to as crucial to have a participatory approach in decisionmaking and to involve all stakeholders at the very beginning to secure their full commitment.

Although local management institutions, as proposed in this operational policy, are recognised as a crucial component in the successful management of marine resources in South Africa (including the management of marine outfalls), specific (legal) details still need to be sorting out on the constitution of such institutions. Section 2 has been amended to provide clearer guidance on the proposed roles and responsibilities of the local management institutions. Towards enforcing the involvement of local role players, the DWAF already requires the establishment of a local monitoring committee, as a licence condition for the disposal of land-derived wastewater to the marine environment.

To flag the importance of this aspect, the legal constitution of local management institutions has been listed as a recommendation for future implementation.

Section 3

Defines extent of physical boundaries to which management framework should be applied.

Section 4

4.3 Stormwater run-off - concern expressed at pollutants in stormwater run-off- but guidelines are not specifically being applied to stormwater!

As stated earlier, the principles, ground rules and management framework put forward in this operational policy apply to any discharge of land-derived wastewater to the marine environment (including contaminated stormwater runoff). Excluded from this operational policy is the 'land-based' control and treatment of stormwater runoff which need to be addressed at the catchment level, rather than a sub-section of this operational policy. The relevant paragraphs have been amended in the final document to reflect the above-mentioned.

4.4 Similar comments with other waste sources!

I suggest expanding Section 4 to identify alternative forms of treatment including re-use, recycling, which can be used to minimize waste water disposal to the marine environment – this would make document more even-handed and bring into consideration full treatment options as opposed to preliminary treatment and marine outfall.

Note: A big campaign has been run by an organization called 'Surfers against Sewage' in the UK over the last ten years which has influenced the water companies to speed up provision of secondary treatment in coastal areas and reduce significantly the number of untreated sewage outfalls.

The aim of this section is to provide the reader with a <u>brief</u> overview on types of pollutants associated with municipal wastewater (at different levels of treatment) and different types of industrial wastewaters. Details on, for example treatment such as re-use, recycling etc. is not considered to be specific to marine discharges, but would apply to water resources (e.g. rivers) and were therefore not considered to be within the scope of this operational policy. To this end, however, recommendation is put forward that a Code of Practice be developed for specific industries in SA that would, for example, address such issues.

Although this operational policy does not apply to other management and control of other waste sources, it is crucial that, in the scientific and engineering assessment, the waste loads for other sources be taken into account, whatever these may be. This is particularly important to address, for example cumulative and synergistic affects. The purpose of including these sections is therefore to provide guidance on the type of pollutants associated with other waste sources.

Section 5

Excellent section detailing best practice guidelines and design criteria for new marine outfall design and construction

Section 6

6.1 What is the relationship between owner of outfall and Monitoring Authority? Who sets up the monitoring programme? Who pays?

The owner of the outfall is required to prepare a monitoring programme and the programme need to be conducted by qualified environmental/engineering specialists. A licence requires that such monitoring be undertaken at the cost of the owner of the outfall. This has been clarified accordingly in the final document under Section 2: Management and Administrative Responsibilities.

6.3 Clarify who are 'appointed management institutions'

This refers to the local management institutions addressed in Section 2. This has been clarified accordingly in the final document.

4. Summary Points

- 1. Policy needs to be clearer on Aim of Operational Policy and that it specifically applies to land derived point discharges of wastewater. Clarify what exclusions are not being dealt with, how these will be dealt with and by whom.
- 2. Policy needs to identify the extent of the problem with existing point discharges, performance of the existing facilities, shortcomings of the existing legislation and why this is leading to a strengthening and review of the policy and guidelines.

- 3. It is not entirely clear who the documents are aimed at. Is it planners, designers, discharge license applicants, municipalities or Government Departments or a combination of these?
- 4. Identify more emphasis on alternative forms of wastewater treatment e.g. recycling, re-use, secondary treatment etc in order to give a balanced view on full treatment versus marine outfall. Guidance document puts much more emphasis on detailed design of marine outfalls and may give impression that it is biased towards this solution. Political pressures and environmental groups are likely to object to outfalls and push for secondary treatment rather that preliminary treatment and long marine outfalls. The minimum requirement of preliminary treatment should be reconsidered in the light of international experience.
- 5. Identify in more detail the relationship with other Government Departments in particular DEAT since the license process and environmental impact assessment run in parallel and there seems to be overlapping responsibilities. Investigate whether two processes can be streamlined in some way.
- 6. Local management institution needs more definition in the guidance document, since stakeholder participation is of crucial importance.

This is a summary of the amendments and revision proposed by the reviewer. It was considered more appropriate to provide the response of the Project Management Committee directly after each of the sections where they are discussed in detail in the review report.

John Steel April 2004

References

UK Department of Environment Food and Rural Affairs (Defra) e-Digest Statistics about: Coastal and marine waters (<u>www.defra.gov.uk</u>)

Construction Industry Research & Information Association (CIRIA) Sustainable drainage systems. A CIRIA project to disseminate and promote good practice in the implementation of sustainable drainage in the built environment (<u>www.ciria.org/suds/</u>)

UK Environment Agency; Sustainable Drainage Systems SUDS (<u>www.environment-agency.gov.uk</u>)