Water Quality & Environmental Audit Report

UMGENI WATER • AMANZI

Engineering & Scientific Services

Water Quality & Environmental Services

April 2011

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1. Resource Water Quality Status – April 2011

Purpose

To report on the quality of all Umgeni Water raw water sources.

Introduction

The quality of the water resources in the Umgeni Water Operational area is shown temporally and spatially with the aid of in-house developed Water Quality Indices.

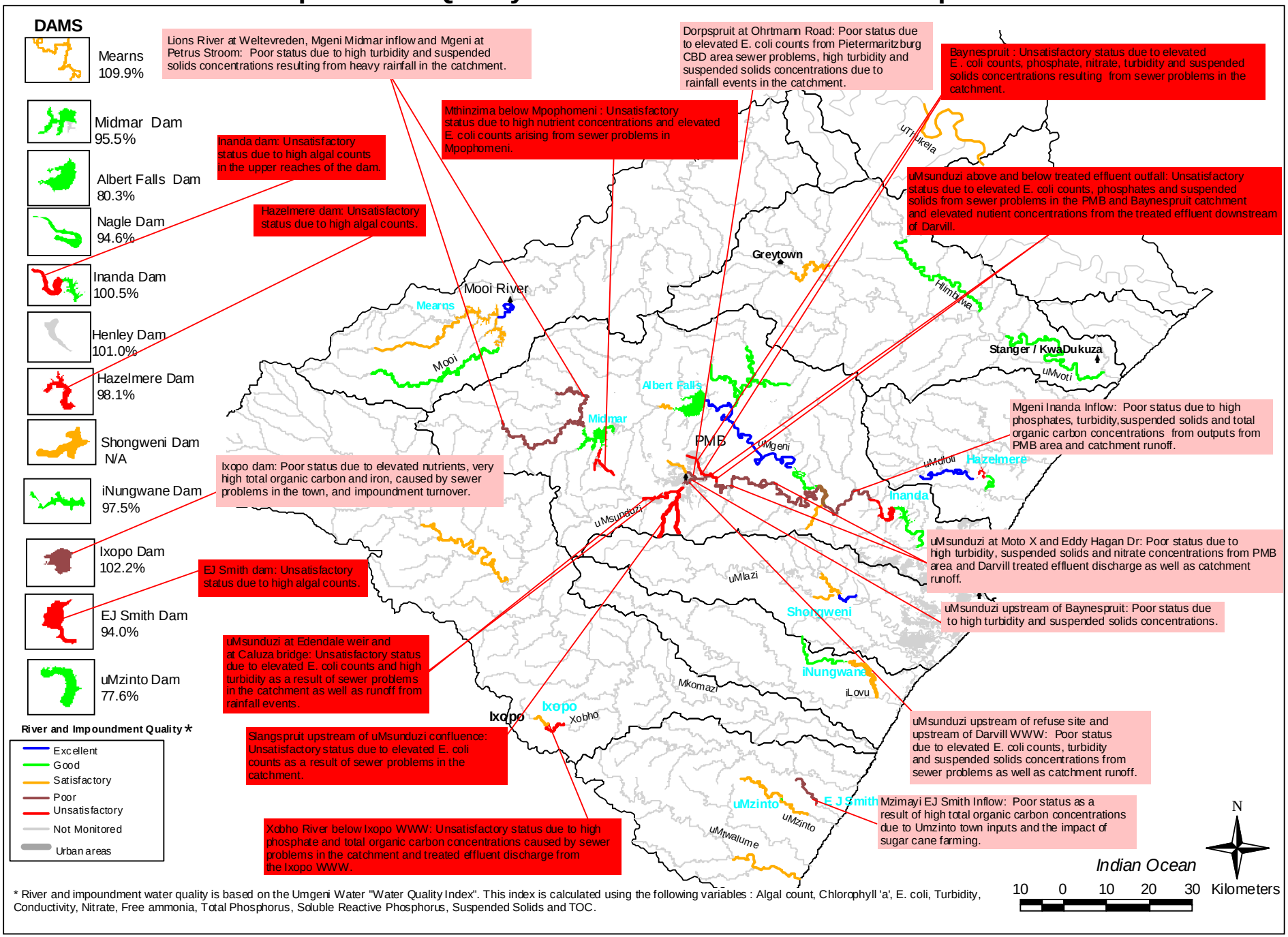
Findings

Refer to Map 1: Water quality status of rivers and dams for April 2011

- The unsatisfactory water quality status of the Mthinzima below Mpophomeni, uMsunduzi at Edendale weir and at Caluza Bridge, Baynespruit, uMsunduzi above and below Darvill treated effluent outfall, Xobho River below Ixopo WWW and Slangspruit upstream of uMsunduzi conf were mostly due to sewer problems experienced in these catchments.
- The poor water quality status of Lions River at Weltevreden, Mgeni Midmar inflow, Mgeni at Petrus Stroom, Dorpspruit at Ohrtmann road, Mgeni Inanda inflow, uMsunduzi at Moto X and Eddy Hagan, uMsunduzi upstream of Baynespruit, upstream of refuse site and upstream of Darvill WWW and Mzimayi EJ Smith inflow were mostly due to catchment runoff from rainfall events. These factors contributed to high *E. coli* counts, turbidity, elevated nutrients, organic carbon concentrations and suspended solids non-compliances.
- The unsatisfactory status of Inanda, Hazelmere and EJ Smith Dams were attributed to high algal numbers.
- The poor status of Ixopo Dam was due to elevated nutrients, very high total organic carbon and iron concentrations caused by sewer problems in the town, and natural impoundment mixing events.
- The dam storage values (% full) referred to in map 1, are as at 30 April 2011.

The Water & Environmental Services Department at Umgeni Water has an active involvement with various stakeholders including the Department of Water Affairs, Department of Agriculture, Water Services Authorities and Non-Governmental Organisations (e.g. DUCT) in responding to the poor and unsatisfactory water resource quality status within the Umgeni Water area of operation. In addition to this, various Catchment Management Fora are attended where the results of the catchment monitoring programme are presented. The close working relationship between all relevant stakeholders ensures that a proactive approach is always adopted in improving the water resources within the operational area.

Map 1: Water Quality Status of Rivers and Dams for April 2011



* River and impoundment water quality is based on the Umgeni Water "Water Quality Index". This index is calculated using the following variables : Algal count, Chlorophyll 'a', E. coli, Turbidity, Conductivity, Nitrate, Free ammonia, Total Phosphorus, Soluble Reactive Phosphorus, Suspended Solids and TOC.

2. Potable Water Quality Audit Summary Report April 2011

Purpose

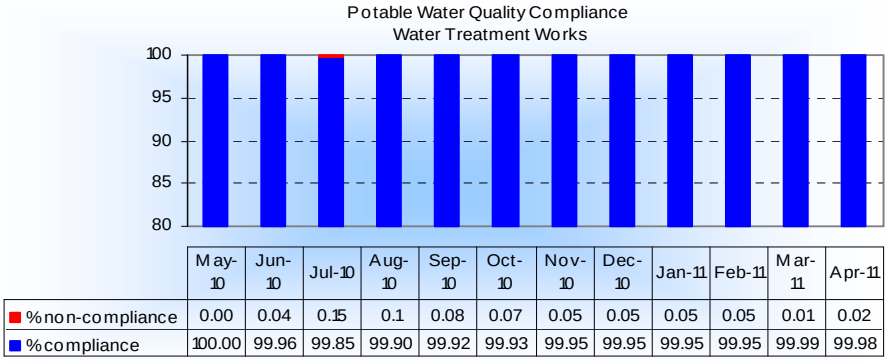
To report on compliance of all Umgeni Water treated water supplies, including the Ilembe Schemes, with legislative requirements.

Introduction

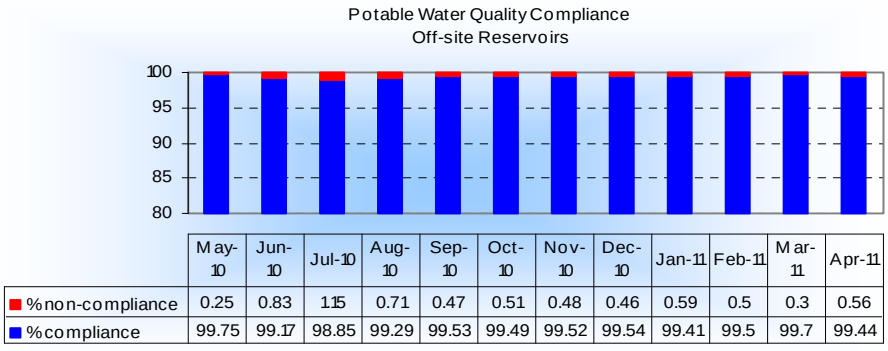
Twelve water works, 31 off-site reservoirs, 47 reticulation sites and the Isithundu unimproved water supply scheme were audited against the SANS 241: 2006 Drinking Water Specification regulated under Section 9 (1) of the Water Services Act, 1997 (Act No. 108 of 1997).

The overall compliance represents combined compliance of the existing Umgeni Water sites including the iLembe scheme sites.

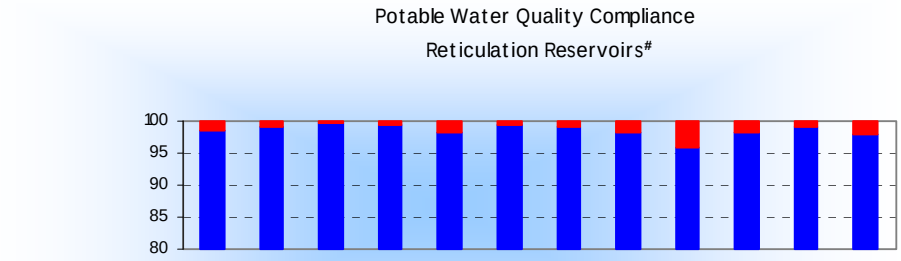
POTABLE WATER QUALITY TRENDS 2010/2011



	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11
%non-compliance	0.00	0.04	0.15	0.1	0.08	0.07	0.05	0.05	0.05	0.05	0.01	0.02
%compliance	100.00	99.96	99.85	99.90	99.92	99.93	99.95	99.95	99.95	99.95	99.99	99.98



	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11
%non-compliance	0.25	0.83	1.15	0.71	0.47	0.51	0.48	0.46	0.59	0.5	0.3	0.56
%compliance	99.75	99.17	98.85	99.29	99.53	99.49	99.52	99.54	99.41	99.5	99.7	99.44



	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11
%non-compliance	160	0.77	0.33	0.67	190	0.73	100	190	4.23	190	0.83	2.07
%Compliance	98.40	99.23	99.67	99.33	98.10	99.27	99.00	98.10	95.77	98.10	99.17	97.93

Comment:

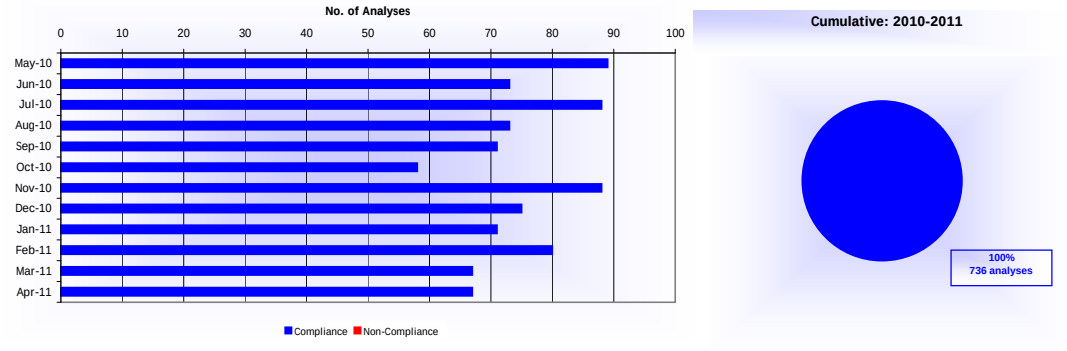
During the period under review, the overall compliance at the bulk waterworks decreased marginally from 99.99 % to 99.98 %. The non compliance was due to a turbidity failure at Mvoti Waterworks. The compliance at the off-site reservoirs decreased from 99.70 % to 99.44 %. Non-compliances at the off-site reservoirs were due to turbidity failures at Mvoti resevoirs 2 & 3. Compliance figures at the reticulation reservoirs decreased from 99.17 % to 97.93 %. Non-compliances at the reticulation reservoirs were mostly due to turbidity as well as a few aluminium failures in the North Coast Reticulation Schemes.

[#] *The overall compliance figure for reticulation reservoirs/ schemes includes boreholes, reservoirs and smaller schemes / treatment plants.*

2. Potable Water Quality Audit: April 2011

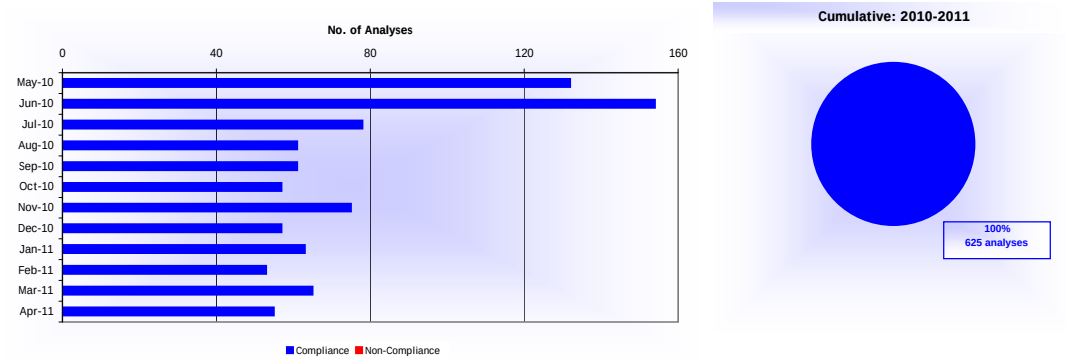
Compliance is audited against the South African National Standard for Drinking Water (SANS 241: 2006). In accordance with this standard only water quality constituents relating to health risk are considered in the calculation of compliance.

Midmar WW (217.04 Ml/d)



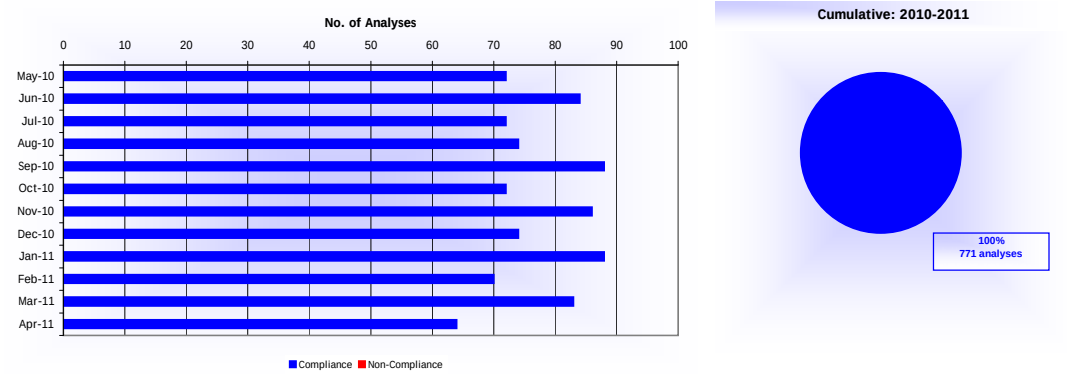
All analyses complied with the required standard.

Midmar Off-site Reservoirs



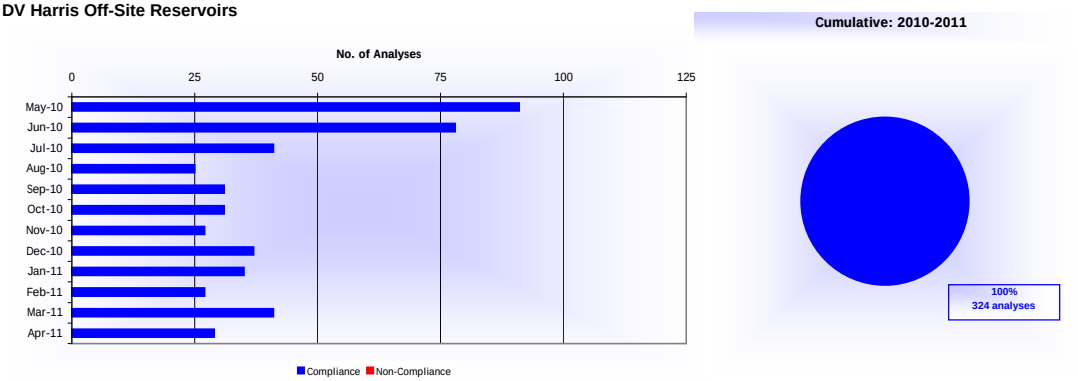
All analyses complied with the required standard.

DV Harris WW (82.87 Ml/d)



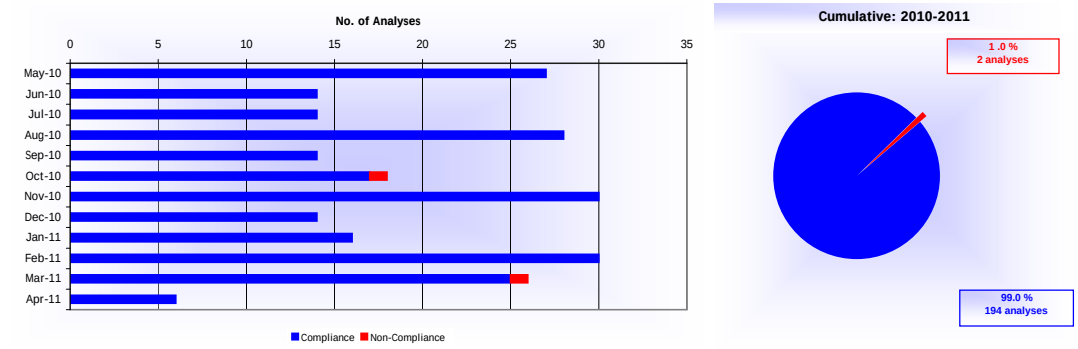
All analyses complied with the required standard.

DV Harris Off-Site Reservoirs



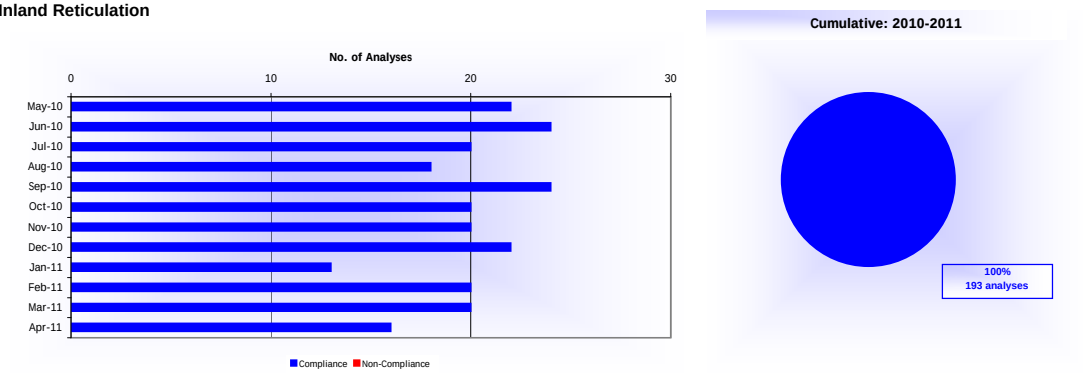
All analyses complied with the required standard.

Ixopo WW (2.58 Ml/d)



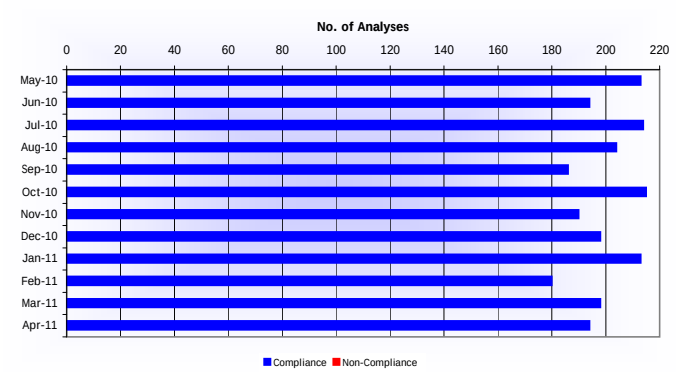
All analyses complied with the required standard.

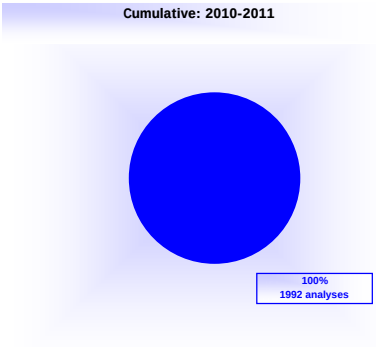
Inland Reticulation



All analyses complied with the required standard.

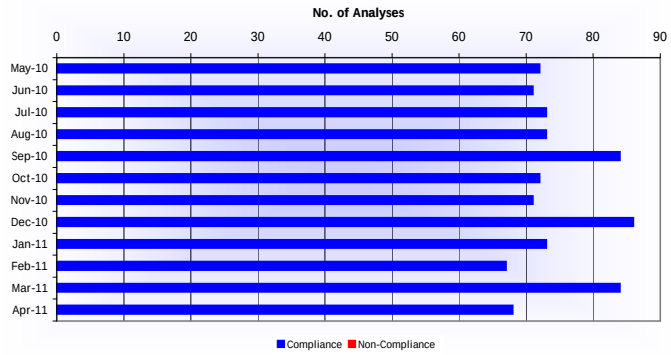
Durban Heights WW (492.01 Ml/d)

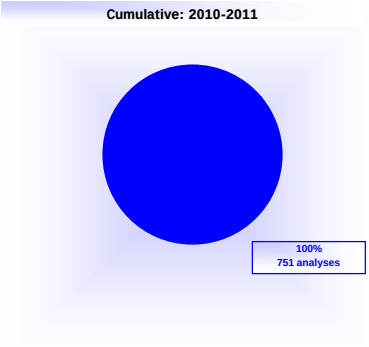




All analyses complied with the required standard.

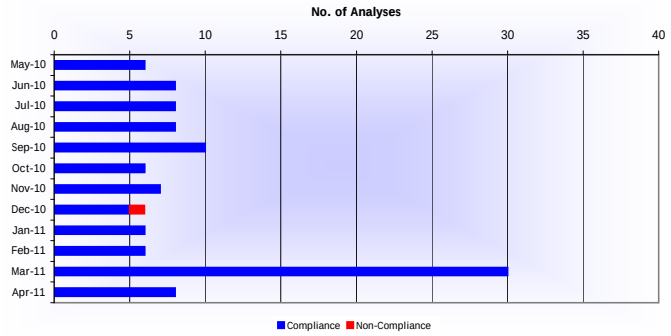
Wiggins WW (248.54 Ml/d)

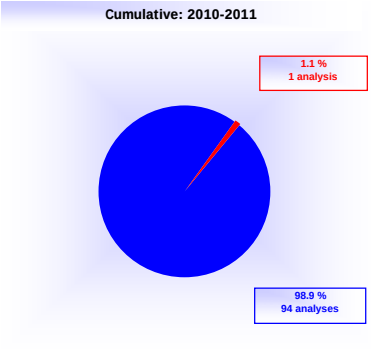




All analyses complied with the required standard.

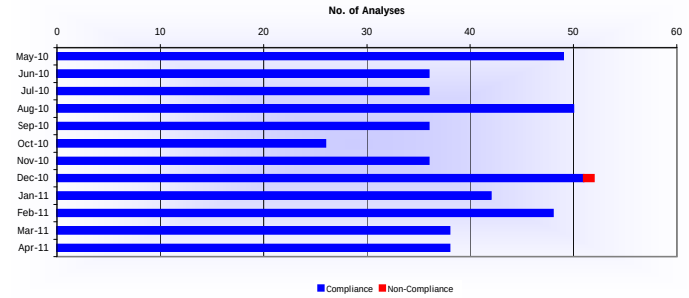
Central Reticulation

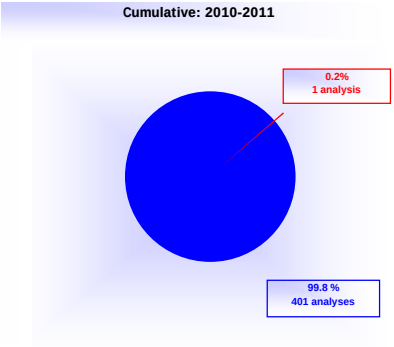




All analyses complied with the required standard.

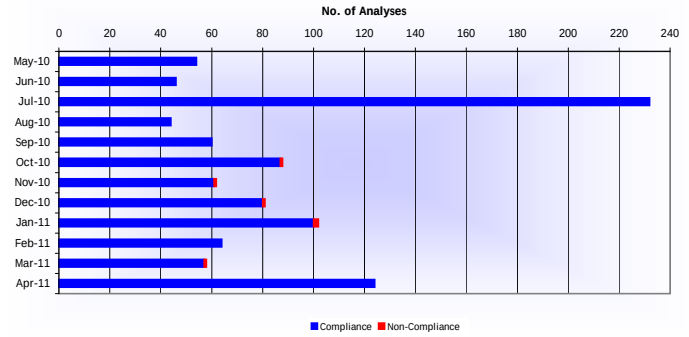
Hazelmere WW (36.64 Ml/d)

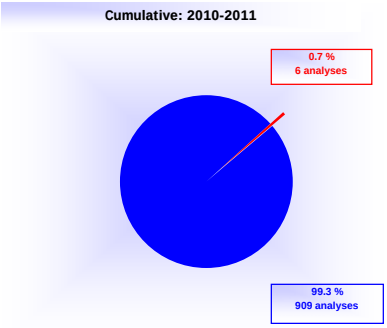




All analyses complied with the required standard.

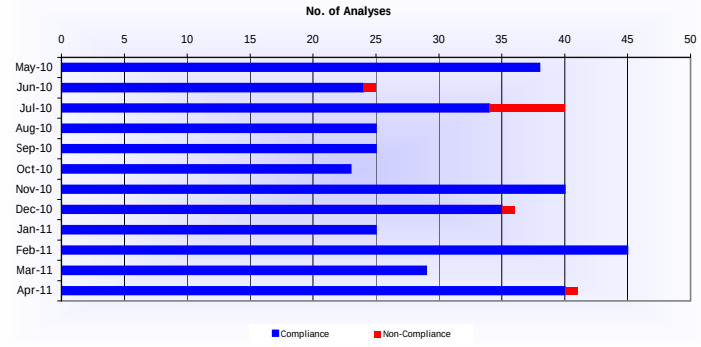
Hazelmere Off-site Reservoirs

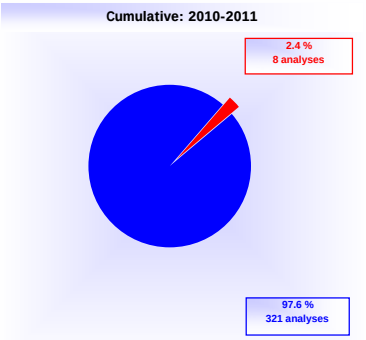




All analyses complied with the required standard.

Mvoti WW (12.0 Ml/d)





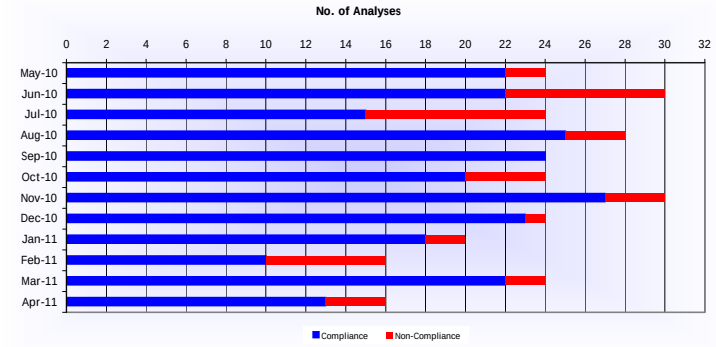
Out of 41 analyses conducted, 1 analysis failed

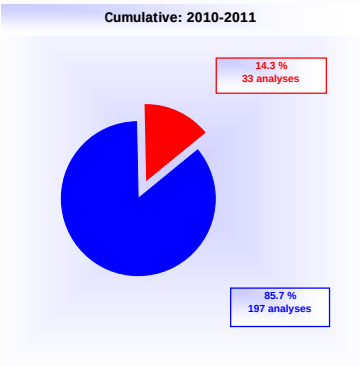
Site	Constituent	Failures	Result
Mvoti WW	Turbidity (std: 5 NTU)	1/8 analysis	6.50 NTU

Operations Incident Report

Cause	Mitigation	Proposed Action
Turbidity failures were due to increased raw water turbidity as well as poor performance of the clarifiers and filters.	The raw water inflow was reduced through augmentation from Hazelmere WW. Increased site monitoring and process adjustments were done. Reactive monitoring was conducted after mitigation measures were implemented and the results detected acceptable water quality	Filter upgrade is in progess and is expected to be completed by July 2011.

Mvoti Off-site Reservoirs





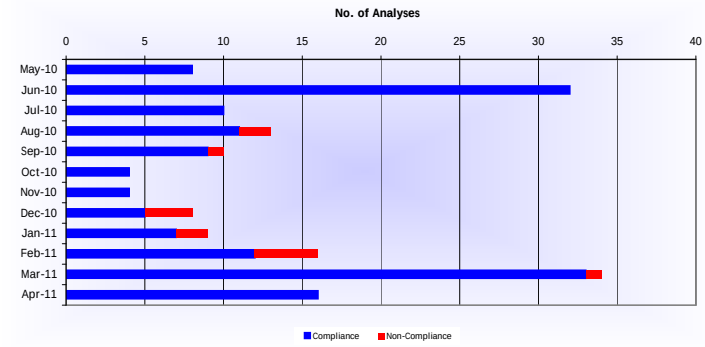
Out of 16 analyses conducted, 3 analyses failed

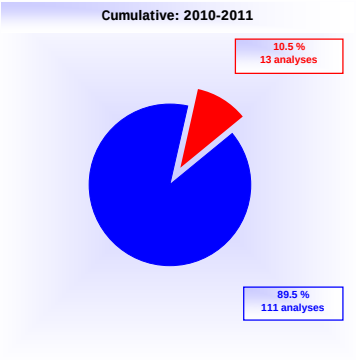
Site	Constituent	Failures	Result
Mvoti reservoir 2	Turbidity (std: 5 NTU)	2/4 analyses	6.23 - 7.59 NTU
Mvoti reservoir 3	Turbidity (std: 5 NTU)	1/4 analysis	5.46 NTU

Operations Incident Report

Cause	Mitigation	Proposed Action
Turbidity failures are related to non-compliances in the final water quality at the waterworks.	The raw water inflow was reduced through augmentation from Hazelmere WW. Increased site monitoring and process adjustments were done. Reactive monitoring was conducted after mitigation measures were implemented and the results detected acceptable water quality	Filter upgrade is in progress and is expected to be completed by July 2011.

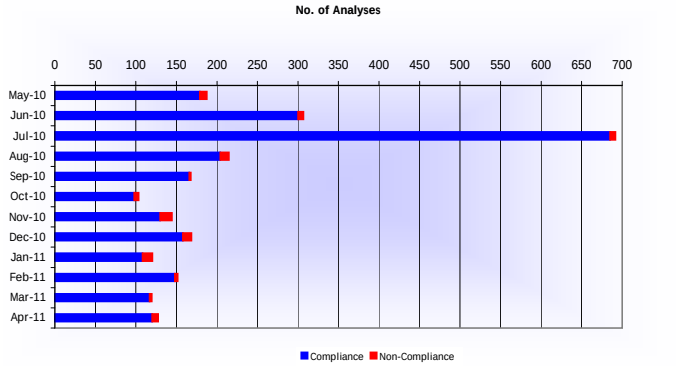
Bulwer WW (1.50 Ml/d)

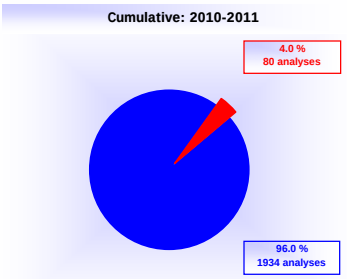




All analyses complied with the required standard.

North Coast Reticulation Schemes





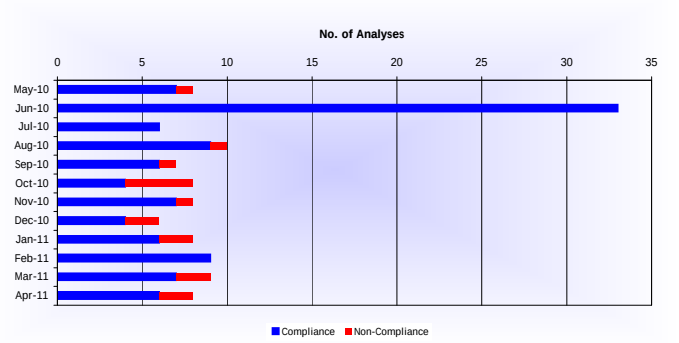
Out of 128 analyses conducted, 8 analyses failed

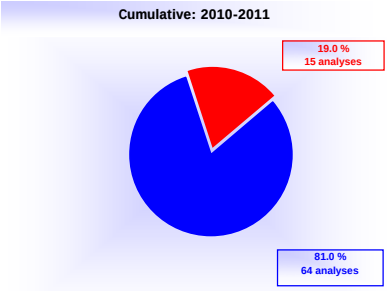
Site	Constituent	Failures	Result
Mushane Final	Turbidity (std: 5 NTU)	3/3 analyses	6.70 - 94.7 NTU
	Aluminium (std: 500 ug/l)	1/1 analysis	9497.8 ug/l
Ntabaskop Phase 1 Final	Aluminium (std: 500 ug/l)	1/1 analysis	507 ug/l
	Turbidity (std: 5 NTU)	1/4 analysis	5.22 NTU
Menyezwayo Final	Aluminium (std: 500 ug/l)	1/1 analysis	2691.1 ug/l
	Turbidity (std: 5 NTU)	1/1 analysis	8.35 NTU

Operations Incident Report

Cause	Mitigation	Proposed Action
Mushane: The pressure filters are ineffective due to the loss of media.	Increased monitoring has been implemented. Reactive monitoring was conducted after mitigation measures were implemented and the results detected acceptable water quality.	The plant will be decommissioned by July 2011 as IDM is commissioning a new package plant to serve the area.
Menyezwayo: Non-compliances were due to increased raw water turbidities.	The coagulant dosage was adjusted.	The frequency of filter backwashing will be increased with an increase in raw water turbidity.
Ntabaskop phase 1 final: Non-compliances were due to an increase in raw water turbidity as well as a possible overdosage of coagulant.	The goefabric on the slow sand filters were removed and cleaned. The coagulant dosage was optimised. Reactive monitoring was conducted after mitigation measures were implemented and the results detected acceptable water quality.	Regular cleaning of geofabric has been planned.

Isithundu Unimproved Water Supply





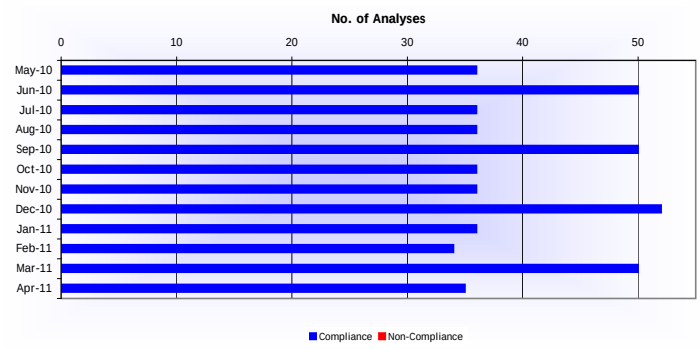
Out of 8 analyses conducted, 2 analyses failed

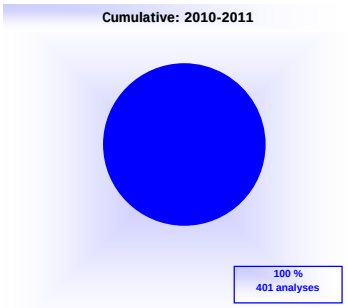
Site	Constituent	Failures	Result
Isithundu WW Final	Turbidity (std: 5 NTU)	2/4 analyses	5.69 - 14.4 NTU

Operations Incident Report

Cause	Mitigation	Proposed Action
Increased raw water turbidities as well as an ineffective auto dosing system resulted in turbidity non-compliances.	The frequency of site visits was increased.	A comprehensive process investigation has been launched to find viable solutions to operate plant without appointing permanent Operators on site.

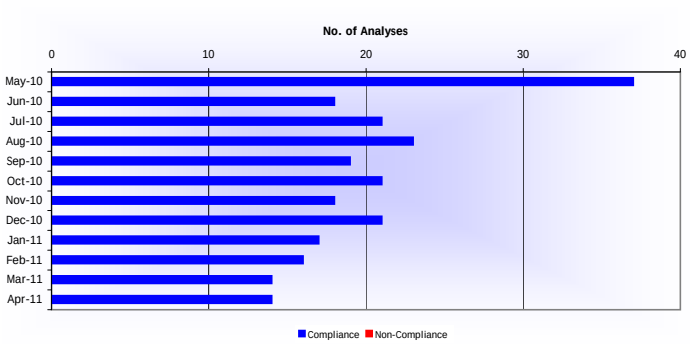
Amanzimtoti WW (49.72 Ml/d)

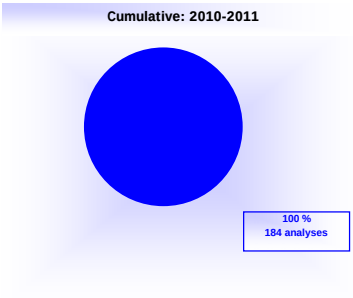




All analyses complied with the required standard.

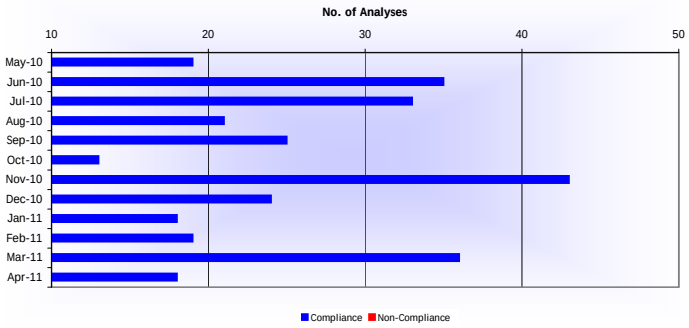
Amanzimtoti Off Site Reservoirs

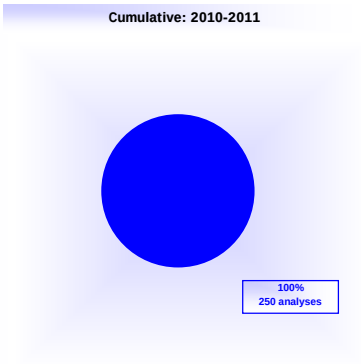




All analyses complied with the required standard.

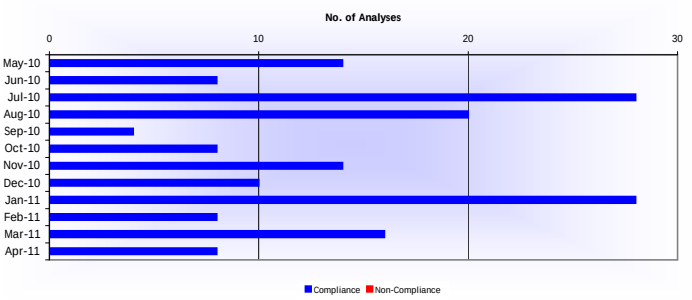
Umzinto WW (9.69 Ml/d)

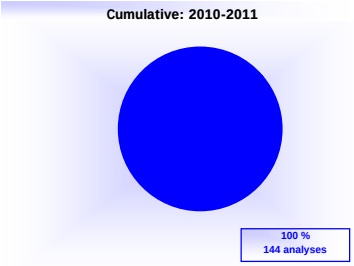




All analyses complied with the required standard.

Mthwalume WW (9.03 Ml/d)





All analyses complied with the required standard.

Appendix 1: list of final water sites

List of sites:

Midmar WW Final

Midmar Off-Site Reservoirs

HD Hill Reservoirs 1 and 2, Howick-Mixed Reservoir, Howick West Reservoir, Mpophomeni Reservoir, Hilton Reservoir, Groenkloof Reservoir, Sweet Waters Reservoir, World's View Reservoir, Blackridge Reservoir, Thornville Reservoir, Ashburton Reservoir, Umlaas Road Reservoir, Cato Ridge Reservoir and Georgedale Reservoir.

DV Harris WW Final

DV Harris Off-Site Reservoirs

Clarendon Reservoir, Belfort Reservoir, Wartburg Reservoir, Pump Station Wartburg, Table Mountain Intermediate Reservoir and Table Mountain Reservoir.

Ixopo WW Final

Inland Reticulation Reservoirs

Albert Falls Domestic Reservoir, Dominican Reservoir, Mpolweni Reservoir Low and High, Vulindlela Reservoir 1, 10, 16 and 19, Hopewell Reservoir.

Durban Heights WW Final

Wiggins WW Final

Central Reticulation Reservoirs

Nagle Domestic, Maphephetwa Reservoir 1

Hazelmere WW Final

Hazelmere Off-Site Reservoirs

Avondale Reservoir, La Mercy Reservoir, Ndwedwe Reservoirs 1 to 5 and Honolulu Reservoir.

Ogunjini WW Final

Mvoti WW Final

Mvoti Off-site Reserviors

Mvoti WW Reservoir 1, Mvoti WW Reservoir 2, Mvoti WW Reservoir 3

Bulwer WW Final

North Coast Reticulation Schemes

Blythedale Borehole Final, Driefontein Borehole Final, Zinkwazi Borehole Final, Blythedale Borehole Reservoir, Zinkwazi Borehole Reservoir, Emayilisweni WW Final, Esidumbini WW Final, Montobello WW Final, Ntabaskop Phase 1 Final, Emayilisweni Reservoir, Isiminya Standpipe, Montobello Reservoir, Ntabaskop Phase 1 Standpipe, Deda/Nkivane Final, Glendale Heights Final, Glendale Final, Kwasathane Final, Madundube Final, Phambela Final, Isithundu WW Final, Mbitane WW Final, Masibambisane WW Final, Mphumulo WW Final, Mushane WW Final, Vukile Final , Isithundu Reservoir, Masibambisane Reservoir, Mphumulo Reservoir, Vukile Reservoir, Balkomb Final, Ekwazini Final, Maqumbi/Otimati Borehole, Ndukwende Final, Ntunjambili Final, Ntunjambili Final 1, Ntunjambili Final 2, Thafamasini Final, Ntunjambili Reservoir

Isithundu Unimproved Water Supply

Amanzimtoti WW Final

Amanzimtoti Off-site reservoirs

South Coat Pipeline at Toti, South Coast Pipeline at Craigieburn, South Coast Scottsburgh

Umzinto WW Final

Mthwalume WW Final

APPENDIX 2: Water Quality Limits

Determinands	Units	Warning limit	SANS 241: 2006 Limits
Physical and Organoleptic requirements			
pH value at 25 degrees	pH units	site specific	4.0 -10.0
Turbidity	NTU	0. 5 & 1*	5
Colour	mg Pt/l	20	50
Conductivity	mS/m	150	370
Hardness (T)	mg CaC03/l	20 - 300	-
Algal count	cells/ml	50	-
Anabaena	total count	100	-
Microcystis	total count	100	-
Geosmin	ng/l	10	-
Dissolved Solids	mg/l	1000	2 400
MIB	ng/l	10	-
Chemical requirements - macro-determinands			
Ammonia as N	mg/l	1	2
Calcium as Ca	mg/l	150	300
Free Chlorine	mg/l	site specific	-
Total Chlorine	mg/l	site specific	-
Chloride Cl^-	mg/l	200	600
Fluoride F^-	mg/l	-	1.5
Nitrite	mg N/l	1	-
Nitrate	mg/l	10	-
Nitrate+nitrite as N	mg/l	-	20
Magnesium as Mg	mg/l	70	100
Potassium as K	mg/l	50	100
Sodium as Na	mg/l	200	400
Sulphate $SO_4^{=}$	mg/l	-	600
Zinc as Zn	mg/l	5	10
Chemical requirements - micro-determinands			
Aluminium as Al	µg/l	300	500
Arsenic as As	µg/l	10	50
Manganese as Mn	µg/l	0.1	1 000
Antimony as Sb	µg/l	-	50
Cadmium as Cd	µg/l	-	10
Tota Chromium as Cr	µg/l	-	500
Cobalt as Co	µg/l	-	1 000
Copper as Cu	µg/l	-	2 000
Cyanide as CN^-	µg/l	-	70
Lead as Pb	µg/l	-	50
Mercury as Hg	µg/l	-	5
Nickel as Ni	µg/l	-	350
Selenium as Se	µg/l	-	50
Vanadium as V	µg/l	-	500
Iron as Fe	µg/l	200	2 000
Chemical requirements - organic determinands			
Dissolved organic carbon as C	mg/l	10	20
Bromoform (CHBr3)	µg/l	100	-
Bromodichloromethane (CHCl2Br)	µg/l	60	-
Dibromochloromethane (CHCLBr2)	µg/l	100	-
Choloroform (CHCl3)	µg/l	200	-
Total Trihalomethanes (CHCl3)	µg/l	200	300
Phenols	µg/l	-	70
Microbiological determinands			
E. coli	count/100 ml	0	0
Total coliforms	counts/100 ml	10, 100*	-
Colony counts @ 21 degrees	per ml	100	-
Colony counts @ 37 degrees	per ml	10, 5 000*	-
Coliphages	PFU per 10 ml	1	-
Giardia/Cryptosporidium	count/10 l	1	-

* - warning limit apply only to the Ilembe scheme sites.

3.1 Trade Effluent and Waste Water Audit Summary Report April 2011

Purpose

Trade Effluent Audit: To report on compliance of Pietermaritzburg industrial effluent discharges to sewer, with the water quality standards stipulated in the Msunduzi Municipal by-laws.

Wastewater Audit: To report on compliance of all Umgeni Water Wastewater Works effluent discharges with legislative requirements.

Introduction

Five Wastewater Works were audited against the relevant legislative requirements:

Primary business

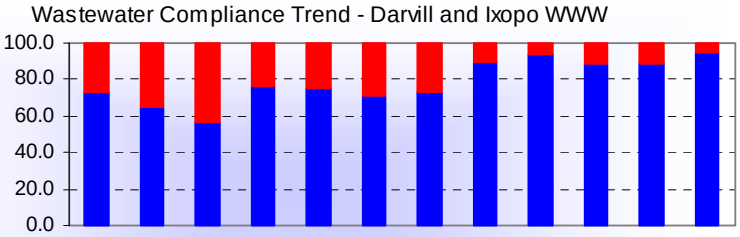
- Darvill WWW: Permit 2045B and DWA General and Special Phosphorus Standard.
- Ixopo and Albert Falls North and South WWW: DWA General Authorisation General Limit.

Other business

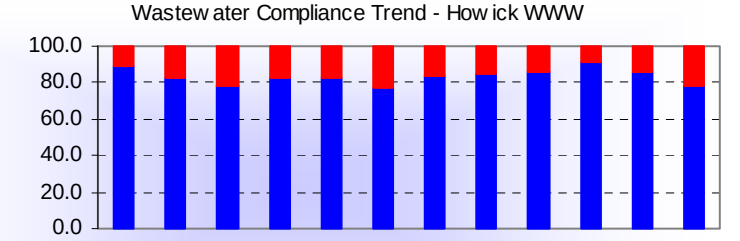
- Howick WWW: Permit 1887B and DWA General and Special Phosphorus Standard.

SUMMARY: FINDINGS AND INTERVENTIONS

WASTEWATER COMPLIANCE TREND



	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11
% Non-Compliance	26.8	34.8	43.6	23.4	24.5	29.0	26.5	10.8	6.0	11.5	11.8	5.5
% Compliance	73.2	65.2	56.4	76.6	75.5	71.0	73.5	89.2	94.0	88.5	88.2	94.5



	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11
% Non-Compliance	10.9	17.8	22.2	17.8	17.8	22.6	16.7	15.3	13.9	9.1	14.4	22.2
% Compliance	89.1	82.2	77.8	82.2	82.2	77.4	83.3	84.7	86.1	90.9	85.6	77.8

COMMENTS

WASTEWATER WORKS

During the month of April 2011, the combined percentage compliance at Darvill and Ixopo WWW's increased significantly from 88.2 % to 94.5 %. Non-compliances at Darvill WWW were due to elevated ammonia and *E.coli* counts as a result of high inflows due to storm water ingress, thus contributing to the plant working at its operating capacity.

The percentage compliance at Howick WWW decreased from 85.6 % to 77.8 %. Non compliances were due elevated suspended solids, COD and *E.coli* concentrations as a result of stormwater ingress.

3.2 Trade Effluent

The effluent from ALL industries with permits to discharge into sewer according to Msunduzi Municipality by-laws is treated at Darvill Wastewater Works prior to discharge to the river. All wet industries in Msunduzi Municipality have to apply for permits to discharge to sewer and are not allowed to discharge their effluent to the river directly.

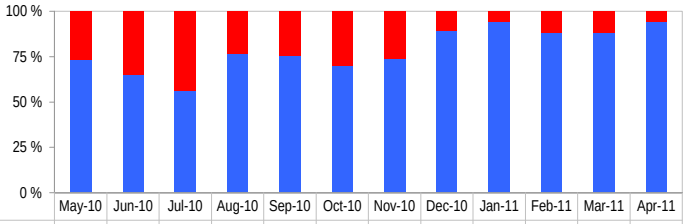
The following is a list of industries that did not comply with their permit in terms of the Msunduzi Municipal By-laws for the month of April 2011.

Name Of Industry	Parameter Out Of Range	Notifications
Hulamin KZN Tissues Site1 Trox (SA) Leather from hart Webroy Springs Manline Sud-Chemie	Sulphates Suspended solids pH – Zinc Sulphates- Susp. solids SRP pH Zinc	On-site written notifications were issued for pH and conductivity. All effluent is discharged via sewer to the Darvill treatment works, where it is suitably treated prior to discharge to the river.

3.3 Waste Water Audit: April 2011

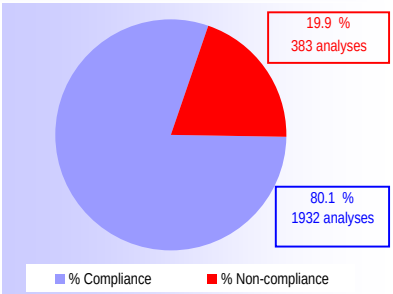
Darvill WWW

Monthly: 2010/2011



	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11
Volume (Ml/d)	76.5	69.5	70.1	71.3	69.4	78.0	89.9	97.1	101.8	86.1	76.3	91.5
Compliance	161	127	121	113	153	140	158	172	192	145	178	168
Analyses	220	195	216	148	203	200	215	193	204	164	202	178
% Non-compliance	26.8 %	34.9 %	44.0 %	23.6 %	24.6 %	30.0 %	26.5 %	10.9 %	5.9 %	11.6 %	11.9 %	5.6 %
% Compliance	73.2 %	65.1 %	56.0 %	76.4 %	75.4 %	70.0 %	73.5 %	89.1 %	94.1 %	88.4 %	88.1 %	94.4 %

Cumulative: 2010/2011



Standards
Darvill wastewater treatment works
License number: 21065561

Total number of analyses conducted were 178 of which 10 did not comply with the required limits.

Non compliance with standards: April 2011

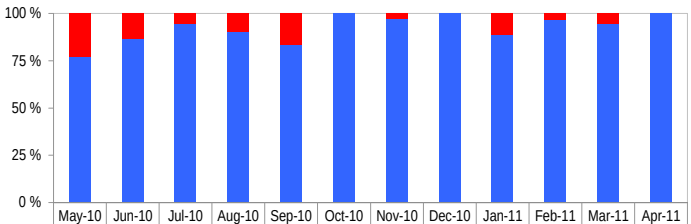
Ammonia (NH_3) (std 6 mg/l) 5/18 analyses failed 6.2 - 10.3 mg/l

E. coli (std 500 per 100ml) 5/18 analyses failed: 6900 - 157000 per 100ml

Comments: The works is operating at approximately its treatment capacity. Storm flows bypassing the main treatment pocesses were the cause of the high *E.coli* counts and most of the out of range ammonia concentrations.

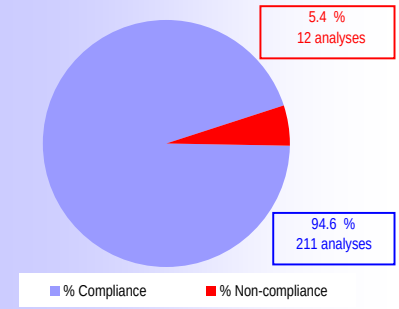
Ixopo WWW

Monthly: 2010/2011



	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11
Volume (Ml/d)	0.26	0.32	0.70	0.80	1.25	1.42	1.32	1.01	1.10	0.95	0.75	1.00
Compliance	20	26	17	27	15	18	36	18	16	29	17	18
Analyses	26	30	18	30	18	18	37	18	18	30	18	18
% Non-compliance	23.1 %	13.3 %	5.6 %	10.0 %	16.7 %	0.0 %	2.7 %	0.0 %	11.1 %	3.3 %	5.6 %	0.0 %
% Compliance	76.9 %	86.7 %	94.4 %	90.0 %	83.3 %	100.0 %	97.3 %	100.0 %	88.9 %	96.7 %	94.4 %	100.0 %

Cumulative: 2010/2011

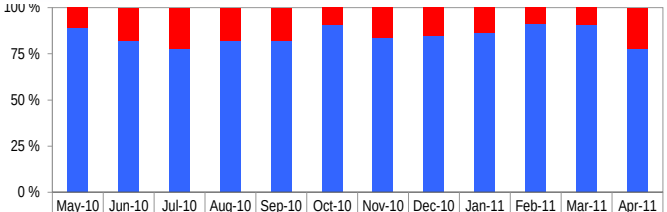


Standards
General Authorisation - General Limit

Total number of analyses conducted were 18 all of which complied with the required limits.

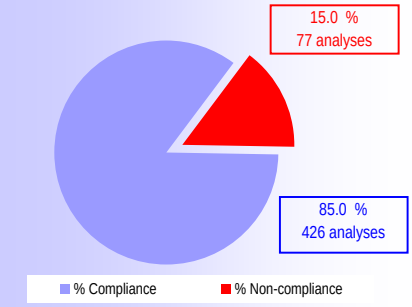
Howick WWW

Monthly: 2010/2011



	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11
Volume (Ml/d)	5.2	3.6	3.9	3.0	5.0	5.0	5.0	7.0	5.0	5.6	4.5	6.1
Compliance	57	37	35	37	60	48	30	50	31	40	67	28
Analyses	64	45	45	45	73	53	36	59	36	44	74	36
% Non-compliance	10.9 %	17.8 %	22.2 %	17.8 %	17.8 %	9.4 %	16.7 %	15.3 %	13.9 %	9.1 %	9.5 %	22.2 %
% Compliance	89.1 %	82.2 %	77.8 %	82.2 %	82.2 %	90.6 %	83.3 %	84.7 %	86.1 %	90.9 %	90.5 %	77.8 %

Cumulative: 2010/2011



Standards
Howick wastewater treatment works
License Number: 21067202

Total number of analyses conducted were 36 of which 8 did not comply with the required limits.

Non compliance with standards: April 2011

E.coli (std: 500 per 100ml) 3/4 analyses failed: 1000 - 16100 per 100ml

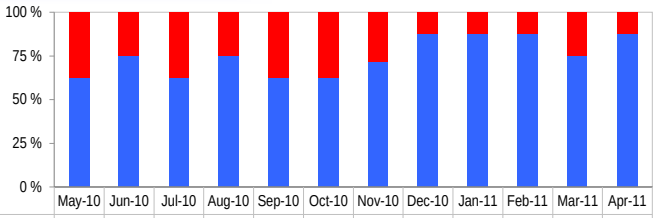
Chemical Oxygen Demand (std. 75 mg/l O_2) 2/4 analyses failed: 226 - 242 mg/l O_2

Suspended Solids (std: 25mg/l) 3/4 analyses failed: 33 - 168 mg/l

Comments: High CODs were a result of the high suspended solids concentrations. Wet weather and insufficient drying bed space caused an overload to the clarifiers. A mechanical dewatering device is in the process of being purchased. The high *E. coli* counts are the result of high suspended solid concentrations and dosing difficulties.

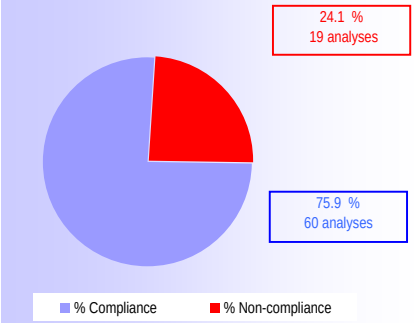
Albert Falls - North WWW

Monthly: 2010/2011



	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11
Compliance	5	6	5	6	5	5	5	7	7	7	6	7
Analyses	8	8	8	8	8	8	7	8	8	8	8	8
% Non-compliance	37.5 %	25.0 %	37.5 %	25.0 %	37.5 %	37.5 %	28.6 %	12.5 %	12.5 %	12.5 %	25.0 %	12.5 %
% Compliance	62.5 %	75.0 %	62.5 %	75.0 %	62.5 %	62.5 %	71.4 %	87.5 %	87.5 %	87.5 %	75.0 %	87.5 %

Cumulative: 2010/2011



Standards
General Authorisation - General Limit

Total number of analyses conducted were 8 of which 1 did not comply with the required limits.

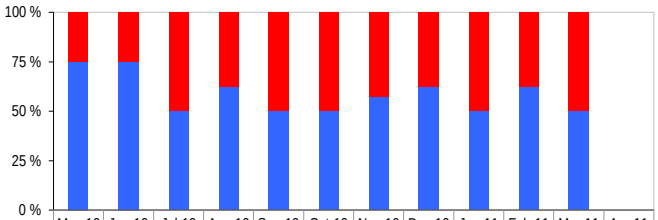
Non compliance with standards: April 2011

E.coli (std: 1000 per 100ml) 1/1 analysis failed: 5200 per 100ml

Comments: Although site refurbishment has been completed, the chlorination process had not been implemented at the time of sampling.

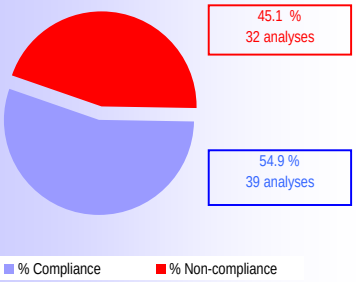
Albert Falls - South WWW

Monthly: 2010/2011



	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11
Compliance	6	6	4	5	4	4	4	5	4	5	4	0
Analyses	8	8	8	8	8	8	7	8	8	8	8	0
% Non-compliance	25.0 %	25.0 %	50.0 %	37.5 %	50.0 %	50.0 %	42.9 %	37.5 %	50.0 %	37.5 %	50.0 %	0.0 %
% Compliance	75.0 %	75.0 %	50.0 %	62.5 %	50.0 %	50.0 %	57.1 %	62.5 %	50.0 %	62.5 %	50.0 %	0.0 %

Cumulative: 2010/2011



Standards
General Authorisation - General Limit

This site is currently offline for refurbishment. During this time, sewage is being diverted to the Albert Falls North WWW site.