sanas Testing Laboratory T0156

REGEN WATERS
LABORATORY • LABORATORIUM
CK. 89/14418/23

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WITBANK 1035

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MICROBIOLOGICAL ANALYSIS
TEST REPORT

Sample From: **ARNOT POWERSTATION** **Address:** Private Bag X 2
Rietkuil
1097

Date Received: 10-Jun-14
Date Analyzed: 10-Jun-14
Date Reported: 11-Jun-14
No. Analyzed: 2 **Ref No:** F 431 - 432 / 14 B

	SAMPLE NAME	STERILIZED BOTTLE		STANDARD LIMITS ≤ 10 TOTAL COLIFORM BACTERIA PER / 100ML		Nil FAECAL COLIFORM PER / 100 ML	Nil ESCHERISCHIA COLIFORM PER 100 ML	≤ 1000 HETEROTROPHIC PLATE COUNT PER 1.0 ML
	Quote ref: Q/ARN/17032014	YES	NO		A / B			
F 431	Potable Water	x		Nil	A/B	Nil	Nil	-
F 432	Raw Water	x		25	A/B	10	1	-
	METHOD USED			A- SANAS 5221 OR B - COLILERT		SANS 5221	COLILERT	SANS 6221

S.A.N.S. 241-1:2011 MICROBIOLOGICAL REQUIREMENTS
Allowable compliance for *DRINKING WATER*

Determinant	*Risk*	*Unit*	*Standard limits*
Escherichia Coliform / or Faecal Coliform bacteria	Acute Health - 1	Count per 100 ml	Not Detected
Heterotrophic Plate Count	Operational	Count per 1 ml	≤ 1 000
Total Coliform Bacteria	Operational	Count per 100 ml	≤ 10

Results exceeding alert levels will require immediate remedial action and follow-up sampling.

EFFLUENT WATER
Regional Standard (Department Water Affairs and Forestry) of 26 March 2004 No.399 for Waste water specifies :
Waste water or Effluent shall **not** contain more than 1000 Faecal Coliform per 100 ml.

SANS 241-1 Edition 1 2011

These results relate only to samples tested.
Opinions and interpretations expressed herein are outside the scope of SANAS accreditation.

REMARKS:

P.L.G UYS (M.D.)
Technical Signatory

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Private Bag X 2
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1097

CHEMICAL ANALYSIS
Date Received : 10 June 2014
Date Reported : 20 June 2014
Quantity Analyzed: 2

Our Ref: APN / 90 - 91 / F / 06 / 14
Quote Ref: Q/ARN/17062014
Att : Tshidi Mosehle

F 90

	Analysis Results mg/l	Raw Water	SANS Standards -241 (2011) Domestic Water Standard Limits
Physical requirements			
	Colour as Pt-Co*	5	
	Conductivity at 25° C in mS/m	14.1	≤ 170
	Total Dissolved Solids	92	≤ 1 200
	Odour *	Inoffensive	Inoffensive
	pH-Value at 25 ° C	7.88	≥ 5.0 to ≤ 9.7
	Taste*	Inoffensive	Inoffensive
	Turbidity as N.T.U.	7.39	Operational ≤ 1.0 - Aesthetic ≤ 5.0
	Total Alkalinity as $CaCO_3$	51	
Macro Determinants			
	Free & Saline Ammonia NH_3 as N	<0.20	
	Calcium as Ca	9.75	
	Chlorides as Cl	7.17	≤300
	Fluoride as F	<0.20	≤1.5
	Magnesium as Mg	6.82	
	Nitrate & Nitrite as N	0.28	≤ 11
	Potassium as K	1.80	
	Sodium as Na	10.0	≤ 200
	Sulphate as SO_4	14.1	Acute Health ≤ 500 - Aesthetic ≤ 250
	Zinc as Zn	<0.01	≤5

All heavy metal analyses have been performed on filtered samples.
Tests marked with an asterisk * are not SANAS accredited
These results are related only to the items tested

These results must be read in conjunction with the Uncertainty of Measurement list as provided by Regen Waters Laboratory

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CHEMICAL ANALYSIS

Date Received : 10 June 2014
Date Reported : 20 June 2014
Quantity Analyzed: 2

Our Ref: APN / 90 - 91 / F / 06 / 14
Quote Ref: Q/ARN/17062014
Att : Tshidi Mosehle

	Analysis Results µg/l	F 90 Raw Water	SANS Standards -241 (2011) Domestic Water Standard Limits
Micro Determinants µg/l			
	Aluminium as Al	91	≤ 300
	Antimony as Sb	<1.0	≤20
	Arsenic as As	<1.0	≤10
	Cadmium as Cd	<1.0	≤3
	Total Chromium as Cr	<1.0	≤50
	Cobalt as Co	<1.0	≤500
	Copper as Cu	4.70	≤2000
	Cyanide as CN *	<70	≤70
	Iron as Fe	223	Chronic Health ≤ 2000 - Aesthetic ≤ 300
	Lead as Pb	<1.0	≤10
	Manganese as Mn	5	Chronic Health ≤ 500 - Aesthetic ≤ 100
	Mercury as Hg	<1.0	≤6
	Nickel as Ni	<1.0	≤70
	Selenium as Se	<1.0	≤10
	Vanadium as V	2.76	≤200
Organics Determinand mg/l			
	Total Organic Carbon	3.26	≤ 10
Total Trihalomethanes mg/l			
	Phenolic Compounds*	Attached	≤ 0.01

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QUALITY CONTROL CHECKS	
Cation Balance	1.53
Anion Balance	1.54
% Difference	-0.2
Measured TDS	92
Calculated TDS	87
Limits > 1.0 - <1.2	1.1
Calcul TDS / E.C. (0.55 - 0.70)	0.6

P.L.G UYS (M.D.)
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Quantity Analyzed: 2

Our Ref: APN / 90 - 91 / F / 06 / 14
Quote Ref: Q/ARN/17062014
Att : Tshidi Mosehle

		F 91	
	Analysis Results mg/l	Potable Water	SANS Standards -241 (2011) Domestic Water Standard Limits
Physical requirements			
	Colour as Pt-Co*	<5.0	
	Conductivity at 25° C in mS/m	16.5	≤ 170
	Total Dissolved Solids	110	≤ 1 200
	Odour *	Inoffensive	Inoffensive
	pH-Value at 25 ° C	7.88	≥ 5.0 to ≤ 9.7
	Taste*	Inoffensive	Inoffensive
	Turbidity as N.T.U.	0.34	Operational ≤ 1.0 - Aesthetic ≤ 5.0
	Total Alkalinity as $CaCO_3$	51	
Macro Determinants			
	Free & Saline Ammonia NH_3 as N	<0.20	
	Calcium as Ca	9.94	
	Chlorides as Cl	11.0	≤300
	Fluoride as F	<0.20	≤1.5
	Magnesium as Mg	6.96	
	Nitrate & Nitrite as N	0.27	≤ 11
	Potassium as K	1.91	
	Sodium as Na	12.6	≤ 200
	Sulphate as SO_4	14.9	Acute Health ≤ 500 - Aesthetic ≤ 250
	Zinc as Zn	<0.01	≤5

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Our Ref: APN / 90 - 91 / F / 06 / 14
Quote Ref: Q/ARN/17062014
Att : Tshidi Mosehle

		F 91	
	Analysis Results µg/l	Potable Water	SANS Standards -241 (2011) Domestic Water Standard Limits
Micro Determinants µg/l			
	Aluminium as Al	64	*≤ 300*
	Antimony as Sb	<1.0	≤20
	Arsenic as As	<1.0	≤10
	Cadmium as Cd	<1.0	≤3
	Total Chromium as Cr	<1.0	≤50
	Cobalt as Co	<1.0	≤500
	Copper as Cu	<1.0	≤2000
	*Cyanide as CN **	<70	≤70
	Iron as Fe	19	*Chronic Health ≤ 2000 - Aesthetic ≤ 300*
	Lead as Pb	<1.0	≤10
	Manganese as Mn	16	*Chronic Health ≤ 500 - Aesthetic ≤ 100*
	Mercury as Hg	<1.0	≤6
	Nickel as Ni	<1.0	≤70
	Selenium as Se	<1.0	≤10
	Vanadium as V	2.51	≤200
Organics Determinand mg/l			
	Total Organic Carbon	2.03	*≤ 10*
Total Trihalomethanes mg/l			
	*Phenolic Compounds**	Attached	*≤ 0.01*

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These results are related only to the items tested

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QUALITY CONTROL CHECKS	
Cation Balance	1.67
Anion Balance	1.66
% Difference	0.2
Measured TDS	110
Calculated TDS	106
Limits > 1.0 - <1.2	1.0
Calcul TDS / E.C. (0.55 - 0.70)	0.7

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CERTIFICATE OF ANALYSIS

PHENOLIC COMPOUNDS

SAMPLE INFORMATION		LAB NUMBER	F90.D
DATE RECEIVED	10-Jun-14	DATE ANALYZED	24-Jun-14
CLIENT	**Arnot Powerstation**	MATRIX	Water
SAMPLE NAME	**Raw Water**		
CONTAINER	Plastic	DILUTION FACTOR	No Dilution
INSTRUMENT	Agilent 7890A GC/MS, Headspace 7697A, Solid Phase Microextraction		

COMPOUND	CONCENTRATION	UNITS
phenol	<10	µg/liter
2-chlorophenol	<10	µg/liter
2-methylphenol	<10	µg/liter
3+4-methylphenol	<10	µg/liter
2-nitrophenol	<10	µg/liter
2,4-dimethylphenol	<10	µg/liter
2,4-dichlorophenol	<10	µg/liter
2,6-dichlorophenol	<10	µg/liter
4-chloro-3-methylphenol	<10	µg/liter
2,3,5-trichlorophenol	<10	µg/liter
2,4,6-trichlorophenol	<10	µg/liter
2,4,5-trichlorophenol	<10	µg/liter
2,3,4-trichlorophenol	<10	µg/liter
2,3,6-trichlorophenol	<10	µg/liter
2,3,4,5-tetrachlorophenol	<10	µg/liter
2,3,4,6-tetrachlorophenol	<10	µg/liter
2,3,5,6-tetrachlorophenol	<10	µg/liter
pentachlorophenol	<10	µg/liter
DINOSEB	<10	µg/liter
TOTAL IDENTIFIED	**<10**	**µg/liter**

Samples stored at 5°C after acceptance by Regen Waters.
This report is only applicable to the sample provided for testing.
Regen Waters cannot be held accountable for any errors that might have been caused by improper sampling, handling or storage of samples prior to acceptance.
Results marked "*"-concentration outside of calibration range, estimate only.

P.L.G. UYS (M.D)

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CERTIFICATE OF ANALYSIS

TRIHALOMETHANE COMPOUNDS

(THM)

SAMPLE INFORMATION		LAB NUMBER	F90.D
DATE RECEIVED	10-Jun-14	DATE ANALYZED	15-Jun-14
CLIENT	**Arnot Powerstation**	MATRIX	Water
SAMPLE NAME	**Raw Water**		
CONTAINER	Plastic		
INSTRUMENT	Agilent 7890A GC/MS, Headspace 7697A, Solid Phase Extraction		

COMPOUND	CONCENTRATION	UNITS
Chloroform	<10	µg/liter
Trichloroethene	<10	µg/liter
Bromodichloromethane	<10	µg/liter
Dibromochloromethane	<10	µg/liter
Bromoform	<10	µg/liter

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Trihalomethane Result Interpretation

According to the South African National Standards 241-1: Ed1 2011 the limits for Trihalomethane content in drinking water are:

Compound	Concentration	Units
Chloroform	<300	µg/liter
Bromoform	<100	µg/liter
Dibromochloromethane	<100	µg/liter
Bromodichloromethane	<60	µg/liter
Trichloroethene*	<20	µg/liter

*Standard from the World Health Organization drinking water standard 2011 (Not technically a THM but is a frequently requested compound in conjunction with THM analysis.)

Trihalomethanes in potable water is a by-product of disinfection using chlorine and other disinfectants. The concentration of Trihalomethanes in potable water needs to be monitored, as long term consumption of high concentrations can lead to chronic ailments.

The sample submitted Arnot Powerstation Raw Water
complies with the standards for Trihalomethane content in drinking water.

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CERTIFICATE OF ANALYSIS

PHENOLIC COMPOUNDS

SAMPLE INFORMATION		LAB NUMBER	F91.D
DATE RECEIVED	10-Jun-14	DATE ANALYZED	24-Jun-14
CLIENT	**Arnot Powerstation**	MATRIX	Water
SAMPLE NAME	**Potable Water**		
CONTAINER	Plastic	DILUTION FACTOR	No Dilution
INSTRUMENT	Agilent 7890A GC/MS, Headspace 7697A, Solid Phase Microextraction		

COMPOUND	CONCENTRATION	UNITS
phenol	<10	µg/liter
2-chlorophenol	<10	µg/liter
2-methylphenol	<10	µg/liter
3+4-methylphenol	<10	µg/liter
2-nitrophenol	<10	µg/liter
2,4-dimethylphenol	<10	µg/liter
2,4-dichlorophenol	<10	µg/liter
2,6-dichlorophenol	<10	µg/liter
4-chloro-3-methylphenol	<10	µg/liter
2,3,5-trichlorophenol	<10	µg/liter
2,4,6-trichlorophenol	<10	µg/liter
2,4,5-trichlorophenol	<10	µg/liter
2,3,4-trichlorophenol	<10	µg/liter
2,3,6-trichlorophenol	<10	µg/liter
2,3,4,5-tetrachlorophenol	<10	µg/liter
2,3,4,6-tetrachlorophenol	<10	µg/liter
2,3,5,6-tetrachlorophenol	<10	µg/liter
pentachlorophenol	<10	µg/liter
DINOSEB	<10	µg/liter
TOTAL IDENTIFIED	**<10**	**µg/liter**

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(THM)

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CLIENT	Arnot Powerstation	MATRIX	Water
SAMPLE NAME	Potable Water		
CONTAINER	Plastic		
INSTRUMENT	Agilent 7890A GC/MS, Headspace 7697A, Solid Phase Extraction		

COMPOUND	CONCENTRATION	UNITS
Chloroform	<10	µg/liter
Trichloroethene	<10	µg/liter
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Dibromochloromethane	<10	µg/liter
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