

HENDRINA POWER STATION

Private Bag X 1003
PULLENSHOPE
1096

CERTIFICATE OF CHEMICAL ANALYSIS

Date received: 4 November 2014
Date reported : 25 November 2014
Quantity Analyzed: 5
Lab No :

Our Ref: HPS / 182 - 186 / A / 11 / 14
Attention : Mr. G Coertze

A 182

	Analysis Results mg/l	Waterplant Raw Water Tap	<i>Standard Limits</i>
Physical requirements			
	Colour as Pt-Co*	5	
	Conductivity at 25° C in mS/m	15.0	≤ 170
	Total Dissolved Solids	132	≤ 1 200
	Odour *	Inoffensive	<i>Inoffensive</i>
	pH-Value at 25 ° C	7.68	≥ 5.0 to ≤ 9.7
	Taste*	Inoffensive	<i>Inoffensive</i>
	Turbidity as N.T.U.	9.66	<i>Operational ≤ 1.0 - Aesthetic ≤ 5.0</i>
	Total Alkalinity as CaCO ₃	58.0	
Macro Determinants			
	Free & Saline Ammonia NH ₃ as N	<0.20	
	Calcium as Ca	12.8	
	Chlorides as Cl	7.83	≤300
	Fluoride as F	<0.20	≤1.5
	Magnesium as Mg	9.24	
	Nitrate & Nitrite as N	0.31	≤ 11
	Potassium as K	1.97	
	Sodium as Na	10.3	≤ 200
	Sulphate as SO ₄	17.3	<i>Acute Health ≤ 500 - Aesthetic ≤ 250</i>
	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

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A 182

	Analysis Results µg/l	Waterplant Raw Water Tap	<i>Standard Limits</i>
<i>Micro Determinants µg/l</i>			
	<i>Aluminium as Al</i>	56.0	≤ 300
	<i>Antimony as Sb</i>	<1.0	≤20
	<i>Arsenic as As</i>	<1.0	≤10
	<i>Cadmium as Cd</i>	<1.0	≤3
	<i>Total Chromium as Cr</i>	1.61	≤50
	<i>Cobalt as Co</i>	<1.0	≤500
	<i>Copper as Cu</i>	19.0	≤2000
	<i>Cyanide as CN *</i>	<70	≤70
	<i>Iron as Fe</i>	126	<i>Chronic Health ≤ 2000 - Aesthetic ≤ 300</i>
	<i>Lead as Pb</i>	<1.0	≤10
	<i>Manganese as Mn</i>	22.0	<i>Chronic Health ≤ 500 - Aesthetic ≤ 100</i>
	<i>Mercury as Hg</i>	<1.0	≤6
	<i>Nickel as Ni</i>	<1.0	≤70
	<i>Selenium as Se</i>	<1.0	≤10
	<i>Vanadium as V</i>	20.0	≤200
<i>Organics Determinand mg/l</i>			
	<i>Total Organic Carbon</i>	2.96	≤ 10
	<i>Total Trihalomethanes mg/l</i>	Attached	
	<i>Phenolic Compounds*</i>	Attached	≤ 0.01

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QUALITY CONTROL CHECKS	
<i>Cation Balance</i>	1.90
<i>Anion Balance</i>	1.76
<i>% Difference</i>	3.7
<i>Measured TDS</i>	132
<i>Calculated TDS</i>	118
<i>Limits > 1.0 - <1.2</i>	1.1
<i>Calcul TDS / E.C. (0.55 - 0.70)</i>	0.8


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

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A 183

		Waterplant Tap	<i>Standard Limits</i>
Physical requirements			
	Colour as Pt-Co*	<5.0	
	Conductivity at 25° C in mS/m	17.4	≤ 170
	Total Dissolved Solids	136	≤ 1 200
	Odour *	Inoffensive	<i>Inoffensive</i>
	pH-Value at 25 ° C	8.75	≥ 5.0 to ≤ 9.7
	Taste*	Inoffensive	<i>Inoffensive</i>
	Turbidity as N.T.U.	1.24	<i>Operational ≤ 1.0 - Aesthetic ≤ 5.0</i>
	Total Alkalinity as CaCO ₃	63.0	
Macro Determinants			
	Free & Saline Ammonia NH ₃ as N	<0.20	
	Calcium as Ca	13.4	
	Chlorides as Cl	12.0	≤300
	Fluoride as F	<0.20	≤1.5
	Magnesium as Mg	9.16	
	Nitrate & Nitrite as N	0.32	≤ 11
	Potassium as K	2.99	
	Sodium as Na	14.5	≤ 200
	Sulphate as SO ₄	15.0	<i>Acute Health ≤ 500 - Aesthetic ≤ 250</i>
	Zinc as Zn	<0.01	≤5

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A 183

	Analysis Results µg/l	Waterplant Tap	<i>Standard Limits</i>
Micro Determinants µg/l			
	<i>Aluminium as Al</i>	62.0	≤ 300
	<i>Antimony as Sb</i>	<1.0	≤20
	<i>Arsenic as As</i>	<1.0	≤10
	<i>Cadmium as Cd</i>	<1.0	≤3
	<i>Total Chromium as Cr</i>	1.02	≤50
	<i>Cobalt as Co</i>	<1.0	≤500
	<i>Copper as Cu</i>	<1.0	≤2000
	<i>Cyanide as CN *</i>	<70	≤70
	<i>Iron as Fe</i>	40.0	<i>Chronic Health ≤ 2000 - Aesthetic ≤ 300</i>
	<i>Lead as Pb</i>	<1.0	≤10
	<i>Manganese as Mn</i>	12.0	<i>Chronic Health ≤ 500 - Aesthetic ≤ 100</i>
	<i>Mercury as Hg</i>	<1.0	≤6
	<i>Nickel as Ni</i>	<1.0	≤70
	<i>Selenium as Se</i>	<1.0	≤10
	<i>Vanadium as V</i>	18.7	≤200
Organics Determinand mg/l			
	<i>Total Organic Carbon</i>	1.70	≤ 10
	<i>Total Trihalomethanes mg/l</i>	Attached	
	<i>Phenolic Compounds*</i>	Attached	≤ 0.01

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QUALITY CONTROL CHECKS	
<i>Cation Balance</i>	2.13
<i>Anion Balance</i>	1.93
<i>% Difference</i>	4.8
<i>Measured TDS</i>	136
<i>Calculated TDS</i>	119
<i>Limits > 1.0 - <1.2</i>	1.1
<i>Calcul TDS / E.C. (0.55 - 0.70)</i>	0.7


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A 184

		Pumpstation Tap	<i>Standard Limits</i>
Physical requirements			
	Colour as Pt-Co*	<5.0	
	Conductivity at 25° C in mS/m	17.8	≤ 170
	Total Dissolved Solids	136	≤ 1 200
	Odour *	Inoffensive	<i>Inoffensive</i>
	pH-Value at 25 ° C	9.00	≥ 5.0 to ≤ 9.7
	Taste*	Inoffensive	<i>Inoffensive</i>
	Turbidity as N.T.U.	1.50	<i>Operational ≤ 1.0 - Aesthetic ≤ 5.0</i>
	Total Alkalinity as CaCO ₃	68.0	
Macro Determinants			
	Free & Saline Ammonia NH ₃ as N	<0.20	
	Calcium as Ca	13.7	
	Chlorides as Cl	13.0	≤300
	Fluoride as F	<0.20	≤1.5
	Magnesium as Mg	9.31	
	Nitrate & Nitrite as N	0.32	≤ 11
	Potassium as K	2.52	
	Sodium as Na	17.5	≤ 200
	Sulphate as SO ₄	15.7	<i>Acute Health ≤ 500 - Aesthetic ≤ 250</i>
	Zinc as Zn	<0.01	≤5

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	Analysis Results µg/l	Pumpstation Tap	<i>Standard Limits</i>
<i>Micro Determinants µg/l</i>			
	<i>Aluminium as Al</i>	30.0	≤ 300
	<i>Antimony as Sb</i>	1.07	≤20
	<i>Arsenic as As</i>	1.62	≤10
	<i>Cadmium as Cd</i>	<1.0	≤3
	<i>Total Chromium as Cr</i>	1.33	≤50
	<i>Cobalt as Co</i>	<1.0	≤500
	<i>Copper as Cu</i>	<1.0	≤2000
	<i>Cyanide as CN *</i>	<70	≤70
	<i>Iron as Fe</i>	35.0	<i>Chronic Health ≤ 2000 - Aesthetic ≤ 300</i>
	<i>Lead as Pb</i>	1.05	≤10
	<i>Manganese as Mn</i>	12.0	<i>Chronic Health ≤ 500 - Aesthetic ≤ 100</i>
	<i>Mercury as Hg</i>	<1.0	≤6
	<i>Nickel as Ni</i>	<1.0	≤70
	<i>Selenium as Se</i>	2.35	≤10
	<i>Vanadium as V</i>	13.0	≤200
<i>Organics Determinand mg/l</i>			
	<i>Total Organic Carbon</i>	1.70	≤ 10
	<i>Total Trihalomethanes mg/l</i>	Attached	
	<i>Phenolic Compounds*</i>	Attached	≤ 0.01

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QUALITY CONTROL CHECKS	
<i>Cation Balance</i>	2.28
<i>Anion Balance</i>	2.08
<i>% Difference</i>	4.6
<i>Measured TDS</i>	136
<i>Calculated TDS</i>	127
<i>Limits > 1.0 - <1.2</i>	1.1
<i>Calcul TDS / E.C. (0.55 - 0.70)</i>	0.7


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A 185

	Optimum Tap	<i>Standard Limits</i>
Physical requirements		
Colour as Pt-Co*	<5.0	
Conductivity at 25° C in mS/m	17.7	≤ 170
Total Dissolved Solids	138	≤ 1 200
Odour *	Inoffensive	<i>Inoffensive</i>
pH-Value at 25 ° C	9.04	≥ 5.0 to ≤ 9.7
Taste*	Inoffensive	<i>Inoffensive</i>
Turbidity as N.T.U.	1.26	<i>Operational ≤ 1.0 - Aesthetic ≤ 5.0</i>
Total Alkalinity as CaCO ₃	68.0	
Macro Determinants		
Free & Saline Ammonia NH ₃ as N	<0.20	
Calcium as Ca	13.6	
Chlorides as Cl	13.1	≤300
Fluoride as F	<0.20	≤1.5
Magnesium as Mg	9.13	
Nitrate & Nitrite as N	0.40	≤ 11
Potassium as K	2.55	
Sodium as Na	17.3	≤ 200
Sulphate as SO ₄	15.5	<i>Acute Health ≤ 500 - Aesthetic ≤ 250</i>
Zinc as Zn	0.02	≤5

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	Analysis Results µg/l	Optimum Tap	<i>Standard Limits</i>
<i>Micro Determinants µg/l</i>			
	<i>Aluminium as Al</i>	28.0	≤ 300
	<i>Antimony as Sb</i>	3.36	≤20
	<i>Arsenic as As</i>	<1.0	≤10
	<i>Cadmium as Cd</i>	<1.0	≤3
	<i>Total Chromium as Cr</i>	1.8	≤50
	<i>Cobalt as Co</i>	<1.0	≤500
	<i>Copper as Cu</i>	28.40	≤2000
	<i>Cyanide as CN *</i>	<70	≤70
	<i>Iron as Fe</i>	212.0	<i>Chronic Health ≤ 2000 - Aesthetic ≤ 300</i>
	<i>Lead as Pb</i>	<1.0	≤10
	<i>Manganese as Mn</i>	12.0	<i>Chronic Health ≤ 500 - Aesthetic ≤ 100</i>
	<i>Mercury as Hg</i>	<1.0	≤6
	<i>Nickel as Ni</i>	<1.0	≤70
	<i>Selenium as Se</i>	1.31	≤10
	<i>Vanadium as V</i>	13.6	≤200
<i>Organics Determinand mg/l</i>			
	<i>Total Organic Carbon</i>	1.69	≤ 10
	<i>Total Trihalomethanes mg/l</i>	Attached	
	<i>Phenolic Compounds*</i>	Attached	≤ 0.01

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QUALITY CONTROL CHECKS	
<i>Cation Balance</i>	2.25
<i>Anion Balance</i>	2.08
<i>% Difference</i>	3.9
<i>Measured TDS</i>	138
<i>Calculated TDS</i>	126
<i>Limits > 1.0 - <1.2</i>	1.1
<i>Calcul TDS / E.C. (0.55 - 0.70)</i>	0.7


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		Lab Tap	Standard Limits
Physical requirements			
	Colour as Pt-Co*	<5.0	
	Conductivity at 25° C in mS/m	17.5	≤ 170
	Total Dissolved Solids	136	≤ 1 200
	Odour *	Inoffensive	Inoffensive
	pH-Value at 25 ° C	8.87	≥ 5.0 to ≤ 9.7
	Taste*	Inoffensive	Inoffensive
	Turbidity as N.T.U.	1.97	Operational ≤ 1.0 - Aesthetic ≤ 5.0
	Total Alkalinity as CaCO ₃	66.0	
Macro Determinants			
	Free & Saline Ammonia NH ₃ as N	<0.20	
	Calcium as Ca	12.9	
	Chlorides as Cl	12.7	≤300
	Fluoride as F	<0.20	≤1.5
	Magnesium as Mg	9.26	
	Nitrate & Nitrite as N	0.33	≤ 11
	Potassium as K	2.52	
	Sodium as Na	16.5	≤ 200
	Sulphate as SO ₄	15.2	Acute Health ≤ 500 - Aesthetic ≤ 250
	Zinc as Zn	0.06	≤5

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	Analysis Results µg/l	Lab Tap	<i>Standard Limits</i>
<i>Micro Determinants µg/l</i>			
	<i>Aluminium as Al</i>	54.0	≤ 300
	<i>Antimony as Sb</i>	1.98	≤20
	<i>Arsenic as As</i>	<1.0	≤10
	<i>Cadmium as Cd</i>	<1.0	≤3
	<i>Total Chromium as Cr</i>	2.64	≤50
	<i>Cobalt as Co</i>	<1.0	≤500
	<i>Copper as Cu</i>	<1.0	≤2000
	<i>Cyanide as CN *</i>	<70	≤70
	<i>Iron as Fe</i>	39.0	<i>Chronic Health ≤ 2000 - Aesthetic ≤ 300</i>
	<i>Lead as Pb</i>	<1.0	≤10
	<i>Manganese as Mn</i>	11.0	<i>Chronic Health ≤ 500 - Aesthetic ≤ 100</i>
	<i>Mercury as Hg</i>	<1.0	≤6
	<i>Nickel as Ni</i>	<1.0	≤70
	<i>Selenium as Se</i>	1.31	≤10
	<i>Vanadium as V</i>	14.7	≤200
<i>Organics Determinand mg/l</i>			
	<i>Total Organic Carbon</i>	1.73	≤ 10
	<i>Total Trihalomethanes mg/l</i>	Attached	
	<i>Phenolic Compounds*</i>	Attached	≤ 0.01

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QUALITY CONTROL CHECKS	
<i>Cation Balance</i>	2.19
<i>Anion Balance</i>	2.02
<i>% Difference</i>	4.0
<i>Measured TDS</i>	136
<i>Calculated TDS</i>	122
<i>Limits > 1.0 - <1.2</i>	1.1
<i>Calcul TDS / E.C. (0.55 - 0.70)</i>	0.7


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