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CHAPTER 11 FRESH WATER SUPPLY

11.1. General

The power station receives its water from two independent sources. The local authority provides the bulk of the required water. The balance is augmented by the supply from the Aquarius well fields. The supply system to the area and site is shown on ***Drawings 29*** and ***33***.

11.2. Local Authority Supply

The local authority (Cape Metropolitan Council) augments the water supply to the greater metropolitan area from the Voëlvlei Dam approximately 12.5 km south west of Tulbagh. At the Voëlvlei Dam water is treated and pumped to the Platterkloof Reservoir, along a 75 km, 1500 mm diameter fibre cement pipeline. The Voëlvlei Head Meter is located approximately 8 km north of the Platterkloof Reservoir, on the Voëlvlei Dam/Platterkloof Reservoir pipeline. At the Voëlvlei Head Meter a 700 mm diameter fibre cement pipe supplies the 40 000 m^3 Melkbos Reservoir, located on the farm Blaauweberg.

The Melkbos Reservoir supplies the northern substructure with water. The water gravitates along a 700 mm diameter fibre cement pipe to a valve chamber north east of the Melkbosstrand/Otto du Plessis drive intersection. In the valve chamber the 700 mm supply pipe feeds both a 300 and 400 mm diameter fibre cement pipe. The 300 mm pipe supplies water to the residences of Bloubergstand, Melkbosstrand, Van Riebeeckstrand and augments the water supply to Duynefontein. These pipes are predominately installed in the western road reserve along Otto du Plessis drive. The 400 mm pipe is installed in the eastern road reserve along Otto du Plessis drive and crosses to the west of Otto du Plessis drive, at the intersection with Carmichael street (south entrance). This is as a result of redesigning the road layout after the pipeline was installed.

The 400 mm pipe feeds a valve chamber to the west of Otto du Plessis drive, between the intersections with Bresford street and Carmichael street (north entrance). In the valve chamber the 400 mm supply pipe feeds both a 150 and 350 mm diameter fibre cement pipe. The 150 mm pipe supplies water to the residences of Duynefontein and augments the water supply to Van Riebeeckstrand. The 350 mm diameter pipe supplies water to a meter chamber.

The meter chamber is located to the east of Otto du Plessis drive at the power station boundary. The 350 mm pipe is installed in a straight line between the valve and meter chambers. Thus the 350 mm pipe crosses the Otto du Plessis drive at the intersection with Dunker street, before crossing the sports field and crossing the Otto du Plessis drive twice at the intersection with Narcissus avenue.

The water consumption of the power station is measured at the meter chamber. The 350 mm pipe is installed in the eastern road reserve along Otto du Plessis drive and feeds a valve chamber south-east of the power station. In the valve chamber the 350 mm supply pipe feeds two 150 and one 250 mm diameter fibre cement pipes. The 150 mm pipe (west) supplies water to the training centre. The 250 mm pipe supplies water to the power station. The 150 mm pipe (east) supplies water to the owner controlled area outside the security fence.

It is envisaged that by 1998 a 500 mm diameter supply pipe will be installed in the eastern road reserve along the West Coast Road, to augment the water requirements in Atlantis.

11.3. Aquarius Well Field Supply

The Aquarius well field is located in the Witzand aquifer, approximately 5 km north-east of the power station, to augment the water supply by the local authorities. The well field currently yields approximately 40 000 m^3 per month

The Aquarius well field comprises of ten wells. Eight of these wells are found on the farm "Kleine Springfontyn", the remaining two are found on the farm "Duynefontyn". Each well is lined with a perforated casing, which is between 27 to 31 metres in depth. However, only eight of the ten boreholes are fully equipped with submerisble pumps, control valves and flowmeters. The extracted groundwater is pumped along a 5 km collector pipe to the SEP water reservoir. The collector pipe is a 160 mm diameter PVC pipeline.

11.4. Community Supply

The local authorities supply the required water to the residential areas of Bloubergstrand, Melkbosstrand, Van Riebeeckstrand and Duynefontein as described in ***Section 11.2***.

Atlantis is supplied with groundwater extracted from two well fields operated by the Cape Metropolitan Council. Silverstroom well field is approximately 12 km north of the power station and Witzand well field is approximately 6 km north of the power station. In 1995 an estimated 2.0 and 3.3. million m^3 were extracted from the two well fields respectively.

The farms in the area derive their water requirements from harvested and extracted water.

11.5. Water Analysis

An analysis of the Voëlvlei water is presented in ***Table 11.1*** (***Reference 11.1***) for both raw and treated water.

This analysis is for September 1996 and is typical of this water supply.

Analytical data on the raw water from the boreholes of the Aquarius Project is presented in ***Table 11.2***. The analysis of the water is carried out by the Koeberg Power Station Chemistry Department (***Reference 11.2***).

REFERENCES

11.1) Analytical Values of the Scientific Services Branch of the City Engineer's Department for September 1996.

11.2) Analytical Values of the Chemistry Department of Koeberg Nuclear Power Station.

TABLE 11.1
VOËLVLEI FILTRATION PLANT - ANALYSIS OF WEEKLY COMPOSITION
(September 1996)

	RAW WATER				TREATED WATER			
	1996/9/3	1996/9/10	1996/9/17	1996/9/25	1996/9/3	1996/9/10	1996/9/17	1996/9/25
PHYSICAL								
Conductivity @ 20 °C mS/m	8.8	8.9	8.7	9.0	12.3	12.1	12.2	12.7
pH	8.16	7.53	8.03	8.01	9.14	8.95	8.81	8.90
Turbidity NTU	14.9	14.8	12.8	15.1	0.65	1.31	1.49	2.10
Colour Plat.Std	20	15	10	20	2	2	2	2
UV Absorbance300nm/40mm	0.268	0.271	0.241	0.272	0.061	0.061	0.061	0.061
ORGANIC								
PV4 @ 27 °C mg/ℓ	2.3	2.3	2.0	2.3	0.7	0.7	0.7	0.7
HARNESS								
Total $CaCO_3$ mg/ℓ	18.5	18.8	18.3	18.9	35.5	36.8	35.3	34.9
MINERAL								
Alkalinity $CaCO_3$ mg/ℓ	10.0	8.0	10.0	11.5	12.5	13.0	13.5	13.5
Chloride Cl mg/ℓ	21.0	17.0	19.5	16.5	23.5	20.0	23.0	19.5
Sulphate SO_4 mg/ℓ	3.8	2.5	4.3	3.9	13.5	13.4	12.9	12.7
Calcium Ca mg/ℓ	3.00	3.10	2.90	3.10	9.80	10.2	9.70	9.50
Magnesium Mg mg/ℓ	2.64	2.67	2.65	2.69	2.65	2.72	2.67	2.69
Sodium Na mg/ℓ	11.5	10.9	11.5	11.3	11.6	11.0	11.5	11.8
Potassium K mg/ℓ	0.85	0.80	0.79	0.84	0.74	0.74	0.70	0.76
TRACE METALS								
Aluminium Al mg/ℓ	0.53	0.57	0.62	0.52	0.05	0.03	0.06	0.05
Iron Fe mg/ℓ	0.450	0.318	0.485	0.433	0.002	0.004	0.019	0.247
Manganese Mn mg/ℓ	0.003	0.010	0.007	0.010	<0.001	0.002	<0.001	0.008
NITROGEN								
Ammonia N mg/ℓ	-	-	0.027	-	-	-	0.028	-
Albuminoid N mg/ℓ	-	-	0.166	-	-	-	0.122	-
OTHER IONS								
Silica Si mg/ℓ	0.69	0.29	0.24	0.10	-	-	0.04	-
Total Phosphate P mg/ℓ	-	-	0.017	-	-	-	0.007	-
Fluoride F mg/ℓ	-	-	-	-	-	-	-	-
Total dissolved Solids mg/ℓ	-	-	64	-	-	-	89	-

TABLE 11.2
AQUARIUS PROJECT BOREHOLE WATER ANALYSIS - 12/05/97

	GCS 1	GCS 2	GCS 3	GCS 4	GCS 5	GCS 7	GCS 9	GCS 10	Aver age
Proposed Abstraction Rate (ℓ/s)	**2**	**3**	**2.5**	**2**	**3**	**3**	**5**	**6**	
Date Sampled									
Date Analysed									
Al µg/kg		54	41	43	26	36	23	18	34
Ba	*								
Ca mg/kg	86	84	91	64	71	67	71	52	73
Fe Total µg/kg	110	1160	1800	420	570	1700	820	820	925
K µg/kg	2864	2701	3070	2163	2616	1912	2016	1845	2398
Mg mg/kg	28	25.5	26.5	18	16.5	20	20	20.5	21.9
Na mg/kg	270	249	213	162	193	184	189	225	211
Sr	*								
Br	*								
Cl mg/kg	550	459	400	310	377	350	350	450	406
F	*								
NO_3	1.3	1.54	1.28	1.85	1.05	0.9	0.9	1.1	1.24
PO_4 mg/kg	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	
SiO_2 mg/kg	10.56	12.66	7.26	12.66	6.15	5.94	9.88	7.94	9.13
SO_4 mg/kg	40	137	152	30	137	80	n/d	n/d	96
TDS mg/kg	1000	1797	1019	1540	1052	1000	999	1260	1208
Total Hard $mgCaCO_3/kg$	310.3	330.3	320.3	225.2	250.2	240.1	255.2	215.2	268.4
T Alkalinity	190	205	190	125	140	145	215	140	169
pH	7.8	7.5	7.33	7.07	7.24	7.26	7.12	7.18	7.31
K25 µS/cm	1990	1870	1710	2290	1390	1420	1500	1560	1716
Temp									
Total Aerobic Plate Count		12000		11600		331000	37000		
Sulphide		Pos		40		94	73		
Total Aerobic Plate Count				940					
Total Anaerobic Plate Count				740					
Sulphide				Pos					
Fungi				< 10					

* Unable to perform analyses