VOITH	Data Sheet	West End Dam Sheet 1

1. Data of Turbine

Type of turbine		: Kaplan S-turbine
Turbine size		: 32.1 (runner Ø 3.21 m)
Voith turbines No.		: 17 883 / 17 884
Head max.		: 6.096 m (20.0 ft)
Water discharge max.		: 58.8 m3/s (~~1.797~~ cfs) 2076 cfs (jca)
Output max.		: 2750 kW
Distributor	$\Delta\gamma$	: max. = 68^{o}
Runner	γ	: min. = 0^{o} max. = 34^{o}
Turbine speed		: n = 120 min^{-1}
Runaway speed		: about 301 %
Overspeed		: about 170 %

2. Data of Generator:

Make	: Siemens Allis Inc.
Generator speed	: n_{Gen} = 720 min^{1}

3. Regulating Device

3.1 Governor oil tank K 4000/2S

Size: 2000 x 1200 x 1100 (L x W x H)
Oil requirements governor oil tank: about 1000 l

Equipment:

1 AC pump unit (main pump)	Q = 106 l/min at n = 1740 min^{-1}
motor output	P = 21.3 kW / 60 Hz
1 DC startup pump	Q = 25 l/min^{-1} at n ≙ 1450 min^{-1}
motor output	P = 5.1 kW

1 safety valve 1007: max. flowrate at 60 bar = 300 l/min
1 safety valve 1017: max. flowrate at 60 bar = 34 l/min
1 distributor regulating valve with emergency changeover valve and emergency equipment (DN 50)

$T_{s\ Le}$ = 4 sec

$T_{s\ LE}$ via emergency shutdown = 6 sec

$T_{ö\ Le}$ = 8 sec

1 runner regulating valve (DN 30)
$T_{s\ La}$ = 10 sec

$T_{ö\ La}$ = 10 sec

2 servovalves of moving-coil type 2100 Y and 2200 Y
1 unloader valve DN 40 (1002/1003)
1 hydraulically controlled shutoff valve (1101)

1 return flow filter 1116
1 duplex filter 2126
1 oil level indicator 1081 S1-2

1 temperature monitor 1180 S1-2
4 solenoid valves 2130 Y / 2140 Y / 1100 Y and 2951 Y

3.2 Pressure Tank Accumulator Station

Size: Ø 600 x about 2300	(with safety valve)
Design pressure	: 64 bar
max. operating pressure	: 60 bar
Servomotor design pressure	: 40 bar
Total contents	: about 343 l
Oil volume at 60 bar	: 153 l
Air volume at 60 bar	: 190 l

1 oil level monitor 1040 S1-S5
1 oil pressure monitor 1043 S1-S5
(see drawing No. 2.41-49207)
1 visual oil level indicator 1038
1 air safety valve 1033

4. Compressor Station for Air Replenishment 1050

Compressor capacity Q = 120 l/min
Final pressure safety valve P = 62 bar
Speed n = 1740 min^{-1}
Three-phase AC motor 2.6 kW, 460 V / 60 Hz
Compressor control cabinet 1050 A

5. Equipment in the Plant

5.1 Gate Servomotor with feedback transmitter

Size Ø 140/90 x 800 max. stroke (2153)

max. design pressure	= 200 bar
max. working pressure	= 60 bar
operating pressure	= 40 bar
pressure connections	= G 1 1/4
oil volume for closure	= 7.1 l/stroke
oil volume for opening	= 12.0 l/stroke

5.2 Distributor Restoring Mechanism

Path measurement electronics 2154 B

Output signals:

Piston retracted	= 4 mA
Piston extended	= 20 mA

5.3 Runner Servomotor

Size: Ø 320/160 x 184.2 stroke (hydraulic)

Oil volume for closure	= 14.8 l/stroke
Oil volume for opening	= 11.1 l/stroke
Operating pressure	: 40 bar
Pressure connections	: G 1 1/4

6. Electronic Governor 2300 N

Type EHR 530 D
for the following methods of control:

a. Frequency adaptation control for synchronization at no-load.

b. Speed control for no-load operation and isolated network operation

c. Gate opening limit

d. Water level control, i.e. headwater level control to a fixed setpoint.

Current supply 24 V/DC from a battery.

7. Water level detector 2280

consisting of: Pressure data pickup 2280 B with connection box (overvoltage protection 2280 F1 installed)

Amplifier 2280 N with overvoltage protection 2280 F 2 (installed in the control cabinet)

Current supply 24 V/DC