MAIN PLANT

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INTAKE AREA

MODE INSTRUMENTATION UPSTREAM AND AT BIFURCATION STRUCTURE

Mode Instrumentation	3.66km (2.27 mi) upstream of bifurcation structure			
Conductivity	4500 tg 5500 microsiemens/cm			
flow	4.85 m /s	111 MGD	171 cfs	112,100 ac-ft/y
level		35.159 m	115.4 ft	
pH	7.0 to 8.5			
TDS	3200 mg/L			
temperature	4.4 - 32.2□C	40 - 90□F		
turbidity	0 to 200 JTU			
continuous sample				
to lab	5 min. maximum travel time			
flow rate	1.5 L/s @ 28.9 m	23.8 9pm @ 94.8ft		

MODE BIFURCATION RADIAL GATES

Bypass Drain Radial Gates (2)	3.05 x 2.13 m	10 x 7 ft	
MODE 2 Radial Gates (2)		2.44 x 2.13 m	8 x 7 ft

MODE 2 Radial Gates 12.5 - kW emergency engine generator set, starts after power outage of 1 minute. Each gate, fully open, can handle the full MODE design flow.

Data for wire-rope hoists:

hoist capacity	5806 kg	12,8000 lb
motor horsepower	0.56 kw	0.75 hp
worm-gear reducer ratio	60 to 1	
drum unit gear ratio	none	
drum pitch diameter	14.3 cm	5 - e inch
drum speed	1.04 rpm	
operator output	62.4 rpm	

lifting speed	0.47 m/min	1.53 ft/min		
wire-rope diameter	0.95 cm	d inch		
MODE Dimensions:				
top width	10.06 m	33 ft		
bottom width	3.66 m	12 ft		
depth	2.13 m	7 ft		
side slope	1 - ½ : 1			
Drawdown rate:	150 mm/hour	5.9 in/hr		

INTAKE SLIDE GATES

Slide gate (4)	1.37 x 1.37 m	54 x 54 in		
face pressure	6.4 m	21 ft		
gate weight	932 kg	2,055 lb		
stem weight	50 kg	110 lb		
lift	318 kg	701 lb		

Three intake pipes can handle plant design feed flow

GRIT SEDIMENTATION BASINS (4)

Intake pipes (4)				
diameter				
(precast concrete)	1.37 m	54 in		
influent flow	4.5 $m^{3/s}$	102.7 MGD	159 cfs	104,000 ac-ft/y
influent chlorine				
dosage	7.5 mg/L	33.1 g/s	119 kg/hr	263 lb/hr
low deflector vanes	13 per basin			
basin dimensions	16 x 16 m	52.5 x 52.5 ft		
effluent weir length	16 m aluminum	52.5 ft		
grit pumps	2 per pair of basins (operating alternately)			
pump to grit pump				
piping	10.16 cm, cast iron	4 in		
grit pump outlet				
piping	15.24	cm HDPE	6 in	
ry weight of solids	244 g/s	878.4 kg/hr	1937 lb/h	
percent solids	5%			
grit settling velocity	51% removal at 0.5 ft/s			
grit to sludge area	229 9/s	825 kg/hr	1820 lb/h	
effluent flowrate	4.5 $m^{3/}$s	102.7 MGD	159 cfs	104,000 ac-ft/y

INTAKE PUMPING PLANT AND SCR FLOW CONTROL

Number of intake pumps				
Intake pumps are single-stage, vertical, mixed - flow units				
4 pumps rated: (707) rpm)	1.43 m^3/s @ 13.7 m	22,665 gpm @ 45 ft	50.5 cf	
Patterson model SAFV				
column pipe: diameter	762 mm	2.5 ft		
length		4534 mm	14.88 ft	
Westinghouse motor		261 kw	350 hp	
mass: motor		2106 kg	4643 lb	
assembled		6804 kg	15,000 lb	
1 pump rated: (887 rpm)	0.80 m/s @ 13.7 m	12,680 gpm @ 45 ft	28.3 cf	
Patterson model SAFV				
column pipe: diameter	610 mm	2 ft		
length		4857 mm	15.94 ft	

Westinghouse motor		149 kw	200 hp
mass: motor		1590 kg	3505 lb
assembled		3629 kg	8000 lb
SCR influent flow control	30 in (0.76 m) magnetic flowmeter		
		30 in (0.76 m) BFV	

SOLIDS CONTACT REACTORS (3)

Dimensions: diameter		56.4 m	185 ft
wall height	6.1 m	21.5 ft	
center depth	8.31 m	27.26 ft	
wall thickness	0.457 m^3	18 in	
tank volume	17813 m^3	4.71 Mgal	629,060 ft^3
SCR influent rate		4.5 m^3/s	102.7 MGD 159 cfs 104,000 ac-f
design flow rate		1.4 m^3/s	32 MGD 49.5 cfs 32,400 ac-ft/y
sludge to thickener: solids	5%		
flow	4160 g/s	15,000 kg/hr	33,000 lb/hr
supernatant: solids		0.1%	
flowrate		0.063 m^3/s	1.44 MGD 2.22 cfs 1500 ac-ft/y
thickened sludge: solids	19.9%		
flowrate	4100 g/s	14,800kg/hr	32,500 lb/hr
recycled flow to SCR:		0.068 m^3/s	1.54 MGD 2.4 cfs 1600 ac-ft/y
backwash return flows to SCR:	0.204 m^3/s	4.66 MGD 7.2 cfs 4700 ac-ft/y	
SCR effluent		4.7 m^3/s	107.3 MGD 166 cfs 99,450 ac-ft/y
draft tube inside diameter	6.096 m	20 ft	
mixer blade diameter		4.267 m	14 ft
mixer blade depth		1.219 m	4 ft
turbine type mixer: motor	56 kw	75 hp	
speed	3.2 to 9.6 rpm		
shaft hub flange diameter	0.76 m	30 inch	
flocculation zone detention time	20 min		
SCR detention time		183 min	
conical steep flocculation hood:			
upper diameter		18.745 m	61.5 ft
lower diameter		21.793 m	71.5 ft
height		4.420 m	14.5 ft
Sludge scraper:			
SCR floor clearance		25 mm	1 in
SCR wall clearance		50 mm	2 in
motor		3.73 kw	5 hp
speed		0.025 rpm	
Operating platform		4.88 x 4.88 m	16 x 16 ft
walkway width		1.22 m	4 ft
SCR influent pipe		0.91 m	36 in
Lime slurry to SCR pipe		15.2 cm	6 in HOPE
Ferric sulfate solution tube	1.9 cm	¾ in PE	
Sludge collection cone pipe	0.3 m	12 in ERP	
(2 pipes, one spare)			
SCR effluent pipe		1.37 m	54 in Al-Br
SCR drain pipe		1.07 m	42 in ERP
Sludge sumps (2, one for first two SCR and one for last SCR and future fourth			
SCR maximum volume		107.64 m^3	28,435 gal 3800 ft^3
active volume		90.71 m^3	23,964 gal 3200 ft^3
SCR influent pH		7.7 to 8.3	
SCR influent TDS		3085 to 4147 mg/L	
SCR effluent pH		9.5 to 10.0	

Lime dosage rate		260 mg/L	1300 g/s 4658 kg/hr	10270 lb/hr
Ferric surface dosage rate	15 mg/L	89.2 g/s 321 kg/hr	707 lb/hr	
SCR rise rate		0.006 l/s/m	1.0 gpm/ft^2	
Maximum Mg removal		5% in thickened sludge		
Solids in reaction zone		3 to 5% by weight		
Sludge pH		10.0		
reaction zone		9.8		
Sludge blowdown rate		60 - 90 sec. every 6 - 8 min		

LIME FEEDING SYSTEM

Knife slide gates		20.32 cm	8 in	
feeder capacity		10.2 m^3/hr	360 ft^3/hr maximum	
feeder turndown ratio	30:1			
feeder motor		0.56 kw	¾ hp	
Lime slakers (paste-type slakers)				
output rate		1134 g/s	4082 kg/hr	4.5 ton/h
service water to slaker	5.08 cm	2 inch PVC pipe		
Slurry pipe to stabilization tank:	15.24 cm	6 inch PVC pipe		
Slaker screen size		1 mm		
Slaker agitator breaker bars attaloy HI 300 Brinell				
breaker bar size		1.9 cm	¾ in	
Lime slurry stabilization tank:				
diameter and height		4.825 m, 5.56 m	15.83 ft, 18.24 ft	
tank volume		102 m^3	26,850 gal	3600 ft^3
dilution water line		7.62 cm	3 inch PVC	
Mixer (propeller - type):				
motor		2.24 kw	3 hp	
Grit conveyor (continuous belt conveyor):				
belt length		18 m	59 ft	
belt speed		6.10 m/min	20 ft/min	
motor		0.37 kw	½ hp	
Lime slurry piping to SCR	15.2 cm	6 in HDPE		
Sludge pumps:				
_____		7.5 kw	10 hp	
design flow		30 L/s	476 gpm	
head range		8 - 23 m	26.2 - 75.5 ft	
pump inlet pipe		15.2 cm	6 in, cast iron	
lime stabilization:				
speed of reaction		15 minutes		
slaking temperature		76N C	165N F	
lime slurry velocity		0.76 - 2.13 m/s	2.5 - 7 ft/s	

SLUDGE THICKENER

SCR Sludge blowdown		5% thickened to 20.8% solids		
supernatant flow pipe		20 cm	8 in, ERP	
thickener diameter		30.48 m	100 ft	
thickener wall height		3.66 m	12 ft	
thickener tank volume		2670 m^3	705,000 gal	94,290 ft^3
valve box inlet pipe (2)	20 cm	8 in, HDPE		
thickener center inlet pipe (2):				
sludge pumps (2 installed operating alternately and 1 spare):				
flow rate		23 L/s	365 gpm	
inlet (2)		12.7 cm	5 in PE	
pump room sump dimensions	0.72 X 0.72 X 0.76 m, deep 2.4 X 2.4 X 2.5 ft			

thickener drive assembly	1.5 kw	2 hp motor		
influent flow rate		0.106 m^3	1680 gpm	
rise rate		0.0015 $m^3/s/m^2$	2.2 gpm/ft^2	
rentention time		8 hr		
supernatant overflow rate	0.083 m^3/s	1316 gpm		
thickened sludge pumping rate	0.023 m^3/s	365 gpm		
required surface area		706 m^2	7600 ft^2	
solids loading rate		850 $kg/m^2/d$	174 $lb\backslash ft^2/d$	
concrete compressive strength	27.6 MPa	281 kg/cm^2	4000	
compressive strength test length:	28 days			
rebar yield		414 MPa	4220 kg/cm^2	60,000 ps
influent sludge		5% solids by weight		
effluent sludge		20% solids by weight		
supernatant		1000 mg/L suspended solids max		
SCR blowdown sump pump:		1350 L/s	21,4000 gpm	
pump 1 head		10 m	33 ft	
pump 1 and 2		1100 L/s	17,400 gpm	
pump 2 head		11.3 m	37 ft	

DUEL MEDIA GRAVITY FILTERS

effluent suspended solids	less than 25 micron			
influent flowrate	4.7 m^3/s	107.3 MGD	166 cfs	108,600 ac-ft/yr
backwash flowrate	0.15 m^3/s	3.42 MGD	5.3 cfs	3500 ac-ft/yr
filter-to-waste	0.05 m^3/s	1.14 MGD	1.8 cfs	1200 ac-ft/yr
effluent flowrate	4.5 m/s	102.7 MGD	159 cfs	95,122 ac-ft/yr
influent pipe (3) w. SMX	1.37 m	54 in, Al-Br		
influent pH		7.8		
sulfuric acid dosage	25 mg/L	125.6 g/s	452 kg/hr	998 lb/yr
filter battery 1		filters 1,2: cells 1 to 8		
filter battery 2		filters 3,4,5: cells 9 to 20		
filter battery 3		filters 6,7: cells 21 to 28		
filter cell dimensions		9.15 x 9.45 m	30 x 31 ft	
silica sand depth		254 mm	10 in	
effective size:		0.50 mm	0.02 in	
uniformity coefficient	1.6			
Anthracite coal depth		508 mm	20 in	
effective size:		1.05 mm	0.04 in	
uniformity coefficient	1.5			
effluent pipe	18.3 m	72 in, ERP		
backwash water sump	40 x 20 x 5.6 m, deep	131 x 66 x 18 ft		
scour air blowers (3)	0.01524 $m^3/s/m^2$	22.4 gpm/ft^2		
	1.317 m^3/s max.	20900 gpm		
air scour piping	16 in (40.6 cm) FRP pipe manifold supplies (14)			
	4-in. FRP risers for each cell			
backwash bed expansion	25%			
backwash water rise rate	0.012 $m^3/s/m^2$	18 gpm/ft^2		
effluent pH	8.0			
effluent turbidity	less than 1.5 JTU			
filtration rate	0.002 $m^3/s/m^2$		3 gpm/ft^2	
flowrate per cell	0.176 m^3/s		2800 gpm	
filter backwash rate	12.9 $L/s/m^2$		19 gpm/ft^2	
filter backwash cycle:				
draindown to sump	2 min			
air scour	5 min			
backwash	10 min			

filter-to-waste	30 min
filtration cycle	72 hrs maximum

CLEARWELL AREA

Clearwell and Overflow Piping

dimensions		40 x 80 m	131 x 262 ft	
bottom elevation		33.2 m	109 ft	
max. water surface elev.	37.49 m	123 ft		
volume		13,600 m^3	3.6 Mgal	480,280 ft^3
pump sump bottom elevation	30.90 m	101 ft		
concrete cover elevation	38.25 m	125 ft		
overflow pipe		1.22 m	48 in. FRP	
clearwell influent	4.5 m^3/s	102.7 MGD	159 cfs	104,000 ac-ft/yr
influent chlorine dosage	0-2 mg/L	1.94 g/s	7 kg/hr 16 lb/hr	
influent SHMP dosage		5 mg/L	26.1 g/s	94 kg/hr 207 lb/hr

Clearwell Instrumentation

1st set of sensors just west of 72 inch clearwell influent pipe entrance
2nd set of sensors near center of clearwell on lower deck
acceptable ranges of parameters for the clearwell:

conductivity	4400 to 4590 microsiemens/cm	
water surface level	33.2 - 37.49 m	109-123 ft
plugging factor	0 to 45 %	
pH	6.5 to 8.5	
water temperature	5 - 30N C	
turbidity	0 to 1.5 JTU	

Process Pumps and Valving

14 pumps installed, 18 pump pits available
3 pumps for HWS, 9 for FSD, 2 used for either
each pump 5-stage, water-lubricated, vertical turbine-type pump constructed of Al-Br

18 inch pumps (12 of the 14)				
capacity:	385L/s	6100 gpm	13.6cf	
head:	320 m	1050 ft	455 psig	314 MPa 32 kg/cm
power:	1678.5 kw	2250 hp		
12 inch pumps (2 of 14)				
capacity:	185 L/s			
head:	320 m	1050 ft	455 psig	314 MPa 32 kg/cm
power:	932.5 kw	1250 hp		

minimum pump efficiency
Pump Motors:
4000 - volt synchronous motor for each pump
3 phase
60 hertz
Starting Duty:

Maximum starts/day	10
Average starts/day	8
Minimum interval between stop and start:	45 minutes
Minimum run time (normal operation:	20 minutes
leading power factor	0.95

Energy Recovery Turbine Units

typepellton wheel (Al-Br)
operating speed 1200 rpm

design pressure	2.78 MP_3	28.1 kg/cm^2	400 ps	
flow rate:	FSD	0.42 m^3/s	6657 gpm	14.8 cf
	HWS	0.33 m^3/s	5230 gpm	11.7 cf
head:	FSD	210 - 313 m	690 - 1027 ft	300 - 445 psi
	HWS	210 - 282 m	690 - 925 ft	300 - 400 psi
minimum turbine efficiency	87%			

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Al-Br Pipe

chemical composition:

Cu	Sn	pb	Fe	Ni	Mn	P	Zn	Si	Al
90.42	0.23	.007	2.52	.08	.04	.008	.04	.056	6.60

Yield Strength	432 MPa	4404 kg/cm^2	62,600 ps
Tensile Strength	600 MPa	6121 kg/cm^2	87,000 ps
Elongation in 2'	38%		

SO2 Building and systems

storage of liquid SO2	ten (900 kg) 1 - ton cylinders		
usage	two cylinders used actively		
SO2 flowrate	2 L/s	31.7 gpm	
maximum feedrate	20 g/s	1725 kg/day	3800 lb/day
SO2 pressure	1055 kPa	10.76 kg/cm^2	
solution tank volume	4430 L	1170 gal	
evaporator capacity	40 g/s	3450 kg/day	7606 lb/day
regulator capacity	20 g/s	1720 kg/day	3792 lb/day
solution strength	1.01%		
SO2 design criteria	reduce C1 residual from 1 to 0.5 ppm		

DESALTING BUILDING AREA

Piping and Valves

st stage feed pipe:	FSD	1.22 m	48 in, Al-Br	
	HWS	0.76 m	30 in, Al-Br	
Feed pipe drain size		7.6 cm	3 inch	
design stress for Al-Br		131 MP^3	1336 kg/cm^2	19000 ps
Design pressure of water in the high pressure reject and feed pipes:				
		3.1 MP^3	31.6 kg/cm^2	450 ps
Design pressure for the product and low pressure reject pipes:				
		689 kPa	7 kg/cm^2	100 ps
pipe and flange supports:				
allowable deflection		1/360th of a span maximum		
modulus of elasticity	120,660 MPa	1.23 Mkg/cm^2	17.5 Mps	
coefficient thermal expansion	9.0 x E-6			

High Pressure Feed Manifold pH Adjustment

dilute acid lines	7.62 cm	3 in. PP-lined steel

dilute acid concentration	10%			
pump to injector acid line	3.81 cm	1.5 in. PP-lined		
metering pumps:	FSD	6813 L/hr	30 gpm	
	HWS	2270 L/hr	10 gpm	
head	317 m	1040 ft 3.1 MP_3 31.6 kg/cm^2 450 psi		
injectors	2.54 cm	1 in. hastelloy		
plugging criteria	RO feed pH between 4.5 and 5.5			
SOL dosage	0 - 3 mg/L	3.06 g/s	11 kg/hr	25 lb/h
Sulfuric acid dosage	30 mg/L	144.4 g/s	520 kg/hr	1147 lb/h
Total RO Feed: TDS	2916 mg/L			
Pressure	2.78 MPa	28.1 kg/cm^2	400 ps	
pH	5.5			
Flowrate	4.5 $m/^3$	102.7 MGD	159 cfs	104,000 ac-ft/yr
Total RO Reject: TDS	9312 mg/L			
Pressure	2.32 MPa	23.6 kg/cm^2	336 ps	
pH	6.2			
Flowrate	1.3 m^3/s	30.3 MGD	47 cfs	30,700 ac-ft/yr
Total RO Permeate: TDS	290 mg/L			
Pressure	0 MPa			
pH	5.1			
Flowrate	3.17 m^3/s	72.4 MGD	112 cfs	73,300 ac-ft/yr

Programmable Master Supervisory Control

two redundantly configured real-time computers
system includes 27 programmable remote terminal units (RIU)

equipment availability	99.80%		
theoretical downtime	18 hours per year		

UPS will provide 15 minutes of power during an outage
CRI displayed data will be current within 3 seconds

Chemical Laboratory

lab area	466 m^2		5000 ft^2
chemical analysis area	27 m^2 bench top,	290 ft^2	
microbiology lab	54 m^2		586 ft^2
misc. nonchemical storage	38m^2 floor	409 ft^2	
instrument room	13.5m^2		145 ft^2
acid/base storage	7 m^2 floor		75 ft^2

Sample System

all piping	PVC schedule 80		
minimum flow rate	2 L/min	0.53 gpm	

Sleeve Valve Units

diameter:	HWS	0.254 m	10 in.	
	FSD	0.457 m	18 in.	
flow rate:	HWS	0.33 m^3/s	5230 gpm	11.7 cfs
	FSD	0.42 m^3/s	6657 gpm	14.8 cfs
head:	HWS	210 - 282 m	690 - 925 ft	300 - 400 psi
	FSD	210 - 313 m	690 - 1027 ft	300 - 445 psi
valve tank:	diameter	2.29 m	90 in.	
	length	2.29 m	7.5 ft	

REVERSE OSMOSIS ELEMENTS

HYDRANAUTICS WATER SYSTEMS

Basic Unit:	$0.98^3/s$	22.35 MGD	34.6 cfs	21,043 ac-ft/yr
	10 first stage control blocks			
	5 second stage control blocks			
	720 pressure vessels			
	5040 membrane elements			
Control block:	4 subunits			
	12 pressure vessels/subunit			
	7 membrane elements/vessel			
Control Block Piping:				
composition	316L stainless steel			
feed piping	0.25 m	10 in. SCH 40		
brine piping	0.20 m	8 in. SCH 40		
Pressure vessels:	fiberglass reinforced epoxy			
inside diameter	0.216 m	8.5 in		
overall length	7.493 m	295 in		
wall thickness	1.27 cm	0.50 in		
design pressure	3.45 MPa	35.15 kg/cm^2	500 psi	
design hoop stress	44.8 MPa	457 kg/cm	6500 psi	
composite 1" thick Type I PVC and 1" thick 6061-TC annodized aluminum				
working stress	68.95 MPa	703 kg/cm^3	10,000 psi	
pressure vessel operating weight:				
vessel	113.4 kg	250 lb.		
end caps and clamps	27.2 kg	60 lb		
dry membrane elements	113.4 kg	250 lb		
water	226.8 kg	500 lb		
Design safety factor	2.35 after 11.4 years			
	1.85 after 50 years			
Flow/tube: 1st stage	0.0025 m^3	40.19 gpm	0.09 cf	
	0.0024 m^3	38.30 gpm	0.085 cf	
membrane Elements:				
Configuration	spiral-wound			
diameter	0.20 m	8 in		
length	1.02 m	40 in		
active membrane area	33.4 m^2	360 ft^2		
membrane composition		cellulose diacetate/triacetate		
membrane support felt		dacron fiber felt		
product side backing		dacron yarn knit into tricot pattern stiffened epoxy base polymer		
brine side spacer		polypropylene mesh		
central tube		glass fiber reinforced epoxy		
tube inside diameter		2.78 cm	1.094 in	
tube outside diameter	3.81 cm	1.500 in		
glue		solventless polurethane		
dry weight		15.9 kg	35 lb	
drained weight		27.2 kg	60 lb	
del number		4082-95		
Control Block Warranty		six years from initial startup		

Materials Warranty		one year from startup		
Basic desalting unit		not less than 21.6 MGD @ 75N F, 400 psig (0.95 m^3/s @ 23.9N C, 2.76 MPa) 73% recovery with on more than 20% increase in product flow. Maximum product salinity is 622 ppm		
Individual element warranty	3.75 years operating life			
		1.25 years no-load operation		
minimum productivity		0.002 m^3/s	3960 gpd	
operating limits:				
temperature	1.67 to 35N C		35 to 95N F	
dry storage temp.	1.67 to 37.8N C	35 to 100N F		
wet no-load temp.	1.67 to 15.6N C	35 to 60N F		
pressure	3.1 MPa		31.6 kg/cm^2	450 psi
pH	3.0 to 8.0			
plugging factor	65% maximum			
CaS04 saturation index	2.0 maximum in reject stream			
maximum recovery	15% per element			
residual chlorine	0.3 to 0.8 ppm			
design feedwater:	73% recovery			
temperature	23.9N C	75N F		
pressure	2.76 MPa	28.1 kg/cm^2	400 psi	
production: 1st stage flow	0.07 m^3	1.602 MGD	2.5 cf	
	TDS	252 ppm		
2nd stage flow	0.055 m^3/s	1.264 MGD	1.9 cf	
	TDS	608 ppm		
Element Check Apparatus:				
skid-mounted unit	3.57 x, a.75 x 1.83 m, hiqh		140.5 x 69 x 72	
flow	0.003 m^3 /s	45 gpm		0.1
pressure	2.76 MPa	28.1 kg/cm^2	400 psi	
five single-element, FRP pressure vessels				
Proof test Unit:				
4 first stage pressure vessels				
2 second stage pressure vessels				

FLUID SYSTEMS

Basic Unit:				
control blocks	18 per 3 basic unit			
capacity	0.88 m^3/s	20 MGD	31. 1 cfs	
number of basic units	2-1/2			
	30 first stage control blocks			
	15 second stage control blocks			
	1080 pressure vessels			
	4320 membrane elements			
Control Block:				
Subunits	2			
pressure vessels	12 per subunit			
physical size	9.14 x 3.75 x 3.66	m, high	30 x 12.3 x 12 f	
capacity	0.05 m^3/s		1.11 MGD	1.8 cfs
Pressure Vessels:				
inside diameter	0.32 m	12.75 in.		
outside diameter	0.36 m	14 in.		
wall thickness	1.59 cm	0.625 in.		
length	6.86 m	22.5 ft		

composition		filament-wound fiberglass/epoxy composite		
capacity of elements		4		
weight: dry wo. elements	272 kg	600 lbs		
in operation		816 kg	1800 lb.	
feed/concentrate high				
pressure ports		5.08 cm (2 in) stainless steel		
permeate port:		3.81 cm (1.5 in) glass filled Roryl		
hoop stress		38.6 MPa	393.7 kg/cm^2	5600 ps
piping composition		316 or 316L stainless steel		
Flow/tube:	lst stage	0.0079 m^3	125 gpm	0.28 cf
	2nd stage	0.0082 m^3/s	130 gpm	0.29 cf
Membrane Elements:				
Configuration		spiral-wound		
diameter		0.305 m	12 in.	
length		1.524 m	60 in.	
drained weight		63.5 ½g	140 lbs	
active membrane area		ll7 m	1260 ft^2	
composition		asyonetric cellulose diacetate		
product tube		glass filled noryl		
inside diameter		3.56 cm	1.4 in	
outside diameter		4.97 cm	1.957 in	
nominal product rate		1.84 m^3/hr	11650 GPD	

support	dacron fabric substrate, polester support fabric
product water channel	dacron-knit tricot impregnated with a polymeric resin
spacer	polyolefin netting
element wrap	0.2.5 cm (0.1 in.) epoxy glass
glue polyurethane elastomer	
model number	30015S

Design parameters for elements:				
maximum applied pressure	4.14 MPa 3	42.2 kg/cm	GOO psi	
initial clean element prod.: 69.65 m^3/d		18,400 GPD		
1.5 yr. clean element prod.: 61.51 m^3/d		16,250 GPD		
1.5 yr. design element prod.: 50.91 m^3/d		13,450 GPD		
maximum operating temp.	35N C	95N F		
maximum feed/concectrate differential pressure:				
element		103 kPa	1.05 kg/cm^2	15 psic
pressure tube assembly	414 kPa	4.2 kg/cm^2	6O psic	
maximum feed flow		0.0076 m^3/s	120 GPM	0.3 cfs
minimum feed flow		0.0021 m^3/s	34 GPM	0.07 cfs

Warranties:	
membrane element operating life	3 years
membrane element no-load storage	3 years maximum
membrane materials and workmanship	1 year after start
equipment other than membrane	18 mo. after shipment or 1 yr. after startup

Element Check Apparatus			
flow rate	0.013 m^3/s	200 gpm	0.46 cfs
pressure	3.1 MPa	52.7 kg/cm^2	450 psi

Proof Test Unit:

4 first stage control blocks

2 second stage control blocks

CHLORINE STORAGE AND HANDLING SYSTEM

evaporator(3) capacity	42 g/s	3630 kg/d	8000 lb
tank car scales capacity	90,000 k9	198,416 lb	

C1 solution from Cl building to:

1) Main plant 54 in. intake pipes (4)
2) Test Train 10 in. intake pipe
3) Test Train 6 in. well water pipe
4) Main plant 72 in. filter effluent pipe
5) Main cleaning system
6) Service water system
7) Test Train post treatment
8) Test Train shock treatment

dosage:	total feed water.	2.5 to 7.5 mg/L	
	post treatment		1 to 2 mg/L
	shock treatment	15 mg/L	
	potable water		0.5 to I mg/L residual
	service water		1 mg/L residual
	cooling water		0.5 mg/L residual
overall daily consumption	34.72 g/s	125 kg/hr	275.6 lb/h

Potable water system draws Cl gas from 150-lb. Cl bottles up to 3 day shutdown may be tolerated: service water, potable water and sh chlorination systems

tank car consumption		11 days per car	
Liquid chlorine flow rate	62.74 g/s	2.2G kg/hr	500 lb/hr
evaporator rate		75 kg/hr/unit	1GG lb/hr/unit

QUICKLIME (CaO) AND FERRIC SULFATE STORAGE AREA

Quick Lime Unloadinq System

lime storage silo (4)	1655 m^3 each	436,920 gal	1750 tons/sil
lime unloading lines:		0.15 cm (6 in.) for railcar unloading	
		0.10 cm (4 in.) for truck delivery	
screw conveyor: lime feed rate	12.7 m /hr	55.9 gpm	
unloading rate for one 100-ton	railcar	8 hr.	
unloading hopper storage	1.5 minutes		
rotary feeder outflow	350 L/min	92.5 qpm	
blowers: pneumatic flow	755 L/sec	11,967 qpm	
estimated maximum demand	1809 g/s	6515 kg/hr	14,363 lb/h
total lime storage		57.5 days	

Quick Lime Storage Transfer System

silo bin activator		3.66 m	12 ft.	
silo rotary feed valve		0.29 m	8 in.	
lime use bin(4) storage		6 m^3	1584 gal	212
bin activator		0.10 m	4 in.	
storage silos: 30 day capacity using		2.4 kg/s	5.3 lb/sec	
silo rotary feed valve min. capacity:	1.8 kg/s	4 lb/sec		
lime use bin capacity		1 to 2 hr		

Ferric Sulfate Storage and Unloading

storage bin(2) capacity		170 m	44,880 gal	570 tons/sil

		60 day supply		
screw conveyor: sized to move	4.2 kg/sec	9.3 lb/sec		
		unload 100-ton railcar in 6 hrs.		
ferric sulfate dosage	7.5 ppm	54.72 9/s	197 kg/hr	433 lb/

Ferric Sulfate Feed

FRP Solution tank(2) capacity	1287 L	340 gal		
solution strength		20% by weight		
screw feeder size		5.08 cm	2 in.	
metering pump(3) capacity	5.4 L/s	8546 gpm		

SULFURIC ACID AREA

Sulfuric Acid Unloading and Storaqe System

concentrated sulfuric acid	93%			
storage tank(2) size		100 m^3, steel	26,400 gal	3530
each storage tank will hold the contents of one tank car				
storage tank capacity	3 to 4 weeks			

SCR/Low Pressure Metering Pumps

metering pump inlet piping	7.62 cm	3 in. PP-lined steel		
Metering pump outlet piping:	3.8 cm	1.5 in. PP-lined steel metering pump		
Pump capacity		2498 L/hr	11 gPm	
head		17 m	56 ft	24 psig

Service Air System

two identical subsystems				
compressor: type		rotary screw unit		
capacity		5660 L/min @ 760 kPa200 CFM @ 110.ps		
_____ carryover in air		8 ppm by weight maximum		
_____ size		0.01 micron		
_____ receiver capacity	1500 L	396 gal		
_____ air pressure		170 kPa	24.7 psi	

MISCELLANEOUS CHEMICAL STORAGE AREA

5olution strength		15% by weight		
5torage silo		84m	22,176 gal	119 tons/sil
Feeder: variable speed volumetric				
screw type maximum capacity	1440 L/hr	6.34 gpm		
Waterflow controller		15 - 284 L/min	4 - 75 gpm	
mixing tank size		2000 L, ERP	528 gal	
metering pump(2):	flow	681 L/hr	3 gpm	
	head	35 m	115 ft	50 psiq
centrifugal pump (1):	flow	0.63 L/s	10 qpm	
	head	1.675 m	!5.5 ft	2.4 psig

Service Water Stabilization System

Dry Chemical Storage Building:			
bucket elevator		5.66 m^3/hr minimum	24.9 gpm
lime-use bin: capacity	1.132 m^3	300 gal	40 ft.
inside diameter		1.219 m	50 in.
		70 degree hopper angle	
_____ feeder: rate		0.038 m^3/hr	
		drive pulley at step 2	
		gear box ratio of 8:1	

diameter-screw		6.35 cm	2-½ in.	
slurry tank capacity		190 L	50 gal	
metering pumps (2): type	duplex-diaphragm			
flow		262 L/hr @ 345 kpa	1.15 ppm @ 50 ___	
Desalting Building:				
ERP static mixer: size	25.4 cm	10 in.		
	flowrate	114 L/s	18007 qpm	
	delta P	50 kPa	7.25 psi	
RO product water pH		5.56		
service H20 flowrate		12G.lG L/s	2000 qpm	4.5 cfs
lime feed rate maximum	40 mg/L			
lime slurry velocity		80 cm/sec	31.5 in/sec	
slurry tank contact time	15 min.			

Activated Carbon Columns

two (2) carbon		vertical tank type		
operating pressure		541.5 kPa @ 21N C	7G psi @ 70N F	
hydrostatic test pressure	700 kPa @ 66N C	102 psi @ 151N F		
granular activated carbon	3.9 m^3		1030 gal	
maximum flow		4.3 L/s		68.2 gpm
empty bed contact time	15 min.			
bed flowrate		4.26 L/s/column	67.5 gpm/column	
effluent DBCP conc.		less than 0.1 microgram/L		

DBCP - dibromochloropropane,

Potable Water

ELECTRICAL FEATURES OF YUMA SWITCHYARD

161 - kv Switchyard

power transformers (2)		3-phase,l6l to 13.8 kV	
low side powers double ended, metal enclosed power switchgear assembly, UX.			
transformers KYlA and KY2A-	3-phase,-60 hertz, l6l kV, 2.0000/26667 kVA OA/rA		
disconnecting switches YYlA, ZYlA and YY2A:		1200 amp, l6l kV, 750 BI	
interrupter switches WYlA and WY2A:			800 amp, l6l kV, 750 B1
metal enclosed switchgear UXlA: double-ended, metal-enclosed, 13.8 kv			with
twelve (121 13.8 kV oilless circuit breakers, ten (10) interrupter switches			
	BIL	Basic Impulse Insulation Level	

13.8 - kv Distribution System

Majority of loads		480 volts	
15 kV metal-clad switchgear			
15 kV insulated cables		133% insulation	
pad-mounted transformers			
primary substation - type transformers			
emergency engine generators	two (2), 900 kW		
metal-enclosed switchgear			
Metal-clad load interrupter switchgear			
pull boxes			
concrete duct bank			
ambient temperature:	earth and air	30N C, 50N C	86N F, 122N C
two (2) 2G.7 - MVA power transformers			

600-Volt DCT (Distribution Center-) Assemblies

US8's low voltage		480- or 120/240-V		
DCT enclosures:	outdoor	NEMA type 3		
	indoor	NEMA type I		
		double-feed		

75N C max. conductor temp. for circuits 100 amp or less
60N C max. conductor temp. for circuits 100 amp or more
copper conductors only 0
internal DCT ambient temp. range: 50 - 2N C (122 - 35.6N F)
DCT's are 600-volt motor control center type

WATER SUPPLY WELL

vertical, tube-type well				
total depth		42.7 m	140 ft	
5tructural depth		40.3 m	132.2 ft	
ground surface elevation	37.8 m	124 ft		
steel pump chamber casing	0.406 m	16 in. OD		
depth of steel pump casing	8.2 m	26.9 ft		
well screen assembly: casing	6.1 m.length	20 ft		
		0.22 m	8 - 5/8 in. OD	
		type 304 stainless steel		
well screen		10.7 m,length	35.1 ft	
		0.22 m	8 - 5/8 in. OD	
		type 301-stainless steel		
		cage type, wire-wound screen		
		1.0 mm,slots	0.039 in.	
gravel packing depth		24.4 - 41.2. m	80 - 135.2 ft	
flow rate		31.6 L/s	500 gpm	1.1 cfs

SEWAGE TREATMENT SYSTEM

two (2) septic tanks with disposal trenches				
two (2) pneumatic ejector stations				
packaged sewage treatment plant				
septic tank, lift station, disposal trenches for TT bldg				
septic tank volume		3.78 m^3	1000 gal	134 ft^3
pneumatic ejector receiver tank :				
volume		113 L	30 gal	30 ft^3
min. working pressure	517 kPa	5.3 kg/cm	75 psi	
aeration time		40 hrs. minimum		
influent design BOD loading	280 mg/a			
effluent sump. volume	0.792 m^3	209 gal	28 ft^3	
lift station effluent pumps	duplex, nonclog, submersible, heavy-duty iron			
flow rate		152 L/min	40.16 gpa	
head		76 as	3 in	
ferric sulfate silos drywell crushed 3 limestone volume:				
		2.49 m^3	87.93 ft^3	
septic tank-hydraulic loading	3.785 m^3/day	1000 GPD		
percolation rate		0.48 min/cm	1.22 min/in	
sludge production		94.63 L/d/employee	25 gpd	
		18.93 L/d/visitor	5 gpd	
		277 employees and 60 visitors		
hydraulic loading		28.39 m^3/day		7500 gpd
BOD loading		0.023 kg/person	0.05 lb	
total BOD loading		8.0 kg/day		17.6 lb/day

detention time		43 - hours		
air requirement/lb. BOD 5	1 m^3/s		2100 SCFM	
30-gal(113.56 L) duplex pneumatic ejector (lime slaker bldg)				
75-gal(Al.83.9 L) duplex pneumatic ejector (desalting bldg)				
minimum slope on all harizontal sanitary lines 2%				

HVAC SYSTEMS

climate - outdoor design conditions:				
summer - dry and wet bulb	44N C, 26N C	111.2N F,	78.8N F	
winter - dry bulb		3N C	37.4N F	
solar factors for 32 N. Lat, June 4 p.m.				
- indoor design conditions				
desalting building:				
process area -		35N C and 12N C		95N F, 53.6N F
maintenance and test areas -	35N C and 15N C		95N F, 59N F	
maintenance and test areas are also spot cooled				
administration area -	27N C and 21N C		80.6N F, 69.8N F	
membrane storage -		2N C		35.6N F
computer and control rooms -	24N C and 21N C		75.2N F, 69.8N F	
		50% RH		
misc. buildings		35N C and 15N C		95N F, 59N F

CORROSION MONITORING SYSTEMS - CATHODIC PROTECTION SYSTEM

Test station location:		Test Train Dual Media Filters
78 in. product discharge pipe	Sludge Thickener	
60 in. reject discharge pipe	Sludge drawdown sumps	
10 in. Test-Train intake-pipe	Test Train grit basins	
SCR's		Test Train intake pump plant
Clearwell		Dual Media Gravity Filter

SLUDGE DISPOSAL AREA

SLUDGE DISPOSAL PUMPING PLANT AND PIPELINE

length of pipeline		32.2 km	20 miles	
diameter of pipe		0.206 m	8 inch	
pipeline pressure:	hi	4.14 MPa	42.2 kg/cm^2	600 psi
	normal	3.76 MPa	38.4 kg/cm^2	546 psi
	low	2.72 MPa	27.8 kg/cm^2	395 psi
pipeline minimum velocity	0.61 m/s	2 ft/sec		
pumps:	type	reciprocating duplex plunger		
number of units 2 (1 operating and I is standby)				
hp		149 kW	200 hp	
normal capacity	26.12 L/s.	414 gpm		
low capacity	19.59 L/s	310 gpm		
motor: speed		1200 rpm		
		3 phase		
		60 cycles		
		460 volts		

A22 Waste Disposal Facility

Location	(29 km) 18 mi south of YDP

Total area		(4.32 k.m^2) 1-2/3 square miles		
time for disposal		50 years		
construction phases		area for 5 years of sludge		
11 dimensions:				
depth		3.96 m	13 ft.	
bottom width		38.1 m	125 ft.	
bottom length		76.2 m	250 ft.	
top width		53.95 m	177 ft.	
top length		92.05 m	302 ft.	
lining		20 - mil PVC		
earth covering		0.305 m	12 in.	
Depth of sludge per cell	3.05 m	10 ft.		
Depth of earth covering		0.61 m	2 ft.	
Future 5-yr. construction	63 sludge disposal cells			
Future construction		64 sludge disposal cells		
maintenance building		3.66 x 4.88 m	12 x 16 ft.	
Pressurized storage tank	1.89 m^2	500 gal.	68 ft^3	
Sludge surface area		(4047 m^2) 1 acre when cell is ½ full		
@ 10 ft. depth		12335m^2	10 acre-ft	
amount of dry solids		33 Mkg	36400 tons	
Shrinkage factor for earthwork	15%			
chain link fence height		(2-13 m) 7 ft. around entire development area		
Main supply line PVC		15.24 cm	6 in.	
____ ution lines PVC		10.16 cm	4 in.	
_____ solids		20%		
major haul roads width		6.096 m	20 ft.	

TEST TRAIN AREA

TEST TRAIN INTAKE SYSTEM

intake pipe: Al-Br and	FRP	0.25 m	10 in.	
trash to landfill		0.014 g/s	0.05 kg/hr	0.11 lb/hr
water thru intake structure	0.039 m^3/s	0.88MGD	1.36 cfs	890 ac-ft/y

TEST TRAIN SCR

dimensions:	diameter	9.75 m	32 ft.	
	wall height	6.86 m	22.5 ft.	tank
volume	512 m^3	135,36O gal	18080 ft^3	
	composition	circular concrete tank		
draft tube inside diameter	1.219 m	4 ft		
mixer: blade diameter		1.067 m	3.5 ft	
blade depth		267 mm	0.88 ft	
operating range		13 to 39 rpm		
motor		3.73 kW	5 hp	
turbine type				
flocculation zone detention time	21 min.			
flocculation hood upper diameter	3.048 m	10 ft		
lower diameter		4.419 m	14.5 ft	
	height	6.096 m	20 ft	
sludge scraper		4 arms with 6 blades/arm		
floor clearance		25 mm	1 in.	
wall clearance		50 mm	2 in.	
motor		0.37 kW	0.5 hp	
scraper speed		0.15 rpm		

SCR operating platform		2.44 x 2.44 m	8 x 8 ft		
walkway width		1.22 m	4 ft		
influent pipe		0.20 m	8 in. FRP		
influent flow rate		0.039 m^3/s	0.88 MGD	1.36 cfs	890 ac-ft/yr
lime slurry pipe		1 cm	d in. PE		
lime dosage	26O mg/L	9.03 g/s	32.52 kg/hr		71.69 lb/hr
ferric sulfate pipe		1 cm	d in. PE		
ferric sulfate dosage	15 mg/L	0.52 g/s	1.87 kg/hr		4.13 lb/hr
soda ash pipe		1.9 cm	¾in. PE		
polymer pipe.	1.27 cm				½ in. PE
sludge bloUdown pipe (2)	10 cm	4 in. FRP			
sludge to thickener		34.04 g/s	123 k-9/hr		270 lb/hr
effluent pipe		0.305 m^3	12.in. FRP		
effluent flow rate	0.039 m^3/s	0.89 MGD	1.37 cfs		900 ac-ft/yr
drain pipe		0.305 m	12 in. FRP		
sludge sump volume		10 m^3	2642 gal		353 ft^3
flowrate		35.5 L/s	562.7 gpm		
pH		9.6 to 10.4 (reaction zone)			
turbidity		0 to 200 JTY (effluent)			
rise rate		0.006 $L/s/m^2$	1.0 gpm/ft^2		
percent solids by volume	3 to 5%				
sludge blowdown tine		0 to 90 seconds			
flushing time		0 to 90 seconds			
blowdown frequency		1 to 10 minutes			

TEST TRAIN CHEMICAL FEED SYSTEMS

Railcar Unloading System				
pressure blower: discharge pressure		50 kPa	72.5 psi	
pressure line (2)	10 cm	4 in.		
vacuum blower: inlet vacuum	32 kPa	4.64 psi		
vacuum line		12.7 cm	5 in.	
dust collector capacity		470 L air/s	16.6 ft^3/S	
Lime System				
storage capacity		71 m^3	18,756 gal	2500 ft^3
slurry concentration		10 to 25%		
slurry tank volume		2300 L	607.6 gal	
lime slurry (1O%) circulation pipe	3.81 cm	1.5 in.		
lime slurry (25%) feed pipe	1.27 cm	½ in.		
normal lime consumption		9.03 g/s.	33.5 kq/hr	73.9 lb/t
storage supply		50 to 6O days		3
rotary feed valve rate		105 L/hr	3.708 ft^3/hr	
Soda Ash System				
storage capacity		85 m^3	22455 gal	53 tons/sil
storage supply		40 to 50 days		
solution strength		10%		
soolution tank volume		2000 L	5812 gal	
di _____ piping		3.81 cm	1.5 in.	
service water intake pipe	1.905 cm	¾ in.		
metering pump		1.905 cm	¾ in.	
maximum consumption		22.3 g/s.	80.3 kg/hr	177 lb/h

Polymer System				
mixing/aging tank volume	800 L	211 gal		
feed tank volume		800 L	211 gal	
design maximum usage		O.656 g/s,	2.36 kg/hr	5.2 lb/hr
Ferric Sulfate System				
solution tank volume		615 L	162.5 gal	
transfer piping		3.18 cm	1.25 in.	
drain pipe		3.81 cm	1.5 in.	
outlet pipe		1.27 cm	½ in.	
solution feed pipe		0.95 cm	d in.	
TEST TRAIN DUAL MEDIA GRAVITY FILTERS				
effluent suspended solids	less than 25 microns in size			
influent pipe		0.305m	12 in. FRP	
influent flow rate	0.039	.89 MGD	1.37 cfs	90O ac-ft/yr
influent pH		7.8		
influent sulfuric acid	25 mg/L	0.88 g/s	3.16 kg/hr	6.96 lb/hr
filter cell dimensions		2.44 x 2.44 m	8 ft x 8	
depth of silica and		254 mm	10 in	
depth of anthracite coal	508 mm	20 in		
backwash sump dimensions	8.58 x 5.21 m	28 x 17.3 f t		
backwash sump depth		1.91 m	6.3 ft	
backwash flow rate	O.68 L/s	0.016 MGD	0.02 cfs	16 ac-ft/yr
backwash return flow to SCR	0.94 L/s	0.02 MGD	0.03 cfs	22 ac-ft/yr
filter - to - waste	0.27 L/s	0.006 MGD	0.01 cfs	6 ac-ft/yr
plant drainage pipe		0.457 m	18 in.	
effluent pipe		0.305 m	12 in.	
effluent flow rate	0.038 m^3/s	0.87 MGD	1.34 cfs	880 ac-ft/yr
air blower(2) capacity		0.09OG m^3	1436 qpm	
filtration rate		1.48 $L/s/m^2$	2.18 gpm/ft^2	
backwash flow rate		12.21 $L/s/m^2$	17.98 qpm/ft^2	
bed expansion during backwash	25%			
initiate backwash after 6 - 8 ft(1.83 - 2.44 m) head loss				
effluent turbidity		less than 1.5 JTU		
effluent plugging factor	less than 45%			
design flow rate		8.8 L/s/cell	139.5 gpm/cell	
TEST TRAIN CLEARWELL				
capacity		227 m^2	6O,000 gal	8016 ft^3
max. water surface elev.	38.88 m	127.6 ft		
floor elevation		33.62 m	110.3 ft	
influent flowrate	0.38 m^3/s	0.87 MGD	1.34 cfs	880 ac-ft/yr
TEST TRAIN SHMP SYSTEM				
solution tank volume		615 L	162.5 gal	
service water inlet piping	1.27 cm	½ in.		
solution tank outlet piping	1.27 cm	½ in.		
solution feed hose		0.95 cm	d in	
SHMP dosage	5 mg/L	0.17 g/s	0.62 kg/hr	1.36 lb/hr
TEST TRAIN SULFURIC ACID SYSTEM				
metering pump(4) service	(1) each to HWS, FSD, future, and SCR effluent			

discharge hose		0.95-cm	d in.	
RO feed sulfuric acid	30 mg/L	1.03 g/s	3.70 kg/hr	8.16 lb/hr

TEST TRAIN RO ELEMENTS

Hydranautics (Section 1):

1 Proof Test Unit
6 Pressure Vessels
4 first stage pressure vessels
2 second stage-pressure vessels
7 Membrane Elements per Pressure Vessel
42 total Membrane Elements

FEED WATER:	Flow	12.98 L/s	206 gpm	
	TDS	2916 mg/L		
	Pressure	2.76 MPa	28.16 kg/cm^2	400 psi
	pH	5.5		
REJECT BRINE:	Flow	3.51 L/s	56 gpm	
	TDS	9842 mg/L		
	Pressure	2.32 MPa	23.67 kq/cm^2	336 psi
	pH	6.2		
PERMEATE:	Flow	9.48 L/s	150 gpm	
	TDS	353 mg/L		
	Pressure	0 MPa		
	pH	5.1		

luid Systems (Section 2):

1 Proof Test Unit
6 Pressure Vessels
4 first stage pressure vessels
2 second stage pressure vessels
4 Membrane Elements per pressure Vessels
24 total Membrane Elements

FEED WATER:	Flow	23.21 L/s		368 gpm
	TDS	2916 mg/L		
	Pressure	2.76 MPa	28.16 kg/cm^2	400 psi
	pH	5.5		
REJECT BRINE:	Flow	6.95 L/s	110 qpm	
	TDS	9111 mg/L		
	Pressure	2.65 hPa	27.04 kg/cm^2	384 psi
	pH	6.2		
PERMEATE:	Flow	16.25 L/s	258 qpm	
	TDS	262 mg/L		
	Pressure	0 MFa		
	pH	5.1		
RO FEED:	pH	5.5		
	flow 0.036 m^3/s 0.83 MGD		1.28 cfs	840 ac-ft/yr
Total REJECT:	TDS	9358 mg/L		
	pressure	2.32 Mga	23.6 kg/cm^2	336 psi
	flow 0.01 m^3/s 0.24 MGD		0.37 cfs	240 ac-ft/yr
Total PERMEATE:	TDS	296 mg/L		
	pressure	0 MPa		
	flow 0.026 m^3/s 0.59 MGD		0.91 cfs	590 ac-ft/yr

TEST TRAIN SAMPLE SYSTEM

maximum travel time	5 min.	
minimum flow rate	2 L/min	0.53 qpm

CONVERSION TABLE

TO CONVERT FROM	TO	MULTIPLY BY
M/S^2	CM/S^2	100
M/S^2	ET/S^2	3.2808
M/S^2	IN/S^2	39.3701
ACRE	M^2	4046.873
M/S^2	CM^2	10,000
M/S^2	ET^2	10.7639
M/S^2	IN^2	1550.0031
M/S^2	YD^2	1.196
G/CM^3	KG/M^3	1000

MG/L	KG/M^3	1000
LB/GAL	KG/M^3	119.8264
KG/S	LB/S	2.2046
KG/S	LB/HR	7936.6402
M^3/S	AC-FT/DAY	70.0456
M^3/S	ET^3/S	35.3147
M^3/S	GAL/SEC	264.172
M^3/S	GPM	15,850.3222
M^3/S	L/SEC	1000
M^3/S	MGD	22.8245
M	FT	3.2808
M	IN	39.3701
MILE	KM	1.6093
KG	LB	2.2046
TON	KG	907.1847
HP	W	745.7
KG/CM^2	PSI	14.2233
KG/CM^2	kPa	98.0665
psi	kPa	6.8948
m/s	ft/s	3.2808
m/s	in/s	39.3701
acre-feet	m^3	1233.489
m^3	ft^3	35.3147
m^3	gal	264.172

MG/L	KG/M^3	1000
LB/GAL	KG/M^3	119.8264
KG/S	LB/S	2.2046
KG/S	LB/HR	7936.6402
M^3/S	AC-FT/DAY	70.0456
M^3/S	ET^3/S	35.3147
M^3/S	GAL/SEC	264.172
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m^3	ft^3	35.3147
m^3	gal	264.172