	Parameter	Units	Outfall #018A	Outfall #18B	Outfall #19	Outfall #15	Outfall#126	Outfall #124		Outfall 21	Parameter	Units
Effluent	flow rate	m^3/sec	0.44	0.47	1.0094	0.0425	0.0227	0.0034		Flow Rate	0.0110408	m3/s
	Temperature	deg C	14.2	14.1	13.1	10.7	10.73	11.41083333		Effluent Density (Temperature)	32	ppb
	Salinity	ppt	17.7	17.7	22.5	0.472	0.272	2.028		Heat Loss Coefficient	5.00	W/m2, deg C
	Calculated Density	kg/m3	1012.83	1012.84	1016.72	1000.0853	999.9285257	1001.209462		Discharge Temperature (Excess)	16	deg C
	Concentration	ppb	26.572	26.572	26.572	29.3608	78.8205	143.1593333				
Ambient	Average Depth	m	9.14	11.28	12.4968	11.28	13.72	8.84				
	Depth at Discharge	m	6.40	8.81	8.80872	11.28	13.72	8.84		Depth at Discharge	10.67	m
	Wind Speed	m/s	0.00	0.00	0	0	0	0		Wind Speed	0	m/s
	Steady Velocity	m/s	0.0289	0.0289	0.0289	0.0289	0.0289	0.0289		Steady Velocity	0.0166	m/s
	Manning #		0.022	0.022		0.0220	0.02	0.02		Manning #	0.022	
	Unbounded		U	U		U	U	U		Unbounded	U	
	Temperature	deg C	8.5	8.5	8.5	8.5	8.5	8.5		Temperature	8.5	deg C
	Salinity	ppt	31	31	31	31	31	31		Salinity	31	ppt
	Density	kg/m^3	1024.06	1024.06	1024.06	1024.06	1024.06	1024.06		Density	1022.67	kg/m^3
Discharge	Nearest Bank		right	right	right	right				Diffuser length	12.192	m
	Distance to nearest bank	m		0	0	0	0	0		Dist. to 1st endpoint	279.806	m
	Port Diamter	m		0.6096	0.9144	1.2192	0.6096	0.30		Dist to 2nd endpoint	291.998	m
	Veritcal Theta	deg		0	0	0	0	0		Port Height	1.2192	m
	Horizontal Sigma	deg		90	90	90	90	90				
	Discharge Port Height	m		6.52	7.28	10.36	13.11	8.38		Port Diameter	0.100584	m
	Port Width	m	3.05							Contraction Ratio	1	
	Port Depth	m	0.30							Total # of openings	5	
	Port Height	m								Alignment Ang GAMMA	90.00	deg
	Bottom Slope	deg	60									
	Horizontal Sigma	deg	90							Configuration of Ports or Nozzles	Single Riser, alternating	
										Vertical- Theta	0	deg
										Direction of nozzles on each side	Same direction	
Mixing Zone	CMC	ppb	3.982	3.982	3.982	3.982	3.982	3.982		Concentration for the WQ Standard (excess)	0.3	deg C
	CCC	ppb	2.282	2.282	2.282	2.282	2.282	2.282				

Results for Cormix modeling		X (Parallel to the discharge)	Y (Perpendicular to the discharge)	Z (depth from surface)	Hydrodynamic centerline dilution	Centerline concentration	units	Trajectory (Meters)	Trajectory (Feet)
Outfall 18A	**Dilution Factor of 3**	0.24	9.98	0.00	3.00	8.93	ppm Cu	9.98	32.75
Cormix 3 run	**CMC HAS BEEN FOUND**	5.32	49.03	0.00	6.67	3.98	ppm Cu	49.32	161.80
	WATER QUALITY STANDARD OR CCC	508.23	0.00	0.00	11.70	2.28	ppm Cu	508.23	1667.42
	Dilution Factor of 10.3 (internal model jumps)	208.76	0.00	0.00	10.30	2.57	ppm Cu	208.76	684.91
Outfall 18B	**Dilution Factor of 3**	0.12	7.31	8.81	3.00	8.87	ppm Cu	7.31	23.99
	CMC HAS BEEN FOUND	0.78	18.40	8.81	6.67	3.98	ppm Cu	18.42	60.42
	WATER QUALITY STANDARD OR CCC	2.60	32.51	8.81	11.60	2.28	ppm Cu	32.61	107.00
	Dilution Factor of 9	1.49	25.04	8.81	9.00	2.97	ppm Cu	25.08	82.30
Outfall 19	**Dilution Factor of 3**	0.69	16.45	8.81	3.20	8.93	ppm Cu	16.46	54.02
	CMC HAS BEEN FOUND	4.36	39.29	8.81	6.67	3.98	ppm Cu	39.53	129.70
	WATER QUALITY STANDARD OR CCC	12.33	62.07	8.81	11.60	2.28	ppm Cu	63.28	207.62
	Dilution Factor of 9	7.79	50.96	8.81	9.00	2.96	ppm Cu	51.55	169.13
Outfall 015	**CMC HAS BEEN FOUND**	1.51	0.00	11.28	7.37	3.98	ppm Cu	1.51	4.95
	WATER QUALITY STANDARD OR CCC	31.71	0.00	11.28	12.90	2.28	ppm Cu	31.71	104.04
Outfall 126	**CMC HAS BEEN FOUND**	287.13	0.00	13.72	19.79	3.98	ppm Cu	287.13	942.03
	WATER QUALITY STANDARD OR CCC	1485.62	0.00	13.72	34.50	2.28	ppm Cu	1485.62	4874.08
Outfall 124	**CMC HAS BEEN FOUND**	34.43	0.00	8.84	35.95	4.80	ppm Cu	34.43	112.96
	WATER QUALITY STANDARD OR CCC	383.58	0.00	8.84	62.70	2.28	ppm Cu	383.58	1258.46
Outfall 21	**WATER QUALITY STANDARD OR CCC**	0.58	0.00	6.11	53.30	0.30	º C	0.58	1.90

Puget Sound Naval Shipyard Elevations	Based on PSNS Reference Datum			
Extreme High Water	124.8	feet	38.04	meters
Mean Higher High Water	121.1	feet	36.91	meters
Mean High Water	120.3	feet	36.67	meters
Mean Tide Level	116.2	feet	35.42	meters
Mean Lower Low Water	109.4	feet	33.35	meters
Extreme Low Water	104.4	feet	31.82	meters

Effluent Elevations (Provided by Keith Conrad)				
Outfall 018B	101.9	feet	31.06	meters
Outfall 018A	120.3	feet	36.67	meters
Outfall 019	104.4	feet	31.82	meters
Outfall 015				
Outfall 126				

Bottom Depth (Provided by Keith Conrad)				
Outfall 018B	80.5	feet	24.54	meters
Outfall 018A	101.3	feet	30.88	meters
Outfall 019	80.5	feet	24.54	meters
Outfall 015				
Outfall 126				

	feet			meters		
Water Depth at Discharge	**Mean High**	**Mean**	**Mean Low**	**Mean High**	**Mean**	**Mean Low**
Outfall 018B	39.80	35.70	28.90	12.13	10.88	8.81
Outfall 018A	19.00	14.90	8.10	5.79	4.54	2.47
Outfall 019	39.80	35.70	28.90	12.13	10.88	8.81
Outfall 015			35.70			
Outfall 126			35.70			

	feet			meters			
Average Water Depth	**Mean High**	**Mean**	**Mean Low**	**Mean High**	**Mean**	**Mean Low**	
Outfall 018B			37.00			11.28	
Outfall 018A			30.00			9.14	Navigational Chart shows 37 which is outside the +/- 30%
Outfall 019			41.00			12.50	Navigational Chart shows 42 which is outside the +/- 30%
Outfall 015			40.00			12.19	
Outfall 126			50.00			15.24	

Port Height Above Channel Bottom	feet	meters	
Outfall 018B	21.40	6.52	
Outfall 018A*	19.00	5.79	*018A is not submerged at mean tide level.
Outfall 019	23.90	7.28	
Outfall 015	31.70	9.66	
Outfall 126	31.70	9.66	

% of depth at discharge
% of depth at discharge

Outfall #018A r1	Parameter	English Units		SI Units		Reference
Effluent						
flow rate		**6,900**	**gpm**	**0.44**	**m^3/sec**	from daily flow rate data
Temperature		**57.6**	**deg F**	**14.2**	**deg C**	Dd Discharge Data Average Temp
Salinity				**17.7**	**ppt**	1993 Diffuser Study Pg. 3
Calculated Density				**1012.83**	**kg/m3**	(Non-Fresh Water)
Concentration				**23.9**	**ppb**	(Independent Value)
Ambient						
Average Depth	HA	**30.00**	**feet**	**9.14**	**m**	From Fact Sheet (Table 8)
Depth at Discharge	HD	**8.10**	**feet**	**2.47**	**m**	From C/980
Wind Speed	UW			**2**	**m/s**	(educated guess)
Steady Velocity	UA			**0.0166**	**m/s**	Average Current Speed provided by SPA
Manning #	n			**0.022**		Relatively Smooth Substrate
Unbounded				**U**		Cornix Selection
Temperature		**47.3**	**deg F**	**8.5**	**deg C**	1993 Diffuser Study Pg. 3
Salinity				**31**	**ppt**	1993 Diffuser Study Pg. 3
Density	RHOAS			**1024.06**	**kg/m^3**	Cormix Calculation
Discharge						
Nearest Bank		**right**		**right**		
Port Width		**10**	**feet**	**3.05**	**m**	
Port Depth		**1**	**feet**	**0.30**	**m**	
Bottom Slope		**45**	**deg**	**45**	**deg**	
Horizontal Sigma	SIGMA	**90**	**deg**	**90**	**deg**	
Mixing Zone						

X	Y	Z	S	C	Meters	Feet

AWAR

	Outfall #018A r1	Parameter	English Units		SI Units		Reference
Effluent							
	flow rate		6,900	gpm	0.44	m^3/sec	from daily flow rate data
	Temperature		57.6	deg F	14.2	deg C	Dd Discharge Data Average Temp
	Salinity				17.7	ppt	1993 Diffuser Study Pg. 3
	Calculated Density				1012.83	kg/m3	(Non-Fresh Water)
	Concentration				23.9	ppb	(Independent Value)
Ambient							
	Average Depth	HA	30.00	feet	9.14	m	From Fact Sheet (Table 8)
	Depth at Discharge	HD	21.00	feet	6.40	m	From C/980 **used 21 feet instead of 8.1**
	Wind Speed	UW			2	m/s	(educated guess)
	Steady Velocity	UA			0.0166	m/s	Average Current Speed provided by SPAWAR
	Manning #	n			0.022		Relatively Smooth Substrate
	Unbounded				U		Cornix Selection
	Temperature		47.3	deg F	8.5	deg C	1993 Diffuser Study Pg. 3
	Salinity				31	ppt	1993 Diffuser Study Pg. 3
	Density	RHOAS			1024.06	kg/m^3	Cormix Calculation
Discharge							
	Nearest Bank		right		right		
	Port Width		10	feet	3.05	m	
	Port Depth		1	feet	0.30	m	
	Bottom Slope		45	deg	0	deg	
	Horizontal Sigma	SIGMA	90	deg	90	deg	
Mixing Zone							
	CMC		4.8	ppb			
	CCC		3.1	ppb			
	Mixing Zone Trajectory		200	feet			
	Grid		300				

	Outfall #018A r1	Parameter	English Units		SI Units		Reference	
Effluent								
	flow rate		6,900	gpm	0.44	m^3/sec	from daily flow rate data	
	Temperature		57.6	deg F	14.2	deg C	Dd Discharge Data Average Temp	
	Salinity				17.7	ppt	1993 Diffuser Study Pg. 3	
	Calculated Density				1012.83	kg/m3	(Non-Fresh Water)	
	Concentration				26.572	ppb	(Independent Value)	-0.818
Ambient								
	Average Depth	HA	30.00	feet	9.14	m	From Fact Sheet (Table 8)	
	Depth at Discharge	HD	21.00	feet	6.40	m	From C/980 **used 21 feet instead of 8.1**	
	Wind Speed	UW			0	m/s	(educated guess)	
	Steady Velocity	UA			0.0289	m/s	Average Current Speed provided by SPAWAR	
	Manning #	n			0.022		Relatively Smooth Substrate	
	Unbounded				U		Cornix Selection	
	Temperature		47.3	deg F	8.5	deg C	1993 Diffuser Study Pg. 3	
	Salinity				31	ppt	1993 Diffuser Study Pg. 3	
	Density	RHOAS			1024.06	kg/m^3	Cormix Calculation	
Discharge								
	Nearest Bank		right		right			
	Port Width		10	feet	3.05	m		
	Port Depth		0.5	feet	0.30	m		
	Bottom Slope		60	deg	60	deg		
	Horizontal Sigma	SIGMA	90	deg	90	deg		
Mixing Zone								
	CMC		3.98	ppb			-0.818	
	CCC		2.28	ppb			-0.818	
	Mixing Zone Trajectory		200	feet				
	Grid		300					

Output

	X	Y	Z	S	C	B	Trajectory Meters	Trajectory Feet
** CMC HAS BEEN FOUND **	1.02	27.74	0	**4.979**	4.80E+00		27.76	**91.07**
STANDARD OR CCC HAS BEEN FOUND**	NADA						#VALUE!	**#VALUE!**

X	Y	Z	S	C	B	Trajectory Meters	Trajectory Feet
0.24	9.98	0	**3**	8.93E+00		9.98	**32.75**
5.32	49.03	0	**6.67**	3.98E+00		49.32	**161.80**
508.23	0	0	**11.7**	2.28E+00		508.23	**1667.42**
208.76	0	0	**10.3**	2.57E+00		208.76	**684.91**

Outfall #018B r1	Parameter	English Units		SI Units		Reference
Effluent						
flow rate		**7,500**	**gpm**	**0.47**	**m^3/sec**	from daily flow rate data
Temperature		**57.4**	**deg F**	**14.1**	**deg C**	Dd Discharge Data Average Temp
Salinity		**17.7**	**ppt**	**17.7**	**ppt**	1993 Diffuser Study Pg. 3
Calculated Density				**1012.84**	**kg/m^3**	(Non-Fresh Water)
Concentration				**26.6**	**ppb**	(Independent Value)
Ambient						
Average Depth	HA	**37.00**	**feet**	**11.28**	**m**	Navigational Chart
Depth at Discharge	HD	**28.90**	**feet**	**8.81**	**m**	From C/980
Wind Speed	UW			**2**	**m/s**	(educated guess)
Steady Velocity	UA			**0.0166**	**m/s**	Average Current Speed provided by SPAWAR
Manning #	n			**0.022**		Relatively Smooth Substrate
Unbounded				**U**		Cornix Selection
Temperature		**47.3**	**deg F**	**8.5**	**deg C**	1993 Diffuser Study Pg. 3
Salinity		**31**	**ppt**	**31**	**ppt**	1993 Diffuser Study Pg. 3
Density	RHOAS			**1024.06**	**kg/m^3**	Cormix Calculation
Discharge						
Nearest Bank		**right**		**right**		
Distance to nearest bank	DISTB	**0**	**feet**	**0.00**	**m**	
Port Diamter	D0	**2**	**feet**	**0.61**	**m**	from Fact Sheet Table 8
Veritcal Theta	THETA	**0**	**deg**	**0**	**deg**	1993 diffuser study pg 3
Horizontal Sigma	SIGMA	**90**	**deg**	**90**	**deg**	1993 diffuser study pg 3
Discharge Port Height	H0	**21.40**	**feet**	**6.52**	**m**	From C/980

1.354 ft^2

Mixing Zone

CMC		**4.8**	**ppb**
CCC		**3.1**	**ppb**
Mixing Zone Trajectory		**200**	**feet**
Grid		**300**	

Output

X	Y	Z	S	C	B	Trajectory Meters	Trajectory Feet	
0.07	7.4	8.81	**3**	8.80E+00	1.02	7.40	**24.28**	
0.29	15.15	8.81	**5.5**	4.79E+00	1.88	15.15	**49.71**	** CMC HAS BEEN FOUND **
0.77	24.38	8.81	**8.6**	3.10E+00	2.91	24.39	**80.03**	**WATER QUALITY STANDARD OR CCC HAS BEEN FOUND**
0.85	25.61	8.81	**9**	2.96E+00	3.04	25.62	**84.07**	

	Outfall #018B r1	Parameter	English Units		SI Units		Reference
Effluent							
	flow rate		7.500	gpm	0.47	m^3/sec	from daily flow rate data
	Temperature		57.4	deg F	14.1	deg C	Dd Discharge Data Average Temp
	Salinity		17.7	ppt	17.7	ppt	1993 Diffuser Study Pg. 3
	Calculated Density				1012.84	kg/m^3	(Non-Fresh Water)
	Concentration				26.6	ppb	(Independent Value)
Ambient							
	Average Depth	HA	37.00	feet	11.28	m	Navigational Chart
	Depth at Discharge	HD	28.90	feet	8.81	m	From C980
	Wind Speed	UW			2	m/s	(educated guess)
	Steady Velocity	UA			0.0166	m/s	Average Current Speed provided by SPAWAR
	Manning #n	n			0.022		Relatively Smooth Substrate
	Unbounded				U		Cornix Selection
	Temperature		47.3	deg F	8.5	deg C	1993 Diffuser Study Pg. 3
	Salinity		31	ppt	31	ppt	1993 Diffuser Study Pg. 3
	Density	RHOAS			1024.06	kg/m^3	Cornix Calculation
Discharge							
	Nearest Bank		right		right		
	Distance to nearest bank	DISTB	0	feet	0.00	m	
	Port Diamter	DD	2	feet	0.61	m	from Fact Sheet Table 8
	Vertical Theta	THETA	0	deg	0	deg	1993 diffuser study pg 3
	Horizontal Sigma	SIGMA	90	deg	90	deg	1993 diffuser study pg 3
	Discharge Port Height	HD	21.40	feet	6.52	m	From C980
Mixing Zone							
	CMC		4.8	ppb			
	CCC		3.1	ppb			
	Mixing Zone Trajectory		200	feet			
	Grid		300				

Outfall #018B r1	Parameter	English Units		SI Units		Reference		Sensitivity
BEST AND FINAL 1								
flow rate		7.500	gpm	0.47	m^3/sec	from daily flow rate data		
Temperature		57.4	deg F	14.1	deg C	Dd Discharge Data Average Temp		
Salinity		17.7	ppt	17.7	ppt	1993 Diffuser Study Pg. 3		
Calculated Density				1012.84	kg/m^3	(Non-Fresh Water)		
Concentration				26.572	ppb	(Independent Value)	-0.018	32.63
Average Depth	HA	37.00	feet	11.28	m	Navigational Chart		
Depth at Discharge	HD	28.90	feet	8.81	m	From C980		
Wind Speed	UW			0	m/s	(educated guess)		
Steady Velocity	UA			0.0166	m/s	Average Current Speed provided by SPAWAR		
Manning #n	n			0.022		Relatively Smooth Substrate		
Unbounded				U		Cornix Selection		
Temperature		47.3	deg F	8.5	deg C	1993 Diffuser Study Pg. 3		
Salinity		31	ppt	31	ppt	1993 Diffuser Study Pg. 3		
Density	RHOAS			1024.06	kg/m^3	Cornix Calculation		
Nearest Bank		right		right				
Distance to nearest bank	DISTB	0	feet	0.00	m			
Port Diamter	DD	2	feet	0.61	m	from Fact Sheet Table 8	1.354	1.354
Vertical Theta	THETA	0	deg	0	deg	1993 diffuser study pg 3		
Horizontal Sigma	SIGMA	90	deg	90	deg	1993 diffuser study pg 3		
Discharge Port Height	HD	21.40	feet	6.52	m	From C980		
Discharge FLUSH		90	Sigma					
Channel Slope		60	Slope					
Channel outlet		2	ft	square discharge				
CMC		3.982	ppb				-0.018	
CCC		2.282	ppb				-0.018	
Mixing Zone Trajectory		200	feet					
Grid		300						

Outfall #018B r1	Parameter	English Units		SI Units		Reference
flow rate		7.500	gpm	0.47	m^3/sec	from daily flow rate data
Temperature		57.4	deg F	14.1	deg C	Dd Discharge Data Average Temp
Salinity		17.7	ppt	17.7	ppt	1993 Diffuser Study Pg. 3
Calculated Density				1012.84	kg/m^3	(Non-Fresh Water)
Concentration				26.6	ppb	(Independent Value)
Average Depth	HA	37.00	feet	11.28	m	Navigational Chart
Depth at Discharge	HD	28.90	feet	8.81	m	From C980
Wind Speed	UW			0	m/s	(educated guess)
Steady Velocity	UA			0.0166	m/s	Average Current Speed provided by SPAWAR
Manning #n	n			0.022		Relatively Smooth Substrate
Unbounded				U		Cornix Selection
Temperature		47.3	deg F	8.5	deg C	1993 Diffuser Study Pg. 3
Salinity		31	ppt	31	ppt	1993 Diffuser Study Pg. 3
Density	RHOAS			1024.06	kg/m^3	Cornix Calculation
Nearest Bank		right		right		
Distance to nearest bank	DISTB	0	feet	0.00	m	
Port Diamter	DD	2	feet	0.61	m	from Fact Sheet Table 8
Vertical Theta	THETA	0	deg	0	deg	1993 diffuser study pg 3
Horizontal Sigma	SIGMA	90	deg	90	deg	1993 diffuser study pg 3
Discharge Port Height	HD	21.40	feet	6.52	m	From C980
Discharge FLUSH		90	Sigma			
Channel Slope		60	Slope			
Channel outlet		2	ft	square discharge		
CMC		4.8	ppb			
CCC		3.1	ppb			
Mixing Zone Trajectory		200	feet			
Grid		300				

Outfall #018B r1	Parameter	English Units		SI Units		Reference		
flow rate		7.500	gpm	0.47	m^3/sec	from daily flow rate data		
Temperature		57.4	deg F	14.1	deg C	Dd Discharge Data Average Temp		
Salinity		17.7	ppt	17.7	ppt	1993 Diffuser Study Pg. 3		
Calculated Density				1012.84	kg/m^3	(Non-Fresh Water)		
Concentration				26.6	ppb	(Independent Value)		
Average Depth	HA	37.00	feet	11.28	m	Navigational Chart		
Depth at Discharge	HD	28.90	feet	8.81	m	From C980		
Wind Speed	UW			2	m/s	(educated guess)		
Steady Velocity	UA			0.0166	m/s	Average Current Speed provided by SPAWAR		
Manning #n	n			0.022		Relatively Smooth Substrate		
Unbounded				U		Cornix Selection		
Temperature		47.3	deg F	8.5	deg C	1993 Diffuser Study Pg. 3		
Salinity		31	ppt	31	ppt	1993 Diffuser Study Pg. 3		
Density	RHOAS			1024.06	kg/m^3	Cornix Calculation		
Nearest Bank		right		right				
Distance to nearest bank	DISTB	0	feet	0.00	m			
Port Diamter	DD	2	feet	0.61	m	from Fact Sheet Table 8	1.354	1.354
Vertical Theta	THETA	0	deg	0	deg	1993 diffuser study pg 3		
Horizontal Sigma	SIGMA	90	deg	90	deg	1993 diffuser study pg 3		
Discharge Port Height	HD	21.40	feet	6.52	m	From C980		
Discharge FLUSH		90	Sigma					
Channel Slope		60	Slope					
Channel outlet		5.11E-10	ft	flat, w ide channel discharge				
CMC		4.8	ppb					
CCC		3.1	ppb					
Mixing Zone Trajectory		200	feet					
Grid		300						

Outfall mxc Outfall mxc Outfall mxc Outfall modeled w rong- These are the results for 18B in terms of configuration of outfall- this one discharges over w ater.

Output

X	Y	Z	S	C	B	Trajectory Meters	Feet
0.07	7.4	8.81	3	8.80E+00	1.02	7.40	**24.28**
0.29	15.15	8.81	**5.5**	4.79E+00	1.88	15.15	**49.71**
0.77	24.38	8.81	**8.6**	3.10E+00	2.91	24.39	**80.03**
0.85	25.61	8.81	**9**	2.96E+00	3.04	25.62	**84.07**

X	Y	Z	S	C	B	Trajectory Meters	Feet
0.12	7.31	8.81	**3**	8.87E+00	1.02	7.31	**23.99**
0.78	18.4	8.81	**6.673**	3.98E+00		18.42	**60.42**
2.6	32.51	8.81	**11.6**	2.28E+00	2.91	32.61	**107.00**
1.49	25.04	8.81	**9**	2.97E+00	3.02	25.08	**82.30**

X	Y	Z	S	C	B	Trajectory Meters	Feet
1.61	28.19	0	**5.5**	4.80E+00		28.24	**92.64**
6.21	57.16	0	**8.6**	3.10E+00		57.50	**188.64**

X	Y	Z	S	C	B	Trajectory Meters	Feet
2.37	32.15	0	**5.5**	4.79E+00	1.88	32.24	**105.77**
15.13	0	0	**8.6**	3.10E+00	2.91	15.13	**49.64**

** CMC HAS BEEN FOUND **
**WATER QUALITY STANDARD
OR CCC HAS BEEN FOUND**

Outfall #019 r1	Parameter	English Units		SI Units		Reference
Effluent						
flow rate		**16,000**	**gpm**	**1.01**	**m^3/sec**	from daily flow rate data
Temperature		**55.6**	**deg F**	**13.1**	**deg C**	Dd Discharge Data Average Temp
Salinity		**22.5**	**ppt**	**22.5**	**ppt**	1993 Diffuser Study Pg. 3
Calculated Density				**1016.72**	**kg/m^3**	(Non-Fresh Water)
Concentration				**26.6**	**ppb**	(Independent Value)
Ambient						
Average Depth	HA	**41.00**	**feet**	**12.50**	**m**	Navigational Chart
Depth at Discharge	HD	**28.90**	**feet**	**8.81**	**m**	From C/980
Wind Speed	UW			**2**	**m/s**	(educated guess)
Steady Velocity	UA			**0.0166**	**m/s**	Average Current Speed provided by SPAWAR
Manning #	n			**0.022**		Relatively Smooth Substrate
Unbounded				**U**		Cornix Selection
Temperature		**47.3**	**deg F**	**8.5**	**deg C**	1993 Diffuser Study Pg. 3
Salinity		**31**	**ppt**	**31**	**ppt**	1993 Diffuser Study Pg. 3
Density	RHOAS			**1024.06**	**kg/m^3**	Cormix Calculation
Discharge						
Nearest Bank		**right**		**right**		
Distance to nearest bank	DISTB	**0**	**feet**	**0.00**	**m**	
Port Diamter	D0	**3**	**feet**	**0.91**	**m**	from Fact Sheet Table 8
Veritcal Theta	THETA	**0**	**deg**	**0**	**deg**	1993 diffuser study pg 3
Horizontal Sigma	SIGMA	**90**	**deg**	**90**	**deg**	1993 diffuser study pg 3
Discharge Port Height	H0	**23.90**	**feet**	**7.28**	**m**	From C/980

Mixing Zone

CMC		**4.8**	**ppb**
CCC		**3.1**	**ppb**
Mixing Zone Trajectory		**200**	**feet**
Grid		**300**	

Output

X	Y	Z	S	C	B	Trajectory Meters	Trajectory Feet	
0.38	16.55	8.81	**3**	8.97E+00	2.29	16.55	**54.31**	
1.7	34.21	8.81	**5.6**	4.79E+00	4.28	34.25	**112.38**	** CMC HAS BEEN FOUND **
4.41	53.75	8.81	**8.6**	3.09E+00	6.59	53.93	**176.94**	**WATER QUALITY STANDARD OR C
4.83	56.09	8.81	**9**	2.96E+00	6.87	56.30	**184.70**	

CC HAS BEEN FOUND**

Plume hits bottom mid-module	Outfall #019 r1	Parameter	English Units		SI Units		Reference
Effluent							
	flow rate		16,000	gpm	1.01	m^3/sec	from daily flow rate data
	Temperature		55.6	deg F	13.1	deg C	Dil Discharge Data Average Temp
	Salinity		22.5	ppt	22.5	ppt	1993 Diffuser Study Pg. 3
	Calculated Density				1016.72	kg/m^3	(Non-Fresh Water)
	Concentration				26.6	ppb	(Independent Value)
Ambient							
	Average Depth	HA	41.00	feet	12.50	m	Navigational Chart
	Depth at Discharge	HD	28.90	feet	8.81	m	From Q980
	Wind Speed	UW			2	m/s	(indicated guess)
	Steady Velocity	UA			0.0166	m/s	Average Current Speed provided by SPAWAR
	Manning #	n			0.022		Relatively Smooth Substrate
	Unbounded				U		Corrix Selection
	Temperature		47.3	deg F	8.5	deg C	1993 Diffuser Study Pg. 3
	Salinity		31	ppt	31	ppt	1993 Diffuser Study Pg. 3
	Density	RHOAS			1024.06	kg/m^3	Corrix Calculation
Discharge							
	Nearest Bank		right		right		
	Distance to nearest bank	DISTB	0	feet	0.00	m	
	Port Diameter	DO	3	feet	0.91	m	from Fact Sheet Table 8
	Vertical Theta	THETA	0	deg	0	deg	1993 diffuser study pg 3
	Horizontal Sigma	SIGMA	90	deg	90	deg	1993 diffuser study pg 3
	Discharge Port Height	HD	23.90	feet	7.28	m	From Q980
Mixing Zone							
	CMC		4.8	ppb			
	CCC		3.1	ppb			
	Mixing Zone Trajectory		200	feet			
	Grid		300				

Output

X	Y	Z	S	C	B	Trajectory Meters	Trajectory Feet
0.38	16.55	8.81	3	8.97E+00	2.29	18.75	61.52
1.69	34.13	8.81	5.54	4.80E+00		34.17	112.11
4.38	53.6	8.81	8.6	3.10E+00		53.78	176.44
4.83	56.09	8.81	9	2.96E+00	6.87	56.30	184.70

** CMC HAS BEEN FOUND **
**WATER QUALITY STANDARD
OR CCC HAS BEEN FOUND**

hits bottom	Outfall #019 r1	Parameter	English Units		
Effluent					
	flow rate		16,000	gpm	
	Temperature		55.6	deg F	13.1
	Salinity		22.5	ppt	
	Calculated Density		1016.72	kg/m^3	
	Concentration		26.6	ppb	
Ambient					
	Average Depth	HA	41.00	feet	
	Depth at Discharge	HD	28.90	28.90	
	Wind Speed	UW	2		
	Steady Velocity	UA	0.0233	m/s	10% tile
	Manning #	n			
	Unbounded				
	Temperature		47.3	deg F	8.5 8.2
	Salinity		31	ppt	
	Density	RHOAS	1024.06	kg/m^3	
Discharge					
	Nearest Bank		right		
	Distance to nearest bank	DISTB	0	feet	
	Port Diameter	DO	3	feet	
	Vertical Theta	THETA	0	deg	
	Horizontal Sigma	SIGMA	90	deg	
	Discharge Port Height	HD	23.90	feet	
Mixing Zone					
	CMC		4.8	ppb	
	CCC		3.1	ppb	
	Mixing Zone Trajectory		200	feet	
	Grid		300		

X	Y	Z	S	C	B	Trajectory Meters	Trajectory Feet
2.39	33.49	8.81	5.54	4.80E+00		33.58	110.15
6	51.3	8.81	8.6	3.10E+00		51.65	169.45

Outfall #019 r1	Parameter	English Units		
Effluent				
flow rate		16,000	gpm	
Temperature		55.6	deg F	13.1
Salinity		22.5	ppt	
Calculated Density		1016.72	kg/m^3	
Concentration		26.6	ppb	
Ambient				
Average Depth	HA	41.00	feet	
Depth at Discharge	HD	28.90	feet	
Wind Speed	UW	2		
Steady Velocity	UA	0.0416	m/s	90 %tile
Manning #	n			
Unbounded				
Temperature		47.3	deg F	8.5
Salinity		31	ppt	
Density	RHOAS	1024.06	kg/m^3	
Discharge				
Nearest Bank		right		
Distance to nearest bank	DISTB	0	feet	
Port Diameter	DO	3	feet	
Vertical Theta	THETA	0	deg	
Horizontal Sigma	SIGMA	90	deg	
Discharge Port Height	HD	23.90	feet	
Mixing Zone				
CMC		4.8	ppb	
CCC		3.1	ppb	
Mixing Zone Trajectory		200	feet	
Grid		300		

X	Y	Z	S	C	B	Trajectory Meters	Trajectory Feet
139.46	0	8.81	5.5	4.81E+00		139.46	457.55
810.5	0	8.81	8.6	3.10E+00		810.50	2659.12

Outfall #019 r1	Parameter	English Units		
Effluent				
flow rate		16,000	gpm	
Temperature		55.6	deg F	13.1
Salinity		22.5	ppt	
Calculated Density		1016.72	kg/m^3	
Concentration		26.6	ppb	
Ambient				
Average Depth	HA	41.00	feet	
Depth at Discharge	HD	28.90	feet	
Wind Speed	UW	2		
Steady Velocity	UA	0.0289	m/s	50 %tile
Manning #	n			
Unbounded				
Temperature		47.3	deg F	8.5
Salinity		31	ppt	
Density	RHOAS	1024.06	kg/m^3	
Discharge				
Nearest Bank		right		
Distance to nearest bank	DISTB	0	feet	
Port Diameter	DO	3	feet	
Vertical Theta	THETA	0	deg	
Horizontal Sigma	SIGMA	90	deg	
Discharge Port Height	HD	23.90	feet	
Mixing Zone				
CMC		4.8	ppb	
CCC		3.1	ppb	
Mixing Zone Trajectory		200	feet	
Grid		300		

X	Y	Z	S	C	B	Trajectory Meters	Trajectory Feet
2.94	32.81	8.81	5.54	4.80E+00		32.94	108.08
7.16	49.08	8.81	8.6	3.10E+00		49.60	162.73

	Outfall #019 r1	Parameter	English Units		SI Units		Best and Final
Effluent							
	flow rate		16,000	gpm			
	Temperature		55.6	deg F			13.1
	Salinity		22.5	ppt			
	Calculated Density		1016.72	kg/m^3			
	Concentration		26.572	ppb			-0.018
Ambient							
	Average Depth	HA	41.00	feet			
	Depth at Discharge	HD	28.90	feet			
	Wind Speed	UW	2				
	Steady Velocity	UA	0.0289	m/s			50 %tile
	Manning #	n					
	Unbounded						
	Temperature		47.3	deg F			8.5
	Salinity		31	ppt			
	Density	RHOAS	1024.06	kg/m^3			
Discharge							
	Nearest Bank		Right				
	Distance to nearest bank	DISTB	0	feet			
	Port Diameter	DO	3	feet			
	Vertical Theta	THETA	0	deg			
	Horizontal Sigma	SIGMA	90	deg			
	Discharge Port Height	HD	23.90	feet			
Mixing							
	CMC		3.982	ppb			-0.818
	CCC		2.282	ppb			-0.818
	Mixing Zone Trajectory		200	feet			
	Grid		300				

X	Y	Z	S	C	B	Trajectory Meters	Trajectory Feet
0.69	16.45	8.81	3.2	8.93E+00		16.46	54.02
4.38	39.29	8.81	6.67	3.98E+00		39.53	129.70
12.33	62.07	8.81	11.6	2.28E+00		63.28	207.62
7.79	50.96	8.81	9	2.96E+00		51.55	169.13

Outfall #019 r1	Parameter	English Units		
Effluent				
flow rate		16,000	gpm	
Temperature		55.6	deg F	13.1
Salinity		22.5	ppt	
Calculated Density		1016.72	kg/m^3	
Concentration		26.6	ppb	
Ambient				
Average Depth	HA	41.00	feet	
Depth at Discharge	HD	28.90	feet	
Wind Speed	UW	2		
Steady Velocity	UA	0.0289	m/s	50 %tile
Manning #	n			
Unbounded				
Temperature		52.3	deg F	11.6
Salinity		31	ppt	28.9 psu
Density	RHOAS	1023.93	kg/m^3	
Discharge				
Nearest Bank		Left		
Distance to nearest bank	DISTB	900	feet	
Port Diameter	DO	3	feet	
Vertical Theta	THETA	0	deg	
Horizontal Sigma	SIGMA	90	deg	
Discharge Port Height	HD	23.90	feet	
Mixing Zone				
CMC		4.8	ppb	
CCC		3.1	ppb	
Mixing Zone Trajectory		200	feet	
Grid		300		

X	Y	Z	S	C	B	Trajectory Meters	Trajectory Feet
2.94	32.81	8.81	5.54	4.80E+00		32.94	108.08
7.16	49.08	8.81	8.6	3.10E+00		49.60	162.73

Outfall #019 r1	Parameter	English Units		
Effluent				
flow rate		16,000	gpm	
Temperature		55.6	deg F	13.1
Salinity		22.5	ppt	
Calculated Density		1016.72	kg/m^3	
Concentration		26.6	ppb	
Ambient				
Average Depth	HA	41.00	feet	
Depth at Discharge	HD	28.90	feet	
Wind Speed	UW	2		
Steady Velocity	UA	0.0289	m/s	50 %tile
Manning #	n			
Unbounded				
Temperature		52.3	deg F	11.75
Salinity		31	ppt	27.75
Density	RHOAS	1023.61	kg/m^3	
Discharge				
Nearest Bank		Left		
Distance to nearest bank	DISTB	900	feet	
Port Diameter	DO	3	feet	
Vertical Theta	THETA	0	deg	
Horizontal Sigma	SIGMA	90	deg	
Discharge Port Height	HD	23.90	feet	
Mixing Zone				
CMC		4.8	ppb	
CCC		3.1	ppb	
Mixing Zone Trajectory		200	feet	
Grid		300	0	

X	Y	Z	S	C	B	Trajectory Meters	Trajectory Feet
2.94	32.81	8.81	5.54	4.80E+00		32.94	108.08
7.16	49.08	8.81	8.6	3.10E+00		49.60	162.73

At DDH6,

The drainage pump flapper is square and opens to approximately 45 degrees
while flowing. It is hinged on top. Sea grow on the flapper is thick, lots
of tube worms and algae.
I have diver video.

	Outfall #019 r1	Parameter	English Units		SI Units				
Effluent									
	flow rate		**16,000**	**gpm**	**1.01**	**m^3/sec**			
	Temperature		**55.6**	**deg F**	**13.1**	**deg C**			
	Salinity		**22.5**	**ppt**	**22.5**	**ppt**			
	Calculated Density		**1016.72**	**kg/m^3**	**1016.72**	**kg/m^3**			
	Concentration		**25.89**	**ppb**	**26.6**	**ppb**	1.5		
Ambient									
	Average Depth	HA	**41.00**	**feet**	**12.50**	**m**			
	Depth at Discharge	HD	**28.90**	**feet**	**8.81**	**m**			
	Wind Speed	UW	0		**0**	**m/s**			
	Steady Velocity	UA	**0.0289**	**m/s**	**0.0289**	**m/s**			
	Manning #	n			**0.022**				
	Unbounded				**U**				
	Temperature		**47.3**	**deg F**	**8.5**	**deg C**			
	Salinity		**31**	**ppt**	**31**	**ppt**			
	Density	RHOAS	**1024.06**	**kg/m^3**	**1024.06**	**kg/m^3**			
Discharge									
	Nearest Bank		**Right**		**right**				
	Distance to nearest bank	DISTB	**0**	**feet**	**0.00**	**m**			
	Port Diamter	D0	**3**	**feet**	**0.91**	**m**			
	Veritcal Theta	THETA	**0**	**deg**	**0**	**deg**			
	Horizontal Sigma	SIGMA	**90**	**deg**	**90**	**deg**			
	Discharge Port Height	H0	**23.90**	**feet**	**7.28**	**m**			
Mixing Zone									
	CMC		**3.3**	**ppb**			1.5		
	CCC		**1.6**	**ppb**			1.5		
	Mixing Zone Trajectory		**200**	**feet**					
	Grid		**300**						
Output							**Trajectory**		
	X	**Y**	**Z**	**S**	**C**	**B**	**Meters**	**Feet**	Difference in feet
Regular results	0.69	16.45	8.81	**3.2**	8.93E+00		16.46	**54.02**	
** CMC HAS BEEN FOUND **	4.36	39.29	8.81	**6.67**	3.98E+00		39.53	**129.70**	
WATER QUALITY STANDARD OR CCC HAS BEEN FOUND	12.33	62.07	8.81	**11.6**	2.28E+00		63.28	**207.62**	
	7.79	50.96	8.81	**9**	2.96E+00		51.55	**169.13**	
Output							**Trajectory**		
	X	**Y**	**Z**	**S**	**C**	**B**	**Meters**	**Feet**	
1.5 background concentration									
** CMC HAS BEEN FOUND **	6.03	45.48	8.81	**7.84**	3.30E+00		45.88	**150.52**	20.82
WATER QUALITY STANDARD OR CCC HAS BEEN FOUND	15.94	72.07	8.81	**16.2**	1.60E+00		73.81	**242.16**	34.54
Output							**Trajectory**		
	X	**Y**	**Z**	**S**	**C**	**B**	**Meters**	**Feet**	
Strong Wind (10 m/s)									
** CMC HAS BEEN FOUND **	4.36	39.29	8.81	**6.67**	3.98E+00		39.53	**129.70**	0.00
WATER QUALITY STANDARD OR CCC HAS BEEN FOUND	12.33	62.07	8.81	**11.6**	2.28E+00		63.28	**207.62**	0.00
Output							**Trajectory**		
	X	**Y**	**Z**	**S**	**C**	**B**	**Meters**	**Feet**	
High ambient velocity (10 m/s)									
** CMC HAS BEEN FOUND **	1.16	0.12	8.81	**6.67**	3.98E+00		1.17	**3.83**	(125.87)
WATER QUALITY STANDARD OR CCC HAS BEEN FOUND	1.59	0.12	8.81	**11.6**	2.28E+00		1.59	**5.23**	(202.39)
Output							**Trajectory**		
1.5 background concentration	**X**	**Y**	**Z**	**S**	**C**	**B**	**Meters**	**Feet**	
High ambient velocity (10 m/s)									
** CMC HAS BEEN FOUND **	1.19	0.12	8.81	**7.845**	3.30E+00		1.20	**3.92**	(125.77)
WATER QUALITY STANDARD OR CCC HAS BEEN FOUND	1.97	0.12	8.81	**16.2**	1.60E+00		1.97	**6.48**	(201.15)

OF21 Steam Plant	Parameter	English Units		SI Units		Reference
Effluent						
Heat Loss Coefficient				**5.00**	**W/m2, deg C**	Concervative CORMIX value 0 wind
Discharge Temperature (Excess)		**60.8**	**deg F**	**16**	**deg C**	
Flow Rate		**175.0**	**gpm**	**0.0110408**	**m3/s**	
Effluent Density (Temperature)		**89.6**	**F**	**32**		
Ambient						
Average Depth	HA	**44.58**	**feet**	**13.59**	**m**	
Depth at Discharge	HD	**35.00**	**feet**	**10.67**	**m**	
Wind Speed	UW	**0.00**		**0**	**m/s**	USED 0 INSTEAD
Steady Velocity	UA			**0.0166**	**m/s**	
Manning #	n			**0.022**		
Unbounded				**U**		
Temperature			**deg F**	**8.5**	**deg C**	
Salinity			**ppt**	**31**	**ppt**	
Density	RHOAS			**1022.67**	**kg/m^3**	
Discharge						
Diffuser length		**40.001952**	**feet**	**12.192**	**m**	
Dist. to 1st endpoint		**918.043486**	**feet**	**279.806**	**m**	
Dist to 2nd endpoint		**958.045438**	**feet**	**291.998**	**m**	
Port Height		**4.0001952**	**feet**	**1.2192**	**m**	
Port Diameter		**0.3300161**	**feet**	**0.100584**	**m**	
Contraction Ratio		**1**				
Total # of openings		**5**				
Alignment Ang GAMMA		**90.00**	**degrees**			
Configuration of Ports or Nozzles						
Single Riser, alternating						
Vertical- Theta	0	0				
Direction of nozzles on each side		Same direction				
Mixing Zone						
Concentration for the WQ Standard (excess)		**0.3**	**deg C**			
Distance		**71**	**m**			
Region of interest		**914.4**	**M**			
Grid Intervals to display		**100**				

Output

X	Y	Z	S	C		Trajectory Meters	Trajectory Feet	
0.58	0	6.11	**53.3**	3.00E-01		0.58	**1.90**	Ambient WQS was encountered at the f

ollowing location

x	Background Cu Concentration				0.818	ppb		
	Large SW PSNS015	**Para meter**	**English Units**		**SI Units**		**Reference**	
Effluent								
	flow rate		**0.043**		**0.04250**	**m^3/sec**		
	Temperature			**deg F**	**10.7**	**deg C**	average temp from FC TMDL Database	
	Salinity				**0.472**	**ppt**	calculated from average temp and conductivity from FC TMDL Database	http://www.es.flinders.edu.au/
	Calculated Density				**1000.085**	**kg/m3**		
	Concentration				**29.3608**	**ppb**	90th% [Total Cu] * 0.83 - background (from ENVVEST Studies)	
Ambient								
	Average Depth	HA	**37.00**	**feet**	**11.28**	**m**	Estimated as 6' below MLLW	
	Depth at Discharge	HD	**37.00**	**feet**	**11.28**	**m**	NOAA Chart18449	
	Wind Speed	UW				**m/s**	(educated guess)	
	Steady Velocity	UA			**0.0289**	**m/s**	Depth Average Current Speed from ADCP	
	Manning #	n			**0.022**		Relatively Smooth Substrate	
	Unbounded				**U**		Cormix Selection	
	Temperature		**47.3**	**deg F**	**8.5**	**deg C**	1993 Diffuser Study Pg. 3	
	Salinity				**31**	**ppt**	1993 Diffuser Study Pg. 3	
	Density	RHOAS			**1024.06**	**kg/m^3**	Cormix Calculation	
Discharge	**48 inch outfall pipe**							
	Nearest Bank		**right**		**right**			
	Port Diameter		**4**	**feet**	**1.2192**	**m**		
	Horizontal Sigma	SIGMA	**90**	**deg**	**90**	**deg**		
	port height		**34.00**	**feet**	**10.3632**	**m**	the depth at discharge (37 ft) Minus the 4 foot diameter outfall pipe minus the depth below the surface (6 fee	
Mixing Zone	CMC		**3.982**	**ppb**			Criteria value - background	
	CCC		**2.282**	**ppb**			Criteria value - background	
	Mixing Zone Trajectory		**200**	**feet**				
	Grid		**300**					

Output

	X	Y	Z	S	C	B	Trajectory Meters	Trajectory Feet
Results for (-)6 feet	H0= 29							
** CMC HAS BEEN FOUND **	1.51	0	11.28	**7.37**	3.98E+00		1.51	**4.95**
STANDARD OR CCC HAS BEEN FOUND**	31.71	0	11.28	**12.9**	2.28E+00		31.71	**104.04**
Results for (-)1 foot	H0= 34							
** CMC HAS BEEN FOUND **	235.26	0	11.28	**7.37**	3.98E+00		235.26	**771.85**
WATER QUALITY STANDARD OR CCC HAS BEEN FOUND	1484.28	0	11.28	**12.9**	2.28E+00		1484.28	**4869.69**

~mattom/Utilities/salcon.html

t)

x

Background Cu Concentration 0.818 ppb

Medium SW PSNS126	Parameter	English Units		SI Units		Reference
Effluent						
flow rate		0.02270		0.0227000	m^3/sec	
Temperature			deg F	10.73	deg C	average temp from FC TMDL Database
Salinity				0.272	ppt	calculated from average temp and conductivity fr http://www.es.flinders.edu.au/~ma
Calculated Density				999.9285	kg/m3	
Concentration		95.95		78.821	ppb	90th% [Total Cu] * 0.83 - background (from ENVVEST Studies)
Ambient						
Average Depth	HA	45.00	feet	13.72	m	Estimated as 6' below MLLW
Depth at Discharge	HD	45.00	feet	13.72	m	NOAA Chart18449
Wind Speed	UW			0	m/s	(educated guess)
Steady Velocity	UA			0.0289	m/s	Depth Average Current Speed from ADCP
Manning #	n			0.022		Relatively Smooth Substrate
Unbounded				U		Cormix Selection
Temperature		47.3	deg F	8.5	deg C	1993 Diffuser Study Pg. 3
Salinity				31	ppt	1993 Diffuser Study Pg. 3
Density	RHOAS			1024.06	kg/m^3	Cormix Calculation
Discharge	**24 inch outfall pipe**					
Nearest Bank		right		right		
Port Diameter		2	feet	0.6096	m	
Horizontal Sigma	SIGMA	90	deg	90	deg	
port height		43.00	feet	13.1064	m	the depth at discharge (45 ft) Minus the 2 foot diameter outfall pipe minus the depth
Mixing Zone						
CMC		3.982	ppb			
CCC		2.282	ppb			
Mixing Zone Trajectory		200	feet			
Grid		300				

Output

	X	Y	Z	S	C	B	Trajectory Meters	Trajectory Feet
Results for (-)6 feet	H0= 38							
** CMC HAS BEEN FOUND **	287.13	0	13.72	**19.79**	3.98E+00		287.13	**942.03**
WATER QUALITY STANDARD OR CCC HAS BEEN FOUND	1485.62	0	13.72	**34.5**	2.28E+00		1485.62	**4874.08**
Results for (-)1 foot	H0= 43							
** CMC HAS BEEN FOUND **	1820.09	0	13..72	**37.48**	3.98E+00		1820.09	**5971.42**
WATER QUALITY STANDARD OR CCC HAS BEEN FOUND	-	-	-	-	-	-	-	-

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below the surface (6 feet)

Background Cu Concentration 0.818 ppb

	Small SW PSNS124	Parameter	English Units		SI Units		Reference	
Effluent								
	flow rate		**0.00340**	**m^3/sec**	**0.0034000**	**m^3/sec**		
	Temperature			**deg F**	**11.41083**	**deg C**	average temp from FC TMDL Database	
	Salinity				**2.028**	**ppt**	calculated from average temp and conductivity from FC TMDL Database	http://www.es.flinders.edu.au/~matt
	Calculated Density				**1001.209**	**kg/m3**		
	Concentration		**173.466667**		**143.1593**	**ppb**	90th% [Total Cu] * 0.83 - background (from ENVVEST Studies)	
Ambient			**29.00**	**feet**	**8.84**	**m**	Estimated as 6' below MLLW	
	Average Depth	HA	**29.00**	**feet**	**8.84**	**m**	NOAA Chart18449	
	Depth at Discharge	HD			**0**	**m/s**	(educated guess)	
	Wind Speed	UW			**0.0289**	**m/s**	Depth Average Current Speed from ADCP	
	Steady Velocity	UA			**0.022**		Relatively Smooth Substrate	
	Manning #	n			**U**		Cormix Selection	
	Unbounded		**47.3**	**deg F**	**8.5**	**deg C**	1993 Diffuser Study Pg. 3	
	Temperature				**31**	**ppt**	1993 Diffuser Study Pg. 3	
	Salinity				**1024.06**	**kg/m^3**	Cormix Calculation	
	Density	RHOAS						
Discharge	**12 inch outfall pipe**		**right**		**right**			
	Nearest Bank		**10**	**feet**	**3.05**	**m**		
	Port Diameter		**1**	**feet**	**0.30**	**m**		
	port height		**27.50**	**feet**	**8.38**	**m**	the depth at discharge (29 ft) Minus the 1 foot diameter outfall pipe minus the depth below the surface (6 feet)	
	Horizontal Sigma	SIGMA			**90**	deg		
			3.982	**ppb**			Criteria value - background	
Mixing Zone	CMC		**2.282**	**ppb**			Criteria value - background	
	CCC		**200**	**feet**				
	Mixing Zone Trajectory		**300**					
	Grid							

Output

	X	Y	Z	S	C	B	Trajectory Meters	Trajectory Feet
Results for (-)6 feet	H0= 22.5							
** CMC HAS BEEN FOUND **	34.43	0	8.84	**35.951**	4.80E+00		34.43	**112.96**
STANDARD OR CCC HAS BEEN FOUND**	383.58	0	8.84	**62.7**	2.28E+00		383.58	**1258.46**
Results for (-)1 foot	H0= 27.5							
** CMC HAS BEEN FOUND **	656.46	2	8.84	**35.951**	3.98E+00		656.46	**2153.75**
WATER QUALITY STANDARD OR CCC HAS BEEN FOUND	920.5	0	8.84	**62.7**	2.28E+00		920.50	**3020.01**

om/Utilities/salcon.html

	Convert				
From	**Enter Value here**	**To**	**Result**		
meters	0.08	feet	**0.262**	40.338	3.14 inches
feet	40.00	meters	**12.191**		
Farenheit	47.30	Celsius	**8.5**		
Celsius	55.60	Farenheit	**132.08**		

Density equation

Density=	1000.085276
p	6255.08225
Alpha	1889.501391
Temperature (C)	10.7
Salinity (ppt)	0.472

;

Outfall #018A r1	Parameter	English Units		SI Units		Reference
Effluent						
flow rate		**6,900**	**gpm**	**0.44**	**m^3/sec**	from daily flow rate data
Temperature		**57.6**	**deg F**	**14.2**	**deg C**	Dd Discharge Data Average Temp
Salinity				**17.7**	**ppt**	1993 Diffuser Study Pg. 3
Calculated Density				**1012.83**	**kg/m3**	(Non-Fresh Water)
Concentration				**23.9**	**ppb**	(Independent Value)
Ambient						
Average Depth	HA	**30.00**	**feet**	**9.14**	**m**	From Fact Sheet (Table 8)
Depth at Discharge	HD	**21.00**	**feet**	**6.40**	**m**	From C/980
Wind Speed	UW			**2**	**m/s**	(educated guess)
Steady Velocity	UA			**0.0166**	**m/s**	Average Current Speed provided by SPAWAR
Manning #	n			**0.022**		Relatively Smooth Substrate
Unbounded				**U**		Cornix Selection
Temperature		**47.3**	**deg F**	**8.5**	**deg C**	1993 Diffuser Study Pg. 3
Salinity				**31**	**ppt**	1993 Diffuser Study Pg. 3
Density	RHOAS			**1024.06**	**kg/m^3**	Cormix Calculation
Discharge						
Nearest Bank		**right**		**right**		
Distance to nearest bank	DISTB	**0**	**feet**	**0.00**	**m**	
Port Diamter	D0	**2**	**feet**	**0.61**	**m**	from Fact Sheet Table 8
Veritcal Theta	THETA	**0**	**deg**	**0**	**deg**	1993 diffuser study pg 3
Horizontal Sigma	SIGMA	**90**	**deg**	**90**	**deg**	1993 diffuser study pg 3
Discharge Port Height	H0	**19.00**	**feet**	**5.79**	**m**	From C/980
port height above water		**-2.00**	**feet**	**-0.61**	**m**	
Mixing Zone						

used 21 feet instead of

X	Y	Z	S	C	Meters	Feet

above a beach, hits rocks

f 8.1

Outfall #018A r1	Parameter	English Units		SI Units		Reference
Effluent						
flow rate		6,900	gpm	0.44	m^3/sec	from daily flow rate data
Temperature		57.6	deg F	14.2	deg C	Dd Discharge Data Average Temp
Salinity				17.7	ppt	1993 Diffuser Study Pg. 3
Calculated Density				1012.83	kg/m3	(Non-Fresh Water)
Concentration				23.9	ppb	(Independent Value)
Ambient						
Average Depth	HA	30.00	feet	9.14	m	From Fact Sheet (Table 8)
Depth at Discharge	HD	21.00	feet	6.40	m	From C/980 **used 21 feet instead of 8.1**
Wind Speed	UW			2	m/s	(educated guess)
Steady Velocity	UA			0.0166	m/s	Average Current Speed provided by SPAWAR
Manning #	n			0.022		Relatively Smooth Substrate
Unbounded				U		Cornix Selection
Temperature		47.3	deg F	8.5	deg C	1993 Diffuser Study Pg. 3
Salinity				31	ppt	1993 Diffuser Study Pg. 3
Density	RHOAS			1024.06	kg/m^3	Cormix Calculation
Discharge						
Nearest Bank		right		right		
Distance to nearest bank	DISTB	0	feet	0.00	m	
Port Diamter	D0	2	feet	0.61	m	from Fact Sheet Table 8
Veritcal Theta	THETA	0	deg	0	deg	1993 diffuser study pg 3
Horizontal Sigma	SIGMA	90	deg	90	deg	1993 diffuser study pg 3
Discharge Port Height	H0	19.00	feet	5.79	m	From C/980
port height above water		-2.00	feet	-0.61	m	

Outfall #018A r1	Parameter	English Units		SI Units		Reference	
Effluent							
flow rate		6,900	gpm	0.44	m^3/sec	from daily flow rate data	
Temperature		57.6	deg F	14.2	deg C	Dd Discharge Data Average Temp	
Salinity				17.7	ppt	1993 Diffuser Study Pg. 3	
Calculated Density				1012.83	kg/m3	(Non-Fresh Water)	
Concentration				23.082	ppb	(Independent Value)	-0.818
Ambient							
Average Depth	HA	30.00	feet	9.14	m	From Fact Sheet (Table 8)	
Depth at Discharge	HD	21.00	feet	6.40	m	From C/980	
Wind Speed	UW			0	m/s	(educated guess)	
Steady Velocity	UA			0.0289	m/s	Average Current Speed provided by SPAWAR	
Manning #	n			0.022		Relatively Smooth Substrate	
Unbounded				U		Cornix Selection	
Temperature		47.3	deg F	8.5	deg C	1993 Diffuser Study Pg. 3	
Salinity				31	ppt	1993 Diffuser Study Pg. 3	
Density	RHOAS			1024.06	kg/m^3	Cormix Calculation	
Discharg							
Nearest Bank		right		right			
Distance to nearest bank	DISTB	0	feet	0.00	m		
Port Diamter	D0	2	feet	0.61	m	from Fact Sheet Table 8	
Veritcal Theta	THETA	0	deg	0	deg	1993 diffuser study pg 3	
Horizontal Sigma	SIGMA	270	deg	90	deg	1993 diffuser study pg 3	
Discharge Port Height	H0		feet	6.40	m		
port height above water		8.10	feet	2.47	m		
Area of Spray Coverage				4.00	m^2		

CMC		3.982	ppb	-0.818
CCC		2.282	ppb	-0.818
Mixing Zone Trajectory		200	feet	
Grid		300		

Mixing Zone

	X	Y	Z	S	C	B	Meters	Feet	X	Y	Z	S	C	B	Meters
** CMC HAS BEEN FOUND **	0	0	3.2	5.5	4.79E+00		0.00	0.00	33.59	0	6.4	5.79	3.98E+00		33.59
WATER QUALITY STANDARD OR CCC HAS BEEN FOUND	397.9	24.38	6.4	8.6	3.10E+00		398.65	1307.89	38.39	0	6.4	10.1	2.28E+00		38.39

Outfall #015 r1	Parameter	English Units		SI Units		Reference
Effluent						
flow rate		**7.71**	**cfs**	**0.22**	**m^3/sec**	SPAWAR study (winter months)
Temperature		**52.5**	**deg F**	**11.4**	**deg C**	Guess Actual Note included in this study: 52.5F from SPAWAR study. (March 2005)
Salinity		**3.67**	**ppt**	**3.67**	**ppt**	Guess Actual Note included in this study: 3.67ppt from SPAWAR study. (March 2005)
Calculated Density				**1002.43**	**kg/m^3**	(Non-Fresh Water)
Concentration				**52.1**	**ppb**	
Ambient						
Average Depth	HA	**40.00**	**feet**	**12.19**	**m**	Navigational Chart
Depth at Discharge	HD	**35.70**	**feet**	**10.88**	**m**	
Wind Speed	UW			**2**	**m/s**	(educated guess)
Steady Velocity	UA			**0.0166**	**m/s**	Average Current Speed provided by SPAWAR
Manning #	n			**0.022**		Relatively Smooth Substrate
Unbounded				**U**		Cornix Selection
Temperature		**47.3**	**deg F**	**8.5**	**deg C**	1993 Diffuser Study Pg. 3
Salinity		**31**	**ppt**	**31**	**ppt**	1993 Diffuser Study Pg. 3
Density	RHOAS			**1024.06**	**kg/m^3**	Cormix Calculation
Discharge						
Nearest Bank		**right**		**right**		
Distance to nearest bank	DISTB	**40**	**feet**	**12.19**	**m**	
Port Diamter	D0	**4**	**feet**	**1.22**	**m**	PW Drawing #57837
Veritcal Theta	THETA	**0**	**deg**	**0**	**deg**	
Horizontal Sigma	SIGMA	**90**	**deg**	**90**	**deg**	
Discharge Port Height	H0	**31.70**	**feet**	**9.66**	**m**	

Mixing Zone

CMC		**4.8**	**ppb**
CCC		**3.1**	**ppb**
Mixing Zone Trajectory		**200**	**feet**
Grid		**300**	

Output

					Trajectory		
X	**Y**	**Z**	**S**	**C**	**Meters**	**Feet**	
3.14	15.89	10.88	**3**	1.75E+01	16.20	**53.14**	
65.47	-12.19	10.88	**7.2**	7.22E+00	66.60	**218.49**	** REGULATORY MIXING ZONE BOUNDARY **
364.91	-12.19	10.88	**9**	5.80E+00	365.11	**1197.88**	
893.92	-12.19	10.88	**10.9**	4.79E+00	894.00	**2933.08**	** CMC HAS BEEN FOUND **
2111.66	-12.19	10.88	**16.9**	3.09E+00	2111.70	**6928.13**	**WATER QUALITY STANDARD OR CCC HAS BE

EEN FOUND**

Outfall #015 r1	Parameter	English Units		SI Units		Reference
Effluent						
flow rate		7.71	cfs	0.22	m^3/sec	SPAWAR study (winter months)
Temperature		52.5	deg F	11.4	deg C	Guess Actual Note included in this study: 52.5F from SPAWAR study. (March 2005)
Salinity		3.67	ppt	3.67	ppt	Guess Actual Note included in this study: 3.67ppt from SPAWAR study. (March 2005)
Calculated Density				1002.43	kg/m^3	(Non-Fresh Water)
Concentration				52.1	ppb	
Ambient						
Average Depth	HA	40.00	feet	12.19	m	Navigational Chart
Depth at Discharge	HD	28.00	feet	8.53	m	
Wind Speed	UW			0	m/s	
Steady Velocity	UA			0.0289	m/s	Average Current Speed provided by SPAWAR
Manning #	n			0.022		Relatively Smooth Substrate
Unbounded				U		Cornix Selection
Temperature		47.3	deg F	8.5	deg C	1993 Diffuser Study Pg. 3
Salinity		31	ppt	31	ppt	1993 Diffuser Study Pg. 3
Density	RHOAS			1024.06	kg/m^3	Cormix Calculation
Discharge						
Nearest Bank		right		right		
Distance to nearest bank	DISTB	40	feet	12.19	m	
Port Diamter	D0	4	feet	1.22	m	PW Drawing #57837
Veritcal Theta	THETA	0	deg	0	deg	
Horizontal Sigma	SIGMA	90	deg	90	deg	
Discharge Port Height	H0	31.70	feet	9.66	m	
Mixing Zone						
CMC		4.8	ppb			
CCC		3.1	ppb			
Mixing Zone Trajectory		200	feet			
Grid		300				

Output

X	Y	Z	S	C	Trajectory Meters	Trajectory Feet
**** CMC HAS BEEN FOUND ****			10.9	4.80E+00	0.00	**0.00**
****WATER QUALITY STANDARD OR CCC HAS BEEN FOUND****			16.9	3.10E+00	0.00	**0.00**

Outfall #15 Stormwater Drainage area #167 440 foot drainage area
MUltiport discharge

Outfall #015 r1	Parameter	English Units		SI Units		Reference
flow rate		7.71	cfs	0.22	m^3/sec	SPAWAR study (winter months)
Temperature		52.5	deg F	11.4	deg C	Guess Actual Note included in this study: 52.5F from SPAWAR study. (March 2005)
Salinity		3.67	ppt	3.67	ppt	Guess Actual Note included in this study: 3.67ppt from SPAWAR study. (March 2005)
Calculated Density				1002.43	kg/m^3	(Non-Fresh Water)
Concentration				52.1	ppb	
Average Depth	HA	40.00	feet	12.19	m	Navigational Chart
Depth at Discharge	HD	35.50	feet	10.82	m	
Wind Speed	UW			0	m/s	
Steady Velocity	UA			0.0289	m/s	Average Current Speed provided by SPAWAR
Manning #	n			0.022		Relatively Smooth Substrate
Unbounded				U		Cornix Selection
Temperature		47.3	deg F	8.5	deg C	1993 Diffuser Study Pg. 3
Salinity		31	ppt	31	ppt	1993 Diffuser Study Pg. 3
Density	RHOAS			1024.06	kg/m^3	Cormix Calculation
Nearest Bank		right		right		
Distance to nearest bank	DISTB	40	feet	12.19	m	
Port Diamter	D0	4	feet	1.22	m	PW Drawing #57837
Veritcal Theta	THETA	0	deg	0	deg	
Horizontal Sigma	SIGMA	90	deg	90	deg	
Discharge Port Height	H0	0.00	feet	0.00	m	
		328 ft				
CMC		4.8	ppb			
CCC		3.1	ppb			
Mixing Zone Trajectory		200	feet			
Grid		300				

X	Y	Z	S	C	Trajectory Meters	Trajectory Feet
285.56	0.39		10.9	4.80E+00	285.56	**936.88**
			16.9	3.10E+00	0.00	**0.00**

Outfall #15 Stormwater Drainage area #167 440 foot drainage area
Big flat channel

Outfall #126 r1	Parameter	English Units		SI Units		Reference
Effluent						
flow rate		**2.264**	**cfs**	**0.0643**	**m^3/sec**	SPAWAR study (winter months)
Temperature		**52.5**	**deg F**	**11.4**	**deg C**	Guess Actual Note included in this study: 52.5F from SPAWAR study. (March 2005)
Salinity		**5.08**	**ppt**	**5.08**	**ppt**	Guess Actual Note included in this study: 3.67ppt from SPAWAR study. (March 2005)
Calculated Density				**1002.43**	**kg/m^3**	(Non-Fresh Water)
Concentration				**52.1**	**ppb**	
Ambient						
Average Depth	HA	**50.00**	**feet**	**15.24**	**m**	Navigational Chart
Depth at Discharge	HD	**35.70**	**feet**	**10.88**	**m**	
Wind Speed	UW			**2**	**m/s**	(educated guess)
Steady Velocity	UA			**0.0166**	**m/s**	Average Current Speed provided by SPAWAR
Manning #	n			**0.022**		Relatively Smooth Substrate
Unbounded				**U**		Cornix Selection
Temperature		**47.3**	**deg F**	**8.5**	**deg C**	1993 Diffuser Study Pg. 3
Salinity		**31**	**ppt**	**31**	**ppt**	1993 Diffuser Study Pg. 3
Density	RHOAS			**1024.06**	**kg/m^3**	Cormix Calculation
Discharge						
Nearest Bank		**right**		**right**		
Distance to nearest bank	DISTB	**40**	**feet**	**12.19**	**m**	
Port Diamter	D0	**2**	**feet**	**0.61**	**m**	PW Drawing #57837
Veritcal Theta	THETA	**0**	**deg**	**0**	**deg**	
Horizontal Sigma	SIGMA	**90**	**deg**	**90**	**deg**	
Discharge Port Height	H0	**31.70**	**feet**	**9.66**	**m**	

Mixing Zone

CMC		**4.8**	**ppb**
CCC		**3.1**	**ppb**
Mixing Zone Trajectory		**200**	**feet**
Grid		**300**	

Output

X	Y	Z	S	C	Trajectory Meters	Trajectory Feet	
1.62	8.78	10.88	**3**	1.76E+01	8.93	**29.29**	
31.64	-12.19	10.88	**10.9**	4.78E+00	33.91	**111.24**	** CMC HAS BEEN FOUND **
58.85	-12.19	10.88	**11.8**	4.42E+00	60.10	**197.18**	** REGULATORY MIXING ZONE BOUNDARY **
460.93	-12.19	10.88	**16.8**	3.09E+00	461.09	**1512.77**	**WATER QUALITY STANDARD OR CCC HAS BE

EEN FOUND**

Outfall #126 r1	Parameter	English Units		SI Units		Reference
Effluent						
flow rate		**2.264**	**cfs**	**0.0643**	**m^3/sec**	SPAWAR study (winter months)
Temperature		**52.5**	**deg F**	**11.4**	**deg C**	Guess Actual Note included in this study: 52.5F from SPAWAR study. (March 2005)
Salinity		**5.08**	**ppt**	**5.08**	**ppt**	Guess Actual Note included in this study: 3.67ppt from SPAWAR study. (March 2005)
Calculated Density				**1002.43**	**kg/m^3**	(Non-Fresh Water)
Concentration				**52.1**	**ppb**	
Ambient						
Average Depth	HA	**50.00**	**feet**	**15.24**	**m**	Navigational Chart
Depth at Discharge	HD	**35.70**	**feet**	**10.88**	**m**	
Wind Speed	UW			**2**	**m/s**	(educated guess)
Steady Velocity	UA			**0.0166**	**m/s**	Average Current Speed provided by SPAWAR
Manning #	n			**0.022**		Relatively Smooth Substrate
Unbounded				**U**		Cornix Selection
Temperature		**47.3**	**deg F**	**8.5**	**deg C**	1993 Diffuser Study Pg. 3
Salinity		**31**	**ppt**	**31**	**ppt**	1993 Diffuser Study Pg. 3
Density	RHOAS			**1024.06**	**kg/m^3**	Cormix Calculation
Discharge						
Nearest Bank		**right**		**right**		
Distance to nearest bank	DISTB	**40**	**feet**	**12.19**	**m**	
Port Diamter	D0	**2**	**feet**	**0.61**	**m**	PW Drawing #57837
Veritcal Theta	THETA	**0**	**deg**	**0**	**deg**	
Horizontal Sigma	SIGMA	**90**	**deg**	**90**	**deg**	
Discharge Port Height	H0	**31.70**	**feet**	**9.66**	**m**	

Mixing Zone

CMC		**4.8**	**ppb**
CCC		**3.1**	**ppb**
Mixing Zone Trajectory		**200**	**feet**
Grid		**300**	

Output

X	Y	Z	S	C	Trajectory Meters	Trajectory Feet	
1.62	8.78	10.88	**3**	1.76E+01	8.93	**29.29**	
31.64	-12.19	10.88	**10.9**	4.78E+00	33.91	**111.24**	** CMC HAS BEEN FOUND **
58.85	-12.19	10.88	**11.8**	4.42E+00	60.10	**197.18**	** REGULATORY MIXING ZONE BOUNDARY **
460.93	-12.19	10.88	**16.8**	3.09E+00	461.09	**1512.77**	**WATER QUALITY STANDARD OR CCC HAS BE

EEN FOUND**