





















Cone Valve Aeration Variables

- Amount of flow through the cone valve and in the tailwater
- Velocity of jet
- Head, pressure
- Hood vs no hood
- Angle of jet

Considerations: DO uptake, TDG,
temperature

Summary of Test Results on the Cone Valve--September 27, 2006

Test Conditions	Measured DO in total discharge	Calculated DO in the turbine releases using mass balance calcs	Calculated DO in the turbine releases and saturated DO in CV flow	Total Project Flow	DO added by CV flow assuming it is saturated	DO uptake induced by jet action of CV	Total DO added by CV	Total DO added by CV	Measured TDG in total discharge	Measured T in total discharge
	mg/L	mg/L	mg/L	cfs	mg/L	mg/L	mg/L	tons/day	psia	TEMP
Unit 4	2.9	2.8	2.8	2,700	0	0	0	1	13.60	16.04
Unit 4 + CV	5.5	2.8	3.2	2,950	0.4	2.3	2.8	24	14.30	16.67
Units 3&4 + CV	4.1	1.6	1.8	5,650	0.3	2.3	2.6	40	13.90	16.50
Units 1,3&4 + CV	3.8	2.1	2.3	8,350	0.2	1.5	1.7	39	13.83	16.41
Units 1,2,3&4 + CV	2.9	1.7	1.8	11,050	0.1	1.1	1.2	38	13.62	16.32
Units 1,2,3&4	1.6	1.7	1.7	10,800	0	-0.1	-0.1	-3	13.37	16.28

CV: cone valve

Notes:

1. the cone valve can add ~ 40 tons/day of DO to the total plant discharge...this would cost about \$4000 per day if LOX was used
2. the cone valve appears to have the capability to increase DO in the discharge from Unit5 to about 4 mg/L using the existing hub baffles, or possibly with larger hub baffles

Test Conditions	Saturation DO at Meas. T in Total Discharge	Saturation DO at Meas. T in Total Discharge	Measured TDG in total discharge	Calculated DN based on DO and TDG Data	Calculated DN based on DN Saturation	Calculated Cone Valve Temperature	Calculated DN conc in CV	DN sat. based on est. temp.
	mg/L	mg/L	% sat.	% sat.	mg/L	celcius	mg/L	mg/L
Unit 4	10.00	16.38	92.52	109.4	17.9	16.04	17.9	16.38
Unit 4 + CV	9.86	16.18	97.28	108.3	17.5	23.47	13.27	14.38
Units 3&4 + CV	9.90	16.23	94.56	108.7	17.6	26.44	11.67	13.80
Units 1,3&4 + CV	9.92	16.26	94.08	108.9	17.7	28.40	10.93	13.49
Units 1,2,3&4 + CV	9.94	16.29	92.65	109.5	17.8	28.42	14.50	13.49
Units 1,2,3&4	9.94	16.30	90.95	110.9	18.1	16.28	18.1	16.30