BATW TWPE and $/TWPE Comparison

Bottom Ash Sluice Concentrations (No Source Water Credits)

			2013 Data (21 Plants) - AVG		2014 Data (6 Plants) - AVG BAP Effluent		EPA TDD Data - AVG		Homer City - EPA Data	
Capacity	# of Units	BAS Flow (Mgal/year)	TWPE/Year Removed	$/TWPE Removed (1981)	TWPE/Year Removed	$/TWPE Removed (1981)	TWPE/Year Removed	$/TWPE Removed (1981)	TWPE/Year Removed	$/TWPE Removed (1981)
51-100	28	1115	2865	$ 2,866	1226	$ 6,696	22928	$ 358	2129	$ 3,856
101-150	22	3372	8665	$ 871	3709	$ 2,035	69356	$ 109	6440	$ 1,172
151-200	49	8937	22969	$ 838	9831	$ 1,958	183840	$ 105	17070	$ 1,128
201-300	39	7164	18411	$ 991	7880	$ 2,315	147357	$ 124	13683	$ 1,333
301-400	45	26671	68544	$ 373	29338	$ 870	548618	$ 47	50941	$ 501
401-500	25	5895	15150	$ 1,101	6485	$ 2,572	121262	$ 138	11260	$ 1,481
501-600	45	12741	32746	$ 1,054	14016	$ 2,462	262092	$ 132	24336	$ 1,418
601-700	58	29933	76929	$ 653	32927	$ 1,526	615730	$ 82	57173	$ 879
701-800	21	14877	38234	$ 531	16365	$ 1,240	306017	$ 66	28415	$ 714
801-900	26	10629	27318	$ 1,015	11692	$ 2,370	218646	$ 127	20302	$ 1,365
>900	22	10783	27713	$ 965	11861	$ 2,255	221808	$ 121	20596	$ 1,298
Total TWPEs Removed (No Source Water Credits):			339,542		145,329		2,717,655		252,344	
Total TWPEs Removed (Source Water Credits):			163,826		51,922					
							1,142,816 (Without Sulfides)			

Annual cost based on UWAG capital cost curve. No annual O&M. Capital annualized over 15-year service life at 7% interest.

Bottom ash flow rates based on unit flows in the ELG ICR database.

Only the BATW concentrations were changed for each scenario based on the given analytical database as described below.

2013 Data (21 Plants) - average concentrations for 21 true bottom ash sluice water or bottom ash pond effluent samples.

2014 Data (6 Plants) - average concentrations for 6 true bottom ash pond effluent samples collected by UWAG using clean sampling and the most sensitive methods for all parameters (31 POCs).

EPA TDD - average concentrations from Table 10-7 of the Technical Development Document (April 2013).

EPA Homer City - bottom ash pond effluent collected by EPA during Preliminary Study (Final Detailed Study Report, Table 5-9.)

Table 8-3
Cost Factors Typically Used in Engineering Estimates

Item	Cost Factor Ranges (%)
Site work	3 to 5
Concrete	15 to 18
Piping	3 to 7
Miscellaneous metals, finishes	2 to 4
Mechanical, heating/ventilation/air conditioning	4 to 8
Process electrical and site electrical	12 to 15
Instrumentation and control	5 to 7
Subcontractor overhead	8 to 10
General contractor general conditions	4 to 6
Bonding and insurance	2 to 4
General contractor profit	14 to 16
Miscellaneous unidentified cost (contingency)	20 to 30
Engineering (design, services during construction, start-up, and operator training)	12 to 17

8.2.6 Some facilities will need to install water treatment to manage water quality in closed loop MDSs.

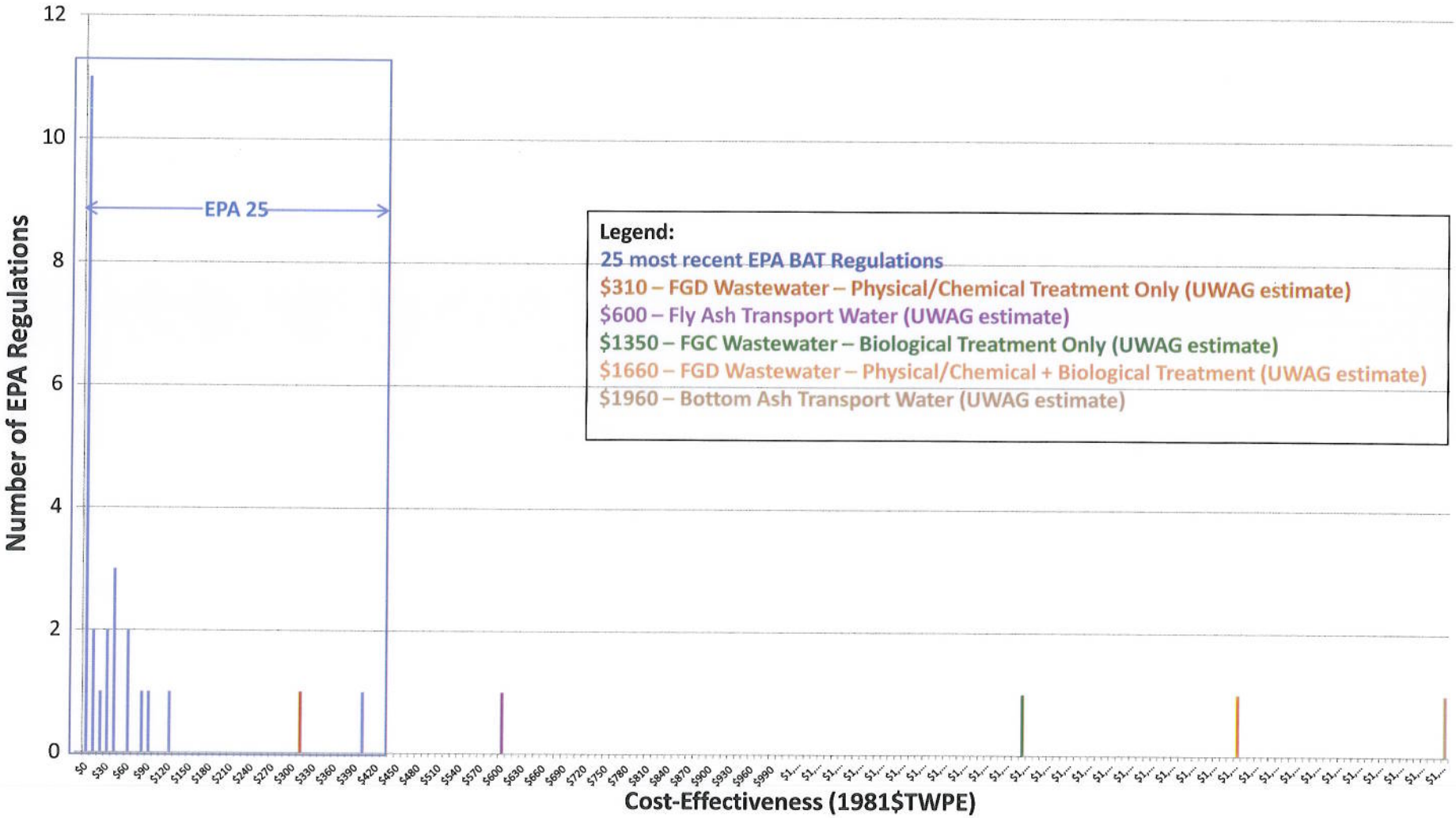
EPA assumed that fines will be managed solely with precipitation by acid addition, and that clarification beyond the MDS will not be required [EPA, 2013c]. Although many facilities will choose not to remove fines, some facilities will elect to remove fines using clarification. Reducing the fines will result in longer life and lower maintenance costs for pumps and piping.

In developing a $/MW unit cost, EPRI projected—for the estimated 75% of the industry that will install remote MDSs—that 50% will employ some type of fines management and 50% will not. EPRI used this projection to determine a $ per MW unit cost.

Treatment equipment that would be used for fines management includes the following:

- Clarifier
- Reaction tank and mixer
- Chemical feed system
- Polymer feed system
- Sludge holding tank and mixer
- Filter press

Comparison of Cost-Effectiveness Values for 25 Recent EPA BAT Regulations and Proposed Steam Electric BAT Regulations



lote: Analysis excludes regulations with "BAT = BPT"

ource: NERA analysis of EPA Regulatory Impact Analysis (EPA 2013 b), Table D-5 (pp. D-7 to D-8)