

**EPA's Final Construction and Development ELG
Summary Comparison of EPA and URS Cost Estimates**

EPA selected Option 4 - Passive Treatment Systems (PTS) in their Construction and Development Effluent Limitation Guideline, Final Rule (40 CFR Part 450, December 1, 2009), as the treatment technology to reduce turbidity concentration to 280 NTU for storm water runoff discharging from a construction site over 10 acres in size. During the URS assessment of the four (4) treatment options for which EPA provided cost estimates in the docket (EPA's Final C&D ELG Docket Document # OAR-2008-0465-1710 DCN 43120, C&D Unit Cost Spreadsheet), URS determined that EPA developed Option 4 Passive Treatment System costs based entirely on a simplified liquid polymer dosing system study conducted in Auckland, New Zealand (EPA's Development Document For Final Effluent Guidelines and Standards for the Construction & Development Category, November 2009, page 9-25) but surprisingly based the 280 NTU turbidity limit mostly on data from sophisticated modified Advanced Treatment System (ATS) systems. These are complete ATS systems except that they do not contain polishing filters. This means that EPA based the turbidity limit on high end "Cadillac" like systems, yet used unproven low end "golf cart" like systems as the basis of the cost. The result is that most construction sites would have to use systems like the modified ATS systems to comply with the 280 NTUs standard, and this would cost 4 to 10 times more than EPA estimated. URS cost estimates are based on EPA's project sizes (1.9 to 145 acres), project duration (0 to >1096 days), and EPA calculated treatment flows.

For visual reference, Figures 1 and 2 depict the sophisticated modified ATS Systems. The polishing filters that are not part of the modified ATS systems have a mark through them. Figure 3 is the simple polymer dosing Passive Treatment System from the Auckland, New Zealand study. The following table summarizes URS national cost estimates which were calculated using the same spreadsheet EPA's used for calculating their four options costs (Docket Document # OAR-2008-0465-1710 DCN 43120, C&D Unit Cost Spreadsheet). By URS utilizing these EPA spreadsheets it does not account for all the issues and contingency; the real cost could be 50 to 100% higher than depicted in the following table.

**EPA's Final Effluent Limitation Guidelines
For the Construction and Development Industry
URS and EPA's Cost Estimates for Passive Treatment Systems (PTS)
And URS Option 4 Costs Based on Using Modified ATS (ATS w/o Filters)
(88% of the data used to established the PTS 280 NTU NEL came from modified ATS)**

Cost Item Description	Annual Cost/Option ⁽¹⁾	Cost/Acre Developed ⁽²⁾
EPA Estimated PTS Cost (Auckland Study)	\$945,554,477	\$1,518
URS Estimated PTS Cost (Auckland Study)	\$3,954,054,657	\$6,350
URS Estimated Option 4 Costs With 100% of Sites Over 10 Acres using modified ATS (ATS w/o Filters); (The 280 NTU is based 88% of data from modified ATS.)	\$9,731,513,587	\$15,627
URS Estimated Option 4 Costs using modified ATS (ATS w/o Filters). This is based on 50% of Facilities using Option 4 Modified ATS and 50% of Facilities Using PTS.	\$6,842,784,122	\$10,989

- (1) URS calculated cost estimates based on EPA' Final C&D ELG Docket Cost Estimate Excel Workbook Spreadsheets Document # OAR-2008-0465-1710 DCN 43120, C&D Unit Cost Spreadsheet and Document # OAR-2008-0465-1666 DCN 43119, C&D Cost Spreadsheet. (These spreadsheets contain EPA's Cost for all 4 proposed Options.
- (2) The cost /acre are based on EPA's estimated 622,720 acres that would be impacted per year by EPA's C&D ELG Rule. (EPA Document # OAR-2008-0465-1710 DCN 43120, C&D Unit Cost Spreadsheet.)

The following summarizes the differences in cost estimates for the four costs estimates in the table above. (More details are provided in the detail spreadsheets of this document).

- **EPA Estimated PTS Cost** – EPA cost for PTS with no changes and which were based on Auckland New Zealand study.
- **URS Estimated PTS Cost** - URS used EPA estimated cost for PTS plus the following:
 - 1) EPA stated on page 9-25 of the TDD that the range of polymer systems was \$1,600 to \$8,000 US dollars for an average cost of \$4,800 per system which was based on studies from Auckland New Zealand. The lower cost range was based on alum addition which has a very low viscosity. The \$8,000 system is based on higher viscosity polymers which is the bases C&D ELG. All of the 25 treatment systems that EPA used to calculate the NEL were based on polymer addition with the majority being Chitosan polymer. Therefore, URS has substituted \$8,000 US dollars instead of the \$4,800 as cost for the systems.
 - 2) URS added Turbidity Meter costs which EPA did not include. EPA states in the Preamble that they included the meter cost, but it appears they did not.
 - 3) URS changed Polymer Addition O&M Cost to a more realistic 25% instead of EPA's 10%.
 - 4) URS added 1 hour of Manager's time per sampling event at a cost of \$95 per hour for oversight, EPA had no cost.
 - 5) URS used a surface outlet filter berm installation cost of \$2.40/ft instead of the \$1.70/ft used by EPA. The \$2.40/ft is the average cost of the perimeter filter berm stated in EPA's Technical Development Document, page 7-51.
 - 6) EPA incorrectly miscalculated the perimeter (ft) of a project in reference to length and the cost of installing filter berms. EPA states in the Final C&D ELG TDD, on page 9-25, that the berms were installed around the entire perimeter. EPA only calculated 1/4 of the project length to be included in cost estimates.
 - 7) URS used a labor rate of \$75.00/hour for performing a sampling event, while EPA used a cost of \$30/hr labor rate in their cost model. The \$75/hr labor rate is from EPA's C&D ELG Development Document, page 9-24.
 - 8) URS based the polymer addition cost on EPA's Chitosan cost of \$0.0045/gallon from the C&D proposed ELG Spreadsheet. This cost was provided by Clear Creek. EPA used a polymer addition cost of approximately \$0.001/gallon. The use of PAM and other polymers are similar to the \$0.0045/gallon cost.
 - 9) URS estimates that there will be approximately 5 days per month that samples will be collected. The 5 days are based on data from areas where most construction occurs. EPA estimated that there would only be 2 days of sampling rain events per month.

- 10) URS estimated that it would take a Professional Engineer 12 hours at a rate of \$125 per hour to engineer polymer systems per storm water basin for sites over 10 acres. The Engineer's cost includes site visit (s) and detail design engineering for local, state and/or federal approvals.
 - 11) **None of these cost estimates include costs for exceeding the 280 NTU limit which is likely to occur several times per year using the simple PTS. This cost would include additional management time, attorneys, extra sampling, and expensive corrected measures (i.e., potential for installing ATS). None of these estimates include costs for freeze protection of the polymer feed systems which will clearly be needed in most states at least 6 months out of the year.**
- **URS Estimated Option 4 Costs With 100% of Sites Over 10 Acres using modified ATS (ATS w/o Filters), (The 280 NTU is based 88% of data from modified ATS) –** Based on EPA's C&D ELG Final Rule Option 3 Cost plus the following:
 - 1) URS eliminated EPA's monthly cost of \$4,000 for polishing sand filters.
 - 2) URS decreased EPA's costs estimated for both Delivery (Mobile) and Pick-Up (Demobilize) of Equipment of \$1,485 by 10% (\$1,337) due to elimination of polishing filters.
 - 3) URS increased the annual amount of storm water to be treated by 10% to account for recycling of water that has been treated but is above the permit turbidity limit of 280 NTUs.
 - 4) URS estimated Manager's time by multiplying 25% of URS calculated System Run Time by a cost of \$95 per labor hour for Managers. This time is for oversight sampling and E&S Controls. EPA had no Manager cost.
 - 5) URS based the polymer addition cost on EPA's Chitosan cost of \$0.0045/gallon from the C&D proposed ELG Spreadsheet. This cost was provided by Clear Creek. EPA used a polymer addition cost of approximately \$0.001/gallon.
 - 6) URS added 20% to volume requirement for 2 year 24-hour basin size. The 20% additional volume was calculated due to extra pretreatment settling ponds that most facilities would need for meeting EPA's 280 NTUs turbidity limit. All of the modified ATS facilities used to establish the 280 NTU used these pretreatment ponds.
 - 7) URS has not estimated all cost for exceeding the 280 NTU limit which is likely to occur several times per year. This cost would include additional labor hours, attorney's fees, extra sampling, and expensive corrected measures (i.e., potential for installing full ATS). None of these estimates include costs for freeze protection of the polymer feed systems which will clearly be needed in most states at least 6 months out of the year. These unaccounted costs for real world issues could greatly increase the URS cost estimates.
 - 8) URS believes that even these URS cost estimates are very conservative and the real cost could be 50 to 100% higher than depicted.

URS Estimated Option 4 Costs based on 50% of Facilities using Option 4 Modified ATS and 50% of Facilities Using PTS – The total cost estimates was based on adding URS Option 4 Modified ATS cost of \$9,731,513,587 and URS Estimated PTS Cost of \$3,954,054,657 and then dividing the number by 2.