



SO₂



Which FGD Process to Choose?

ADVATECH™

A URS and MHPSA Company

Wet Calcium FGD
Hot Topic Hour

July 24, 2014



Which FGD Process to Choose?

Attribute	Wet FGD	Dry FGD	DSI	Notes
SO ₂ & HCl Removal	***	**	*	WFGD: >99% removal over wide range of conditions
Fuel Flexibility	***	**	*	WFGD: better equipped to handle a wide range of fuels
Reliability	***	**	*	WFGD: reliably operates 2-4 years between outages
Ease of Retrofit	**	*	***	WFGD: installed where space usually available
Scalability (Sizing)	***	**	*	WFGD: single module can scrub up to 1300 MW from multiple units
Minimize Solid Waste Disposal Cost	***	**	*	WFGD: gypsum production can offset landfill requirements/disposal costs; no impact to ash sales
Lowest Installed Cost	*	*	***	WFGD: can be designed for pre-ground limestone; with additional 50-75% removal, avoids FF
Lowest Operating Cost	***	**	*	WFGD: lowest reagent cost but highest overall power requirement
Plume Aesthetics	*	***	**	WFGD: less buoyant moisture plume
Wastewater Discharge	*	***	***	WFGD: may generate liquid waste stream requiring treatment
Water Consumption Minimization	*	**	***	WFGD: can use portions of existing plant wastewater that otherwise have to be treated
Mercury Removal	***	***	*	WFGD: capture high levels of oxidized Hg
Sulfur Trioxide Removal	*	***	***	WFGD: typically removes 10-50% of SO ₃

MYTHS About Wet FGD

- ❌ **WFGD Costs More Than DFGD**
 - Wet FGD has been installed on an EPC basis for < \$280/kW (excluding Owner's costs)
- ❌ **WFGD Requires a Costly and Difficult-to-maintain WWT Process**
 - At times, enough chlorides can be purged with non-wallboard-grade gypsum to avoid a wastewater stream
 - When required, low-capital / low operating cost options exist to control chlorides to a reasonable range
- ❌ **You're Going to Need a Fabric Filter (FF), So Better Go Dry**
 - With MATS limited to filterable PM, compliance is achievable with an ESP followed by WFGD (additional 50 to 75% PM removal by WFGD)
- ❌ **It's More Challenging to Achieve MATS Hg Limits with WFGD**
 - Numerous test programs show that >90% Hg removal (coal to stack) can be achieved on systems with wet FGD for all fuel types and AQCS configurations, even in the absence of an SCR and FF
- ❌ **WFGD is Susceptible to Significant Corrosion**
 - Countless examples of how proper design/operation and material selection provide for a highly robust and long-lasting system
 - Many economical materials have proven highly reliable, including FRP and corrosion resistant linings
- ❌ **You're Going to Need a New Stack with WFGD**
 - The option exists to reline your existing stack flue if the outage can be tolerated
 - For smaller units, an integrated-stack is a viable and cost-effective option
- ❌ **You Don't Have the Space for WFGD**
 - A single WFGD module can handle upwards of 1300 MW of capacity
 - Through use of pre-ground limestone, reagent preparation equipment can be greatly minimized
 - Since WFGD downstream of the particulate control device, usually more space exists for installation

Steps to Reduce Wet FGD Cost

- ✓ Procure on an EPC basis
- ✓ Minimize overdesign
 - Design for fuel most likely to use
- ✓ Use pre-ground limestone
- ✓ Treat multiple units with a single module
- ✓ Employ close-coupled arrangement
- ✓ Control chlorides to levels that permit use of less expensive materials
- ✓ Minimize/eliminate extraneous scope
- ✓ Optimize balance-of-plant scope of supply



Example Selection Matrix

		SO ₂ Removal	Existing ESP Adequate	Existing ESP Marginal	Existing Fabric Filter	New Fabric Filter
Capacity <400 MW	Low- to Med-S Fuel	<94%	WFGD or DSI*	WFGD or SDA/FF	SDA, DSI* or WFGD	SDA or DSI*
		>94%	WFGD	WFGD	WFGD	CDS
		>98%	WFGD	WFGD	WFGD	WFGD or CDS
	Med- to High-S Fuel	<94%	WFGD or DSI*	WFGD	SDA, DSI* or WFGD	CDS or SDA
		>94%	WFGD	WFGD	WFGD	CDS
		>98%	WFGD	WFGD	WFGD	WFGD
Capacity >400 MW	Low- to Med-S Fuel	<94%	WFGD or DSI*	WFGD	WFGD	SDA or DSI*
		>94%	WFGD	WFGD	WFGD	CDS
		>98%	WFGD	WFGD	WFGD	WFGD or CDS
	Med- to High-S Fuel	<94%	WFGD	WFGD	WFGD or DSI*	CDS, SDA or DSI*
		>94%	WFGD	WFGD	WFGD	CDS or WFGD
		>98%	WFGD	WFGD	WFGD	WFGD

* DSI limited to a maximum of 70–80% sustained removal with a fabric filter and less with an ESP.

When WFGD Makes Sense

- ✓ Significant SO₂ to scrub
 - Large capacity and/or high-S fuel
 - Very high % removal
- ✓ Installing a new FF or significantly modifying an existing can be avoided
- ✓ Lifecycle cost is important
- ✓ Higher water usage is tolerable
- ✓ A chloride purge isn't required or can be minimized

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QUESTIONS?

Delivering Certainty of Outcome

ADVATECH combines the strength and corporate commitment of two world-class organizations – URS and Mitsubishi Heavy Industries – to manage, engineer, procure, and construct the optimum technology solutions for emerging environmental requirements.

ADVATECH has found that our customers desire—and it is our mission to deliver—certainty of outcome. We believe this is best accomplished by integrating technology supply with complete project execution. ADVATECH, as a major engineering, procurement, and construction (EPC) provider with world-class technologies, has successfully delivered over 14,000 MW of air quality control systems valued at over \$2 billion to the U.S. utility industry in its first ten years.

Like most technology providers, ADVATECH stands behind process performance so that our customers can rest assured that their investments will result in regulatory compliance. We set ourselves apart through our ability to deliver the lowest cost solution by optimizing technology integration and project execution. ADVATECH offers a full range of technologies for the control of sulfur dioxide, sulfur trioxide, hazardous air pollutants, mercury, and particulate matter. We can optimize around site-specific constraints and even provide for maximum fuel flexibility.

Upcoming Events

Advatech will be Holding its 7th Users' Group Meeting this June

News

March 4, 2013
Achieve Zero Liquid Discharge for one tenth the cost of conventional treatment
[Read more >](#)

March 4, 2013
Our Low-cost Solution to MATS Hg Compliance
[Read more >](#)

March 30, 2012
Wet FGD for Small Boiler & Industrial Applications that can be Delivered for <\$200/kW
[Read more >](#)

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