

Coal-Fired Power Plant Configuration and Operation Impact on Plant Effluent Contaminants Conditions

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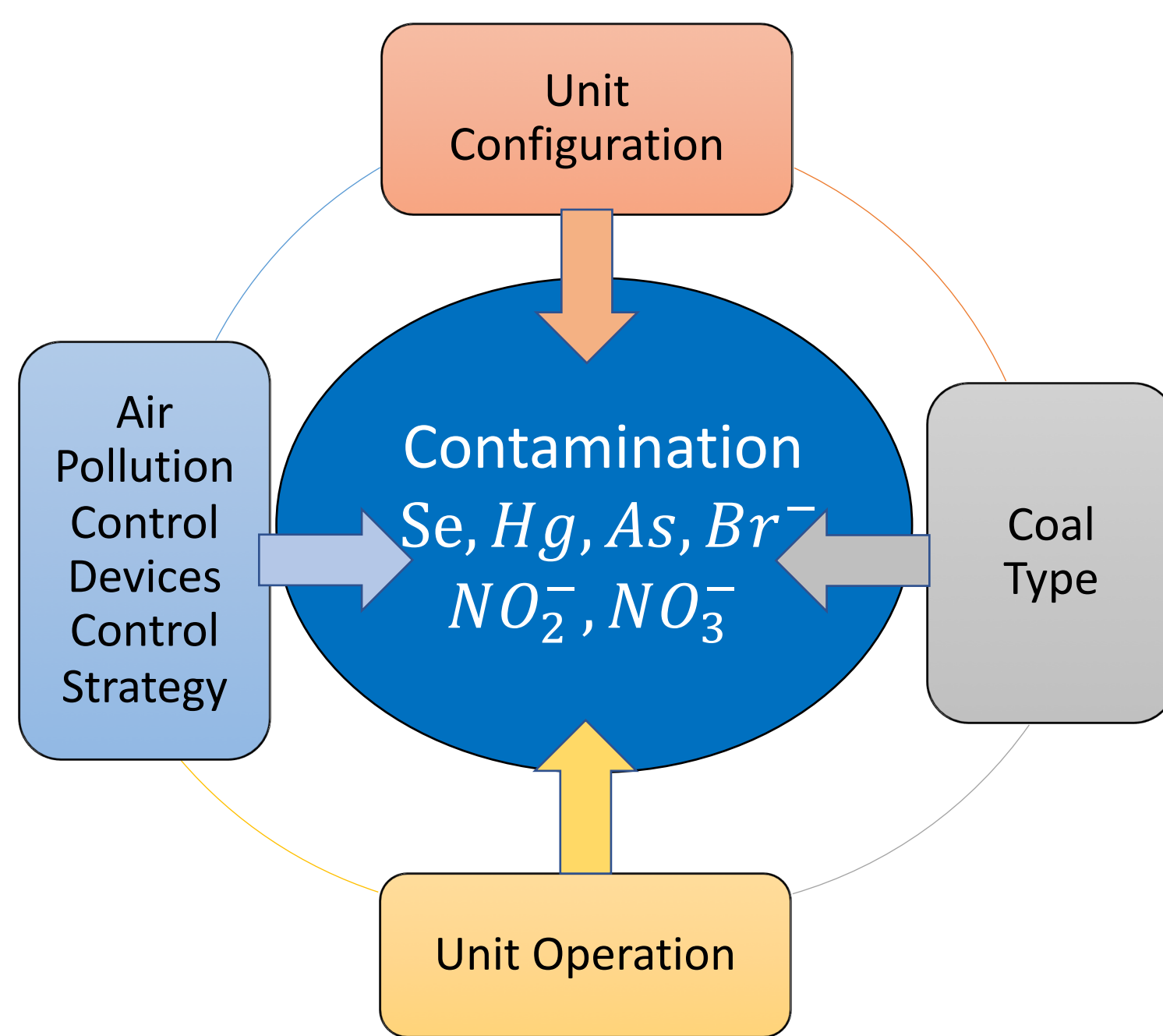
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Background

Coal-fired power plants are a source of 33% of the toxic pollution discharged to rivers and streams, among all industrial sources. [1] In 2015, the U.S. Environmental Protection Agency (EPA) developed effluent limitation guidelines (ELGs) applicable to the content of dissolved solids, mercury, selenium, nitrates, and arsenic in effluent streams from steam power generation plants. [2] Insufficient monitoring makes it challenging to determine the content of contaminants released to public waterways. Quantifying their impact on water quality and ensure an appropriate treatment.

Sources Dispatching Plant Effluent Contaminants:



In order to meet EPA's guidelines on controlling effluent discharge, there is an interest in a systematic study on the impact of fuel type, cyclic plant operation and control on effluent conditions.

Purpose

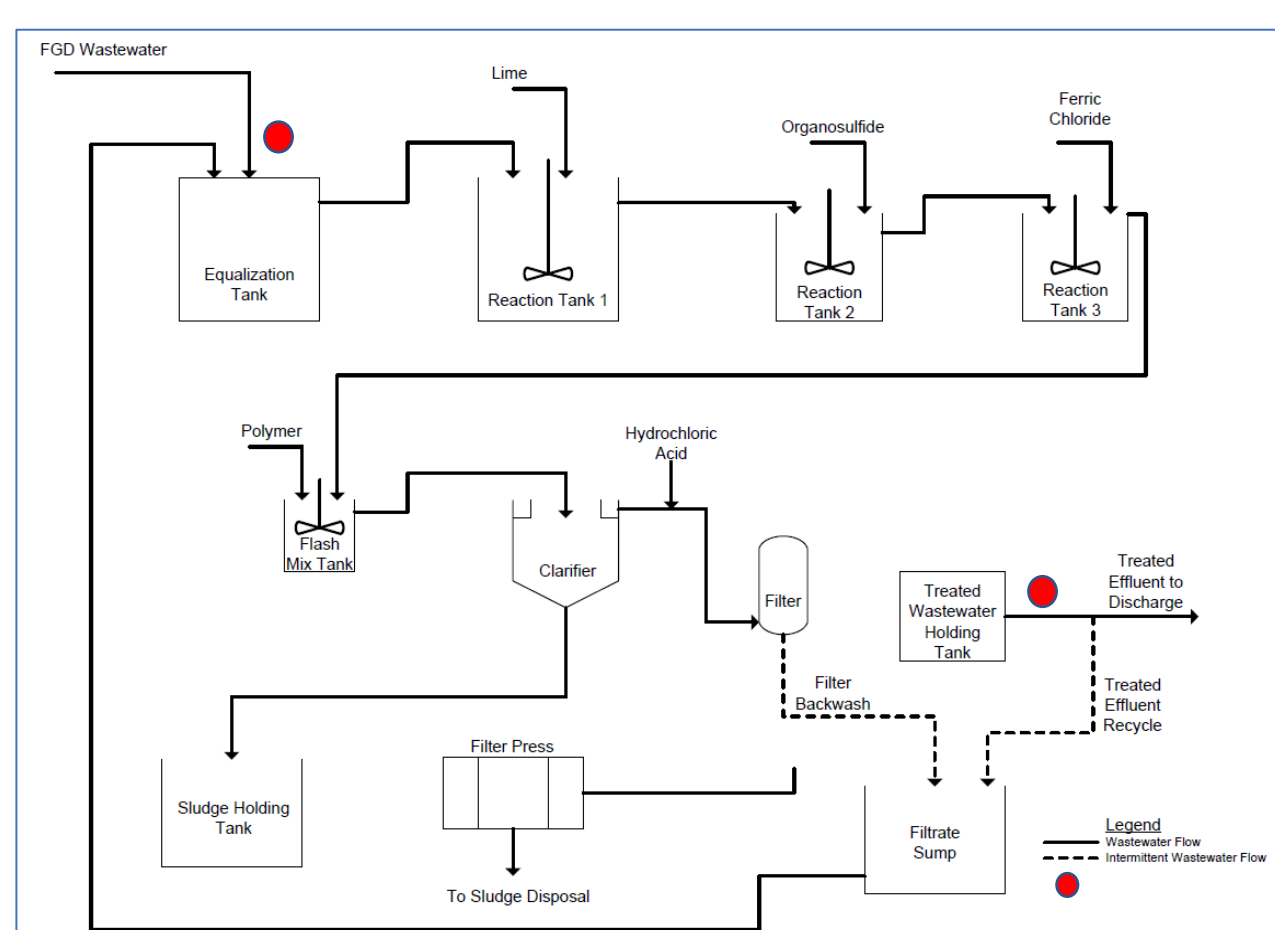
To characterize coal contaminants in coal-fired power plant waste water based on:

COAL TYPE	PLANT OPERATION	WASTE WATER TREATMENT TECHNOLOGY	EFFLUENT SPECIES
<ul style="list-style-type: none"> Bituminous Sub-Bituminous 	<ul style="list-style-type: none"> Baseload Cycling 	<ul style="list-style-type: none"> Physical/Chemical 	<ul style="list-style-type: none"> Mercury Arsenic Selenium Nitrate/Nitrite Bromide

Approach



Sampling Locations for Waste-water Chemical Precipitation System



Technical Development Document for the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category, EPA-821-R-15-007, Sept. 2015.

Parameter	Sample Analysis Matrix			
	Proximate	Ultimate	Trace Elements	Anions
Incoming Slurry from the Absorber			X	X
Solids Pretreatment Step Discharge			X	X
Treated Water Tank Discharge			X	X
Coal	X	X	X	X

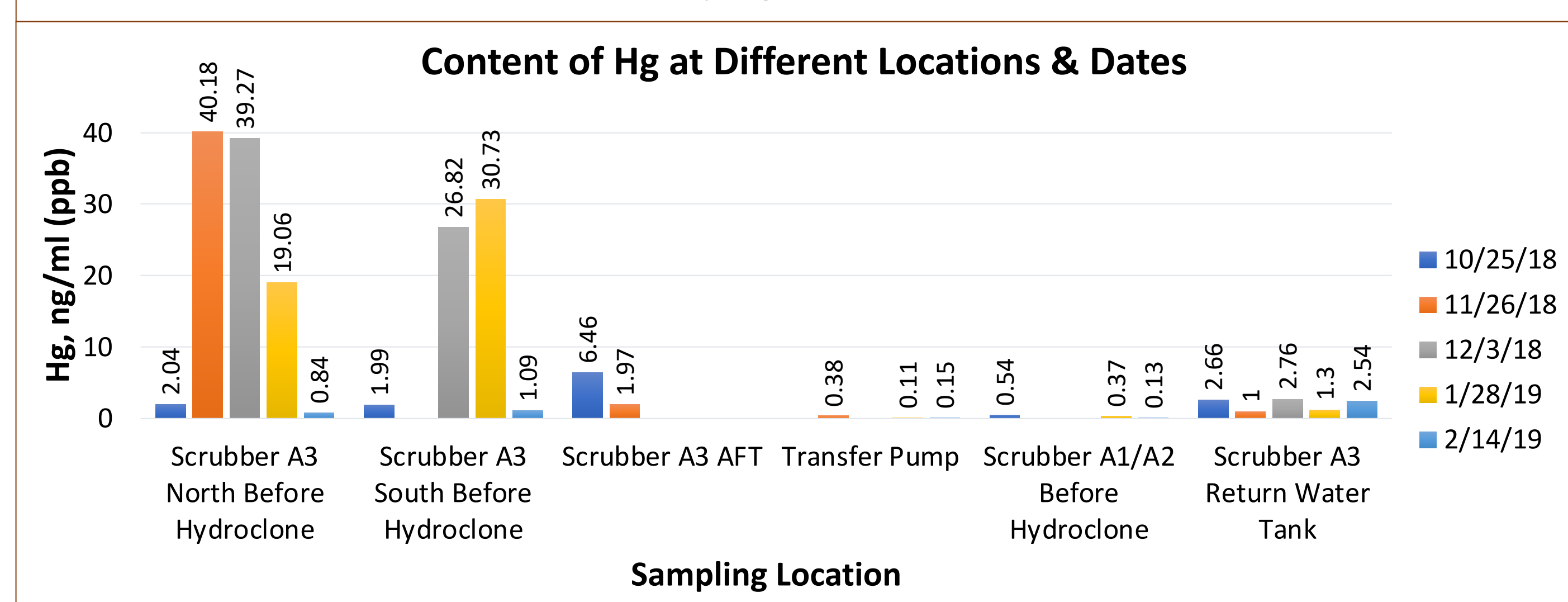
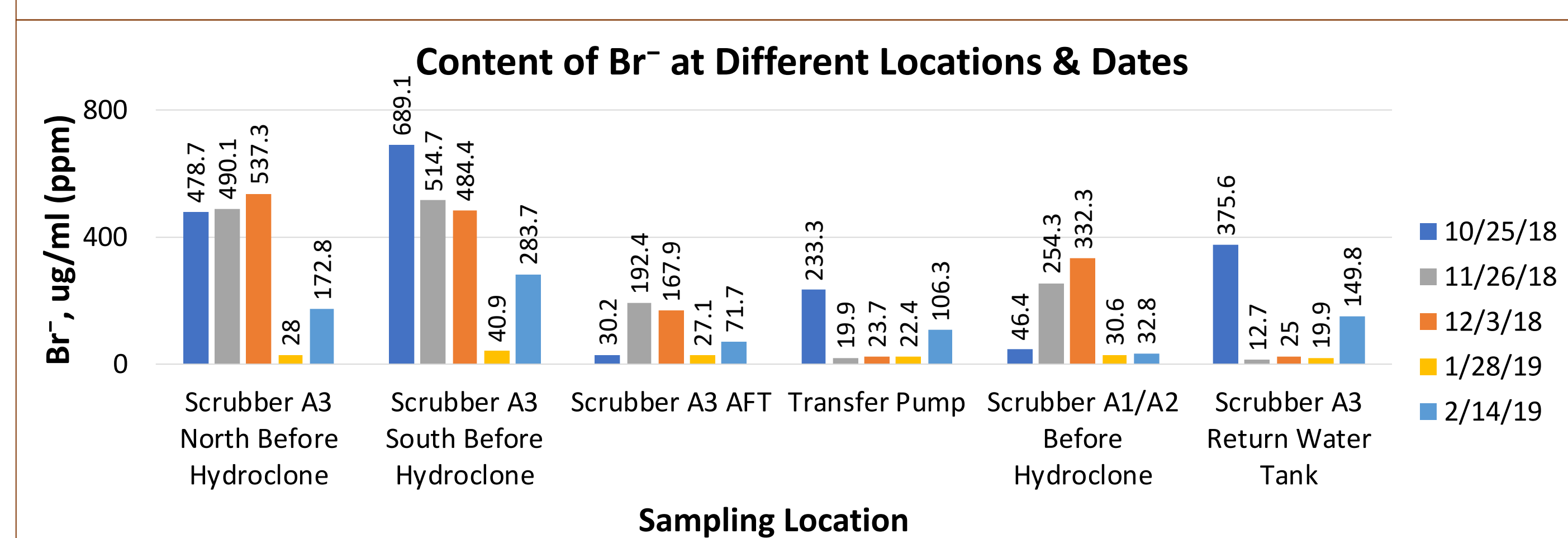
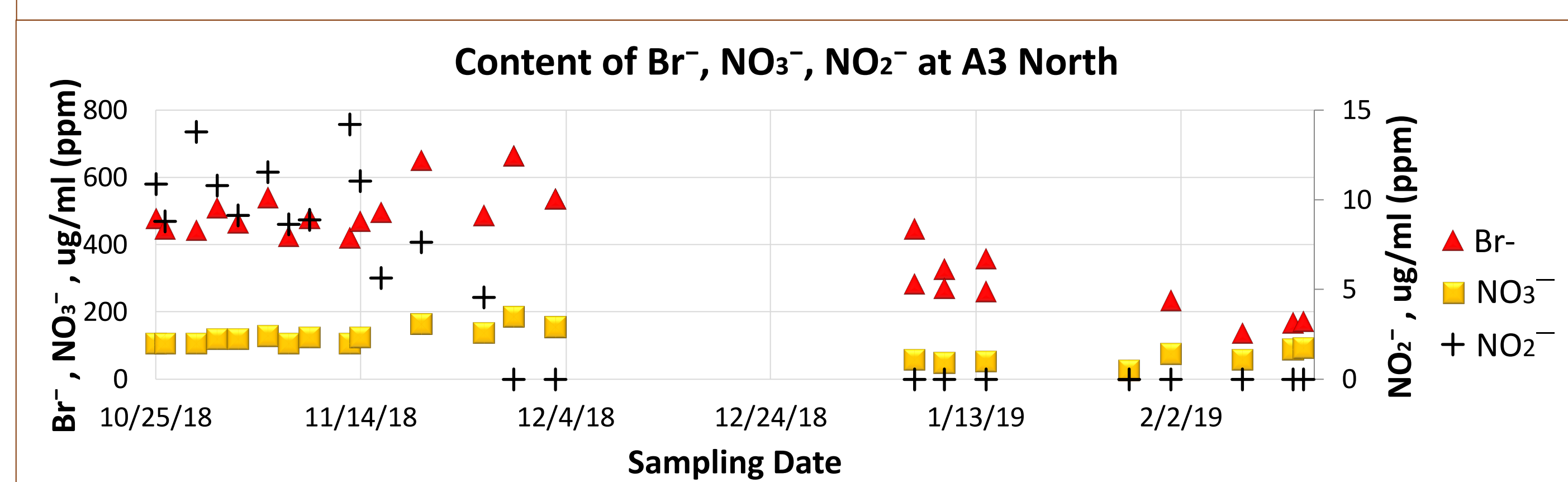
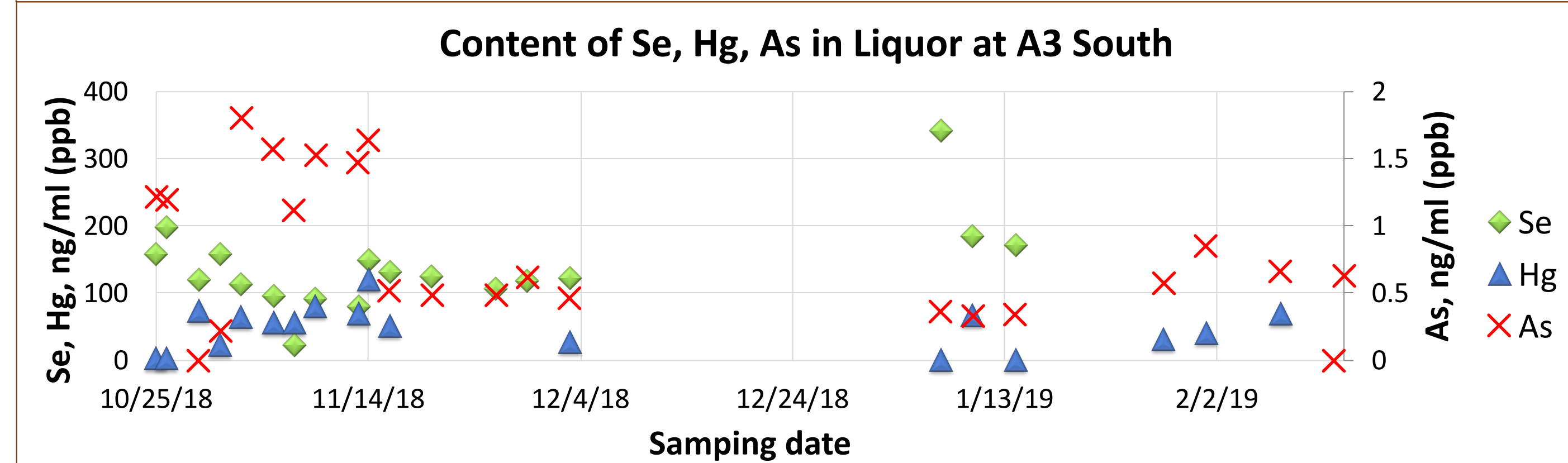
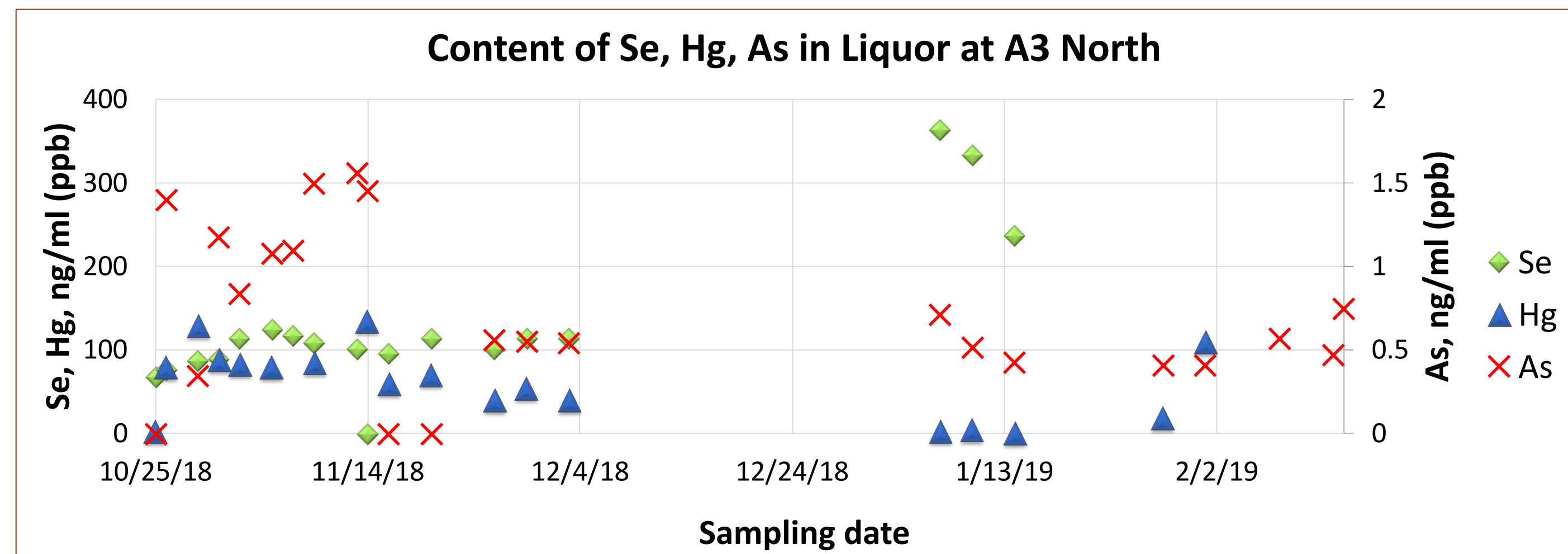
Proximate Analysis: Moisture, Volatile Matter, Ash and Fixed Carbon
Ultimate Analysis: Carbon, Hydrogen, Nitrogen, Sulfur, Ash and Oxygen
Trace Elemental Analysis: Mercury, Arsenic and Selenium
Anions Analysis: Bromide, Nitrate + Nitrite

Acknowledgment

The project is sponsored by the U.S. Department of Energy under the program of University of Coal Research (UCR).



Results



Benefits and future work

- Filling the void of a systematic study on the impact of coal type on effluent conditions;
- Addressing the effects of cyclic plant operation, including environmental controls;
- Identifying sample collection and analysis issues.

References

- [1] Toxic Wastewater from Coal Plants. (2016, August). Retrieved March 04, 2019, from <http://www.environmentalintegrity.org>
- [2] Efficiency, Energy, and Renewable Energy. (2018). "FINANCIAL ASSISTANCE FUNDING OPPORTUNITY ANNOUNCEMENT."

