Esmil Process Systems Ltd

Metal Processing Application

Case Study – Heavy Metals Removal - Asarco Globe Plant, USA
Gold, Silver, Lead, Arsenic and Cadmium

Existing Precipitation System

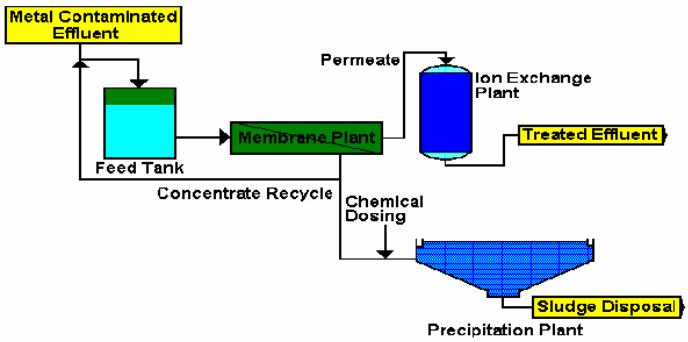
The existing system comprised a conventional precipitation system and an ion exchange system to extract residual metals. The existing system had the following shortfalls:

- Requirement for constant monitoring of the precipitation plant
- Excessive loading on ion exchange system thereby requiring frequent media regenerations
- High operating costs associated with chemical dosing, off site sludge disposal

Upgraded Membrane System

The system was upgraded by the installation of a membrane plant to reduce the load on the biomass plant and reduce the hydraulic load on the precipitation plant. The upgraded system offered the following advantages:

- Reduced media regeneration requirement
- Reduced chemical requirement
- Reduced off-site sludge disposal costs
- Improved treated effluent quality



Cost Benefit of Upgraded Asarco Heavy Metals Removal Plant		
	Existing System	Upgraded System
Through-put	9500 gal/day	
Capital Cost	-	$300,000
Chemical Costs	$9.88/1000 gal	$1.74/1000 gal
Operator Costs	$10/day	$3.33/day
Sludge Volume (off-site Disposal)	160lb/1000 gal	24lb/1000 gal
Total Treatment Costs	$58.34/1000 gal	$16.48/1000 gal
Payback Period	***Two years***	

Note: All costs in US Dollars

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Metal/Electronic Industry

Benefit Summary

Competitive Edge of Membrane Plants versus Conventional Precipitation Plants	
Membrane Advantage	**Justification**
Low Capital Cost	Smaller Ion Exchange Plant Low civil engineering investment requirement Low earth working investment requirement
Rapid Investment Pay back	Reduced raw material usage Reduced effluent disposal costs Reduced towns water / natural water intake requirement Reduced loading on Ion Exchange Plant
Reduce, Recycle & Re-use	Reduced sludge generation Recycle of residual metals Recycle of spent acid Re-use of high quality treated effluent
Confidence of Environmental Compliance	Robust treatment process that is not affected by temperature, complexing ions, or variations in pH Fixed physical barrier thereby guaranteeing compliance State of the Art Technology (BATNEEC)
Modular System	Discrete process units facilitating incremental upgrading

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