BLUE SKY
Water Technologies

Blue Sky Water Technologies, Inc.
P. O. Box 881
Folsom, CA 95763
Phone 916-988-1182
blueskytechnologies.biz

PRECISION WATER TREATMENT SOLUTIONS

- **Results that easily meet or exceed discharge requirements**
- **Substantially lower operating costs - less staffing, utilities, etc.**
- **Dramatic reductions in sludge and/or post-treatment residue**

Contaminants in complex waste streams require "individual" treatment for effective removal. Pollutants must "unlock" or break their chemical bonds to water molecules so they can they easily filter out of a waste stream — leaving clean, clear water and little post-treatment residue.

WHAT IS IONIC STATE MODIFICATION?

Multiple valance metals are an important but misunderstood factor in metal recovery and wastewater treatment. Blue Sky's technology quickly and effectively alters the ionic state of targeted contaminants so that they are NO LONGER soluble in water. Conventional treatments (filtration, chemical, centrifugal, biphasic, etc.) do not address contaminants in this manner.

Separating out contaminants using ISM typically lowers chemical additive costs, dramatically reduces B.O.D., C.O.D., T.S.S. and produces exceptionally high quality clarified effluent.

We successfully treat and remove contaminants from process waters generated in: construction projects, mining operations, fiber glass manufacturing, olive processing, metal plating and food processing. We also achieve impressive results treating wastewaters containing highly chelated materials, emulsions and mixtures of soluble organic materials, including MTBE.

We design each ISM process to fit specific circumstances — since no two waste streams are the same — and differing flow regimes, varying from 5 gallons per day up to several million gallons per day.

TESTIMONIALS

Bill Purly
Project Manager / Powerhouse Project, El Dorado Irrigation District, Placerville, CA
"They came in during a crisis and turned it around into a situation which went from certain failure to an impressive success. They prevented the State of California from shutting us down. We couldn't have completed this project without them."

David K. Rogers, P.E., C.E.G.
Vice President, Montgomery Watson Harza
Walnut Creek, CA
"...commends them on the superb services provided to the El Dorado Irrigation District during the treatment of tunnel construction water for the Mill Creek to Bull Creek Tunnel, El Dorado County. ...The waste stream...was difficult to treat...however, your system effectively removed (these) constituents."

William E. Glassley - Geochemist
Lawrence Livermore National Laboratory
Livermore, CA
"The materials were contaminated with a lot of heavy metals and the before and after testing showed a significant decrease in contamination."

Ms. Katherine Clay
Environmental Health and Safety Manager
Spectra-Physics, Oroville, CA
"I am pleased to work with these people and their technology. They demonstrated from the outset that they have a keen eye on our operational concerns and keeping us happy. I can heartily recommend their business based on these factors.

"And, the treatment results were beyond our expectations."

BENEFITS OF BLUE SKY

Multiple Projects - Proven Success
- Versatility - Years of experience operating under a variety of circumstances.
- Record of reliability - Less down time and fewer service interruptions.
- Effective - Meet or exceeds most discharge requirements.

Reduced Operating Costs
- Fewer Consumables - Less need for expensive chemicals or permanent installations.
- Fewer Resources Required - Little or no hazardous waste to dispose of or handle. No ponding required.
- After-Treatment Convenience - Minimal amounts of sludge.

Lower Maintenance - Less Supervision
- Ease of Implementation – Usually ONLY periodic maintenance and supervision required.

Environmental Safety
- Right thinking - Cleaner water and a safer environment for friends, family and associates.

Other Major Benefits
- Can produce high quality recycled water for conservation and lower costs.
- Dramatically less sludge or contaminants than conventional treatment methods - to remove from site.
- In some instances, no permits required.
- In some instances, lower sewer discharge fees.

Metal Removal Projects and Bench Tests of Note

Iron Mountain, Northern CA

	Untreated #6 ppm	Untreated #8 ppm	**Treated ppm**
Aluminum	1,074	1,058	**ND>6**
Arsenic	17.6	17.1	**ND>1**
Calcium	158	163	**2.4**
Cadmium	4.67	4.59	**ND>0.01**
Copper	336	326	**0.06**
Iron	9,543	9,650	**ND>0.02**
Potassium	70	68	**49**
Manganese	13	12	**0.09**
Sodium	81	82	**19,220**
Selenium	ND <1.0	ND <1.0	**N/A**
Zinc	609	603	**ND>1**
Sulfates	35,700	35,100	**147**
Chloride	51	57	**28**
NIT	ND	74	**97**

Bench Tests

Tests conducted by Lawrence Livermore National Laboratories, 1997

- AMD unusually high in copper, most in Cu+1 ionic state
- Cu+1 was oxidized to Cu+2 prior to hydroxide precipitation
- Very high levels of three other toxic metals: arsenic, cadmium and nickel
- Raised the effluent pH above 9.5 for the formation of insoluble metal hydroxides
- Demetalized AMD needed second treatment stage to reduce residual sulfates
- Two-stage treated water exceeded drinking water standards for heavy metals
- Significantly reduced sulfates

Berkeley Pit, Butte, MT

	Test Sample Avg ppm	**1st Treated ppm**	**2nd Treated ppm**
Aluminum	294	**ND**	**ND**
Arsenic	2.6	**ND**	**ND**
Cadmium	2.5	**ND**	**ND**
Copper	185	**ND**	**ND**
Lead	>1.0	**ND**	**10**
Nickel	1.0	**ND**	**ND**
Zinc	605.5	**0.1**	**ND**
Sulfates	10,800	**3,800**	**900**

Bench Tests; Supervised by EPA and MSE

Tests conducted by Lawrence Livermore National Laboratories, 1997

- Dissolved / suspended metals & sulfates reduced by 99.98%
- Method able to remediate AMD with environmentally safe chemical reagents
- While not to EPA std., sulfate level reduced 1/3 compared to std. chemistry results
- Sulfates converted to insoluble anhydrous calcium and magnesium sulfates
- Metals and sulfates were removed in separate processes

Leviathan, Lake Tahoe Area

	Untreated ppb	**1st Phase Treated ppb**	**2nd Phase Treated ppb**
Aluminum	420,000	**2500**	**ND**
Arsenic	7,000	**33**	**ND**
Copper	3,500	**ND**	**ND**
Iron	830,000	**540**	**ND**
Nickel	7,400	**ND**	**ND**
Sulfates	5,900	**-**	**44**

Bench Tests

Tests conducted by BSK Laboratories, 1999

- Blue Sky method would bypass / make obsolete elaborate ponding measures
- Filtered treated AMD; produced .825 pounds of 80% moisture metal hydroxide cake
- Tests of side stream indicated sulfate concentration of 79,700 ppm
- Treated concentrate converted to 2.2 pounds of an agricultural sulfate product
- 2.58 pounds of sulfate material per gallon of concentrate generated

85.64% sludge reduction vs standard lime treatment processes still in use

Mammoth Mine, Northern CA

	Untreated ppb	**Treated ppb**
Aluminum	58,000	**620**
Cadmium	110	**ND**
Copper	5,100	**95**
Lead	41	**ND**
Manganese	4,400	**20**
Zinc	26,000	**240**
Sulfates	1,600	**460**

Project ran for 2 1/2 weeks with mobile unit at site

Tests conducted by BSK Laboratories, 1999

- Approx. 100,000 gallons of AMD treated
- Produced approx. 150 gallons of de-watered metal oxide sludge
- Initial lab analysis revealed sulfate levels of 1600 ug/l in the untreated AMD
- Sulfate level of the treated AMD - below 500 ppm
- Metal hydroxides and calcium sulfate were precipitated as a single sludge cake

Mill/Bull Tunnel, El Dorado County

	Untreated Average ppb	**Treated ppb**
Aluminum	5,150	**ND**
Iron	8,913	**ND**
Manganese	173	**34**

Tests conducted by BSK Laboratories, 2001-2002

Project ran for 16 months, treated over 51M gallons

No NPDES violations, Saved project from failure

- Remote tunnel drilling site on USFS land in El Dorado County
- Chemical Costs - >$.002 per gallon
- Sludge Removed – 360 55-gallon barrels; ½ cubic feet / 1000 gallons treated
- Electrical Costs - >$25,000 for entire project
- Water released into nature at site; No on-site ponding or containment required
- Effluent fluctuations of primary metals