



# Zero Waste Project Report



With assistance from the Zero Waste Alliance (ZWA) and support from the Portland Development Commission, Rejuvenation, Inc. is working to ‘close the loop’ on their antiquing process. Results are: continued high product quality, cost savings and measurable increases in environmental performance.

## Scope of Project

- ◆ Rejuvenation, Inc., in Portland, Oregon employs 190 people and is America’s leading manufacturer of authentic period lighting. Rejuvenation is known for its commitment to the community and environmental quality. As part of the company’s dedication to continual improvement through its environmental management system, Rejuvenation decided to tackle their brass antiquing process. Although legal to discharge at low concentrations, Rejuvenation understood that their primary brass antiquing effluent – selenium (Se) – is bioaccumulating and harmful to human health and the ecosystem. The company’s specialized brass antiquing process is an important part of their business success because it provides a beautiful, antique patina to their products.
- ◆ Rejuvenation has been using *flocculation*, “forming particles into clumps,” to treat rinse-water from their antiquing bath. This process discharged 600 gallons of wastewater per week and it was frequently hard to meet the 0.6 ppm (parts per million) selenium discharge limit set by the City of Portland.
- ◆ Rejuvenation wanted an alternative process that would be ecologically safe, provide the same robust, beautiful patina to their products and be affordable.



Rejuvenation, Inc.

## BENEFITS

• Annual Cost Savings	\$14,155	65%
• Annual Water Savings	31,000 gal	100%
• Selenium to city sewer	0.00 ppm	100% less
• Product Quality	Uncompromised	

### Old System

• Cost of flocculation equipment	\$55,000
• Cost of chemicals and supplies to operate and maintain flocculator	\$15,755/yr
• Labor costs of operating flocculator	\$3,900/yr
• Cost of sewer discharge permit (for Se)	\$2,000/yr
• Total annual costs	\$21,655/yr
• Water use	31,200gal/yr
• Selenium discharged to sewer	Yes

### New System

• Cost of ion exchange system	\$8,100
• Cost of permit (for Se)	\$0
• Cost to recharge cartridges (incl. transport)	\$7,500/yr
• Total annual costs	\$7,500/yr
• Water (evaporation loss)	~60gal/yr
• Selenium discharged to sewer	No

## Results

- ◆ Led by Dr. Lauren Heine, Director of Green Chemistry and Engineering, ZWA researched and evaluated alternative chemical processes and vendors. ZWA recommended a system designed by Birchwood Casey to remove selenium from antiquing process rinse-water on-site. After proving the effectiveness of this system, a larger scale process was designed and implemented through US Filter that requires minimal maintenance and purifies multiple rinse tanks.
- ◆ The new system uses ion-exchange and eliminates the discharge of process water and sewer discharge fees. The rinse-water is continually purified and reused and metal ions are removed by the ion exchange units. The units will be recharged for reuse once or twice each year, resulting in cleaner rinse water and more consistent product quality than previously attained. While the process still uses selenium, it is contained within a closed system that completely eliminates discharge to the environment. **Rejuvenation will reduce their annual processing cost by 65% and they are delighted with the results of this project.**

Portland Development Commission’s Business Outreach Program provided matching funds to support this project. If you would like to know more about this program, please contact the Zero Waste Alliance, One World Trade Center, 121 SW Salmon, Suite 210, Portland, Oregon USA 97204 Tel. 503-279-9383, Fax. 503-279-9381, email: [info@zerowaste.org](mailto:info@zerowaste.org), and [www.zerowaste.org](http://www.zerowaste.org).

The Zero Waste Alliance is an initiative of the International Sustainable Development Foundation – a 501 (c) 3 not-for-profit corporation.