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DANIEL SCARPINE, P.E.
Principal Engineer

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Daniel Scarpine is a licensed professional environmental engineer whose technical expertise and professional experience has been dedicated to the design, development and integration of technologies to treat water in a variety of applications. For the last 15 years his focus has primarily been on process engineering industrial water applications ranging from recycling facility stormwater to ultra-high purity semiconductor process waters. Mr. Scarpine is the primary inventor for several water treatment equipment patents. He has managed stormwater and wastewater treatment evaluations for facilities in the semiconductor, galvanizing, cold steel rolling, metal recycling, and metal fabrication industries, focusing on the removal of heavy metals, suspended solids, organics as well as pH control. His significant experience as a construction project manager brings additional negotiation, risk management and execution skills to the projects he manages.

REPRESENTATIVE PROJECT EXPERIENCE

- **Industrial Stormwater Metals Removal System** – Principal inventor of the passive filtration system for metals removal from industrial stormwater with high concentrations of total suspended solids. Completed bench testing, pilot testing and full-scale product development in less than one year. Led technical product integration creation of manufacturing workflow and sales to drive growth of company from \$25,000 to \$750,000 sales in two years.
- **Semiconductor Ultra-pure Water Urea Abatement System** – Key member of technical staff to develop and integrate urea removal process to existing semiconductor ultra-pure water system. Led field trial portions at 5 gpm to collect process design data for 500 gpm treatment system. Project lead engineer for design development and integration of full scale system to new and existing operating facility.
- **Stormwater Treatment Design, Permitting and Construction** – Provided comprehensive services for new Seattle-based metal recycling facility. Provided design of advanced stormwater treatment system for removal of heavy metals and particulate and provided permitting, engineering report and technical assistance with SEPA and Shoreline permit process. Led construction management and commissioning effort for system installation. Engineering technical author for stormwater pollution prevention plan, operations and maintenance manual, and final permit documents.
- **Lithographic Printing Facility Wastewater System** – Engineer of record for the design and development of new electrocoagulation process for treatment of printing wastewater. Complete project management from bench testing, thru design, construction and commissioning. Novel use

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of technology for this application provided greater than \$200,000 capital cost savings and effluent is of re-use quality.

- **Steel Rolling and Coating Mill Wastewater** – Comprehensive evaluation and strategic plan for optimization and upgrade of 125,000 gallon per day heavy metals removal wastewater treatment system. Completed comprehensive single line diagrams, process modeling and statistical process control parameters. Upon completion of proposed process changes facility became fully compliant with all operating permits.
- **Galvanizing Industry Stormwater Treatment Technology Evaluation and Rainwater Harvesting Integration** – Provided technology feasibility, pilot test, design, and permitting services to four Northwest galvanizing facilities. Developed innovative use of rainwater contaminated by process exhaust as process make-up water. Led pilot initiative for three technologies, documenting results in two site-specific engineering reports. Developed design, layout and integration of rainwater capture system, process water feed and stormwater filtration system and associated controls. Also provided technical assistance in negotiations related to environmental group lawsuit.
- **Project Engineering Advanced Stormwater Treatment System**– Engineer of record for electrocoagulation treatment system at industrial facility in King County, WA. Provided detailed design services, project plans and specifications, engineering stormwater report and permit submittals. Services during construction included as-built documentation and commissioning technical assistance.
- **Marine Drydock Stormwater and Hydroblast Wastewater Treatment and Reclaim** – Developed, designed, and integrated high-efficiency, self-contained treatment system for the reclaim and re-use of co-mingled stormwater and marine hydroblast water at a marine facility in Anacortes, WA. System was designed to remove suspended solids and heavy metals. Integrated the system into a modular intermodal container to provide rapid mobilization / demobilization and optimal process for ever-changing influent.
- **Adsorptive Filtration Media Development** - Developed MetalRx filtration media for CONTECH Stormwater Solutions. MetalRx is a fine-grained, organic, adsorptive filtration media used exclusively with the StormFilter for reduction of heavy metals from rooftops and process emissions. Developed sampling and analysis plan, laboratory testing plan, and field test plan. Result was low cost, highly effective metals removal via adsorption and the release of natural hardness ions, which mitigates residual metals toxicity, and typically results in disposal of the media as a non-hazardous waste.
- **Underground Injection Control Contaminant Reduction** – Lead technical advisory to multi-million dollar retail chain for stormwater best management practices associated with underground injection control. Conducted comprehensive site surveys, develop management plans and designed treatment or closure retrofits using proprietary and natural treatment systems such as bioinfiltration.
- **Litigation Response Technical Assistance** – In conjunction with client attorney, led response efforts to Puget Sound environmental group. Conducted site assessment and site screening to identify pollutant sources at a manufacturing facility with focus on heavy metals in stormwater. Developed structural Best Management Controls and compliance schedule. Completed re-write of facility Stormwater Pollution Prevention Plan, base maps and operations and maintenance manual.
- **Comprehensive Watershed Study** – Lead Engineer of project to identify and mitigate the source in watershed of ultra-low concentration total organic carbon migrating through semi-conductor facility's ultra high purity water treatment system. Investigation focused on identification and quantification of potential stormwater pollutant sources in watershed, drinking water treatment and distribution system. The problem was traced to seasonal and point source discharges via

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runoff of urea fertilizer, an electro-neutral carbon and nitrogen compound ubiquitous in agriculture. Project involved considerable evaluation of fate and transport of stormwater compounds including phase transformation through natural watershed processes.

WORK HISTORY

Aquarius Environmental, LLC – Founder & Principal Environmental Engineer	Current
StormwaterRx – Founder & Vice President of Engineering	2006-2008
CONTECH Stormwater Solutions / Stormwater Management, Inc. – Project Engineer	2002-2006
Intel Corporation – Facilities Chemical Engineer	1997-2002
GE Water & Process Technologies (formerly Ecolochem)- Field Service Engineer	1996-1997
Virginia Department of Transportation – Environmental Specialist	1994-1996

EDUCATION

Bachelor of Science, Environmental Engineering	1996
Virginia Tech, Blacksburg, VA	

PROFESSIONAL REGISTRATIONS

Registered Professional Engineer: Washington and Oregon	Current
High Purity Water Treatment Specialist – David H. Paul, Inc.	1997
Certified, Hazardous Waste Operations and Emergency Response	1996

INVENTIONS

Stormwater Filtration System, Patent Pending, Scarpine, D.A., et al. "Passive Stormwater Management System and Apparatus." 2007.

SELECT PUBLICATIONS AND PRESENTATIONS

Scarpine, D.A., Krause, D. "Trick or Treat: Why BMP Performance is Irrelevant for Industrial Stormwater", proceedings of North American Surface Water Quality Conference & Exposition (STORMCON), August 2010.

Scarpine, D.A., "Out of site, but on our minds... How to protect water quality with drywell best management practices that work." Proceedings of the Washington Hydrogeology Symposium. April 2009.

Scarpine, D.A., "Prognosis on Stormwater Infiltration – Moving from Disposal to Reclamation." Proceedings of the Washington Hydrogeology Symposium. May 2007.

Scarpine, D. A. "Modern Medicine for Stormwater: Best Management Practices for Galvanizers." Proceedings of the American Galvanizers Association, Technical Forum. October 2006.

Noling, C. P., deRidder S., Scarpine, D. A. et al. "A Case Study of Stormwater Management at a Small Coastal Industrial Facility." Proceedings of WEF Industrial Wastes Conference. August 2004.

Scarpine, D. A. "New Technologies in Stormwater Treatment." Pacific Northwest Clean Water Association, proceedings of Annual Conference. September 2003

Scarpine, D.A. "Passive Adsorptive Filtration Emergence as a Stormwater Treatment Technology." Proceedings of the American Galvanizers Association, Technical Forum. October 2003.

Scarpine, D. A., Noling, C. "Taking Water Quality Outside the Fab: a Watershed Case Study." Ultrapure Water, Tall Oaks Publishing. July 2002.

Banerjee, A., Lambertson, M., Scarpine, D. A. "Ensemble Average Laser Light Scattering (EALLS) – An Effective Alternative to Particle Counting for Monitoring Turbidity in UltraPure Water." Proceedings of SEMI Advanced Semiconductor Manufacturing Conference. September 1999.