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(208) 672-2700

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14 June 2002

Ms. Linda Meyer (WCM-121)
Project Manager RCRA/Superfund
U.S. EPA Region 10
1200 Sixth Avenue
Seattle, WA 98101

Subject: Supplemental Information Regarding MFG's Statement of Qualification Eastern Michaud Flats Superfund Site

Dear Ms. Meyer:

Your letter of May 31, 2002 included a 'conditional disapproval' of our selection of MFG as Supervising Contractor due to insufficient documented experience in the field of ex-situ treatment of groundwater containing inorganic contamination. You suggested that some additional information would be required. This letter transmits our response to that request.

It has been our understanding any treatment of groundwater prior to its reuse or recycling into the processes at the Don Plant is not addressed in the Consent Decree. Extracted groundwater will be used without conditioning wherever possible but some process applications will require some pre-processing. For this reason we did not ask MFG to emphasize their considerable expertise in this area. Enclosed is MFG's response to our request for additional documentation. I think you will agree that their accomplishments are most impressive.

We are pleased that matter of date of delivery of the November, 2001 SOQ has been cleared up so quickly. If you have any further questions please call. I am moving offices this week and the phone may not work but the email should.

Sincerely,

Ward L. Wolleson

Ward Wolleson
Senior Environmental Engineer
J. R. Simplot Company

C: with enclosure
Doug Tanner – IDEQ Pocatello
Susan Hanson – ShoBan Tribe
Alan Prouty – J. R. Simplot Company
Andy Koulermos – MFG, Boulder

USEPA SF
1274858

Linda Meyers
SOQ Response
14 June 2002

BC: with Enclosure
Leon Pruett – Don Plant
Dale Reavis – Don Plant

MFG
consulting
scientists and
engineers

MFG, Inc.
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Suite 300W
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303/447-1823
Fax: 303/447-1836

June 12, 2002
MFG Project No. 010121

Mr. Ward Wolleson
Simplot AgriBusiness
418 South 9th Street, Suite 308
Boise, ID 83702

Subject: Supplemental Information for MFG's Statement of Qualifications
Eastern Michaud Flats Superfund Site

Dear Ward:

This letter and attachments provide a brief summary of MFG's recent experience associated with design and construction of water treatment systems for inorganics. This letter has been prepared in response to Linda Meyer's correspondence dated May 31, 2002, in which she conditionally disapproved MFG as the Supervising Contractor, because the Statement of Qualifications (SOQ) provided "fails to include demonstrated experience with ex-situ treatment of extracted groundwater containing inorganic constituents." The letter further requests Simplot to "provide supplemental information demonstrating MFG, Inc. has the staff, capabilities and experience essential to the successful design and implementation of the required groundwater remediation system, specifically experience with the design of a water treatment system for inorganic constituents."

Response?

As you are aware EPA's Record of Decision (ROD) does not require treatment of extracted groundwater, but requires that the water be recycled into the Don Plant. In fact EPA's selected remedy does not mention any potential requirement for treatment of groundwater (ROD, page 64). The issue of potential treatment appears in the Consent Decree SOW as a contingency if the water cannot be directly recycled to the Don Plant process. In this event, it could be necessary to discharge the water to the Portneuf River, after treatment to meet discharge standards. Because EPA's ROD does not require treatment and Simplot is confident that extracted groundwater will be recycled to the Don Plant (the process currently uses approximately 4,300 gallons per minute of extracted groundwater), we did not feel that providing qualifications regarding treatment were necessary.

Nonetheless, I have assembled the following documentation to address the Agency's request. The previous SOQ contained some information pertinent to treatment; in particular in the section entitled "Treatment and Remediation". In addition, MFG is currently working on or has recently completed the following relevant projects:

- Fallon Water Treatment Plant - MFG is currently designing an expanded water treatment plant for the City of Fallon, Nevada. The plant will process groundwater that contains approximately 0.1 mg/L of arsenic and treat it to below the MCL for use as drinking water. The plant design flow is 9.7 million gallons per day. MFG has performed all aspects of the work, including water characterization, bench- and pilot-scale testing, and has recently completed a full-scale plant design. The design team for Fallon is in place and could be used directly at EMF in the event that treatment and discharge of extracted groundwater was necessary at the Don Plant.

- Kaiser Mead Superfund Site - MFG performed bench-scale testing and an alternatives analysis for extraction of 300 to 600 gallons per minute (gpm) of groundwater and treatment for cyanide, fluoride and nitrate. Design and construction documents for the full-scale system were recently completed by MFG and the project is scheduled for construction later this year.

- Eagle Mine Superfund Site, Colorado - MFG personnel were responsible for the construction, start-up and operation of a 200 gpm acid mine water treatment facility to treat heavy metals and the management of lime sludge discharged from the plant at a low solids content.

- Acid Mine Drainage, Various Sites - MFG has designed treatment systems for groundwater containing heavy metals at numerous mining sites in the west, including: the Upper Blackfoot Mining Complex near Lincoln, Montana; the Butte Priority Soils Operable Unit in Butte, Montana; the Hecla Republic Unit in Republic Washington; and the Gem Portal Site near Wallace, Idaho.

In performing these projects we often subcontract water treatment companies (for example US filter) or independent testing laboratories to perform bench tests or preliminary conceptual design evaluations under our guidance. Also, I understand that the Don Plant has process and design engineers that would also provide assistance as needed.

In addition, as you are aware, MFG is a fully-owned subsidiary of Tetra Tech, Inc. Tetra Tech has approximately 5,000 employees and has a long history in water resources management, including a wide range of projects including treatment of inorganics. MFG's sister companies within Tetra Tech include firms that specialize in performing bench-scale and pilot-scale treatability studies in support of treatment system design. The internal company structure is set up such that we can easily access a wide range of water treatment expertise, if it becomes necessary.

Resumes for likely MFG team members for a treatment project are attached.

I hope this provides you with the information you need. Please do not hesitate to call if you have any questions.

Sincerely,

MFG, INC.

for Andrew C. Koulermos
Senior Chemical Engineer

ACK/cb
Attachments

J:\010121\Treatment SOQ\SOQ Treatment Information.doc

EXPERTISE

Mr. Hagen has over 30 years experience in customer service, research and product development for the water and wastewater industry. Specializes in pilot studies, plant startup, and operator training for municipal and industrial water and wastewater treatment. Areas of expertise are pretreatment for membrane processes, membrane systems, oil/water separations, solids conditioning and dewatering clarification, media filtration, physical/chemical waste treatment, lime softening, and membrane regeneration. Design, build, and operate bench and pilot equipment for process analysis. Perform system audits and troubleshooting services.

CERTIFICATION

Secondary Ed. Teaching Certificate, South Dakota University (1967)
Graduate Studies in Science Education, St. Cloud, Minnesota (1972)
Class C Stationary Engineer Certificate, Minnesota (1975)
Class I, II Wastewater Treatment Operator, Minnesota (1974)
Reverse Osmosis Pretreatment from Ultrapure Walter, D.H. Paul (1997)

PROJECT EXPERIENCE

- **MFG/Shepherd Miller, CO.** Pilot-scale testing, water treatment process design, plant audits, plant startup, and operator training. He has several patents related to water treatment filtration and has water treatment experience in both municipal and industrial settings. Process design and development for waste treatment applications for Fallon, Nevada.
- **Separations Sciences, Inc., OR.** Consulting to Water Treatment Technologies. Projects include arsenic removal pilot, acid mine waste pilot, reverse osmosis pretreatment. Engaged in pilot studies, ultra-pure plant audits, and membrane system assistance. Product development lead on several waste treatment systems. Training for filtration technologies given. Plant start-up services performed.
- **Argo Scientific, CA.** Develop the Jel Clear filtration media, application guidelines, engineering support, and to be directly responsible for the commercial installations. Developed Jel Clear filter underdrain, piping, valving and control specifications for the hardware, initiated qualification guidelines, conducted tests for operating parameters, and performed or assisted in all pilot testing. Was responsible for training sales staff and customer service personnel on product applications and pretreatment techniques. Co-authored Engineers Manual. Provided in-house training for all company personnel on membrane processes. Presented seminars for customer operators. Performed troubleshooting services. Provided technical assistance for each of the sales representatives in their regions.
- **Separations Sciences, Inc. OR.** Designed, built, and operated bench scale and pilot scale equipment for separation technology development. Primary areas of focus included sludge dewatering, rotating biological contractor, cross-flow micro filtration, media filtration, and membrane separations. Designed and built prototype systems. Engaged in three-year contract with Alcoa of Membralox product for oil/water separation on offshore production

platforms. Developed micro-filter lime-softening units for surface water. Worked on potato starch recovery systems. Developed membrane treatment systems for radioactive and heavy metal recovery system for titanium molding process. Worked on chromium recovery process equipment. During 1987 had 1-year contract to set up customer service department for Consep Membranes. During 1993 worked for Aqua Air on membrane product development on oil/water separations for compressor blow-down product development. Engaged in start-up services, operator training, and troubleshooting on potable water treatment plants in North America.

- **Neptune Microfloc, OR.** Start-up services and operator training for package water and wastewater treatment systems. Provided troubleshooting services. Performed pilot studies on reverse osmosis pretreatment for sea water systems. Engaged in process and equipment development for cross-flow micro filtration, buoyant media clarifier, and polyelectolyte mixing and feeding equipment. Start-up services and operator training for municipal treatment systems were a major focus.
- **LSI. Gresham, OR.** Project involves a system audit, pilot, filtration retrofit, operator training for high purity water system. The facility is for ultrapure water (2 stages of reverse osmosis plus ultraviolet and demineralizers) and the pretreatment runs between 600 and 900 gallons per minute.
- **Kingsford (Chlorox). Springfield, OR.** Pilot system, including design, installation, and startup for a commission waste pond treatment system. Treated flow rate was 40 to 50 gallons per minute.
- **BHP. Northbeach Wollongong, Australia.** Filter retrofit, installation and startup for boiler treatment, steel manufacture. Treated flow rate was approximately 450 gallons per minute.
- **Bunker Hill. Kellogg, ID.** Pilot design and operation for EPA acid mine waste. Pilot-scale system contained 1 to 2 gallons per minute segments. The full-scale system flow rate is expected to be in the range of 1500 to 1800 gallons per minute.
- **WaferTech. Camus, WA.** Pilot studies for both a reverse osmosis pretreatment and a fluoride removal system, including installation and startup. Treated flow rate was 125 gallons per minute.
- **Western Mining Company. Roxby Downs, South Australia, Australia.** System audit, pilot, filter retrofit, installation and startup services for reverse osmosis pretreatment. Treated flow rate was approximately 1600 gallons per minute.
- **Genie, Inc. Redmond, WA.** Installation, startup, operator training for reverse osmosis & E-Cell system. Treated flow rate was 60 gallons per minute.
- **A+ Galvanizing. Salina, KS.** Reverse osmosis pretreatment design, reverse osmosis installation and startup, galvanizing wastewater treatment system design and startup. Treated flow rate was 125 gallons per minute.
- **AKZO Nobel. Moses Lake, WA.** Filtration and reverse osmosis troubleshoot, pilot study.
- **7–Up Bottling. Los Angeles, CA.** Pilot study, filtration system retrofit, and startup. Treated flow rate was approximately 300 gallons per minute.
- **Ohio Edison. Niles, OH.** Pilot and filtration system upgrade.

- **Union Carbide (Fluor Daniel). Hahnville, LA.** Pilot study, system start-up, filtration system, reverse osmosis, demineralizers for high-pressure turbine.
- **Cheil Synthetics. Seoul, Korea.** Design and installation of membrane cleaning system, operator training.
- **Sam Yang Kasei Co. Chonju, Korea.** Pilot study, system design, filtration system retrofit, reverse osmosis upgrade, installation, start-up, operator training for 2,200 gpm system including waste treatment.
- **Saehan Industries. Seoul, Korea.** Teaching, training, filtration design, system design, pilot design and operation for Filter Company Division.
- **Samsung. Suwon, Korea.** Troubleshoot reverse osmosis system and pretreatment, initiated operator training.
- **IDT. Hillsboro, OR.** Pilot study, system audit, membrane cleaning, pretreatment, and operator training.
- **Penn Power. Shippingport, PA.** Pilot study and alteration of chemical feed methodology for filtration retrofit.
- **Duke Energy. McGuire Nuclear Station, VA.** Pilot filtration and chemical feed system, provided design criteria.
- **ROVA Generating, LG & E. Westmoreland, VA.** Pilot and filtration system design, installation, and start-up.
- **Intel. Hillsboro, OR.** Multiple pilot studies for reverse osmosis pretreatment, system installation, start-up, and operator training.
- **Precision Cast Parts. Portland, OR.** Bench-scale test, system retrofit, and start-up for wastewater ultrafilter system.
- **Alcoa. Warrendale, PA.** Product development on crossflow microfiltration, pilot equipment design, module design, system design and start-up services.
- **Lamb Wesson. Connell, WA.** Pilot system for starch recovery, and treatment plant optimization.
- **San Ysidro, NM. (1985).** Arsenic and fluoride water treatment pilot study with lime softening. Published paper for Pittsburgh Water Conference.
- **US Navy. Port Hueneme, CA.** Pilot seawater reverse osmosis pretreatment for ROPU.
- **Oklahoma City, OK.** Pilot lime softening municipal water treatment.
- **US Navy. Wrightsville Beach, NC.** Pilot seawater reverse osmosis pretreatment.
- **R. D. Nixon Power Plant. Pueblo, CO.** Pilot study, installation, start-up, operator training, and troubleshooting; wastewater treatment system for zero discharge. Treated flow rate was approximately 400 gallons per minute.
- **Proctor and Gamble. Oxnard, CA.** Pilot studies, filtration system upgrade, reverse osmosis procedures established.

Iowa City, IA. Reverse osmosis pretreatment design and start-up.

Sherman, TX. Pilot study, filtration system design, installation, start-up, and operator training; waste treatment system for Folgers.
North Carolina. Plant audit, membrane cleaning training, pretreatment retrofit, and operator training.

- **Puerto Rico Electric.**

  San Juan (3 sites) – Installation, start-up, and operator training of wastewater (lime softening) treatment, including sludge dewatering from generation stations.
  Ponce (1 site) – Installation, start-up, and operator training of wastewater (lime softening) treatment, including sludge dewatering from generation stations
  Treated flow rate for all four sites ranged from 450 to 1100 gallon per minute.

- **Abbott Lab. Austin, TX.** Reverse osmosis pretreatment pilot study and filtration system retrofit.
- **Abitibi. West Bend, WI.** Startup of waste treatment components and sludge dewatering system.
- **Aguasin. Santiago, Chile.** Reverse osmosis training and establishment of laboratory analysis.
- **Aklavic, Northwest Territories.** Installation, start-up, and operator training for a municipal package water treatment system.
- **Alexander City, AL.** Installation, start-up, and operator training for municipal water treatment system.
- **Alexander City, AL.** Start-up and operator training for municipal water treatment.
- **American Petroleum Institute. Plano, TX.** Development of bench-scale evaluations for produced water criteria.
- **Amoco Production Company. Alaska Operations.** Produced water pilot system, water and wastewater start-up in facilities and on pipeline. Operator training. Multiple trips over two years.
- **Antelope Valley, CA.** Installation, start-up, and operator training for municipal water system.
- **ARCO Alaska, Inc. Facility Engineering, Prudhoe Bay, AK.** Pilot study on produced water treatment, system start-up assistance.
- **Arkansas Kraft. Mtn. Home, AK.** Sludge dewatering installation, start-up, and operator training.
- **Armour Foods. Cold Spring, MN.** Treatment plant operator, activated sludge and all poultry waste handling.
- **Armour Foods. Nampa, ID.** Start-up and operator training for activated sludge.
- **Beaver Creek, Yukon.** Start-up and operator training for municipal water treatment system.
- **Beaver Valley Cogeneration, AES. Monaca, PA.** Pilot study and chemical system retrofit.
- **Belcourt, ND.** Installation, start-up and return service for municipal water treatment system.

- **Beverly, MA.** Upgrade and installation of municipal water treatment system.
- **Biwater International UK Division. Lancashire, England.** Pilot system design and operation technology transfer.
- **Bloomfield Petroleum. Bloomfield, NM.** Pilot system, installation of filtration system for oily waste water reclamation.
- **Bosch. Stuttgart, Germany.** Pilot system and filtration retrofit for reverse osmosis pretreatment
- **Boundary Dam, Sask.** Pilot-scale system for reverse osmosis pretreatment.
- **Breckenridge, CO.** Installation and start-up for a municipal water treatment system.
- **Broomfield, CO.** Installation, start-up, and operator training for a municipal water system.
- **Buffalo, NY.** Installation and start-up of filtration system for tertiary sewage treatment.
- **Canadian Crude Separators, Ltd. Calgary, Alberta.** Oil/water separation equipment design and emulsion breaking chemical application.
- **Caramondani Desalination Plants. Nicosia, Cyprus.** System audit and operator training.
- **CASE Engineering and Laboratory. Ventura, CA.** Pilot system operation on produced water.
- **Chevron Research and Technology Company. Richmond, CA.** Filtration plant installation and start-up.
- **Coastal Chemical Company. Abbeville, LA.** Bench- and pilot-scale equipment and test development, water treatment.
- **Coca Cola de Argentina. Buenos Aires, Argentina.** Installation guidelines for filtration system.
- **Commencement Bay Corrugated. Orting, WA.** Tune-up waste treatment system.
- **Conoco UK Limited. Aberdeen, Scotland (offshore).** Pilot system and treatment recommendations for produced water.
- **Cook Inlet Production Engineering. AK. (offshore).** Produced water treatment pilot and retrofit for two production platforms.
- **CPC Engineering. Sturbridge, MA.** Sludge dewatering retrofit.
- **Culligan. Grande Prairie, Alberta.** Pilot and system retrofit for boiler feed at plywood and pressboard facility.
- **Deksa. Nicosia, Cyprus.** Seawater reverse osmosis pretreatment pilot system and product design for NATO.
- **Dow Chemical Company. Liquid Separations Technical Service, Midland, MI.** Membrane cleaning development.
- **DuPont Permasep Products. Newark, DE.** Reverse osmosis cleaning system development.

- **Ecodyne, Ltd. Oakville, Ontario.** System start-up.
- **EIMCO. Calgary, Alberta.** System retrofit, start-up, and operator training services.
- **El Abra Mining. Calama, Chile. System audit, chemical system changes, and operator training.**
- **Elizabethtown, NY.** Installation, start-up, and operator training on municipal water treatment package plants.
- **Environmental Treatment Team. Theodore, AL.** Oil wastewater pilot system development.
- **Esso. Cold Lake, Alberta.** Extensive pilot work on oil/water separation for enhanced oil recovery in tar sands, demonstration system start-up and operation.
- **Exxon Chemical Co. Thousand Oaks, CA.** Filtration system installation and start-up.
- **Exxon. Pasadena, TX.** Lengthy pilot testing for produced water treatment equipment.
- **Filmtec Corporation. Edina, MN.** Reverse osmosis pretreatment technology transfer, demonstration equipment.
- Fort **McPhearson, Northwest Territories.** Pilot system, upgrade and refurbishment of municipal water treatment system.
- **Glegg Water Conditioning. Guelph, Ontario.** System troubleshooting services, filter internal design, E-Cell pretreatment, and membrane cleaning.
- **Groton. Nashua, NH.** Physical/chemical wastewater treatment system installation and start-up.
- **Huntsman Chemical. Odessa, TX.** Pilot study for upgrade filtration system, boiler feed.
- **IBM. PaloAlto, CA.** Pilot system, installation and start-up for wastewater treatment system.
- **Illinois Water Treatment. Rockford, IL.** Pilot system development for corn product separations.
- **InAqua. Langmaar, Belgium.** Pilot for filtration on machine coolant waste/recycle stream.
- **IPA Continental. Buenos Aires, Argentina.** Reverse osmosis system training.
- **Jamesville, NY.** Wastewater treatment plant start-up.
- **Johnson & Johnson. Jamesburg, NJ.** Physical/chemical wastewater system installations and upgrades.
- **Kodak. Rochester, NY.** Installation and start-up of sludge dewatering on waste system.
- **Lake Placid, NY.** Municipal package water treatment installation and start-up.
- **Marathon Oil (offshore). Lafayette, LA.** Multiple platforms treating produced water.
- **Marathon Oil. Houma, LA.** Produced water treatment system upgrade.
- **Maxim Integrated Products. Beaverton, WA.** Reverse osmosis pretreatment evaluation.

- **Mesa Verde, CO.** Installation, start-up and operator training for municipal water system for Park Service.
- **Milwaukee, WI.** Several pilot studies on sludge dewatering, installation and equipment start-up.
- **Mt. Vernon, IL.** Filter installation, start-up and training for municipal water treatment system.
- **Nanton, Alberta.** Pilot system, design assistance, installation, start-up, and operator training for municipal water treatment system (cold lime softening).
- **Nashville, TN.** Retrofit and start-up on municipal water treatment upgrade, installation and start-up sludge handling and dewatering system.
- **National Research Council. Calgary, Alberta.** Pilot system for tertiary treatment of sewage using lime softening and microfiltration.
- **Neroclean. Lefkosia, Cyprus.** Reverse osmosis pretreatment design.
- **Patterson, NJ.** Filter system installation, supervision and start-up services for municipal system expansion.
- **Perfect Circle. Muskegon, MI.** Chrom waste system installation and start-up.
- **Petro Canada. Valhalla Centre, Alberta.** Pilot system, installation, and start-up for service produced water treatment system.
- **Plymouth, MA.** Installation, start-up, operator training, and return visits for municipal water treatment system.
- **Public Health. Jefferson City, MO.** Reverse osmosis installation and start-up.
- **PuriTech. Oslo, Norway.** Bench- and pilot-scale equipment design for produced water tests.
- **Rely. Middleton, KT.** Reverse osmosis system installation and start-up.
- **Royal Dutch Shell. Den Helder, Netherlands (offshore).** Pilot system of wastewater treatment for gas production platform, North Sea.
- **Salt Separation Services. Rochdale, Lancs, England.** Filtration plant start-up services and surface water treatment.
- **Saskatoon, City of Saskatoon SK.** Pilot system for establishing chemical feed rates for municipal water treatment system.
- **SaskPower. Regina, Sask.** Pilot-scale system for reverse osmosis pretreatment, plant upgrade and installation services.
- **Simplot. Burley, ID.** Pilot-scale systems operations for wastewater treatment – potato.
- **South Padre Island, TX.** Pilot sweater reverse osmosis for municipal system.
- **Spokane, WA.** Start-up and operator training of anaerobic digester, sludge dewatering system on a new wastewater treatment plant.
- **Standard Oil. Lake Charles, LA.** Oily wastewater treatment pilot and system retrofit.

- **Standard Oil. Rangely, CO.** Installation and start-up of filtration system for produced water.
- **Standard Oil. Santa Barbara, CA (offshore).** Produced water treatment system audit and upgrade.
- **Statoil. Stavangar, Norway.** Oil water separation pilot-scale system.
- **Texaco Inc. Bakersfield, CA.** Pilot-scale system, filter refurbishing, chemical feed equipment installation and start-up.
- **Texas Utilities. Mt. Pleasant, TX.** Installation, start-up, and operator training for reverse osmosis pretreatment system; pilot and installation of wastewater treatment system; pilot scrubber waste treatment.
- **Torrey Island Power. Adelaide, South Australia.** Filtration system retrofit and reverse osmosis start-up.
- **Troy, NY.** Installation, start-up, and operator training on municipal water treatment filtration system.
- **TVA Wilson Dam. Florence, AL.** Plant audit and recommendations for upgrade.
- **Union Pacific Petroleum Production. Pasadena, CA.** Pilot-scale system for produced water, hydrogen sulfide removal, and thermal softening and filtration.
- **US Filter. Rockford, IL.** Design guidelines for media filters.
- **Valley River, Manitoba.** Installation, start-up, and operator training for municipal water treatment system.
- **Vincennes, IN.** Plant upgrade, installation, and start-up for municipal water treatment system.
- **Vista Chemical. Austin, TX.** Pilot system development for oily wastewater.
- **Wacker Siltronic Corp. Portland, OR.** Reverse osmosis pretreatment, system start-up, and operator training.
- **Waverly, NB.** Biotower installation and start-up for wastewater treatment plant.
- **Weyerhaeuser. Cathlamet and Hoquiam, WA.** Pilot wastewater chemical requirements and start-up sludge dewatering system.
- **Yuma Desalination Facility. Yuma, AZ.** Pilot membrane cleaning and storage methods.

PROFESSIONAL EMPLOYMENT HISTORY

Senior Process Design Manager - MFG/Shepherd Miller, Colorado (October 2001-present).
Owner – Separations Sciences, Inc., Oregon (1999-2001).
Director of Product Development – Argo Scientific, California (1996-1999).
Owner – Separations Sciences, Inc., Oregon (1985-1996).
Senior Customer Service Representative (3 years) / Research and Development Team Leader (4 years) – Neptune Microfloc, Oregon (1978-1985).

EDUCATION

B.S., Fisheries Science - South Dakota State University (1965)

PROFESSIONAL AFFILIATIONS

Member, New York Academy of Sciences
Member, AWWA

PATENTS

Enhanced cold lime softening via micro filtration, 1985
Flux enhancement techniques for cross-flow micro filtration, 1986

EXPERTISE

Civil Engineering and Construction Management; Mine Remediation and Reclamation; Feasibility Studies; Treatment System Design and Construction; Project Scheduling; and Cost Control.

CERTIFICATION

Professional Engineer - Michigan, No 44485 (1998)
Professional Engineer - Colorado, No. 29119 (1993)

PROJECT EXPERIENCE

MINE REMEDIATION AND RECLAMATION

- **Eagle Mine Superfund Site, Colorado.** Site Manager for the remediation - Managed fiscal and technical aspects of the excavation, classification, relocation, and consolidation of over 1 million cubic yards of tailings material including the segregation of tailings slimes for use as a low permeability capping material; construction of a multi-layered engineered cap over the 70-acre consolidation site; construction of surface-water diversion, collection, and transfer systems; maintenance of erosion and sediment control structures; installation, operation, and maintenance of a ground-water extraction system and mine seepage collection system; construction of three underground bulkheads in the mine workings; and implementation of a surface grout curtain program. Responsible for the construction, start-up and operation of a 200-gpm acid mine water treatment facility and the management of lime sludge discharged from the plant at a low solids content. These sludge management activities included dredging sludge from a lined pond and impoundment of the sludge behind a series of earthen berms. Assisted in the development of designs for, and coordinated construction of, a pilot passive acid mine drainage treatment system. Also coordinated the removal and disposal of PCB-contaminated electrical equipment, lab chemicals, waste oils and miscellaneous reagents found in abandoned facilities.

- **Yak Tunnel, Leadville Colorado.** The Yak Tunnel treatment plant is a conventional lime neutralization high density sludge facility that treats approximately 1,000 gallons per minute of acid mine drainage discharging from the tunnel. Contaminants of concern include arsenic, manganese and zinc. Provided operational support for the Yak Tunnel water treatment plant for a range of issues.

- **California Gulch Superfund Site – Colorado.** Project manager for several operable units of the 16.5 square mile site in Leadville, Colorado. Sites include abandoned tailing impoundments, former smelter sites, mine waste piles within residential areas, and a mine drainage tunnel and associated water treatment plant. Activities include supplemental remedial investigations, development of remedial alternatives, preparation of feasibility studies, removal action planning, design and implementation. Engineer of Record for the design of remediation activities associated with the in-place closure/capping of a 15 acre tailings impoundment and a former smelter site. The tailings impoundment closure design required significant geotechnical and slope stability evaluation primarily related to excavating

a large channel through a portion of the impoundment known to contain wet, low-strength tailing slimes up to 35 feet deep. Also managed the implementation of several interim actions, one involving the installation of vertical wick drains to expedite consolidation and dewatering of the slimes.

- **Abandoned sulfur mine located in the hills of Oakland, California**. Lead engineer for the evaluation of an abandoned sulfur mine. Developed source control remedial action alternatives to produce a stable closure of the mine waste dump, reduce water contact with the acid generating waste material, and mitigate the effects of acid mine drainage on the receiving stream. Also conducted an evaluation of passive and active water treatment options for the acid mine drainage.

- **Triumph Mine Site, Idaho.** Construction coordinator and remedial design team member for the remediation of an abandoned lead, zinc and silver mine. Participating in the development of the remedial design for the regrading, consolidation and capping of two tailing impoundments, and a waste rock dump; and the closure of abandoned mill/process areas. Responsible for the preparation of construction contract and bid documents, procurement of a performance contractor, construction management, and contract administration.

- **Former gold and silver mine in Washington State.** Preparation of a closure plan for a tailings impoundment at a gold and silver mine. Activities included: evaluation of geotechnical data in preparing settlement calculations; an analysis of wick drain installation; development of a grading plan; and design of an appropriate cap.

- **White Pine Mine, Michigan.** Engineering manager for the closure of a 37,500 acre former copper mine, mill, smelter and refinery complex in the Upper Peninsula of Michigan being conducted under a Consent Decree and Remedial Action Plan. Activities include the design and construction of a lined repository for the containment of removed sediments and debris; capping of the 60 acre plant site, direct revegetation and/or capping of approximately 4,500 acres of tailings in three basins/impoundments; design and construction of spillways for the tailings basins, flooding of the underground mine workings and development of a passive wetlands system to control stormwater runoff.

CIVIL ENGINEERING AND CONSTRUCTION MANAGEMENT

- **Rental car facility in Denver, Colorado.** Lead engineer for the design of a six acre parking lot expansion, including site grading, pavement section design and site drainage.

- **Mineral Belt Trail – Leadville, Colorado.** Design of concrete abutments for two pedestrian bridges. Also prepared specifications and assisted in the procurement of a 70 foot pre-engineered pedestrian bridge.

- **Former battery breaking Superfund Site – Pocatello, Idaho.** Preparation of remedial design and remedial action plans for a lead-contaminated soil remediation project at an operating metals recycling facility. Also coordinated the remedial action construction activities involving fixation/stabilization of the impacted soils through a pugmill utilizing a phosphate treatment formulation determined through treatability study analyses. Excavation

activities encountered significant volumes of asbestos-containing materials intermixed with the lead impacted soils.

- Operations manager for a small general contractor with overall responsibility for projects including: the construction of municipal and industrial wastewater treatment plants; water and sewer lines; storm sewer lift stations; electrical substation control buildings and infrastructure; UST removals, replacements and upgrades; petroleum and solvent contaminated groundwater extraction and treatment systems; soil vapor extraction systems; and remediation of petroleum contaminated soils at federal installations, railroad facilities and electrical substation yards.

- **Elitch Gardens Amusement Park, Denver, Colorado.** Served as one of two Remedial Program Managers to oversee and manage remediation work associated with the relocation of the amusement park. Past uses of the site included a former railroad maintenance yard and a coal gasification plant. Developed a system to track and allocate remediation costs associated with the project.

- **Commuter light rail line through downtown Denver, Colorado.** Environmental remediation manager on the construction of the commuter light rail line. Prepared project Health and Safety Plan and conducted safety briefings for site personnel, performed underground storage tank removals and related soil remediation activities at seven sites, and managed the removal and abatement of underground steam lines and associated asbestos-containing material (ACM) pipe insulation.

- Field quality control inspections and construction materials testing on various projects including airport, heavy highway, municipal, and industrial construction projects.

TREATMENT SYSTEMS DESIGN AND CONSTRUCTION

- Design of several soil vapor extraction/air sparging systems for the remediation of soils at UST sites in Colorado and design of a groundwater extraction and treatment system for a site in California impacted by petroleum hydrocarbons and chlorinated solvents.

- **Semi-conductor manufacturing facility – Colorado.** Evaluation of an industrial wastewater treatment plant and design of a pre-treatment unit for an isolated waste stream at the facility.

- Project Manager responsible for groundwater and industrial wastewater treatment and vapor extraction systems. Managed construction and start up of treatment systems consisting of extraction, collection and distribution components, oil/water separators, air strippers, vapor extraction equipment, and catalytic oxidation units. Contaminants included petroleum hydrocarbons and chlorinated solvents.

SCHEDULING AND COST CONTROL

- Project controls activities (highlights) include: Project scheduling and cost control, performance evaluation/monitoring, and subcontractor administration for a variety of multi-discipline investigations, feasibility studies and turnkey remediation projects.

PROFESSIONAL EMPLOYMENT HISTORY

Senior Engineer/Construction Manager - MFG, Inc.; Colorado (1995-Present)
Operations Manager - Vector Environmental Services; Colorado (1992-1995)
Site Construction Manager/Project Engineer - Dames & Moore; Colorado (1987-1992)
Field Engineer - Aguirre Engineers; Colorado (1986-1987)

EDUCATION

B.S., Civil Engineering - University of Colorado (1986)

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers

PROFESSIONAL DEVELOPMENT/CONTINUING EDUCATION

40-hour OSHA Hazardous Materials Health and Safety Training

8-hour OSHA Hazardous Materials Supervisor Training

Short Course: Economic Evaluation and Investment Decision Methods, Colorado School of Mines (1988)

Metorex X-MET 920 X-Ray Fluorescence Training Course (1996)

EXPERTISE

Mr. Burgeson has more than 35 years of experience in the engineering and consulting industry, managing numerous large programs for government and private sector clients. He has served as Program Manager and Principal Engineer for several large-scale environmental engineering, infrastructure, and permitting contracts, including wastewater collection transport and treatment; water supply, treatment, storage, and distribution; and water/residual solids refuse. His responsibilities have included project quality control, cost estimating, scheduling, contract and document administration, construction administration, information systems management, community relations, and training. In addition to management and design responsibilities, Mr. Burgeson has also provided litigation support for related projects.

CERTIFICATION

Registered Professional Engineer, Colorado, Nebraska, Kansas, and Arizona
Reciprocal Licensing (pending), Wyoming

PROJECT EXPERIENCE

- **Project Manager/Project Engineer, RBD, Inc.** As co-founder, responsible for office administration in addition to serving numerous municipal and industrial clients. Consultation on water sources, delivery and storage systems and treatment operations and processes for each of these clients. Similar report, design, construction administration and startup/O&M of wastewater, collection, transport, treatment and wastewater reuse projects.
- **Project Manager/Project Engineer, M&I, Inc.** Responsible for numerous water and wastewater projects in Colorado and Nebraska, including onsite systems, total containment ponds, conventional water and wastewater treatment, water and wastewater desalting and wastewater reuse. Project Engineer, USEPA. Responsible for the review and field inspection of wastewater projects in Region 7 through the construction grants program. Participated in the technical support branch to define watershed water and sediment quality through chemical, physical and biological characterization. Participated in the O&M assistance branch in the evaluation and operation of wastewater treatment plants.
- **Project Engineer, USEPA/Los Angeles County Sanitary District.** Responsible for day-to-day operation, maintenance and analysis of water desalting technologies in the treatment of carbon-treated secondary effluent. Electrodialyses, electrodialyses reversal, reverse osmosis and ion exchange were evaluated at the Pomona wastewater plant of the Los Angeles County Sanitary District.
- **Senior Engineer, Regional Water Treatment Plant, CO.** Provided services to the Upper Eagle Regional Water Authority. This regional water treatment project consisted of preparing final design documents for the construction of a water diversion system and a 10 million gallon per day potable water treatment plant. Treatment processes included: ozone pretreatment, coagulation using alum, filtration through mixed media, and disinfection via chlorine contact.

- **Johnstown, CO.** An engineering feasibility study was completed that recommended a raw water pumping plant from Lonetree Reservoir to replace the open ditch delivery system. The pumping station (5.0 MGD) and delivery system (16" ductile iron pipe) was designed and construction is nearly complete for the 1997 spring season.
- **Upper Eagle Regional Water Authority, CO.** The ski industry near Vail, Aspen, and Edwards, Colorado reached the limits of several small package treatment systems in the mid-1980's. A water authority was formed and an engineering feasibility study completed. Final design drawings and specifications were prepared for a 5.0 MGD plant. The site was developed to allow expansion to 10.0 MGD by "mirror imaging" the initial 5.0 MGD module. The plant included ozone pretreatment to assist in the removal of high Eagle Rive metals for the Eagle Mine near Minturn, Colorado. Pretreatment was followed by coagulation/flocculation/sedimentation/filtration with chlorine disinfection; clear well pumping and backwash recovery facilities.
- **Wastewater Treatment Facility Design and NPDES Permit Support, CO.** The district collects, transports, and treats domestic wastewater generated in three community service areas. Wastewater is pumped by a single screw pump to a three-cell stabilization pond. The first pond is a facultative aerated pond followed by a sedimentation cell and a final storage cell. Effluent from the third cell is chlorinated prior to discharge. NPDES permit materials were completed for liquid effluent; pond bottom sampling and analysis for heavy metals were performed prior to land applying pond bottom solids.
- **Berthoud Estates Homeowners, CO.** This privately held system collects, transports and treats domestic wastewater in a three-cell stabilization pond system. During the summer season, wastewater is treated in a deep facultative pond (mechanically aerated) prior to discharge (via a siphon) to an intermittent sand filter using a graded sand and gravel media of 36-inch depth. Excellent effluent quality has allowed transfer of the NPDES discharge permit from an initial private holder to a sanitation district. Winter operation relies on use of two aerated cells of the total system prior to effluent chlorination and discharge.
- **Senior Engineer, Wastewater Treatment Facility Design and NPDES Permit Support for the Vail Area, CO.** The district collects, transports, and treats wastewater from a service area surrounding Vail as well as a national and international clientele using the Vail Mountain Ski area. Treatment includes flow equalization, activated sludge biological treatment, nitrification via upflow attached growth media (innovative technology grant), effluent disinfection with ozone and discharge to a sensitive cold water fishery in Gore Creek. Water quality modeling prescribed the treatment processes and operations were put in place, primarily addressing in-stream toxicity. Effluent is approximately 75 percent of the streamflow in Gore Creek and is used in snowmaking activities on Vail mountain. All NPDES permit application materials were assembled and submitted for approval by the state and EPA. Waste biological solids are wasted to an interceptor sewer for conveyance to downstream stabilization facilities of another District under an intergovernmental agreement. Solids are stabilized and applied to agricultural lands consistent with 503 sludge regulations.
- **Senior Engineer, Wastewater Treatment System Design, CO.** The district collects, transports and treats wastewater generated below Vail and Avon, Colorado, including the Beaver Creek Ski Area. Treatment includes activated sludge biological treatment, nitrification to control ammonia toxicity, effluent disinfection with chlorine and sulfur dioxide dechlorination prior to discharge to the Eagle River. Biological solids are stabilized by aerobic digestion in combination with solids wasted from the upstream Vail wastewater

plant. All NPDES discharge permit requirements were met including sewer use ordinances, pretreatment and biomonitoring for toxicity testing.

- **Senior Engineer, Wastewater Treatment System Design for the Canon City/Florence Area, CO.** The district provides collection, transport, and treatment of wastewater generated in the City of Canon City, East Canon City, Lincoln Park, the Federal prison system at Florence, Colorado. The 201 Facilities Plan consolidated these individual entities into a single authority for wastewater and solids treatment consistent with Colorado statutory requirements for a Sewage Disposal District. Following consolidation, design, construction, and startup and operation of a 9.0 MGD activated sludge plant were successfully implemented. Residual biosolids are land applied on nearby dryland or pasture areas.

- **Senior Engineer, Design and Construction of a Wastewater Lift Station and Force Main, CO.** The wastewater lift station and force main was designed and constructed for the Eagle Rock School and Teacher Education Center, Inc., a special needs school constructed by the American Honda Education Corporation. The school was developed to provide personalized learning experiences to approximately one hundred 15 to 18 year olds from diverse backgrounds who have not been successful in conventional school settings. The Center was expected to produce approximately 20,000 gallons of domestic wastewater per day. This wastewater was to be treated by the Upper Thompson Sanitation District. In order for treatment to take place, however, the wastewater had to be transported up over a watershed divide to the District's wastewater transportation system. The District agreed to construct a gravity main, which would begin at the top of the divide. Features of the lift station and force main included in the preliminary design were a two chambered wet well system designed to separate sinking and floating debris, a pumping system consisting of two peristaltic type hosepumps with variable speed drives operating alternatively or concurrently if necessary, a control system triggered by sonic water level sensors, a simultaneous computer-aided, data acquisition (SCADA) system for communication with the District's office a force main pressure pipeline and additional line available for future expansion, and a force main to gravity main connection at the top of the watershed divide. Drexell Barrell completed the design. This conceptual design was innovative in the two-chambered wet well and the use of variable speed peristaltic type hose pumps in this application.

- **Senior Engineer, Long Term Technical Assistance including Wastewater Treatment Facility Design, CO.** The district provides collection, transport, and treatment of wastewater generated by local residents and a national/international visitor population in the Estes Park/Rocky Mountain National Park area. Water quality modeling combined with high quality fishery resources resulted in the implementation of wastewater flow equalization, activated sludge biological treatment, nitrification of ammonia to nitrate to control undissocated ammonia nitrogen toxicity, effluent filtration, chlorination for effluent disinfection and dechlorination for effluent chlorine toxicity control. Waste biological solids are stabilized with aerobic digestion; stabilized solids are dewatered to 6 percent and land applied. Liquid effluent and solids disposal permits (consistent with State/EPA NPDES requirements) were applied for, secured and utilized based on required renewal frequencies. The district also implemented sewer use ordinances, industrial pretreatment rules, and recently revised its operations to address 503 sludge regulations and treatment plant stormwater runoff controls.

- **Senior Engineer, Wastewater Treatment System Design and Related Technical Assistance, CO.** The district provides collection, transport, and treatment of wastewater generated by local, national, and international visitors to the Rocky Mountain National Park

areas. District treatment facilities include activated sludge biological treatment preceded by flow equalization, effluent disinfection with chlorine and dechlorination with sulfur dioxide for toxicity control. The district recently completed a plant evaluation study and new sludge 503 regulation requirements. The district will continue use of aerobic digestion for waste biological stabilization and land application of solid residuals. Liquid and solids NPDES requirements were reviewed for permit renewal March 15, 1994. Water quality modeling (waste load allocation model) prescribed ammonia discharge limits and the district will conduct effluent toxicity tests (biomonitoring) in conformance with permit requirements.

- **Senior Engineer, Potable Water System Improvements, CO.** Provided services to Pueblo West Metropolitan District (PWMD) in two phases. In Phase 1, Dr. Burgeson developed a water system planning study to estimate the potable water needs of PWMD for the next 20 years. Phase II services consisted of preparing final design documents for the construction of a 2 million gallon-per-day addition to PWMD's existing potable water treatment plant. Treatment processes included: coagulation using liquid polymer, solids removal in an upflow contact clarifier, filtration through mixed media, and disinfection via chlorine contact. In addition, the plant featured the reclamation of water used to backwash the filter and clarifier media. Finally, a chlorine gas detection containment and treatment process was designed for the plant to respond to any future accidental releases of chlorine gas.

- **Senior Engineer, Water Distribution System Improvements, Johnstown, CO.** Due to recent growth and newly annexed properties, improvements to Johnstown's existing water distribution system and appurtenances were required. The pumping capacity for the existing distribution system was inadequate to provide for municipal standard fire flows, and construction of a new water main to service newly annexed areas required additional pumping capacity. A pumping system was designed to pump water from the existing storage tanks using two 125 HP pumps and two 250 HP pumps. Each of the pumps has a maximum capacity of 3,000 gpm at the required head. Pump motors are equipped with variable speed drives controlled by pressure sensors in the outlet piping of the pumping system. The system is more flexible because the treatment system can be operated continuously, filling the 1,500,000 gallon storage capacity. Flexibility is added by pumping water demands that exceed the treatment capacity from storage.

- **Senior Engineer, North Central Gateway Water and Sewer Lines, Johnstown, CO.** HSI GeoTrans and John Burgeson, was contracted by the Town of Johnstown, Colorado to design water and sewer facilities to a newly annexed parcel at the 1-25 and Colorado State Highway 60 interchange, 2.5 miles west of Johnstown. The probable future development between 1-25 and Johnstown was used to determine the required capacity of the sewer line and water line. HSI GeoTrans prepared drawings, specifications, and contract documents for the 2.5 miles of 20-inch water line, 3 miles of 8, 12, 15, and 21-inch sewer line, and a sewage lift station and force main. HSI GeoTrans was also contracted to provide resident engineer and construction contract administration services to ensure conformance with project drawings and specifications.

- **Senior Engineer, Water Distribution System Model, Johnstown, CO.** Utilizing existing drawings of the town's distribution system and demands determined from a previous study, HSI GeoTrans modeled existing conditions using Haestad Methods WaterCADD modeling software. Future developments were then added to the model, and demands were determined

using recognized demand-per-household flows. Preliminary pipe configurations, construction materials and elevations were designed for the planned developments.

With this model, pumping requirements for the town's distribution system were determined. Fire flows were added to the distribution system to determine peak demand pressure profiles and the pump requirements for those peak demands were determined. The model showed pressure regulating valves were needed in the distribution system to keep the low end of the system from being over pressurized. A report was presented to the Town of Johnstown detailing necessary upgrades to the water distribution system to meet the present and future needs of the town.

- **Senior Engineer, Side Channel Spillway, Johnstown, CO.** The Hillsborough Ditch is a small irrigation ditch which receives much of Johnstown's stormwater runoff due to its location at the lower end of many of the town's drainage basins. Development within these basins has increased potential stormwater runoff flows to the Hillsborough Ditch. To prevent potential flooding from overtopping the Hillsborough Ditch with stormwater, a side channel spillway was designed to redirect all flow in excess of the ditch baseflow capacity of 80 cfs. Excess stormwater runoff is diverted to a 6,000 linear foot gravity storm drain line with a capacity of 320 cfs. The storm drain line discharges to the Little Thompson River south and east of town through an energy dissipater to prevent river channel erosion. HSI GeoTrans prepared a complete construction bid package including contract documents, drawings, and specifications.

- **Senior Engineer, Wastewater Treatment Plant Expansion Evaluation and Preliminary Design, Upper Thompson Sanitation District (UTSD).** HSI GeoTrans and John Burgeson evaluated several alternatives including preparation of conceptual designs for expanding the treatment capacity of the existing UTSD wastewater treatment plant from 1.5 million gallons per day (MGD) to 3.0 MGD. The evaluation criteria included capital costs, ability to construct the expansion in phases in response to district budgetary needs, and ease of operation for treatment plant operators. HSI GeoTrans prepared a preliminary design of the selected alternative and is currently under contract to prepare the final design and obtain regulatory approval for the expansion.

  Growth within the District's service area has generated the need for additional wastewater treatment plant capacity as summer peak flows have reached the level to trigger regulatory required initiation of design services for treatment system expansion. The final design will include additional activated sludge basins, a new clarifier, dissolved air flotation unit, sludge thickening/dewatering centrifuge, and air supply control system modifications to reduce plant power consumption.

- **Senior Engineer, Wastewater Treatment Plant Upgrade, Carson City, Nevada.** HSI GeoTrans and John Burgeson, as part of a design-build team, is preparing the design for a sequencing batch reactor (SBR) wastewater treatment plant upgrade for the Indian Hills General Improvement District in Carson City Nevada. The design consists of a two basin SBR system capable of treating an average daily flow of 0.6 MGD and a peak storm flow up to 1.5 MGD with an integral aerobic digester, modifications to the existing headworks, and integration into the existing site layout and hydraulic profile to allow use of the existing effluent storage ponds and parallel use of the existing aerated lagoon system if desired. HSI is currently preparing the design drawings and specifications to submit for regulatory approval prior to commencement of construction. The entire SBR process including the aerobic digester will be controlled by a programmable logic controller (PLC) to optimize

plant performance and minimize operation and maintenance requirements. The effluent will meet the discharge limits required to allow re-use as irrigation at a local golf course.

- **Senior Engineer, Dannon Large-Scale Spring Water Loading Facility Design, Jones Spring, Utah.** The Dannon Company enlisted HSI GeoTrans and John Burgeson to design a spring water loading facility to transfer water from Jones Spring to double 5,000-gallon tanker trucks. Before initiating the detailed design, HSI GeoTrans conducted cost-benefit and hydraulic analyses of various tank placement/sizing configurations. Subsequently, HSI GeoTrans prepared civil, mechanical, structural, and electrical drawings and specifications for the loading system. The system consisted of a 20,000 gallon storage tank with a clean-in-place (CIP) system, low-head pump capable transferring spring water to trucks at a flow rate of 500 gallon per minute pump (gpm), filtration system, automatic flow controls, and associated piping. All equipment and plumbing materials were designed to meet FDA "Milk-Grade" requirements. HIS GeoTrans met all design submittal milestones under a rigorous schedule and completed work on budget. The loading facility is currently in operation.
- **Graduate Student, University of California, Berkeley in Sanitary Engineering (MSCE, 1968).** Laboratory and lecture: graduate study on water quality, unit operations/processes for water and wastewater treatment. Freshwater and saltwater biological evaluations of water quality, industrial water and wastewater treatment, groundwater hydrology, advanced water resource engineering and wastewater reclamation/reuse.
- **Project Engineer, WQA/EPA.** Evaluated salt loadings to the Colorado River from natural and manmade sources.
- **Project Engineer, US Bureau of Reclamation.** Planned irrigation projects in Nebraska, Kansas and Arizona including hydrology, dam location and sizing, irrigation canal and lateral delivery systems from gravity and pumped supplies.
- **Vail Valley Water District, CO.** Seismic exploration of Gore Creek resulted in the location of a significant groundwater resource. Several large capacity wells (1,500-2,000 gpm) were drilled in the Gore Creek aquifer and were equipped with submersible motors and flood-proof wellheads. The system included fluoride addition and chlorine disinfection in the discharge pipelines.

PROFESSIONAL EMPLOYMENT HISTORY

MFG/Shepherd Miller (2001 – Present)
HSI GeoTrans, Inc., Westminster, Colorado (1997 - 2001)
PRC Environmental Management, Inc., Denver, Colorado (1992 – 1997)
RBD, Inc. (1982 – 1992)
M&I, Inc. (1971 – 1982)
USEPA (1969 – 1971)
USEPA, Los Angeles County Sanitary District (1968 – 1969)
FWQ/EPA (1965 – 1967)
US Bureau of Reclamation (1963 – 1965)

EDUCATION

M.B.A. - Regis College, Colorado Springs (1988)

M.S., Fisheries Science - Colorado State University, Fort Collins (1981)
M.S., Sanitary Engineering - University of California, Berkeley (1968)
B.S., Civil Engineering - University of Nebraska, Lincoln (1963)

PROFESSIONAL AFFILIATIONS

Diplomate, American Academy of Environmental Engineers
Member, American Water Works Association
Member, Water Pollution Control Federation
Member, American Fisheries Society

EXPERTISE

Civil Engineering; Hazardous Waste Facility and Mine Remediation; and Dam and Hydraulic Structures Design.

CERTIFICATION

Professional Engineer - Missouri, No. E-2001015625 (2001)
Professional Engineer - Illinois, No. 062-053064 (1999)
Professional Engineer - Utah, No. 340480 (1997)
Professional Engineer - New Mexico, No. 12684 (1995)
Professional Engineer - Montana, No. 11487PE (1994)
Professional Engineer - Idaho, No. 6984 (1992)
Professional Engineer - Wyoming, No. 6131 (1991)
Professional Engineer - Colorado, No. 14707 (1977)

PROJECT EXPERIENCE

MINE REMEDIATION AND HAZARDOUS AND INDUSTRIAL WASTE FACILITY REMEDIAL DESIGN

- Wastewater treatment facilities and contaminated groundwater treatment plant final designs; Colorado, Arizona, Oklahoma and Guam.

- Engineer of Record for a remedial design project at the Upper Blackfoot Mining Complex including three mine waste repositories, mine infiltration control and mine adit discharge hybrid treatment systems with conventional pretreatment and constructed wetland polishing including all ancillary facilities, Montana.

- Development of work plans and preliminary designs for the Bunker Hill CERCLA site FS and RD; Groundwater/Surface Water Collection and Diversion, treatment systems, Smelter Complex closure; Floodway and Central Impoundment Area Closures.

- Engineer of Record for design of a pilot demonstration project for treatment of groundwater containing heavy metals, Montana.

- Engineer of Record for design of a subgrade, hanging containment wall of an industrial facility, for containment of a light non-aqueous phase liquid (LNAPL) material along the west bank of the Mississippi River, including LNAPL recovery system and bank stabilization measures, Missouri.

- Engineer of Record for remedial design at a former lead smelter site, including an on-facility geomembrane-lined repository for arsenic-contaminated materials and smelter complex remedial design, including coordination of design with various site redevelopment activities, Utah.

- Engineer of Record for design of closure plans for tailings facilities, process areas, residential area remediation, mine waste rock pile, mine drainage control and mine adit plugging program at the Triumph Mine site in central Idaho.

- Engineer of Record for a remedial design project at the Bonanza Mining District including tailings consolidation and repository design, flood control and stream channel rehabilitation design with aquatic/riparian habitat enhancements and mine discharge control including adit plugging, runon control and oxidation/sedimentation pond, including certification of constructed components, Colorado.

- Engineer of Record for streambank and channel remediation along the South Fork Coeur d'Alene River including stabilized levee and in-channel stabilization and habitat enhancement components, design of a large mine waste repository, and design of a system to divert and treat secondary effluent from a municipal wastewater treatment plant in a natural wetland, Idaho.

- Senior Project Engineer for the design of principal pipe spillway and emergency spillway systems at a large (5,400 acre) multiple unit tailings impoundment facility, Michigan.

- Senior Project Engineer for design of a remedial program at a tailings facility that experienced a previous failure, including design of all geotechnical and hydraulic remedial measures, Idaho.

- Preparation and certification of a Spill Prevention Control and Countermeasure Plan (SPCC) for a rental car facility at the Salt Lake International Airport Facility, Utah.

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- Provided technical expertise on the inspection and certification of surface coatings and linings for tanks, storage and containment areas, and assessment of repairs at a hazardous waste treatment, storage and disposal (TSD) facility and review and certification of a subsurface investigation report for a secure landfill cell at the TSD facility, Colorado.

- Various senior planning and design review of civil and geotechnical remedial projects for mill tailings and industrial facility developments and closures, various states.

- Hazardous and industrial waste landfills, impoundments and groundwater extraction systems for CERCLA and RCRA sites; Utah, Ohio, Wyoming, New York, Florida, Colorado, Idaho and Texas.

- Mine remediation design including civil site work, flood control channels, groundwater extraction systems, temporary treatment facilities, mine adit bulkhead and shaft cover designs; Colorado.

- Expedited engineering evaluation/cost analysis (EE/CA) for the Colorado Tailings operable unit of the Silver Bow Creek/Butte Area Superfund site in Montana.

- CERCLA site feasibility studies (FS) and focused feasibility studies (FFS) for sites in Colorado and Idaho.

- Bioremediation landfarm design for oily wastes and landfarm closure design at a RCRA facility in Wyoming.

- Solid waste and municipal landfill designs, including active methane gas venting system designs and specifications; Colorado, Arizona and Illinois.

- Nuclear waste disposal site isolation and encapsulation design study, and cost/benefit analysis; Idaho.

WATER RESOURCES AND GENERAL CIVIL ENGINEERING

- Roller compacted concrete (RCC) dam designs (80 to 260 feet high) for water supply, flood/pollution control and diversion dams including stability analyses, intake structures, outlet works, spillways, reinforced concrete, access, reservoir and peripheral design; California and Arizona.

- Irrigation dam rehabilitation design, Colorado; water supply rockfill dam design, with concrete facing, Guam; and tailings dam and spillway designs; Missouri, Colorado and Alaska.

- Flood control diversion design, leachate basin, pumping, pipeline systems, decant systems, river stabilization, floodwall, mine railroad bridge design and construction inspection; Arizona, Colorado.

- Heap leach project designs; Colorado and Nevada.

- Offshore runway extension and airport expansion design and cost estimate for $60 million job; Alaska.

- Wind Energy Project, site grading and drainage, access roads and control and maintenance buildings; California.

- Pipeline route selections and assessments for industrial water supply in Wyoming, Montana, North Dakota and South Dakota; and pipeline settlement analyses and remedial design at a powerplant constructed over collapsible soils, Utah.

- Hydroelectric feasibility study, Wyoming; and water supply reservoir yield analysis, spillway studies and preliminary design of dams, Alaska, New Mexico and Colorado.

- Design and contract documents for large irrigation, drainage, pumped storage, hydroelectric, and water supply projects of up to 21,000 cfs, Arizona, California, Colorado, Nevada, Washington, and Singapore.

- Research in water quality - heavy metal removal and desalination techniques, Colorado and Arizona.

- Construction inspection - canals, pipelines, geothermal, and desalination test facilities, and construction cost estimating for various projects, Arizona and California.
- Technical review of major earth dam failure, Idaho.
- Planning, layout, design, construction and management of a number of water supply and bridge projects for rural communities, Ecuador.
- Volunteered civil engineering services for planning and design of various hospitals, schools, and orphanages including water, wastewater, and foundation designs in developing countries; Belize, Bolivia, Haiti, Honduras, India and Papua New Guinea.

PROFESSIONAL EMPLOYMENT HISTORY

Senior Engineer - MFG, Inc.; Colorado (1992-Present)
Project and Senior Engineer, Dames & Moore (1978-1992)
Civil Engineer - U.S. Bureau of Reclamation (1975-1978)
Civil Engineer - U.S. Peace Corps Ecuador (1973-1975)

EDUCATION

B.S., Civil Engineering - Valparaiso University (1972)

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers
Engineering Ministries International (water resource design assistance for orphanages, hospitals and schools in developing countries)

PROFESSIONAL DEVELOPMENT/CONTINUING EDUCATION

Health and Safety Training, 40 hr. OHSA (1990 and subsequent refresher courses)
Wastewater Treatment with AIWPS and Constructed Wetlands, ASCE (1998)
Settlement and Consolidation Analyses, ASCE (1996)
NPDES Construction Stormwater Permit Compliance ASCE (1994)
Designing with Geosynthetics, Drexel Research Institute (1990)
Quality Assurance and Control for Design and Construction, ASCE (1988)
Cavitation in Hydraulic Structures, ASCE (1984)
Various Civil and Structural Short Courses, ASCE

PUBLICATIONS

"Wetlands Treat Mine Runoff," *Civil Engineering*, American Society of Civil Engineers, January, 1999, Co-author.

"Design and Optimization of the Mike Horse Mine, Montana, Wetland Treatment System," ASCE Wetlands Engineering & Rivit Restoration Conference, 1998, Co-author.

"A Case History of Tailings Consolidation and Closure at the Bonanza Mining District;" Tailings and Mine Waste '97, Colorado State University, 1997, Co-author.

"Design and Construction of Lower Chase Creek Dam," Roller Compacted Concrete II, ASCE, 1988, Co-author.

"Development of Design Criteria and Final Design of Hydraulic Structures for Pamo Dam;" Design of Hydraulic Structures, Colorado State University, 1987, Co-author.

LANGUAGE PROFICIENCY

Spanish

COUNTRIES WORKED IN

Australia
Belize
Bolivia
Ecuador
Guam
Haiti
Honduras
India
Papua New Guinea
Singapore
United States