



DGS Metallurgical Solutions, Inc.

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Douglas G. Stalheim - President

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SUMMARY: Bright Experienced Metallurgical Engineer with Experience in All Facets of Production (Melting, Rolling, Forging), R&D, Quality Control, Heat Treating, Facility Design/Start-up, Customer Relations, and Product/Process Engineering for the Production of Aluminum Plate/Sheet Alloys, Steel Plate/Coil/Billet/Bar Alloys and API Line Pipe Steels.

OBJECTIVE: To Communicate and Implement Creative Cost Effective Solutions to the Metal, Oil, and Gas Industries Challenges, where Practical Application of Prior Experience can benefit the Industry and whereby Personal Growth and Development can continue.

EDUCATION: 1980 South Dakota School of Mines and Technology, Rapid City, S.D. BS Metallurgical Engineering

EXPERIENCE:

05/05 - Present **DGS Metallurgical Solutions, Inc.** Vancouver, WA

President (06/05 – Present)

DGS Metallurgical Solutions, Inc. is a fee based technical consulting service. DGS Metallurgical Solutions, Inc is an “S” corporation founded with a desire to fulfill the technical short fall of the oil, gas, and primary metals industries. The President and principal of DGS Metallurgical Solutions, Inc. is Douglas G. Stalheim. Mr. Stalheim brings a BS in Metallurgical Engineering along with 25 years of practical primary metals, oil and gas industry experience. He is one of the recognized top experts in the world in API line pipe production including specification review, alloy design, rolling design, plate, coil and pipe production. He has been involved in over 2.2 million tons representing in excess of 650 API line pipe projects in the world market. In addition, to the API experience, Mr. Stalheim has experience in all aspects of steel and aluminum production including Steckel Mill operation. Mr. Stalheim has experience in from low carbon to high carbon cast iron, from low alloy to high alloy, and shapes ranging from sheet, plate, coil, bar, billet, and blooms. He has extensive heat treat experience along with a specialty of high carbon abrasion resistant grinding media. Over the 25 years, he has developed extensive contacts around the world in these industries.

7/93-5/05 **Oregon Steel Mills, Inc.** Portland, OR

Manager, Metallurgy – Portland Division (5/04-05/05)

Manage the Metallurgical Functions for the Portland Division. This includes Direct Supervision of two Metallurgists. Personally Responsible for the Development of All API Grades including Heavy Wall up to 1” X80 Plate and Coil. Developed Abrasion Resistant Heat Treated Plate directly off the Rolling Mill (Direct Quench Method). Developed Commercially acceptable HR100 ksi Minimum Yield Strength Structural Steel Directly off the Rolling Mill. Implemented Rolling Practice upgrades to Maximize Throughput while making Physical Properties. Optimized Chemistries for Physical Properties and Throughput. Developed Vanadium Bearing High Strength Structural Steels. Working on Development of HR130 ksi Minimum Yield Strength Structural Steel. Worked with US Department of Energy and Oak Ridge National Labs on Research into Development of Steels and Coatings for Transmission Pipelines for Movement of Hydrogen Gas as a Fuel Source.

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Oregon Steel Mills, Inc. Portland, OR

Manager Technical Services – Portland Division (9/02-5/04)

Manage the Technical Services Group for the Portland Steel Works of Oregon Steel. This includes the Portland Test Lab (13), Metallurgical Engineers (3), Quality Assurance/Claims (6), and Material Test Reporting Functions. Total Personnel in the Department 22. Responsibilities include Managing a \$3.0 million/year Budget Related to the Technical Services group of the Division. Responsible for Strategic Planning, Quality Assurance/Claims, Research and Development, Steel Sourcing, Maintaining ISO, API, and other Certifications of the Division. Responsible for Establishing Training for Progression/Development of Technical Services Personnel. Extensive Experience in International Travel and Negotiations in Steel Slab and Plate Purchasing.

Oregon Steel Mills, Inc. Portland, OR

Manager Technical Services – OSM Division (9/01-9/02)

Manage the Technical Services Group for the Portland Steel Works of Oregon Steel in Addition to the Technical Services Group at Napa Pipe, Napa CA. The Two Combined Represented the Technical Services Group for the OSM Division. This includes the Portland and Napa Test Labs, Metallurgical Engineers (6) at Both Locations, Quality Assurance of the Division/Claims (86), Material Test Reporting Functions, Level III RT/UT Corporate Personnel (1). Total Personnel in the Department for the Division is 124. Responsibilities include Managing a \$10.8 million/year Budget Related to the Technical Services group of the Division. Responsible for Strategic Planning, Quality Assurance, Research and Development, Steel Sourcing, Maintaining ISO, API, and other Certifications of the Division. Responsible for Establishing Training for Progression/Development of Technical Services Personnel.

Oregon Steel Mills, Inc., Portland, OR

Metallurgist III (5/97-9/01)

Responsible for all Metallurgical Functions Associated with the Rolling of Slabs into Plate and Coil Products. Products include Heat Treat Grades, API Linepipe X Grades, Structural Plate Grades, Coil Grades, Alloy Grades, Military Grades, and Abrasion Resistant Grades. Primary Metallurgist to support Oregon Steel Mills Pipe Making Operations in Napa, CA and Camrose, Alberta, Canada. Responsible for Review of Sales Inquiries for Plate and Coil including Oil and Gas Pipeline Inquiries from OSM Pipe Mills. Ensures that Orders are set up Correctly, especially Specialty Orders. Maintains Computer Systems that Supports OSM highly Automated Computer Controlled Rolling Mill. Responsible for R&D. Works closely with Production Planning to Ensure Proper Slab Applications, Direct Process Responsibility for Slab Reheating, Automated 140" 4HI Steckel Rolling Mill, Leveling, Shearing, Inspection and Shipping, Provided Customer Technical Service, Complaints, and Customer Visits including Trial Monitoring and Data Collection. Works in-directly with Steelmaking for Quality and Productivity improvements. Provides Training on Rolling of Challenging Grades. Sets up Testing Protocol and Does Metallographic Investigations.

Metallurgist II (7/93-5/97)

Same Duties and Responsibilities as Metallurgist III

8/89-7/93

Ravenswood Aluminum Corp., Ravenswood, W. Va.

Staff Hot Line Metallurgist (7/92-7/93)

Responsible for all Metallurgical Functions Associated with the Hot Rolling of Aluminum Ingots into Sheet and Plate Products. Products include Aerospace, Automotive, Building Products, and Can Stock. Works in Scalping, Preheating, and Rolling, Direct Process Responsibility for Scalping, Soaking Pits (Radiant Tube and Direct Fire), Walking Beam Furnace (Radiant Tube), 168" 4HI Reversing Plate Mill, 110" 4HI Reversing Intermediate Mill, 112" 4HI Computer Controlled 5-Stand Continuous Strip Mill, Direct Responsibility for Development of Automotive Bumper Stock, Soaking Pit Modeling, and Hot Line Roll to Gauge Products (5052, 5083). Familiar with Rolling Coolants/Lubrication. Responsibility of Managing and Developing Co-op Engineers Assigned to Hot Rolling. Works closely with Production Planning. Used as Temporary Scaling/Soaking Pit Department General Forman with Responsibility for Safety, Quality, Production, Maintenance, and Planning/Scheduling of Scalping/Soaking Pit Department. During



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Strike of 1990-92 worked as Reduction Cell Operation, 15 ton Stiff Leg Crane Operator, Soaking Pit Operator, Fork Truck Operator, and Production Foreman. Had Direct Responsibility of Training New Replacement Work Force in Operations of Scalping, Preheating, and Hot Rolling including operation of 50,000 lb. Fork Trucks, 15 ton Stiff Leg Crane, All Soaking Pits, and Ingersoll Scalper, Direct Responsibility of Re-training returning Union Workers.

Senior Hot Line Metallurgist (8/89-7/92)

Same Duties and Responsibilities as Staff Hot Line Metallurgist

2/81-8/89

Armco, Inc., Kansas City, MO

Senior Metallurgist (5/89-8/89)

Duties and Responsibilities Remained the Same as Listed under Previous Title with the Addition of Evaluation and/or Training of Other Steel Mills as Sources of Bar Stock for Grinding Media.

Metallurgist (3/84-5/89)

Involved with all Metallurgy, Quality Control, and Process Engineering Activities Associated with the Manufacture of Armco's High Quality Abrasion Resistant Grinding Media, including Supervision of 10 Inspectors. Worked in R&D to Formulate New and Better Products Including the Successful 1% Carbon Project and Modified Quench Process. Interfaced with Production Management and Shop Personnel to Implement Projects within Manufacturing Capabilities and to Monitor Progress, Product Quality, and Costs, including Benefits and Budgets. Was Principal Engineer in Customer Relations, Plant Visitations, On-Site Product Evaluation/Trials and Product Dispositions. Shared Much Information Valuable to Marketing, R&D, and Other Manufacturing Groups with Armco. Instrumental in the Design and Start-up of New Grinding Media Plant in Kamloops, British Columbia (Stelco/Armco). Implemented SPC when Applicable Interfaced with International Armco Plants on Product/Process Implementation and Problem Solving Involved with the Implementation of New Instrumentation and Process Control Equipment. Tested, Compared and Analyzed Competitor's Products. Familiar with Combustion Processes and Furnace Operations.

Associate Metallurgist (8/81-3/84)

Involved with all Areas of Grinding Media Manufacturing including Grinding Ball Heat Treating (Quench & Temper, Belt, Slope, Rotary, Induction, Electrical Resistance Furnaces), Upset Forging (Ajax, Hill-Acme), Roll Forming Process, (Danielli, Armco) Ultrasound Testing (Level I) and R&D. Interfaced with Manufacturing Personnel in the Melt Shops and Rolling Mills. Experience with Horizontal Bar Casting.

Assistant Metallurgist (2/81-8/81)

Started out as Inspection Observer in Steel Melting and Rolling Areas. Electric Arc Furnace Shops, Continuous Casting, Ingot Production, Bar Rolling.

Societal Organizations:

American Society of Mechanical Engineers (ASME) – Member
American Society of Mechanical Engineers (ASME) – Codes and Standards Committee Member
B31.12 Hydrogen Tanks, Piping, and Pipelines
Association for Iron & Steel Technology (AIST) – Member
American Society for Metals International (ASM) - Member

Technical Papers and Presentations:

Presentations

“*The Metallurgy of Steel and Aluminum*” – Basic 8 hour Metallurgical Training Course on Steel and Aluminum



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“Materials Solutions for Hydrogen Delivery in Pipelines” – Summary of US Department of Energy Funded Research and Development Effort of Hydrogen Fuel Cells and Infrastructure Technologies Program, US Department of Energy Workshop, Augusta, GA USA, August 2005.

“The Use of Microalloyed Steels for Steckel Mill Rolling of Plate and Coil” – Short Course of Practical Use of HSLA Steels in Steckel Mill Rolling including API Grades. Presented at “International Symposium of Steckel Mill Processing Technology”, Nanjing, China, September 2005.

“The Use of Microalloyed Steels for Rolling of Plate and Coil” – Basic 2 hour Course on the Practical Use of HSLA Steels in Rolling of Plate and Coil including API Grades. Presented at Baoshan Steel and Shagang Steel, China, September 2005.

“On the Development of Fracture Criteria for Hydrogen Embrittlement of Pipeline Steels” – Discussion on Fracture Mechanics in Hydrogen Embrittlement of API Pipeline Steel. A collaboration with the University of Illinois, Sandia National Laboratories, and Oak Ridge National Laboratories. Presented at ASTM TF G.01.06.08 Hydrogen Gas Embrittlement Workshop, Dallas, Texas USA, November 2005.

“API Pipeline Steels Training” – Short 4 hour course on the design of pipelines, alloy design to meet the pipeline requirements, equipment capability and layout, physical property of skelp and pipe, and field weldability. Presented at Nanjing Steel, China, November 2005.

“Materials Solutions for Hydrogen Delivery in Pipelines” – Summary of US Department of Energy Funded Research and Development Effort of Hydrogen Fuel Cells and Infrastructure Technologies Program, Arlington VA USA, May 2006.

“The Use of Microalloyed Steels for Steckel Mill Rolling of Plate and Coil - Modified” – Short Course of Practical Use of HSLA Steels in Steckel Mill Rolling including API Grades Highlighting the use of HTP Steels. Presented at “International Symposium of Niobium Processing Technology”, Beijing and Anyang, China, June 2006.

“Material Challenges in the Use of High Strength Steel Pipelines for High Pressure Hydrogen Gas Transmission” – 2nd Hydrogen Panel Forum “Hydrogen Pipeline Transmission: Updates and Opportunities”, 6th ASME International Pipeline Conference, Calgary, Canada, September 2006.

“Alloy Designs and Property Evolution during Pipemaking for High Strength Oil and Gas Transmission Linepipe Steels” – CBMM/CITIC Symposium on Development, Specifications and Welding of High Strength Linepipe, Beijing China, December 2006

“Alloy Design, Processing, Microstructure and Property Evolution during Pipemaking of X80 HTP Steels” – CBMM/CITIC Symposium Line Pipe Steel Metallurgy and Pipe Supply in the New Millennium, Beijing China, August 2007

“Materials Solutions for Hydrogen Delivery in Pipelines” – Department of Energy Pipeline Working Group for Hydrogen Delivery, Sandia National Laboratory, Livermore, CA USA February 2008.

Papers

“The Use of High Temperature Processing (HTP) Steel for High Strength Oil and Gas Transmission Pipeline Applications” – Fifth International Conference on HSLA Steels, Chinese Society of Metals, China, November 2005.

“Alloy Designs for High Strength Oil and Gas Transmission Linepipe Steels” - International Symposium of Microalloyed Steels for the Oil and Gas Industry, CBMM/TMS, Brazil, January 2006.

“Ferrite/Acicular Ferrite Alloy Designs for API X80 Gas Transmission Linepipe Steels” – Modern Steels for Gas and Oil Transmission Pipelines, Problems and Prospects, International Seminar, Moscow, Russia, March 2006.

“Micromechanics of Embrittlement of Materials for Hydrogen Delivery” - A collaboration with the University of Illinois, Sandia National Laboratories, and Oak Ridge National Laboratories. Presented at the 6th ASME International Pipeline Conference, Calgary, Canada, September 2006.

“The Role of Niobium in High Strength Oil and Gas Transmission Linepipe Steels” - Presented at the 6th ASME International Pipeline Conference, Calgary, Canada, September 2006.



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“The Role of Continuous Cooling Transformation Diagrams for High Strength Oil and Gas Transmission Pipeline Steels” - Presented at the 6th ASME International Pipeline Conference, Calgary, Canada, September 2006.

“The Application of High Temperature Processing (HTP) Steels for Oil and Gas Transmission Pipelines” - Presented at IBP Rio Pipeline Conference & Exposition 2007, International Pipeline Conference, Rio de Janeiro, Brazil, October 2007.

“The Development of High Temperature Processing (HTP) Pipeline Steels at Nanjing Iron and Steel Company, Nanjing China” - Presented at IBP Rio Pipeline Conference & Exposition 2007, International Pipeline Conference, Rio de Janeiro, Brazil, October 2007.

“Continuous Cooling Transformation Diagrams Use in Material Design for Pipeline Steels” – Presented at 3rd Baosteel Biennial Academic Conference (BAC) 2008, Shanghai, China, August 2008.

“Metallurgical Considerations for Commercial Steels used for Hydrogen Service” Presented at Hydrogen08 Conference, Jackson Hole, WY USA September 2008

“Improved DWTT Performance on Heavy Gauge API Plate and Coil from 150 and 180 mm Thickness Slab at Nanjing Iron and Steel Company, Nanjing China” – Presented at the 7th ASME International Pipeline Conference, Calgary, Canada, September 2008.

“The Development of X80 Steel Plate and Coil for the 2nd West-East Pipeline Project, Nanjing Iron and Steel Company, Nanjing China” - Presented at the 7th ASME International Pipeline Conference, Calgary, Canada, September 2008.

“Modern High Strength Steels For Oil and Gas Transmission Pipelines” - Presented at the 7th ASME International Pipeline Conference, Calgary, Canada, September 2008.

“Development of Welding Procedures for the X70/X80 Rockies Express Pipeline Project” - Presented at the 7th ASME International Pipeline Conference, Calgary, Canada, September 2008.