DGS Metallurgical Solutions, Inc.

DGS Metallurgical Solutions, Inc.
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 29 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 5 million tons representing in excess of 800 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 30 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.

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

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

"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.
"Materials Solutions for Hydrogen Delivery in Pipelines-Peer Review" – Department of Energy Peer Review Meeting for Hydrogen Delivery, Arlington, VA USA, June 2008.
"Materials Solutions for Hydrogen Delivery in Pipelines - Update" – Department of Energy Pipeline Working Group for Hydrogen Delivery, Jackson Hole WY USA, September 2008.
"Alloy/Processing/Microstructure Designs for High Strength Transmission Pipeline Steels" - Department of Energy Pipeline Working Group for Hydrogen Delivery, Jackson Hole WY USA, September 2008.
"Plate & Plate –Steckel Mill Technology Workshop", SiemensVAI Internal Training at NAMTEC, Sheffield, UK, January 2009.
"Materials Solutions for Hydrogen Delivery in Pipelines-Peer Review" – Department of Energy Peer Review Meeting for Hydrogen Delivery, Arlington, VA USA, May 2009.
"Materials Solutions for Hydrogen Delivery in Pipelines - Update" – Department of Energy Pipeline Working Group for Hydrogen Delivery, NIST Boulder, CO USA, August 2009.
"Alloy/Processing/Microstructure Designs for High Strength Transmission Pipeline Steels" – Technical Visits at Xinyu Steel, Shougang Steel, Jinan Steel, Anyang Steel, Baotou Steel – China, March/August 2009.
"Metallurgical Training - Structural Plate Steel Production", Process Engineering Training at Nanjing Iron and Steel Company, Nanjing China, April 2010.

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"Basic Training - Heat Treatment of Structural, Abrasion Resistant and Armor Plate", Process Engineering Training at Nanjing Iron and Steel Company, Nanjing China, August 2010.
"Materials Solutions for Hydrogen Delivery in Pipelines-Peer Review" – Department of Energy Peer Review Meeting for Hydrogen Delivery, Washington, DC USA, June 2010.
"Materials Solutions for Hydrogen Delivery in Pipelines-Peer Review" – Department of Energy Peer Review Meeting for Hydrogen Delivery, Arlington, VA USA, May 2011.

Papers

"***The Use of High Temperature Processing (HTP) Steel for High Strength Oil and Gas Transmission Pipeline Applications"*** – Proceedings and Presentation Fifth International Conference on HSLA Steels, Chinese Society of Metals, China, November 2005.
"Alloy Designs for High Strength Oil and Gas Transmission Linepipe Steels" - Proceedings and Presentation 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" – Proceedings and Presentation at 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. Proceedings and Presentation 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.
"The Role of Continuous Cooling Transformation Diagrams for High Strength Oil and Gas Transmission Pipeline Steels" - Proceedings and Presentation 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" - Proceedings and Presentation 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" - Proceedings and Presentation at IBP Rio Pipeline Conference & Exposition 2007, International Pipeline Conference, Rio de Janeiro, Brazil, October 2007.
"Alloy Design Concepts for High Strength Coil for Gas Transmission Spiral Pipe" – Proceedings and Presentation at International Seminar on X80 and Higher Grade Pipe Line Steel 2008, Xi'an, China, June 2008.
"Continuous Cooling Transformation Diagrams Use in Material Design for Pipeline Steels" – Proceedings and Presentation at 3rd Baosteel Biennial Academic Conference (BAC) 2008, Shanghai, China, September 2008.
"Metallurgical Considerations for Commercial Steels used for Hydrogen Service" - Proceedings and Presentation at Hydrogen08 Conference, Jackson Hole, WY USA September 2008.
"Effect of Microstructure on Hydrogen Embrittlement Characteristics of Selected Pipeline Steels" - Presented at Hydrogen08 Conference, Jackson Hole, WY USA September 2008.
"Optimization Considerations for New or Revamped Plate/Steckel Mills" – Proceedings and Presentation at Rolling and Processing Conference '08, Linz, Austria, 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" – Proceedings and Presentation 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" - Proceedings and Presentation at the 7th ASME International Pipeline Conference, Calgary, Canada, September 2008.
"Modern High Strength Steels For Oil and Gas Transmission Pipelines" - Proceedings and Presentation at the 7th ASME International Pipeline Conference, Calgary, Canada, September 2008.

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"ASME B31.12 Hydrogen Piping and Pipeline Code Design Rules and their Interaction with Pipeline Materials Concerns, Issues and Research" - Proceedings of PVP2009, 2009 ASME Pressure Vessels and Piping Division Conference, Prague, Czech Republic, July 2009.

"The Development of Wide Plate/Coil Capabilities for Linepipe Production at Welspun Gujarat Stahl Rohren, LTD. India" – Proceedings and Presentation at Association for Iron and Steel Technology ASITech09 Conference, St. Louis, MO USA, May 2009.

"***Identification and Investigation of Continuous Cast Slab and Billet Defects"*** – Proceedings and Presentation at Roundtable Meeting on the Quality Control of Billets, Slabs and Beams of Nb-bearing Steels – CITIC/CBMM, Beijing, China, June 2009

"Development and Capability of High Temperature Processing (HTP) Pipeline Steel at Nanjing Iron and Steel Company" - Proceedings and Presentation at Pipeline Technology09 Conference, Oostende Belgium, October 2009.

"Production of Fine Grained As-rolled Structural Plate Steels", Proceedings and Presentation at Association for Iron and Steel Technology ASITech10 Conference, Pittsburgh, PA, MO USA, May 2010.

"Fracture and Fatigue of Commercial Grade API Pipeline Steels in Gaseous Hydrogen", Presentation and Proceedings of the ASME 2010 Pressure Vessels & Piping Division / K-PVP Conference, Bellevue, WA USA, July 2010.

"Hot Rolling Operational and Metallurgical Considerations for Value Added Microalloyed Bearing Steels", Presentation and Proceedings of the Chinese Society of Metals 10th International Conference on Steel Rolling, Beijing, China, September 2010.

"Guidelines for Production of API Pipelines Steels Suitable for Hydrogen Induced Cracking (HIC) Service Applications", Proceedings and Presentation at the 8th ASME International Pipeline Conference, Calgary, Canada, September 2010.

"Microstructure and Mechanical Property Performance of Commercial Grade API Pipeline Steels in High Pressure Gaseous Hydrogen", Proceedings and Presentation at the 8th ASME International Pipeline Conference, Calgary, Canada, September 2010.

"Steckel Mill Operational and Microalloy Considerations", Proceedings and Presentation at Chinese Society of Metals First International Conference on Advanced Steels 2010, Guilin City, China, November 2010.

"Fundamentals of Optimized Metallurgy and Production of Structural Plate", Proceedings and Presentation at International Symposium of Niobium Bearing Structural Steels, New Delhi, India, April 2011.

"Slab and Level 2 Automation Design Guidelines for Optimum Metallurgy and Productivity for Plate and Steckel Mills", Proceedings and Presentation at The 6th International Conference on High Strength Low Alloy Steels (HSLA Steels 2011), Chinese Society for Metals, Beijing China, June 2011.

"Metallurgical Optimization of Microalloyed Steels for Oil and Gas Transmission Pipelines", Proceedings and Presentation at The 6th International Conference on High Strength Low Alloy Steels (HSLA Steels 2011), Chinese Society for Metals, Beijing China, June 2011.

"Fundamentals of the Generation of Fine Grain As-rolled Structural Steels", Proceedings and Presentation at AIST International Symposium on the Recent Developments in Plate Steels, Winter Park, Colorado USA, June 2011.

"Key Operational and Metallurgical Parameters for Production of Structural Plate Steels", Proceedings and Presentation at AIST International Symposium on the Recent Developments in Plate Steels, Winter Park, Colorado USA, June 2011.

"Fracture toughness and fatigue crack growth of x80 pipeline steel in gaseous hydrogen", Proceedings of the ASME 2011 Pressure Vessels & Piping Division / K-PVP Conference, Baltimore, MD, USA, July 2011.

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DGS Metallurgical Solutions, Inc. Client List

Current Clients

Client	Country	Date Established	Main Scope
Nanjing Iron and Steel Company	China	2005	Product/Process Development and Optimization
Qinhuangdao Shouqin Metal Materials Co.	China	2010	Product/Process Development and Optimization
LPN Plate Mill Public Company Limited	Thailand	2006	Product/Process Development and Optimization and Plate Marketing
Kinder Morgan, Inc.	USA	2007	Technical Consulting on Pipeline Materials
Energy Transfer Company – Tiger Pipeline LLC	USA	2010	Technical Consulting on Pipeline Materials
Dura-Bond Pipe LLC	USA	2006	Technical Consulting API Steel/Plate Supply and Pipe Mill Operations
Secat, Inc.	USA	2005	Technical Consulting on Hydrogen Research related to Pipeline Steels
CBMM/Reference Metals Company	USA/Brazil	2005	Technical Consulting related to Alloy Designs and Steel Processing utilizing Niobium
Evraz East Metals North America	USA	2006	Technical Consulting related to Alloy Designs and Steel Processing utilizing Vanadium
BASF Catalysts LLC	USA	2010	Technical Consulting related to the Development of Infrared Pyrometer Technology for the Metals Industry
SiemensVAI	UK	2009	Technical Consulting related to Steelmaking and Rolling Mill Designs/Layouts
Dow Chemical Company	USA	2010	Technical Consulting related to Worldwide API Pipeline Projects
Berg Steel Pipe	USA	2011	Technical Consulting of Plate/Coil Procurement for API Pipe Production
Gardere Wynne Sewell LLP	USA	2010	Technical Consulting Related to API Pipe Production Litigation

Past Clients

Client	Country	Main Scope
Welspun Gujarat Stahl Rohren Ltd.	India	Product/Process Development and Optimization
SIDENOR Steel Products Manufacturing Company	Greece/Bulgaria	Steel Operations Review
Olmstead Products Company	USA	Failure Analysis of High Pressure Hydraulic Valve
National Metals Technology Centre, Ltd. (NAMTEC)	UK	Commissioned to Contribute Chapter to Plate Rolling Book
JSW Steel (USA), Inc.	USA	Product/Process Development and Optimization
Kinder Morgan/Energy Transfer – Fayetteville Express Pipeline LLC	USA	Technical Consulting on Pipeline Materials
Camrose Pipe Company	Canada	Technical Consulting and Data Analysis of Strain Based Pipeline Design Welding Trials
Bonneville Power Administration	USA	Metallurgical Training

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