

# RECYCLING METALS FROM INDUSTRIAL WASTE

A Short Course and Workshop  
with Emphasis on Plant Practice

June 23-25, 2015  
Golden, Colorado  
23rd Year



Sponsored by the Colorado School of Mines  
Office of Special Programs and Continuing Education  
Course Organizer: Paul B. Queneau - Adjunct Professor

RECYCLING  
METALS FROM  
INDUSTRIAL  
WASTE  
June 23-25, 2015



Office of Special Programs and  
Continuing Education (SPACE)  
Colorado School of Mines  
1500 Illinois Street  
Golden, CO 80401

ADDRESS SERVICE REQUESTED

Non-Profit Org.  
U.S. Postage  
PAID  
Lone Oak  
Mailing Services

**COURSE  
PURPOSE  
AND  
SCOPE**

This program focuses on current plant practices to convert metal-containing wastes to products. Processors, raw materials, and markets are identified and quantified. Speakers with decades of hands-on experience detail multiple approaches to recycling metals and associated materials - backed up by slides, videos, and the syllabus.

Particular emphasis is given to combinations of physical, hydrometallurgical, and pyrometallurgical processing, along with associated regulations, to facilitate economical recycling. The presentations are on a practical level, focusing on plant operations, with ample opportunity for interaction by the course participants.

**PROGRAM OUTLINE AND SCHEDULE**

**Tuesday Morning, June 23**

**7:45 Registration**

**8:30 *Metal Recycling: Opportunities, Limits, Infrastructure***

Markus Reuter, Director - Technology Management, Outotec, Espoo, Finland

**9:30 Break**

**9:45 *You, Your Plant, and Power***

Calvin Bell, National Account Manager, Power Systems Group (PSG), Golden, CO

**10:15 *Recycling of Minor Metals By-Products: A Tool for Growth***

Max Cossette, Director of Recycling - North America, 5N Plus, Saint-Laurent, Quebec

**10:45 Break**

**11:00 *Critical Materials 2015***

Rod Eggert, Professor, Colorado School of Mines, Golden, CO and Deputy Director, Critical Materials Institute (U.S. Department of Energy)

**11:30 *Networking Time, Followed by Lunch***  
Colorado School of Mines Green Center

**Tuesday Afternoon, June 23**

**1:00 *Secondary Lead at Gopher Resource***

Rob Jablonski, VP of Engineering, Gopher Resource, Eagan, MN

**1:30 *Methods for Recovering Vanadium from Steel Slag***

Mike Woolery, Director of Technology, EVRAZ Stratcor, Hot Springs, AR

**2:00 Break**

**2:15 *Happenings at Conesus LLC***

Peter Ruth, North American Business Manager, Conesus LLC, Independence, KY

**2:45 *Precious Metals and PGMs from Catalysts & Other Secondaries Using Plasma Smelting Technology***

Dan Martin, International Sales Manager, Tetronics Intl., Swindon, U.K.

**3:15 Break**

**3:30 *Reuse of Acid and Caustic in the Manufacture of Inorganic Chemicals***

Brian Wodetzki, General Manager, PDF Chemical, Detroit, MI

**4:00 *Social at the Colorado School of Mines Coolbaugh Hall Atrium***

**Wednesday Morning, June 24**

**8:30 *The Good, the Bad and the Ugly - Project Experiences and the Lessons to be Learned***

J.P. Rosso, President, International Precious Metals Institute, Pensacola, FL

**9:30 Break**

**9:45 *Recycling PM Scrap to Dore Metal, Fundamentals and Practice***

Patrick Weerts, Director, Patrick Weerts Consulting, Mortsels, Belgium

**10:15 *Melting, Sampling and Assaying of Gold and Silver Bullion***

Bob Lawrence, Evaluation Manager, Johnson Matthey, Brampton, Ontario

**10:45 Break**

**11:00 *Silver, Specialty Fertilizers, and Related Technologies & Products***

John Whitney, President, Itronics, Reno, NV

**11:30 *Networking Time, Followed by Lunch***  
Colorado School of Mines Green Center

# PROGRAM OUTLINE & SCHEDULE

Wednesday Afternoon, June 24

- 1:00** *KIEM's Recycling Successes*  
Pat Taylor, Ansell Chair and Distinguished Professor,  
Colorado School of Mines, Golden, CO
- 1:30** *Copper Slag to Gold in a Few Easy Steps*  
John Googins, Applications Engineer,  
Aggregate & Mining Consultants LLC, Littleton, CO
- 2:00** **Break**
- 2:15** *Happenings at Network Environmental*  
Mike Aston, General Manager,  
Network Environmental Services, Toronto, Ontario
- 2:45** *Economic Challenges of Recycling Rare Earth Materials*  
Jon Blumenthal, President & CEO,  
Blue Line Corporation, San Antonio, TX
- 3:15** **Break**
- 3:30** *Around the World in 20 Minutes - Recycling Zinc from EAF Dust: Status, New Technologies*  
Larry Southwick, Consulting Chemical Engineer,  
L.M. Southwick & Associates, Cincinnati, OH
- 4:00** **Social at the Colorado School of Mines Geology Museum**

Thursday Morning, June 25

- 8:30** *Examples of Sampling Misfortunes*  
Francis Pitard, President, Francis Pitard Sampling  
Consultants, Broomfield, CO
- 9:00** *Rare Earth Recycling Plant Practice*  
Joe Ferron, President, HydroProc Consultants,  
Peterborough, Ontario
- 9:30** **Break**
- 9:45** *Recycling Rare Earths at Hydrometal*  
Philippe Henry, Director, Jean Goldschmidt  
International, Brussels, Belgium
- 10:15** *Recycling High-Chrome Nickel*  
Fred Koch, Manufacturing Manager, Patriot Forge,  
Brantford, Ontario
- 10:45** *Recycling of Strategic Metals in the European Union, Research and Networks*  
Wolfgang Kummer, Consulting Metallurgical Engineer:  
Mo-Re-W, Refractory Metals Consulting,  
Goslar, Germany
- 11:30** **Adjourn**

# REPRESENTATIVE LIST OF PAST ATTENDEES

5N Plus ♦ Agmet ♦ Air Products ♦ Aleris ♦ Alpha  
AMG Vanadium ♦ Apex Materials Technologies  
Atlantic Metals & Alloys ♦ Aurubis AG ♦ Ausmelt ♦ Batrec  
Bear Group ♦ Befesa Steel ♦ BioteQ ♦ Blue Line ♦ Boliden  
Brunswick Smelting ♦ Cal-Chem Metals ♦ Catalytic Innovations  
CDL Heavy Metal Recycling ♦ CDTECH ♦ Chevron Energy  
Christian Doppler Lab ♦ Colonial Metals ♦ Colt Refining  
CONECSUS ♦ CRI Metal Products ♦ CSM/Kroll Institute  
CUPROSA ♦ Delft University ♦ DH Catalyst ♦ Doe Run  
Dowa International ♦ Eastern Alloys ♦ ECS Refining  
E.I. DuPont ♦ ELG Haniel Metals ♦ Energy Fuel Resources  
Engitec Technologies ♦ EQ Ohio ♦ Erachem Comilog  
EVRAZ Stratcor ♦ Exotech ♦ Franklin Pierce University  
Freeport MacMoRan ♦ Gannon & Scott ♦ Garrison Minerals  
Genesis Recycling Technologies ♦ GF Industries  
GFE Metalle und Materialien ♦ Global Steel Dust  
Greenville Metals ♦ Gulf Chemical & Metallurgical  
Hansen Consultants ♦ Harsco Metals ♦ Hazen Research  
H.C. Starck GmbH ♦ Heraeus Precious Metals  
Heritage Environmental ♦ Hillah Consultants  
Huron Valley Steel ♦ Hussey Copper ♦ Hydrometal ♦ IBM  
Industrial Mondelo ♦ INMETCO  
Integrated Resource Management ♦ Jean Goldschmidt Intl.  
Johnson Matthey ♦ Kalumetals ♦ Kemiron ♦ KGHM Matracco S.A.  
Kinsbursky Brothers ♦ Langeloth Metallurgical ♦ Lanxess Sybron  
LithChem Energy ♦ M&M Metals Intl.  
Manchester Metro. University ♦ Marcuson & Associates  
Masterloy Products ♦ Metallo-Chimique ♦ Metal Solutions  
Metal Tech ♦ Micronutrients/Heritage ♦ MK Reverse Logistics  
Molycorp Minerals ♦ Morris Equipment Sales ♦ MSE Consulting  
Natural Resources Canada ♦ Neo Performance Materials  
Network Environmental Services ♦ Nickelhuetten Aue  
Ocean Partners ♦ Olin Brass ♦ OmniSource  
Omnium Dodge City ♦ Paul Wurth S.A. ♦ Penoles  
Philip Services ♦ Phoenix Automotive Cores ♦ Piller Induction  
PIZO Technologies ♦ P.J. Mackey Technology ♦ PM Recovery  
Porocel/Catalyst Recovery ♦ Power Systems Group ♦ Powmet  
Praxair ♦ Precision Cast Parts ♦ Queens University ♦ Redimet  
RSR ♦ RHI AG ♦ Sabin Metal ♦ Saltire Services ♦ Scan Arc PT  
Shell ♦ Silver Anvil Engineering ♦ SINTEF ♦ Sipi Metals  
S.M. Stoller ♦ Solumet ♦ Southeastern Minerals  
Stillwater Mining ♦ Sumitomo ♦ Teck Metals ♦ Tetra Tech  
Tin Technology & Refining ♦ Titan Metal Powders  
Tonolli Canada ♦ Treibacher Industrie ♦ TRICAT ♦ Umicore  
U. of Alabama ♦ U. of Leoben ♦ U.S. EPA ♦ USGS ♦ U.S. Steel  
U.S. Zinc ♦ Vale Inco ♦ Veolia ES Tech Services  
Verdant Holdings ♦ Vital Specialty Materials  
Wilmington Iron & Metal ♦ Wil Swanson & Associates  
Winfield Solutions ♦ WM Mercury Waste ♦ WRC ♦ Zinc Nacional



## COMMENTS FROM PAST PARTICIPANTS

*In my opinion, probably the best short course of this kind on earth, allowing the chance to test your knowledge and to generate new ideas.*

Patrick Weerts, Director,  
Patrick Weerts Consulting, Mortsels, Belgium

*What I particularly enjoyed are the world perspectives, the high quality of the attendees, the fascinating presentations, and the excellent discussions.*

Tom Ondrejko, Manager of Metallurgical Development, Langeloth Metallurgical, Langeloth, PA

*This conference is the most efficient meeting place for entrepreneurs and managers I have attended. We always pick up leads that have generated projects and income resulting from the trip to beautiful Golden, CO.*

Bror Heegaard, CEO, ScanArc Plasma Technologies, Hofors, Sweden

*Content and contacts are excellent, with a good balance between commercial and technical. A better metals recycling conference does not exist.*

Nigel Morrison, President, Pizo Technologies, Indianapolis, IN

*A very useful conference, one of the best...a must to attend. What I liked most was the networking, and particularly the knowledge and experience of the experts.*

Max Cossette, Director of Recycling - North America, 5N Plus, Saint-Laurent, Quebec

*Program content and presentations were excellent! The good networking opportunities were much appreciated, as was the warm hospitality.*

Jason Evens, General Manager, EQ Ohio, Canton, Ohio

*I have enjoyed this meeting very much, and found it incredibly interesting and useful. It is without a doubt one of the best specialist meetings that I have ever attended in my career.*

Herman Potgieter, Professor, Manchester Metropolitan University, Manchester, UK

## REGISTRATION INFORMATION

### ■ Cost

The registration fee is \$1495 if registering by April 20, \$1595 after April 20 and by May 18, \$1695 after May 18. Included are the syllabus, continental breakfasts, luncheons, and socials.

### ■ Cancellations and Attendee Substitution Policy

Any modification, including cancellation, of your registration requires written notice that must be emailed (space@mines.edu) or faxed (303-277-8683) to the SPACE Office. The following information applies:

- ◆ Attendee substitutions may be made without cost penalty at any time up to the date of the start of the event.
- ◆ Cancellations will be accepted if notice of cancellation is received at the SPACE Office at least five (5) working days prior to the date of the start of the event. Registrants who cancel within this period will be charged a \$275 service fee.
- ◆ No refunds will be made to registrants who fail to cancel within the specified cancellation period.

### ■ Credits

Two Continuing Education units are awarded for this course by the Colorado School of Mines.

### ■ Location and Attire

Golden and the Colorado School of Mines (CSM) are located at the foot of the Rockies 15 miles west of Denver. The area is steeped in western history. Mountain hiking and biking trails begin in town along Clear Creek and the white-water park. Attire is casual.

### ■ Accommodations

**(available until May 24, if blocks are not full)**

Blocks of rooms in Golden are at the Dove Inn (Tel: 303-278-2209; Fax: 303-273-5272), Table Mountain Inn (Tel: 303-277-9898; Fax: 303-271-0298), and the Golden Hotel (Tel: 303-279-0100; Fax: 303-215-1010). The rooms are under the designation "Recycling Short Course." Golden is a popular summer destination, so book your reservation early.

### ■ Course Content Details

Contact Paul Queneau at The Bear Group: 303-854-2036, fax 303-273-0494, e-mail: pqueneau@mines.edu

### ■ Registration Information

Contact the Office of Special Programs and Continuing Education at CSM:

phone: 303-279-5563  
fax: 303-277-8683  
e-mail: space@mines.edu  
website: www.csmSPACE.com