

# RECYCLING METALS FROM INDUSTRIAL WASTE

A Short Course and Workshop  
with Emphasis on Plant Practice

June 26-28, 2018  
Golden, Colorado  
26th Year

Sponsored by the Colorado School of Mines  
Course Organizer: Paul B. Queneau - Adjunct Professor

June 26-28, 2018

RECYCLING  
METALS FROM  
INDUSTRIAL  
WASTE



Colorado School of Mines  
1500 Illinois Street  
Golden, CO 80401

**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 26**

7:45 **Registration**

8:30 ***Integrated Recycling Strategies at Boliden's Smelters***

Joachim Pettersson, Sr. Metallurgist, Boliden, Vasterbotten, Sweden

9:00 ***Complex Tin Recycling at Fenix and Falcon***

John Broxham, Senior Commercial Director, Fenix Metals, Chmielow, Poland

9:30 **Break**

9:45 ***Metals Recycling: Using Metsim to Confirm the Value Case***

Lorena Tere, Engineer in Training/Non-Ferrous Pyrometallurgy, Hatch, Mississauga, Ontario

10:15 ***LCD's, the New CRT***

Adam Shine, Vice President, Manitoba Corp., Lancaster, NY

10:45 **Break**

11:00 ***Pms & Pgms: Seven Years of Recycling Research in CR3***

Brajendra Mishra, Director, Center for Resource Recovery and Recycling, WPI, Worchester, MA

11:30 **Networking Time, Followed by Lunch**

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**Tuesday Afternoon, June 26**

1:00 ***World Approaches to Recycling Lead***

Tim Ellis, President, RSR Technologies, RSR, Dallas, Texas

2:00 **Break**

2:15 ***My Pgm Love Affair / Progress of a Career***

Mel Elguindy, Manager, SAFAGA LLC, Newport Beach, CA

2:45 ***Vacuum-Metal Refining Worldwide***

Joe Thomas, President, International Applied Technology, Anaheim, CA

3:15 **Break**

3:30 ***Metals Recycling at Terrapure Environmental***

Benoit Deschenes, Vice President Manufacturing, Terrapure Environmental, Ville Sainte Catherine, Quebec, Canada

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

**Wednesday Morning, June 27**

8:30 ***How to Win by Recycling Non-Metallics***

Dave Jacobs, Owner, Encore Materials, Pittsburgh, PA

9:00 ***Towards a Pyrometallurgical Microwave Process***

Chris Pickles, Professor, Queen's University, Kingston, Ontario

9:30 **Break**

9:45 ***The Veolia Model for Electronic Scrap***

Kevin Shaver, General Manager, Veolia Environmental Services, North America, Milwaukee, WI

10:15 ***The Bre-X Story, and Lessons Learned***

Bill Wilson, Professor of Practice, Nazarbayev University/CSM Partnership, Golden, CO

10:45 **Break**

11:00 ***Recycling Pgms from Spent Catalyst***

Jürgen Antrekowitsch, Head, Christian Doppler Laboratory for Heavy-Metal Recycling, Leoben, Austria

11:30 **Networking Time, Followed by Lunch**

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# PROGRAM OUTLINE & SCHEDULE

## Wednesday Afternoon, June 27

- 1:00** *State-of-the-Art Design for Recycling: Case Fairphone*  
Marcus Reuter, Director, Helmholtz-Institute Freiberg for Resource Technology, Freiberg, Germany
- 2:00** **Break**
- 2:15** *Through the Years with Zinc, Lead, and Others*  
Mike Deelo, Consulting Engineer, Deelo & Associates, Beaver, PA
- 2:45** *Yes, There is Recycling in Ore Processing*  
Harold Cline, Area Sales Manager Mining, TOMRA Sorting Solutions, Englewood, CO
- 3:15** **Break**
- 3:30** *Integrated Process Development: Lessons Learned*  
Alain Roy, Principal - Operations, Kingston Process Metallurgy (KPM), Kingston, Ontario
- 4:00** *Social at the Colorado School of Mines Geology Museum*

## Thursday Morning, June 28

- 8:30** *Multi-Metal Recycling and Refining*  
Bert Coletti, R&D Director  
Metallo-Chimique, Beerse, Belgium
- 9:00** *Problem Solving in Process Metallurgy*  
Tom Battle, Consulting Metallurgical Engineer,  
Tom Battle and Associates, Charlotte, NC
- 9:30** **Break**
- 9:45** *Recycling Spent Resid/HDS Catalyst*  
Mike Shinn, Manager Business Development,  
H.C. Starck, Huntsville, AL  
Larry McHugh, CEO, Orchard Material Technology,  
Boston, MA
- 10:15** *One Hundred Years of Recycling at Nickelhütte*  
Wendy Fett, Area Manager, Nickelhütte Aue,  
Aue, Germany
- 10:45** *Complex Metals: What They Are, Sourcing and Recycling Processes*  
Trevor Landry, Manager – Recycling and Precious Metals  
Aurubis Buffalo, Buffalo, NY
- 11:15** **Adjourn**

## REPRESENTATIVE LIST OF PAST ATTENDEES

Agmet ♦ Air Products ♦ Aleris ♦ Alpha  
Alpha Omega Recycling ♦ AMAG Austria Metall  
AMG Aluminum ♦ AMG Vanadium ♦ Apex Materials Technologies  
Asahi Refining ♦ Aurubis AG ♦ Baltrec ♦ Battery Solutions  
Bear Group ♦ BHS Solutions ♦ BioteQ ♦ Blue Line  
Boliden ♦ Brick Recycling ♦ CAF Innovative Shapecasting  
Cal-Chem Metals ♦ Caterpillar ♦ Catalytic Innovations  
CC Consultants ♦ Chevron Energy ♦ Christian Doppler Lab  
Colt Refining ♦ CONECSUS ♦ CRI Metal Products  
CSM/Kroll Institute ♦ CUPROSA ♦ Delft University  
DH Catalyst ♦ Doe Run ♦ Dowa International  
ECS Refining ♦ E.I. DuPont ♦ ELG Haniel Metals  
Energy Fuel Resources ♦ Engitec Technologies  
Erachem Comilog ♦ EVRAZ Stratcor ♦ Exotech  
5N Plus Semiconductors ♦ Fenix Metals/Falcon Metals  
Francis Pitard Sampling ♦ Franklin Pierce University  
Freeport-McMoRan ♦ Gannon & Scott ♦ Garrison Minerals  
Genesis Recycling Tech ♦ GFE Metalle und Materials  
GF Industries ♦ Glencore Technology ♦ Global Steel Dust  
Global Tungsten & Metal ♦ Gopher Resource ♦ Greenville Metals  
Hansen Consultants ♦ Harsco Metals ♦ Hazen Research  
H.C. Starck ♦ Heraeus Precious Metals ♦ Heritage Environmental  
Huron Valley Steel ♦ Hussey Copper ♦ Hydrometal  
HydroProc Consultants ♦ IBM ♦ INMETCO  
IPM Services ♦ IPMI ♦ Itronics ♦ Jean Goldschmidt Intl.  
J.E. Litz & Associates ♦ Johnson Matthey ♦ Kalumetals  
KGHM Matraco S.A. ♦ Korea Inst GeoSci & MinRes  
Langeloth Metallurgical ♦ LithChem Energy  
M&M Metals International ♦ Marcuson & Associates  
Masterloy Products ♦ Metal & Catalyst Resources  
Metallica Commodities ♦ Metallo-Chimique ♦ Metal Solutions  
Metal Tech ♦ Micronutrients/Heritage ♦ Montana Tech  
MoReW-Refractory Metals ♦ Morganite Industries  
Morris Equipment Sales ♦ Music City Group  
Natural Resources Canada ♦ Network Environmental Services  
Nickelhuetten Aue ♦ Ocean Partners ♦ OmniSource  
Omnium-Dodge City ♦ Outotec ♦ Patrick Weerts Consulting  
Paul Wurth S.A. ♦ Penoles ♦ Philip Services  
Phoenix Automotive Cores ♦ Pillar Induction  
P.J. Mackey Technology ♦ P. Kay Metal ♦ PM Recovery  
Porocel/Catalyst Recovery ♦ Praxair ♦ Precision Cast Parts  
Queens University ♦ RSR Technologies ♦ RHI AG  
Sabin Metal ♦ Saltire Services ♦ Sanguinetti Engineering  
Scan Arc Plasma Technology ♦ Shell Global Solutions  
ShoreMet ♦ Silver Anvil Engineering ♦ SINTEF ♦ Sipi Metals  
Southeastern Minerals ♦ Stillwater Mining  
Stoller Newport News Nuclear ♦ Sumitomo  
Sustainable Management ♦ Technology & Refining  
Teck Metals ♦ Terrapure Environmental ♦ Tetra Tech  
Tetronics International Tin ♦ Thomas Battle & Associates  
Torma Sorting Solutions ♦ Treibacher Industrie  
Trisidan Commodities ♦ TTM Technologies ♦ Tunco ♦ Umicore  
Unicat Catalyst ♦ U. of Leoben ♦ US Ecology  
US EPA ♦ USGS ♦ US Steel ♦ US Zinc ♦ Vale Inco ♦ Veolia  
Wilmington Iron & Metal ♦ WM Mercury Waste ♦ Zinc Nacional

## COMMENTS FROM PAST PARTICIPANTS

*This conference, dollar-for-dollar, is the best that I attend all year! As always, it is a first-rate experience: Quality and diversity of speakers, networking, and opportunities.*

Richard Nickerson, President, Cal-Chem Metals, Globe, AZ

*What I like best is the variety of presenters and presentations, opportunities to interact with potential partners, and the innovations.*

Matt Stevens, Process Coordinator, Stillwater Mining, Columbus, MT

*The best companies in the field are identified, attracted to attend, and to make a presentation. Lots of time is available for networking.*

Fred Steward, President, Micronutrients, Pittsburgh, PA

*This short course's most significant strengths are the variety of topics, the variety of participants, lots of time for socializing and interacting, in Golden... What a magnificent setting!*

Charles Geenen, Director Technology, Metallo-Chimique, Nieuwe, Belgium

*After a hiatus of 3 years, I returned to Golden to attend the Recycling Metals course. Key course strengths are content, opportunities to network, meeting new friends, and learning new concepts/processes. My only regret was wondering "What did I miss in the previous 3 years"?*

John Likarish, Manager of Marketing, The Doe Run Resources Corporation, St. Louis, MO

*It is amazing how this course always pays for itself with new business leads, not to mention it's such a catalyst for new ideas and innovations.*

Scott Volner, President, Catalytic Innovations, Rolla, MO

*Simply the best conference of its kind anywhere: Excellent content and contacts year after year, with diversity and balance.*

Nigel Morrison, President, AMG Aluminum, Wayne, PA

## REGISTRATION INFORMATION

### ■ Registration Fee

\$1495 if registering by April 24  
\$1595 after April 24 and by May 22  
\$1695 after May 22

Included are the syllabus, continental breakfasts, luncheons, and socials. Assistance may be available to self-employed sole consultants, retired, or unemployed attendees...contact Learn@mines.edu for details.

### ■ Cancellations and Attendee Substitution Policy

Modification, including cancellation, of your registration requires written notice either by email (Learn@mines.edu) or fax (303-384-2695) to Continuing & Professional Education Services (CPES).

- ◆ 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 by CPES 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

CSM awards two Continuing Education units for this course.

### ■ 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 Whitewater Park. Attire is casual.

### ■ Accommodations, if blocks are not full

Blocks of rooms in Golden are at the Table Mountain Inn (Tel: 303-277-9898; Fax: 303-271-0298) by May 26, and the Golden Hotel (Tel: 303-279-0100; Fax: 303-215-1010) by May 10, under the designation "Recycling Short Course." The Dove Inn B&B (Tel: 303-278-2209; Fax: 303-273-5272) is also close by; it is super for couples; the best rooms fill quickly. 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

Continuing and Professional Education Services (CPES) at Mines: phone: 303-384-2690 ◆ fax: 303-384-2695  
e-mail: Learn@mines.edu ◆ website: www.csmspace.com