

# RECYCLING METALS FROM INDUSTRIAL WASTE

A Short Course and Workshop  
with Emphasis on Plant Practice

June 21-23, 2016  
Golden, Colorado  
24th Year



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

June 21-23, 2016

RECYCLING  
METALS FROM  
INDUSTRIAL  
WASTE



Office of Special Programs and  
Continuing Education (SPACE)  
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 21

7:45 **Registration**

8:30 ***Win-Wins by Outsourcing Complex Side Streams***

Dimitri Van Uytfrange, Global Sales Manager:  
Industrial By-Products, Umicore, Hoboken, Belgium

9:30 **Break**

9:45 ***There's Gold in Them Thar Boards:  
Recycling at TTM Technologies***

Ben Nelson, Resource Recovery & Reclaim Manager -  
North America, TTM Technologies, Portland, OR

10:15 ***USS Enterprise Inactivation***

Joe Legare, Vice President, Stoller Newport News  
Nuclear, Newport News, VA

10:45 **Break**

11:00 ***Zinc Recycling from Industrial Residues***

Juergen Antrekowitsch, Head of Christian Doppler  
Laboratory for Optimization in Heavy Metal Recycling,  
Montanuniversitaet Leoben, Leoben, Austria

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

### Tuesday Afternoon, June 21

1:00 ***Environmental Control for the Circular  
Economy: A Battery Industry Perspective***

Tim Ellis, VP of R&D, RSR, Dallas, TX

2:00 **Break**

2:15 ***Made to Be Made Again...The ShoreMet  
Program***

Bruce Kasen, Vice President - Business Development,  
ShoreMet, Valparaiso, IN

2:45 ***Recycling Metals at US Ecology***

Jason Evens, General Manager, US Ecology - Canton,  
Canton, OH

3:15 **Break**

3:30 ***Recycling Scrap: The Sustainability Picture***

Phil Mackey, President, P.J. Mackey Technology,  
Kirkland, QC, and C. Ferron, President, HydroProc  
Consultants, Peterborough, ON

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

### Wednesday Morning, June 22

8:30 ***Hydrometallurgical Treatment of E-Scrap***

Hao Cui, Ph.D. Candidate, Colorado School of Mines,  
Golden, CO

9:00 ***Mining for Metals in Hard Rock Drilling Bits***

Wayne Wilson, President, Genesis Recycling  
Technology, Longview, TX

9:30 **Break**

9:45 ***Recycling of Contaminated Aluminum Scrap***

Werner Fragner, Head of Corporate Technology,  
Austria Metall, Ranshofen, Austria

10:15 ***Sensor-Based Sorting for Recycling & Mining***

Harold Cline, Area Sales Manager Mining,  
TORMA Sorting Solutions, Englewood, CO

10:45 **Break**

11:00 ***Operating in High-Risk Areas***

Tim Pasquarelli, Managing Partner, IPMServ,  
Golden, CO

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

## PROGRAM OUTLINE & SCHEDULE

### Wednesday Afternoon, June 22

- 1:00** *What CSM Teaches Metallurgical Engineers*  
Corby Anderson, Harrison Western Professor,  
Colorado School of Mines, Golden, CO
- 2:00** **Break**
- 2:15** *Innovations in Consumer Battery Recycling*  
Shane Thompson, Vice President - Corporate  
Development, Battery Solutions, Howell, MI
- 2:45** *Potential Metal Recovery from Waste Streams*  
Kathy Smith, Scientist Emeritus, U.S. Geological Survey,  
Denver, CO; Affiliated Faculty, CSM, Golden, CO
- 3:15** **Break**
- 3:30** *King Steam*  
John Googins, Applications Engineer,  
Aggregate & Mining Consultants LLC, Denver, CO
- 4:00** *Social at the Colorado School of Mines  
Geology Museum*

### Thursday Morning, June 23

- 8:30** *Urban Gold Mining*  
Roger Neuscheler, Director of Engineering,  
Silver Anvil Engineering, Lone Tree, CO
- 9:00** *Happenings at Greenville Metals and  
Caledonian Alloys*  
Norm Wilson, Technical Manager, Greenville Metals,  
Transfer, PA
- 9:30** **Break**
- 9:45** *Security Issues in Mining, Mineral Processing,  
and Metal Production*  
John Mosher, VP-Global Security, Freeport-McMoRan,  
Phoenix, AZ
- 10:15** *Catalyst Manufacturing...Art or Black-Box  
Technology?*  
Rahul Bhaduri, Metals Advisor,  
Chevron Energy Technology, Richmond, CA
- 10:45** *Carbon Dioxide*  
Paul Queneau, Principal Metallurgical Engineer, The  
Bear Group, Golden, CO
- 11:15** **Adjourn**

## REPRESENTATIVE LIST OF PAST ATTENDEES

Aggregate & Mining Consultants ♦ Agmet ♦ Air Products  
Aleris ♦ Alpha ♦ AMG Vanadium ♦ Apex Materials Technologies  
Asahi Refining ♦ Aurubis GA ♦ Batrec ♦ Battery Solutions  
Bear Group ♦ Beaver Valley Slag ♦ Befesa Steel  
BioteQ ♦ Blue Line ♦ Boliden ♦ Cal-Chem Metals  
Canadus Power Systems ♦ Catalytic Innovations  
CDL Heavy Metal Recycling ♦ Chevron Energy and Technology  
Christian Doppler Lab ♦ Colonial Metals ♦ Colt Refining  
CONECSUS ♦ CRI Metal Products ♦ CSM/Kroll Institute  
Cuprosa ♦ Deelo & Associates ♦ Delft University  
DH Catalyst ♦ Doe Run ♦ Dowa International ♦ Eastern Alloys  
ECS Refining ♦ E.I. DuPont ♦ ELG Haniel Metals  
Energy Fuel Resources ♦ Engitec Technologies  
Erachem Comilog ♦ EVRAZ Stratcor ♦ Exotech ♦ 5N Plus  
Franklin Pierce University ♦ Francis Pitard Sampling  
Freeport-McMoRan ♦ Gannon & Scott ♦ Garrison Minerals  
Glencore Technology ♦ Global Steel Dust ♦ Greenville Metals  
Gulf Chemical & Metallurgical ♦ Hansen Consultants  
Harsco Metals ♦ Hazen Research ♦ H.C. Starck  
Heraeus Precious Metals ♦ Heritage Environmental  
Hillah Consultants ♦ Huron Valley Steel ♦ Hussey Copper  
Hydrometal ♦ HydroProc Consultants ♦ IBM ♦ INMETCO  
Integrated Resource Management ♦ Itronics ♦ IPMI  
Jean Goldschmidt Intl. ♦ J.E. Litz & Associates  
Johnson Matthey ♦ Kalumetals ♦ KGHM Matracco S.A.  
Korea Inst GeoSci & MinRes ♦ Langeloth Metallurgical  
Lanxess Sybron ♦ LithChem Energy ♦ M&M Metals Intl.  
Manchester Metro. University ♦ Marcuson & Associates  
Masterloy Products ♦ Metal Solutions ♦ Metallo-Chimique  
Metal Solutions ♦ Metal Tech ♦ Metals Recovery Technology  
Micronutrients/Heritage ♦ Molycorp Minerals  
MoReW-Refractory Metals ♦ Morris Equipment Sales  
Music City Group ♦ Natural Resources Canada  
Network Environmental Services ♦ Nickelhuetten Aue  
Ocean Partners ♦ OmniSource ♦ Omnium-Dodge City  
Outotec ♦ Paul Wurth S.A. ♦ Patrick Weerts Consulting  
PDF Chemical ♦ Penoles ♦ Philip Services  
Phoenix Automotive Cores ♦ Piller Induction  
P.J. Mackey Technology ♦ PM Recovery  
Porocel/Catalyst Recovery ♦ Powmet ♦ Praxair  
Precision Cast Parts ♦ Queens University ♦ RSR ♦ RHI AG  
Sabin Metal ♦ Saltire Services ♦ Scan Arc Plasma Technology  
Shell ♦ ShoreMet ♦ Silver Anvil Engineering ♦ SINTEF  
Sipi Metals ♦ Solumet ♦ Southeastern Minerals  
Stillwater Mining ♦ Stoller ♦ Sumitomo  
Sustainable Management ♦ Teck Metals ♦ Tetra Tech  
Tetronics International ♦ Tin Technology & Refining  
Tonolli Canada ♦ TORMA Metal Sorting  
Treibacher Industrie ♦ Umicore ♦ U. of Leoben ♦ US Ecology  
U.S. EPA ♦ USGS ♦ U.S. Steel ♦ U.S. Zinc ♦ Vale Inco ♦ Veolia  
Vital Specialty Materials ♦ Wilmington Iron & Metal  
Wil Swanson & Associates ♦ WM Mercury Waste ♦ Zinc Nacional



## COMMENTS FROM PAST PARTICIPANTS

*Having the best minds in the industry all together in one room is incredible. The vast process knowledge creates an atmosphere of constant improvement and innovation. Great course; thank you!*

Brad Williams, Quality Assurance Specialist,  
Omnium - Dodge City, Dodge City, KS

*The program's most significant strengths were the open dialogue, the diversity of the metals discussed, and the opportunities to network.*

Rick Miller, Raw Materials Manager, Teck  
Metals, Trail, BC

*This short course provides excellent technical and commercial learning opportunities. I learned something from every presentation. It says a lot that so many of us keep coming back.*

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

*A conference that you cannot miss. Diverse technical experts help you find opportunities where you never imagined.*

Pablo Alvarez, Ingenero Industrial, Cuprosa, S.A.  
DE C.V., Guadalajara, Mexico

*This meeting is a must to attend for any organization involved in metals recovery. The presentations were well thought out and relevant to industry today...a wonderful experience.*

Jason Evens, General Manager, US Ecology,  
Canton, OH

*We met a lot of very interesting people who may be able to help support some of our long-term goals. Thanks so much for hosting such an incredible meeting.*

John Czysz, North American Reclaim Manager,  
Alpha Inc., Newark OH

*Thank you again for putting on such an excellent conference. I particularly appreciated the mutual friendliness and helpfulness of the participants. What a good group!*

Joe Thomas, President, Metals Recovery  
Technology, Anaheim, CA

## REGISTRATION INFORMATION

### ■ Cost

The registration fee is \$1495 if registering by April 18, \$1595 after April 18 and by May 16, \$1695 after May 16. Included are the syllabus, continental breakfasts, luncheons, and socials. Assistance may be available to self-employed sole consultants, retired, or unemployed attendees...contact [space@mines.edu](mailto:space@mines.edu) for details.

### ■ Cancellations and Attendee Substitution Policy

Modification, including cancellation, of your registration requires written notice that must be emailed ([space@mines.edu](mailto: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

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 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](mailto:pqueneau@mines.edu)

### ■ Registration Information

Office of Special Programs and Continuing Education at CSM:  
phone: 303-279-5563 ♦ fax: 303-277-8683  
e-mail: [space@mines.edu](mailto:space@mines.edu)  
website: [www.csmspace.com](http://www.csmspace.com)