INAP and The Global Acid Rock Drainage Guide (GARD Guide)

Presentation to Elko Roundtable 2012
15 March 2012

Presented by Terrence Chatwin (INAP)
Mining Industry Mandate

- Meet the current and future mineral needs
- Create jobs and value without adversely impacting future generation’s opportunities
  - Prevent, minimize, and mitigate potential environmental risks
- Maintain “social license to mine”
- ARD frequently represents greatest challenge
  - ARD impacts can be very long lasting
  - ARD remediation is very costly (US: $5-50 billion)
International Network for Acid Prevention (INAP)

An organization of international mining companies that seeks the prevention of acid rock drainage (ARD) and metal leaching in support of responsible mineral development

• Information Transfer
• Collaborative Research
• Organizing Conferences and Workshops
• Supporting Regional ARD Organizations
• Peer Review
INAP

Members:

- Anglo American
- bhp billiton
- Barrick
- Freeport-McMoRan Copper & Gold Inc.
- Antofagasta Minerals
- Vale
- RIO TINTO
- xstrata
- Kinross
- Newcrest Mining Limited
- Newmont
- Twin Metals Minnesota

Supported by the Global Alliance
The Global Alliance

Acid Drainage Technology Initiative

CNAMD

INAD

SANAP

Water Research Commission

INAP

MEND

PADRE

SMI Knowledge Transfer
ARD Issues Recognized by INAP

- International Network for Acid Prevention (www.inap.com.au)
- Consortium of mining companies that “…exists to fill the need for an international body which mobilizes acid drainage information and experience.”
  - Networking and information-sharing
  - Technology transfer
  - Gap-driven research
- Recognized the need for global approach to ARD management
  - Gravity of impacts (duration, cost)
  - Increase awareness that current techniques can prevent and mitigate ARD
  - Focus on prevention: techniques are less effective after ARD generation (legacy sites)
Global ARD Guide (GARD Guide)

“An international guide for facilitating world-wide best practice in prediction, control, and mitigation of acid rock drainage.”

“The guide will become a reference document for all stakeholders involved in ARD and waste management issues.”
GARD Guide Characteristics

- 2-year effort, awarded to Golder by INAP
- Rolled out in Summer 2009 (ICARD, Sweden)
- Flexible to accommodate site-specific issues
- Avoids duplication and builds on existing guidelines and compendia
- Consistent and promotes a systematic approach
- Founded on a risk-based approach
- Endorses a pro-active approach and encourages reduction and control at the source
- A “how to” guide and not a regulatory tool or a design manual
- Based on proven, field-tested technologies
- Encompasses the life cycle of a mine (cradle to cradle)
Scope of GARD Guide

1. **All Mine Phases** – Exploration through Post-Closure

2. **All Mine Facilities** - tailing, waste rock, underground mine, pit walls, pit lakes, spent ore heaps and low-grade stockpiles

3. **All Commodities** - base metals, precious metals, coal, diamonds, iron ore and uranium

4. **Global perspective** -
Target Audience

• Companies, governments, consultants, researchers, educators, communities, bankers, and NGOs

• Primary target audience is a scientist or engineer with a reasonable background in chemistry and the basics of civil engineering, but not necessarily specifically related to acidic drainage
GARD Guide Features

• Web based
• Navigate within the Guide via internal links
• Connect to relevant references via external links
• Opportunity to provide comments
• Continual improvement and updates
• Presently no hard copy
• Translations anticipated
1. **GARD Guide** (INAP)

2. **ARD Process** – Dr. Rens Verburg

3. **Corporate, Regulatory and Community Framework** – Mr. John Wates (Fraser Alexander, Jo’burg)

4. **Defining the Problem** – Characterization – Dr. Devin Castendyk (SUNY Oneonta) – Ms. Cheryl Ross (Golder, Redmond)

5. **Prediction** – Dr. Kirk Nordstrom (USGS Denver)

6. **Prevention and Mitigation** – Dr. Ward Wilson (Univ. Alberta, Edmonton), Dr. Ben Wickland (Golder, Vancouver)

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**GARD Guide Structure and Authors**
GARD Guide Structure and Authors

7. Treatment
- Dr. Andre van Niekerk (Golder, Jo’burg)

8. Monitoring
- Dr. Peter Chapman (Golder, Vancouver), Ms. Cheryl Ross

9. Management and Performance Assessment
- Dr. Andrew Robertson (RGC), Dr. Dirk van Zyl (UBC)

10. Communication and Consultation
- Mrs. Tisha Greyling (Golder, Jo’burg)

11. ARD Management in the Future
- Keith Ferguson (Sustainability Engineering)
Application of GARD Guide within the Industry

- Benchmark for ARD Management Plans
- Use as a Baseline for Internal ARD Audits
- Promote Integration of ARD Prevention into Mine Plans and Operations
- Use as a Text for ARD Training
- Focus Future ARD Research
- Raise Management’s Awareness of ARD Issues
GARD Guide Roll Out

• Develop working relationship with ICMM, IFC and others to exchange ARD technical support
• Work with Mining Associations to promote Guide usage
• Add new INAP members
• Facilitate new members of Global Alliance in Developing Countries
• Facilitate translation to other languages with technical review
• Assist regulatory agencies with Guide training
• Work with companies to integrate the Guide into their EMS programs
Growth of GARD Guide Usage

[Bar chart showing the growth of GARD Guide usage from Nov-09 to Aug-11 for various sections such as Main Page, ExSum, Introduction, ARD, Framework, Characterization, Prediction, Prevention/Mitigation, Treatment, Monitoring, Management, Communication, and Future. The y-axis represents the number of hits.]
GARD Guide Updates

- On-line at www.gardguide.com
- Internet Classes – EduMine & Possibly SME
- Workshops & Presentations with support from GA
  - AMD Workshop (June 2011, Darwin)
  - SME MN (Aug 2011, Duluth)
  - IMWA 2011 (Sept 2011, Aachen)
  - Enviromine 2011 (Nov 2011, Santiago)
  - NWMA (Nov 2011, Reno)
  - Indonesia (Feb 2012, Bandung)
  - ICMM (May 2012, London)
  - Twin Metals (June 2012, St Paul)
  - Brazil (July 2012, Belo Horizonte)
  - China (Nov 2012, Beijing)
- Next milestone – Summer 2012 (ICARD, Ottawa)
- Next update – 1\textsuperscript{st} quarter 2012
Thank you

www.gardguide.com