THE GEOLOGICAL SOCIETY OF AMERICA®

# The Geological Society of America

## Rocky Mountain Section Meeting

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**"Exploration Best Practices – Success and Compliance"**


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# Best Practice – What is it?

- Investopedia defines it as:

"**A set of guidelines, ethics or ideas** that represent the most efficient or prudent course of action. Best practices are often **set forth by an authority, such as a governing body or management,** depending on the circumstance."

"While best practices generally dictate the **recommended course of action**, some situations **require** that such practices be followed".

**Nothing herein is prescriptive and there is room for addition and modifications based on your conditions. The most important take-away should be for you to build your own protocols and follow-through with them.**

http://www.investopedia.com/terms/b/best_practices.asp

# Best Practice

## Breaking Down the Definition

- First and foremost they are ***guidelines***.
  - External (established by regulatory authority).
    - May or may not be specific mandates. SOX 404 is an example of regulation that leaves the details - The Controls - to the reporting company to establish.

    **Example - Audit of data used in mineral resource estimation.**
  - Internal (established by the company).
    - Designed to spur improvement and meet or exceed industry norms.

    **Example – Zero team environmental or safety incidents in the year.**

# Best Practice – Exploration Pipeline

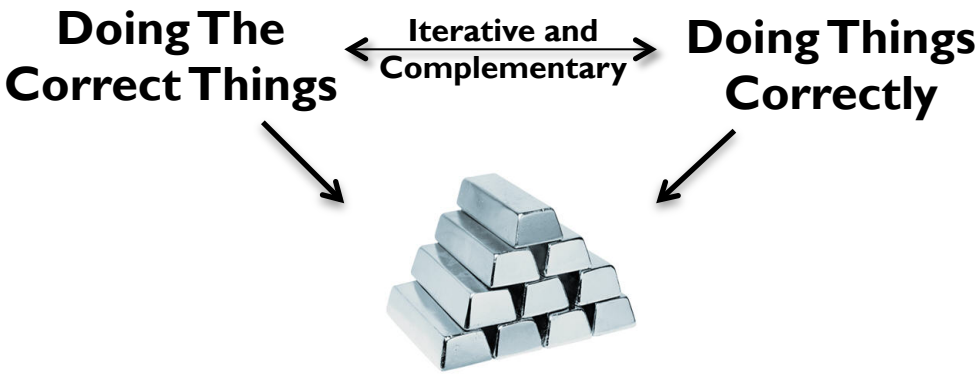
- Exploration spans the full mining chain from target generation through operation of a new mine.


- The goals are Discovery and Definition of a new, and potentially valuable, mineral deposit leading to a new mine.

**Setting and documenting goals and expectations (Best Practice) enhances the Pipeline processes.**

# Best Practice

## Discovery and Definition (D&D) - Two Paths to Success




- Doing The Correct Things addresses **"what is needed to make a discovery"**.
- Doing Things Correctly addresses **"how the work will be conducted"**.

**They are synergistic but the latter is within the sphere of Best Practice.**

# Best Practice

## D&D – Enhanced with Best Practice

- The correct methods to employ in the **D**iscovery and **D**efinition process are Subjective; the record will judge the effectiveness of each method.

- Best Practice in mineral exploration is Objective, it can enhance the discovery process by providing a measure of confidence in the process and outcome.

# Best Practice

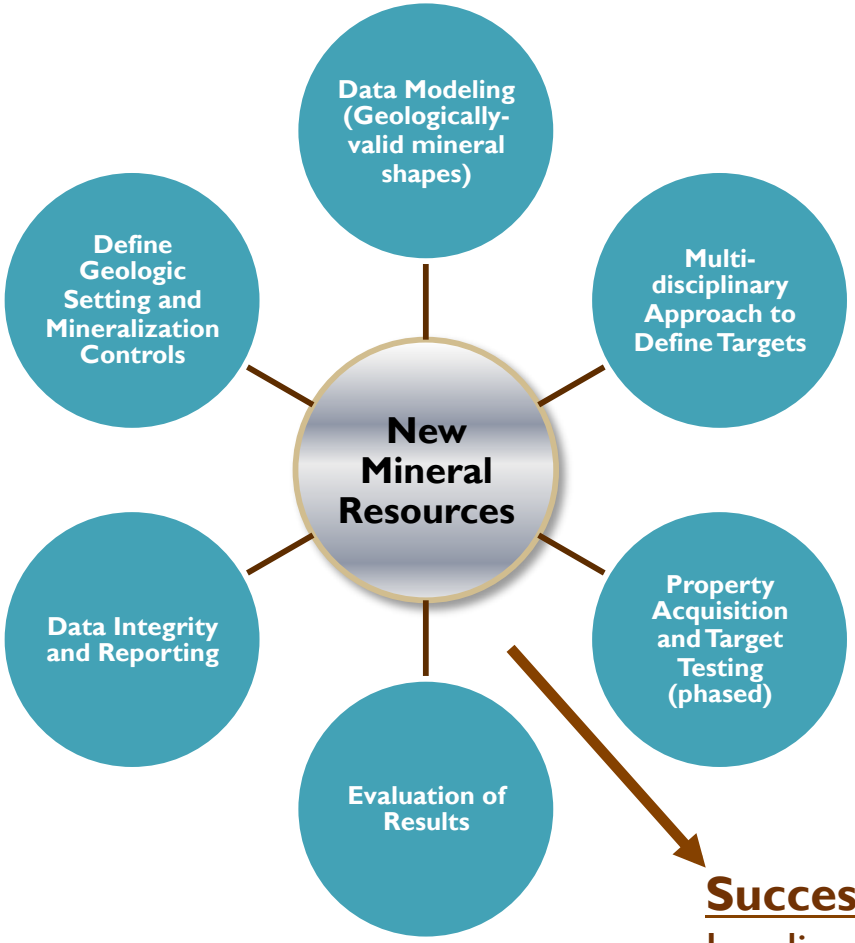
## D&D – Fundamental Goals

- To start, set over-arching, Fundamental, goals:
  - ✓Safety and Environment performance,
  - ✓Respect for local processes (laws/regulations, customs) and local people directly affected,
  - ✓Adherance to all company and regulatory standards;
  - ✓Communicate discovery parameters,
    - Size and timing, the fit with the corporate strategy and Life of Mine plans (if appropriate)
  - ✓Attention to costs,
  - ✓Others (specific to your company).

**Follow through!**

# Best Practice

## D&D – Specific Goals




There are distinct, though not necessarily linear, stages of exploration simplified into:

1. **Target Generation,**
2. **Initial Evaluation,**
3. **Definition of mineral resources,**
4. **Technical, Social and Economic evaluation.**

**Success!**

Leading to a Feasibility Study, Mineral Reserves, & a New Mine.

# Best Practice

## 1. Target Generation Stage

The Intital stage of the Pipeline. As mineral deposits become more difficult to find (deeper or new geologic settings), Best Practice suggests:

- ✓ **Use of multi-source data**;
  - Confirm clear data title – know the source (reputable)
- ✓ **Utilize multi-discipline data evaluation;**
- ✓ **Define Prospectivity** Across All Scales;
  - Analogies – define the compelling reasons
- ✓ **Define Permissability** of the Area.

# Best Practice

## 1. Target Generation

- ✓ Define the Permissability (cont.)

Your "pitch" to managment will be credible if you examine some key aspects of permissability ➔

**KNOW THE SCENE**, Especially Communties!

| | CRITERIA | Sub-Criteria |
|---|---|---|
| Geologic Risks | Prospectivity | ***Geologic Potential*** |
| | | Maturity |
| | | Ground Availability |
| | | Degree of Difficulty |
| Country Risks | Operational | ***Security of Tenure*** |
| | | Repatriation of Profits |
| | | Taxes/Royalties/FCI |
| | | Infrastructure |
| | Environmental | ***Legislation*** |
| | | Communities Issues |
| | | External Pressure |
| | | Compliance Cost |
| | Political | ***Gov't Stability*** |
| | | Security/Safety |
| | | Corruption |
| | | Bureaucracy |

***Critical Sub-Criteria***

# Best Practice

## 2. Initial Evaluation Stage

Once an area is selected and secured, the team moves in to validate the assumptions; data collection and costs increase to justify (Go vs. No-Go) further work. Best Practice suggests:

- ✓ **Build a sustainable and secure database** – Various formats exist but Industry is quickly moving to relational databases;

  Build protocols to ensure data security

- ✓ **Know where you are** – Validate land title, accurate topograpy, GPS, site surveys.

# Best Practice

## 2. Initial Evaluation Stage (cont.)

- ✓ **Employ appropriate analytical methods;**

  Tried and true analyses.

  Field XRF's can help screen areas but do not replace reputable, commercial laboratories for sample analysis.

- ✓ **Consider using certified laboratories**;

  No hard regulatory requirement yet, but NI 43-101 guidelines come close, and some consider it essential.

  Some companies employ in-house labs – generally for definition or grade control drilling.

- ✓ **Implement QAQC protocols,** with follow-up routines to ensure reliable data.

# Best Practice

## 2. Initial Evaluation Stage (cont.)

✓ **Implement QAQC Protocols** (continued);

- **All** laboratories make mistakes.
- The QAQC protocol should address the full range of potential variance.

**Total Sampling Variance = (Site Variance + Sample Variance + Preparation Variance + Analytical Variance)**

- Duplicates, Standards and Blanks should be routinely inserted into the sample stream.
- Some companies designate both a primary lab and a secondary lab to check the primary (the latter via a much smaller number of QA/QC samples).

**The Purpose of QAQC is to Detect Batch (not all) Errors.**

# Best Practice

## 2. Initial Evaluation (cont.)

✓ **Implement QAQC Protocols** (continued);

- The amount of QAQC is up to you.

  A Senior Company polled adds **20-25%**, a mid-tier Company polled adds **15-20%**, a Junior Company polled adds **20%.**

- Consider adding (per batch)...

  **1 field duplicate** (Half core or RC rig split - addresses site and preparation variance).

  **1 blank** (must be coarse enough to require crushing – this covers all prep and analytical variance).

  **2 – 3 anayltical standards** (certified commerial standards).

  1 standard matching your target mineralization.
  1 blank (pulp – can be barren sand).
  1 pulp duplicate (from a prior primary batch).

  **Change the bag or envelope!**

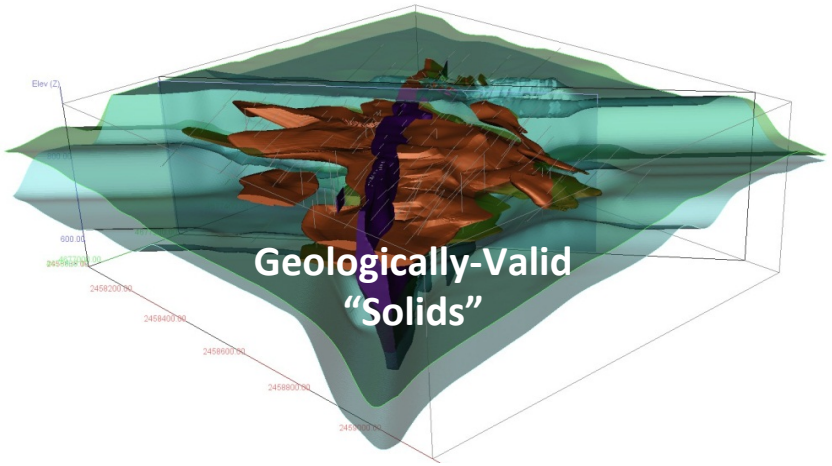
**These are <u>not</u> prescriptive (tailor your program to your deposit characteristics).**

# Best Practice

## 3. Definition of Mineral Resources

The process can depend on the type of deposit but the essential goal is a mineral resource estimate that honors the **interpreted geologic setting.**

Quality Data + Reliable Databases + Local expertise of ore controls =



# Best Practice

## 3. Definition of Mineral Resources (cont.)

Best Practice suggests ...

✓Further develop the detailed electronic database to include other pertinent data, such as:

- Historic mine workings;
- Lithology, alteration and mineralization types;
- Geotechnical data (core recoveries, RQD, structure types and attitudes);
- Geochemical/Geophysical survey data.

# Best Practice

## 3. Definition of Mineral Resources (cont.)

- ✓ Select appropriate software for data manipulation, construction of preliminary 2-D and 3-D interpretations of geology, and subsequent block model development;
  - ✓ Update your sections and plans throughout your sampling program

- ✓ Assess/revise QA/QC sample requirements (sample types and frequency of submission) based on mineralization type present;

- ✓ Estimate Mineral Resource quantities (tonnages) and quality (commodity grades).
  Determine if infill or extension drilling/sampling is required to further refine your initial geologic interpretations

# Best Practice

## 4. Technical, Social and Economic Issues

Best Practice **Demands**...

- Estimation of valid Mineral Resource tonnages and grades;
- Early metallurgical testing and mineralization/waste material characterization studies;
- Early commissioning of baseline environmental surveys and cultural resource evaluations;
- Creation of comprehensive community awareness programs.

**THESE ITEMS ARE HIGHLY IMPORTANT EARLY IN THE PROCESS!**

# Summary

1. Best Practice guidelines exist to encourage public companies to take efficient and prudent actions;
2. Best Practice consists of *doing things correctly* and goes hand-in-hand with *doing the correct things*, and can enhance the value of the discovery process;
3. Build your Fundamental Goals – They give your team the company's "raison d'être" for exploration and its basic expectations (follow-up!);

# Summary (cont.)

4. Target Generation followed by integrated, multi-disciplined evaluation of reliable data, coupled with an understanding and communication of prospectivity and permissibility, helps ensure robust, cost-effective results;
5. Data is money and a key component of company value (build a sustainable and secure database);
6. Use of certified laboratories is becoming industry-accepted Best Practice, but this must be accompanied by QAQC protocols with clearly-defined corrective steps;

   Periodic assessment and revision of QA/QC protocols (as knowledge of mineralization style and character is gained);

# Summary (cont.)

7. Periodic definition of valid Mineral Resources relies heavily on well-defined geologic interpretations that adequately constrain estimation of tons and grades.

8. Project success depends on early initiation of:
   - ✓ Metallurgical testing and mineralization(and waste rock) characterization (geologically-driven);
   - ✓ Baseline environmental surveys and cultural resource evaluation;
   - ✓ Effective community awareness programs.

Embracing Best Practice Leads To…

**Transparency, Materiality and Competence of the Work and Product!**