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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.
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 Discovery and Definition 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.

Doing the Correct Things

Doing Things Correctly
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

Data Modeling (Geologically-valid mineral shapes)
Multi-disciplinary Approach to Define Targets
Property Acquisition and Target Testing (phased)
Evaluation of Results
Define Geologic Setting and Mineralization Controls
Data Integrity and Reporting

New Mineral Resources

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

There are distinct, though not necessarily linear, stages of exploration simplified into:
1. Target Generation,
2. Initial Evaluation,
3. Definition of mineral resources,
1. Target Generation Stage
The initial 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 management will be credible if you examine some key aspects of permissability ➔

**KNOW THE SCENE, Especially Communities!**

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>Sub-Criteria</th>
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<tbody>
<tr>
<td>Geologic Risks</td>
<td>Prospectivity</td>
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<td><strong>Geologic Potential</strong></td>
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<td>Maturity</td>
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<td>Ground Availability</td>
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<td>Degree of Difficulty</td>
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<td>Security of Tenure</td>
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<td>Repatriation of Profits</td>
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<td>Taxes/Royalties/FCI</td>
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<td><strong>Legislation</strong></td>
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<td>Communities Issues</td>
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<td>Corruption</td>
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**Critical Sub-Criteria**
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 topography, GPS, site surveys.
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.
2. Initial Evaluation Stage (cont.)

☑ Implement QAQC Protocols (continued);
  - All laboratories make mistakes.
  - The QAQC protocol should address the full range of potential variance.

<table>
<thead>
<tr>
<th>Total Sampling Variance = (Site Variance + Sample Variance + Preparation Variance + Analytical Variance)</th>
</tr>
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<tbody>
<tr>
<td>• Duplicates, Standards and Blanks should be routinely inserted into the sample stream.</td>
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<tr>
<td>• 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).</td>
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The Purpose of QAQC is to Detect Batch (not all) Errors.
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 **analytical standards** (certified commercial standards).  
      1 standard matching your target mineralization.  
      1 blank (pulp – can be barren sand).  
      1 pulp duplicate (from a prior primary batch).  

These are **not** prescriptive (tailor your program to your deposit characteristics).
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.
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
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'etre” for exploration and its basic expectations (follow-up!);
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);
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!