MinEx CRC – Data, drilling and lessons – South Australia perspective

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DEM / GSSA overview

• “deliver affordable, reliable and secure energy supplies in a transitioning national energy market, and responsibly unlock the value and opportunities offered by South Australia’s mineral and energy resources. “

• To stimulate mineral exploration in key areas of the state by providing industry with new data and new constraints on the geological framework and mineral prospectivity in these greenfields regions.

• Hence the level commitment: $5M in cash, $10M staff in kind, $10M non staff in kind.

The issue of data: NDI opportunity

Over 135 years of geoscientific data from:
• government surveys and investigations;
• industry exploration and mining activities;
• academic research; and
• groundwater investigations

• 300,000+ drillholes
• ~350,000 surface samples
• 1.5 Million downhole samples
• Over 9000 mineral occurrences
• 90,000+ field observations
• HyLogger data
• > 150 Gb of geophysical data
• ~20,000 Report Books and Envelopes
Scale of challenge:

- Increase in company activity in increase in analysis has resulted in a rapid increase in analytical data captured.
- Increasing over past 3 years.
- This information has to be incorporated into department systems.
- Ultimately all made available to the sector.
- Audit of NDI areas: “How much data do we hold but it is not captured into SA Geodata?”
- Ongoing process - identifying areas for improvement, tenements with little or no work/data.

<table>
<thead>
<tr>
<th>Mineral Drillholes 1st July 2019</th>
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<tbody>
<tr>
<td>25% OF captured</td>
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<tr>
<td>16% OF to be captured digital files</td>
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<tr>
<td>1% OF Handwritten to be captured</td>
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<tr>
<td>2% OF non digital</td>
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<td>56% Confidential data to be captured</td>
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Innovation required to maximise value

- Machine learning:
  - Predicting outcrop (with Australian Institute of Machine Learning)
  - Automated extraction of data from documents
  - Predicting lithology from geochemistry
- Geochemical Data Quality
  - Understand the variability of our geochemical data (Uni SA - School of IT and Maths Sciences)
- Web service delivery of 3D drill hole
  - New ways, speed, efficiency
Audit considerations

• Data completeness:
  • Understand what we have, what we could have, and what users want
  • Improve workflows for ingesting data

• Data quality is understood and communicated
  • Better metadata

• Data is accessible and usable
  • Web services
  • Where possible, data is structured around national and international standards
  • Wide table geochemistry
  • Spatially enabled

South Australia project areas

• GSSA has selected 3 projects areas as part of NDI
  • Area selection based on:
    • Prospectivity (known or assumed)
    • Extend of knowledge / obvious gasp in key geoscience datasets
    • Recognising emergent infrastructure demand
South Australia project areas

**National Drilling Initiative** – new ideas, research programs and potentially drilling in three regions of the state:

1. Central and eastern Gawler Craton (F2F)
2. Delamerian-Murray Basin
3. Curnamona

**NDI Focus on Delamerian**

1. **DEFINING THE GEOLOGICAL FRAMEWORK**
   - What is the distribution of Delamerian rocks beneath the Murray Basin?
   - What is the Delamerian and post-Delamerian deformational history?
   - What is the architecture of the basement at depth?
   - Can we map a back arc – volcanic arc transition in South Australia?

2. **DEFINING THE PROSPECTIVE MINERAL SYSTEMS**
   - SEDEX
   - Cu-(Mo-Au) porphyry
   - Orogenic gold
   - VMS
   - Magmatic Ni-Cu-PGE

3. **MAPPING THE ELEMENTS AT A DISTRICT SCALE**
   - Energy source
   - Metal/fluid source
   - Host rocks/reactive lithologies
   - Structures/fluid pathways
   - Mineralogical/geophysical footprints
**GSSA work flow**

**Phase 1** (2019)
- Compilation and interpretation of legacy data
- Some analytical work to fill data gaps
- Geological questions to test by drilling

**Phase 2** (~ Q2 2021)
- Drilling program
- This is where the majority of our money will be spent

**Phase 3**
- Synthesis of all results
- Publish new/revised tectonic and metallogenic framework for Delamerian basement to the Murray Basin

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**Access and Engagement**

- To enable completion of initial phases of data collection and definition of drill targets:
  - DEM lodged Section 15
    - Secures region of tenue ~12months
    - Excludes new applications / renewals
    - Allows time to access / review
    - For consideration:
      - Timeframe to reduce S15 - <12 months
      - How to manage stakeholders?
      - Area release strategy – options available

- Drilling areas selected
- New S15 lodged
- Plan to release areas previously held under S15
- Competitive process - Exploration Release Area or open release
Drilling program

- Drilling targets will be selected at the end of this financial year.

- Targeting will be driven by geological questions generated as part of our structural-lithostratigraphic basement mapping.

- The program is likely to include a **stratigraphic component** and a **mineral systems component**.

- With CT rig – and newly developed technology.

Past experience

- GSSA significant expertise in precompetitive drilling programs:
  - DET CRC Mineral Systems
  - Coompana Regional

So what worked and what can we take forward into NDI?
Lessons learnt: planning

• Ensure all types of land tenure and the key personnel to contact with respect to these are known
  “however it could have improved by being more up front, regular, and face to face.”

• Relationships between stakeholders identified
  “it would have been valuable to properly explain and highlight the extent/type of vehicles, rigs and other equipment expected for the drilling program.”

• Frequency of communication
  “early and often to ensure they are aware of the project and know exactly what is happening”

Lessons learnt: program

• Safety – right culture, right authority
  “If there are complications in the program, STOP work and any issues to prevent them to escalate. Don’t be afraid to pull the pin if things aren’t changing.”

• Management of access – “Using a local contractor that has knowledge of the tracks for water cartage and rehabilitation is useful as they generally drive to conditions to reduce track wear.”

• Logistics – “issues with managing the camp so we assumed control.” “field gear and supplies organisation was well executed. All necessary equipment was obtained before we went out onsite, there were never any delays/lack of gear, even with the one-day-a-week delivery service.”
Closing

• Data audit has highlighted gaps in our data which could value add to the CRC regions
• Vital to understand value of data (legacy / current).
• CRC see the delivery of new precompetitive data sets in key areas.
• Import to acknowledge past programs and adopt key findings – implement industry best practice.
  • Engage, communicate and share learnings.

Thanks to GSSA team for inputs into presentation

Disclaimer

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