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**Goldfields Tender Briefing Geoscience Datasets Relevant for Mineral Exploration**

[Slide: Geoscience datasets relevant for mineral exploration in north central Victoria - Melanie Phillips]

*Melanie Phillips*

So first, fantastic talks already today from Ross, Rob and Phil, and they’ve provided some great insights on the tectonics and geodynamics, geochemistry and geophysics of north central Victoria.

But none of these insights would be possible without data.

Data and information is what we use to make these interpretations on geology and prospectivity.

And two of the greatest sources of this data information is from the work that we do at the Geological Survey of Victoria, but also the work done by the past explorers of the area.

So my role today is to highlight what open file information is available to you and the best and easiest ways to access that information.

[Slide: Presentation summary]

I’m going to start off by running you through a data compilation project that we conducted to pull together the most recent surface geochemistry and drilling data for the ground release area.

I’m also going to summarise what geophysical datasets we have available and how to access them.

I’m going to teach you the best and easiest ways to access company mineral exploration reports and GSV reports.

And lastly I’m going to speak about the GSV Drill Core Library and the drill cores and cuttings that we have available from the ground release area.

[Slide: Modern company data compilation - slide 1]

So to make the modern exploration data for the ground release area as easy to access as possible, we have pulled together all of the recent surface geochemistry and company drilling data into several datasets which you can download from our website.

The data was sourced from 12 annual technical reports from six exploration licences, and these licences were the most recent to be explored in the ground release area.

And they include EL3539 which was held by the Fosterville Gold Mine, and EL4552 to 4555, and EL4742.

These tenements were previously held by Goldfields and various joint venture partners, and they contain the Lockington area prospects.

Mandatory digital reporting of exploration data commenced in Victoria in 2001, and prior to this exploration data was provided in hardcopy.

And so for the EL3539, that was actually granted in 1994, and so there is about seven years of exploration data that is currently in the technical report pdfs, and we chose to have a cut-off date of 2001 so that we could pull together the digital data for you.

And so for the Lockington tenements that includes all the data.

In total the datasets contain over 11,000 surface geochemistry samples, almost 1200 drill holes and represent roughly $14m in exploration expenditure.

And if you would like to download a copy of the datasets we’ve provided a link in the tender document for you, and you can also access it from the Earth Resources website which I’ll discuss later.

[Slide: Modern company data compilation - slide 2]

So the data is delivered in four relational databases, both in MS Access and ASCII format.

We elected to keep the data for the Lockington tenements separate to the data for EL3539, and there were several reasons for this, but the main one was that the licences had been worked by different operators and so naturally you get differences in the types of information being collected.

And so the simplest and cleanest way for us to deliver the data was in separate datasets.

However, we did use the same approach to data compilation for all of the datasets in that the submitted data files were ingested into a customised SQR database skimmer with tables for things like colour survey, assay etcetera, and appropriate validation constraints required.

So any data which failed the validations was put into a quarantine, and we did go through a process to try and resolve as many of the issues as possible using the accompanying technical report.

So for example, if the downhole survey instrument was missing from the digital data files we would check the technical report, and if we could find that information we would add it to the dataset.

However, if we could not resolve the error using the technical report that data was put into a quarantine table so that you guys, the users of the datasets, could choose how you would like to resolve it.

As a tenement geologist I’ve seen the good, bad and ugly of data, and this dataset is definitely in the good category.

The drill core from the Lockington area was donated to the GSV, and Phil mentioned earlier some of the drill cores are put through their AGOS multisensory core logger at Melbourne University, and all of that petrophysical data is included in this dataset, and it’s the first time that it’s been published and this is the only place where it’s available.

[Slide: Surface geochemistry - Lockington]

This map shows the locations of all the surface geochemistry samples.

The purple colours are the samples from the Lockington dataset and the orange are the samples from the EL3539 dataset.

There’s over 1600 soil samples in the Lockington dataset, and most of them are from a two kilometre space traverses with a 400m sample spacing.

The operator has provided really detailed information on the sampling methodology which is consistent throughout the various programs, and so the data is readily comparable.

I came across an interesting observation whilst reading the accompany technical reports for this, and the operator found that elevated assay values along the road reserves weren’t continuing into the farm paddocks.

And so on this map you can see a traverse right up in the north that’s in dark purple, and that’s actually road gravel rock chip samples, and they did this to test whether the road reserve soil samples had been contaminated by these road gravels.

However, there was no correlation between the two datasets, and so the more likely cause of this is that the farm paddocks have had their soil profiles destroyed by cultivation and grading, so it’s definitely something to keep in mind if planning any future sampling programs in the area.

Another thing to keep in mind is that most of these surface samples have only been tested for a six element suite of assays, and that it does include important assays such as gold, silver, arsenic and antimony.

But there’s definitely potential to do some more extensive surface geochemistry in the area.

[Slide: Surface geochemistry - EL3539]

The EL3539 dataset is a lot closer spaced.

There’s over 9,000 soil samples and most of the them are on traverses 400m apart with a 100m sample spacing.

And most of these samples were only collected in the last few years.

Again there’s good metadata describing the sampling and analytical methodology, and portable XRF was used on almost all of these samples and most have also been assayed for an extended suite of 57 elements.

The operator did a comparison between these portable XRF results and the lab assay results, and they did find that the portable XRF was doing a good job of identifying elevations in arsenic which was being used as a vector.

There’s also roughly 1300 samples in areas covered by Murray Basin sediments which were analysed using MMI.

[Slide: Drilling - Lockington]

This map displays the locations of the drill holes captured in the compilation.

The Lockington dataset holes are in green and the EL3539 dataset holes are in purple.

There’s over 1100 drill holes captured in the Lockington dataset, however of these 1,071 are air core holes.

And you can see on the map that these were drilled in quite wide spaced traverses with the aim of testing basement geochemistry in areas of anomalous surface geochemistry.

All of the diamond holes which are the dark green, were focused on the Lockington prospects, and the best gold intersection came from Lockington south which was 1.6m at 19.49 grams per tonne gold.

In addition to the standard down hole data, some holes were logged with the CSIRO’s HI tips instrument, and so there is a table in the database containing that hyperspectral data as well as a table containing the petrophysical data from the AGOS core scanner that I mentioned earlier.

Again, it’s a fairly narrow suite of elements that have been tested for.

In most cases it was only seven, and you can see from the map a huge portion of the area is untested by diamond drilling which we know is crucial for understanding the structure of these high grade orogenic gold targets.

[Slide: Drilling - EL3539]

The drilling dataset for EL3539 contains only 73 drill holes, but 51 of them are diamond.

Most of these holes were testing the structural settings and the strike continuation of mineralisation.

The deepest hole in the ground release area is 1400m, and this was drilled at the Backhouse Prospect east of Axedale.

The best intersection is 2.05m at 11.22 grams per tonne gold, and that was from the Goornong South prospect which is north of Fosterville.

There are a couple of holes in this dataset that were originally drilled on EL3539, that did get slightly deeper and had slightly better intersections, however they’re now part of the Fosterville mining licence after that was extended earlier this year.

This database contains some hyperspectral data from an ASD TerraSpec and it also contains some portable XRF data.

And most prospects from this dataset have at least one drill hole which was tested for an extended suite of multi-element geochemistry, in some cases this was up to 60 elements.

However, there’s also been many holes which have only been tested for gold.

[Slide: Presentation summary]

So Phil has already discussed all of the geophysics in his presentation so I’m just going to summarise that really quickly here.

And I’d also like to point out Susan Hayden who is our geophysical dataset expert to answer any of your questions you might have.

[Slide: Airborne geophysical surveys]

So this image here shows the airborne magnetic, electromagnet and gravity gradiometry survey coverage.

In the ground release area magnetic surveys have a line spacing which ranges from 50m, as shown in the pink, the 400m as shown in the green.

From the hatch patterns you can see block four has been surveyed with airborne electromagnetics, and portions of block two and four have been surveyed by gravity gradiometry.

You can use Geoscience Australia’s geophysical archive delivery system, also known as GADS, to download the airborne magnetic data, but that won’t contain the most recent surveys.

And so in the tender document we have provided a list of the open file airborne surveys and links for downloading that data.

[Slide: Ground geophysical surveys - Electrical]

Electrical geophysical surveys were restricted to prospect scale or to trials.

We’ve listed some of the key company surveys on this slide, and the data for these surveys resides in the company exploration reports, which can be downloaded from that website, and I’ll be explaining a bit more about those later.

[Slide: Ground geophysical surveys - Gravity]

In this image the light purple shows the regional ground gravity surveys.

They range from a 1.5 kilometre station spacing in the south, to a nominal 500m station spacing along the central and north of the ground release area along the roads.

Data for these can be accessed via the Australian National Gravity Database, which is delivered through Geoscience Australia’s GADS website.

The darker coloured purple are company surveys which have not yet been included into the National Gravity database, and so to access these surveys you’ll have to get the data from the company exploration reports.

[Slide: Presentation Summary]

So how do we access these company exploration reports?

So if anyone hasn’t seen our website this is what it looks like.

[Slide: View of website]

And the entry points for all of our data delivery tools are behind this button.

We have three main data delivery tools.

[Slide: Website - Maps, reports and data]

The first one I’ll talk about is GeoVic.

GeoVic is our online spatial mapping tool, and it can be used to display and query over 1100 features, which includes tenements, mineral occurrences, drill holes, maps, aerial photos and much more.

Certain layers can also be exported from GeoVic.

Earth Resources publications, so this used to be called our online store, and this is the easiest place to find GSV reports.

The GSV catalogue, this contains our entire report repository, including the company exploration reports.

And if you know which licence you’re looking for this is the easiest way to find the reports that relate to it.

But what if you don’t know what you are looking for?

[Slide: GeoVic - Searching for past tenements]

Well, that is when I would turn to GeoVic.

So this is the expired exploration licence layer in GeoVic, and it’s a complete shemozzle of red polygons.

But say I’m interested in finding all of the previous exploration licences for Block 2 of the ground release area.

In GeoVic you can draw a polygon over this to select those licences, and bring up a table which lists those exploration licences from that polygon.

And from here you can navigate to the dropdown to find the reports.

So if I decided that I wanted to look at the oldest exploration licence for the area, which in this case is EL3, searching for the reports will take you to the GSV catalogue.

[Slide: Website - Geological Survey of Victoria files available to download]

And here it will list all of the files that we have in our database that is tagged to EL3.

But there is another way, and once you know the exploration licence number it’s an easier way.

And so instead of going to GeoVic you can go straight to the GSV catalogue from the Earth Resources website.

And from here you can do an advanced search.

[Slide: Website - GSV Catalogue]

And that allows you to search for things like tenement ID or author or keywords.

And so in this screenshot you can see instead of listing all of the individual files tagged to the licence it returns all of the reports.

And so it’s a more structured search.

You can see the metadata for the report like the publication year and the title, and when you go to the downloadable files it will show you the files that are relevant to that report, and that may include things like geophysics or geochemistry.

So this search only shows you the things that you’ve asked to show as opposed to showing you everything for the entire licence.

[Slide: Website - GSV Catalogue tenement summary reports]

Also available through the GSV catalogue are the GSV tenement summary reports.

These are also tagged to the exploration licence and so when searching for an exploration licence this is one of report types that will be returned.

My colleague [colleague’s name 0:17:23] has been writing these tenement reports for the last 20 years and they cover all of the exploration work conducted on the licence over its entire life, and so it’s a great document if you’re wanting an exploration snapshot for the licence.

They can also be a really handy reference if, for example, you’re wanting to find out if there was any geophysics conducted on a licence instead of trolling through all of the technical reports you can go straight to this summary, go straight to the geophysics section, and see if there’s any record of it.

It’s all broken down by year, so if you do find what you’re looking for you can then go straight to the tenement report for that year.

This is a page from the summary for the main Lockington licence, and you can see there is a section on geochemistry, another section on geophysics.

Within that section you can see in 2005 they did a ground gravity survey.

In 2006 they did CSAMT.

You can see it can be that really handy quick reference if you’re just wanting that snapshot of the work done or if you’re looking for something in particular.

[Slide: Website - Earth Resources Publications]

For GSV products, the best place to go is Earth Resourced Publications, and again this is accessed through the Earth Resources website.

[Slide: Presentation summary - Website - Earth Resources Publications]

So as I said this was previously known as the online store, and it’s the best place to find GSV products.

It’s easy to navigate and you can access all of our mapping products, digital data packages, reports and more.

A couple of the presentations have referenced the Gold Undercover Reports, and these reports are particularly relevant for north central Victoria.

This series of reports are the result of a program of work the GSV did over a period of three years, from 2006, and it includes reports on things like endowment, alteration, dispersion, relief ground water, geophysics and more.

[Slide: Presentation Summary]

Now for the last part of my talk which is on the GSV Drill Core Library.

[Slide: GSV Drill Core Library]

Our Drill Core Library is located 30 kilometres down the road in Werribee and it contains cores and cuttings from over 18,000 drill holes from all over the state.

It’s a tremendous resource of physical information.

It’s open to the public and it’s free to use.

For the ground release area we have cores and cuttings from 251 drill holes and they’re plotted on this map here.

All of the holes that are in blue were drilled for groundwater exploration.

The holes in green were drilled for extractives.

And the holes in yellow and black were drilled for minerals exploration.

[Slide: GSV Drill Core Library - Drill cores available - mineral exploration]

I’ll talk a bit more about the minerals exploration drill holes.

But I just want to highlight that a lot of the groundwater holes drilled, particularly in the central part of the ground release area, were drilled to in excess of 100m.

And after being drilled with percussion they were cored for the last few metres so they’re probably worth investigating as well.

We have 41 drill cores stored at Werribee that were drilled for minerals exploration.

Thirty eight of them are from the Lockington prospects, including the deepest hole and the best intersection.

We have one drill hole from the Axedale prospect, and that was drilled by Newmont in 1977.

This hole was drilled to 73m and we have four trays of core from this hole including the bottom 10m.

Lastly, we have two drill holes from the Myrtle Creek prospect.

These were drilled by the Fosterville Gold Mine as part of the Rediscover Victoria co-funded drilling program, and that was in 2009.

And both of those holes were drilled to depths in excess of 150m.

So if you’re interested in viewing any of this drill core I encourage you to use this facility.

You just need to make an appointment with our Drill Core Library Manager, Ken Sherry.

We also allow sampling of drill core in certain circumstances in accordance with our sampling procedures.

But any data that is generated from the sampling must be provided back to us so that it can be made open file.

[Slide: Summary]

So hopefully this presentation I’ve made you aware of some of the products and data delivery tools that we have, and given you some know-how on the use of them.

My goal is to make sure that everyone has access to all of the data and information that they need, and so if you have any questions feel free to ask.

And as Cam mentioned, we also have our GeoVic experts, Rob and Dave, outside to speak to you.

And also note that all of this information that I have presented today is available in the tender document.

So I’d just like to finish with this.

And as I was putting together this presentation I went through a couple of the historic reports, and I stumbled across this paragraph from Western Mining.

And it says, In an area which has produced over 70 million ounces of gold, and in which a large proportion of the gold-bearing Ordovician rocks, are covered with basalt and younger sediments. There could be concealed fields of Ballarat or Bendigo calibre still to be found.