

## Project Objectives

Major Objectives:

- **Initiate Semi-Regional Exploration of the Waterberg Coalfield to the benefit of the Industry.**
- Generate a good quality Airborne Geophysical Dataset.
- Generate a basic lineament and surface geology interpretation of the Ellisras Basin.
- Generate a basic Ellisras Basin analysis to help with the structural understanding.



**Project Name: Waterberg Coalfield Airborne Geophysics**

**Project Number: 1.55**

**Sub Committee: Geology and Geophysics**

**Presenter: Dr. Stoffel Fourie**

**Co-Workers: Dr. George Henry & Me. Leonie Marè**

**Collaborators: Coaltech & CSIR**

## Project team

The following members were involved in the research:

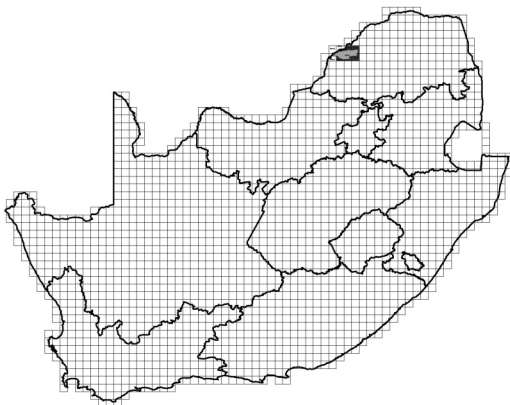
- Airborne Geophysics – Southern Geophysical Exploration and the CGS.
- Physical Property Analysis – CSIR and the CGS.
- Geophysical Interpretation – CSIR.
- Geophysical Modelling – CSIR.



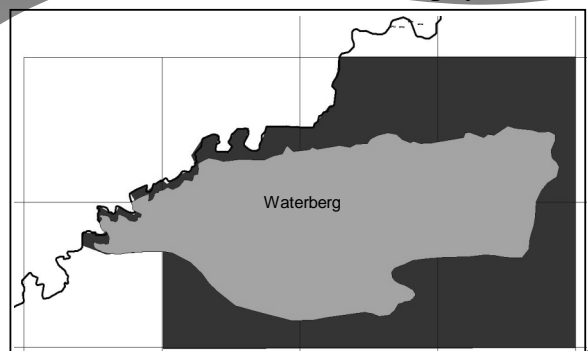
## Agenda

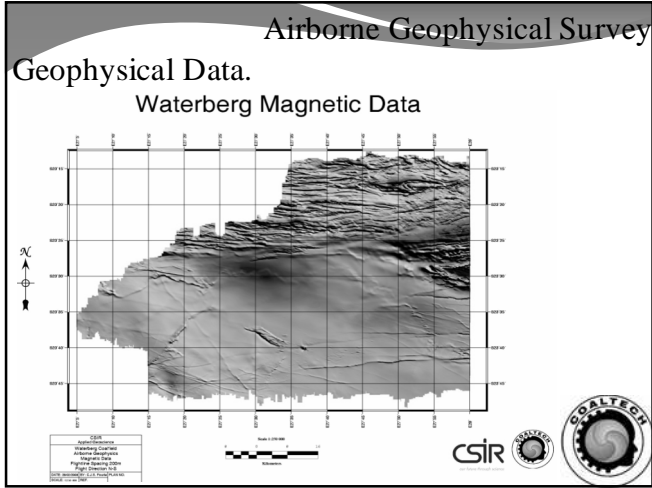
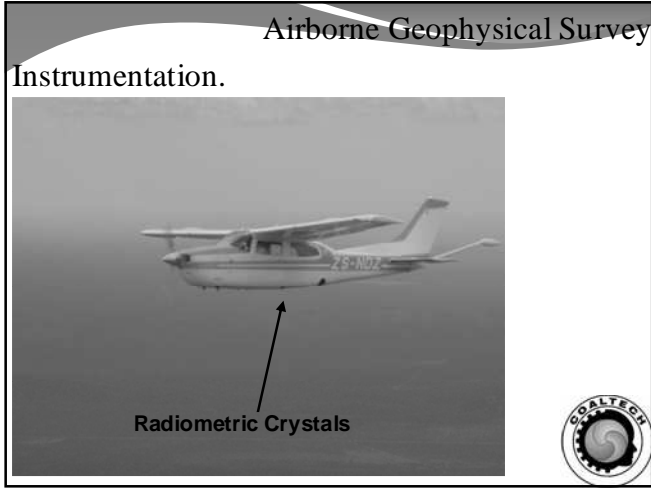
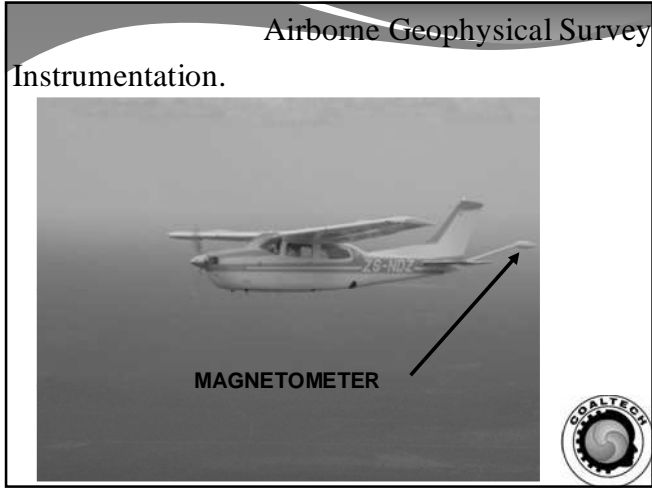
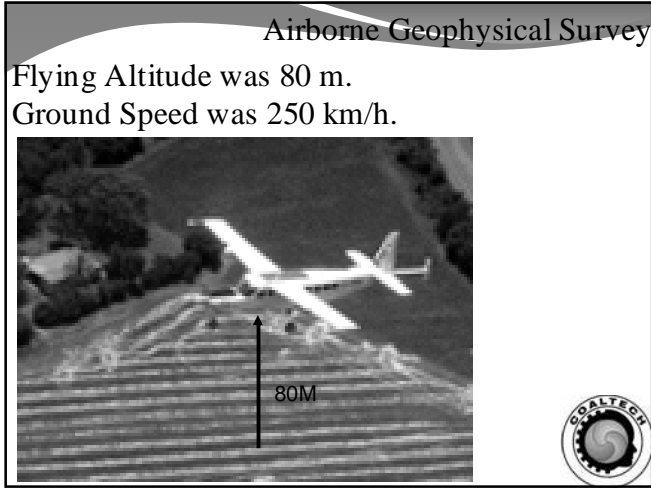
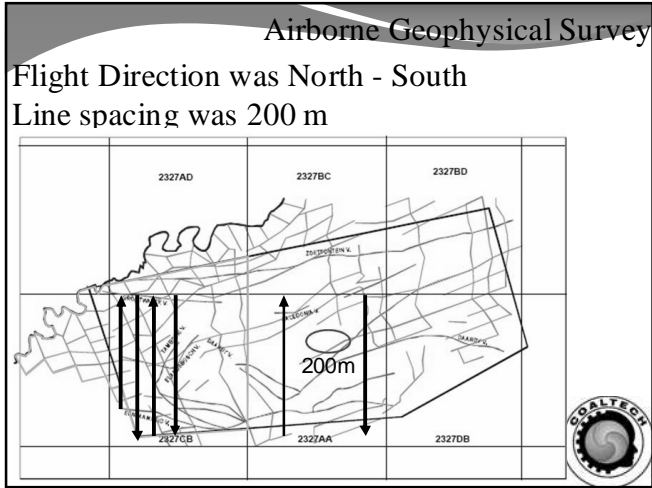
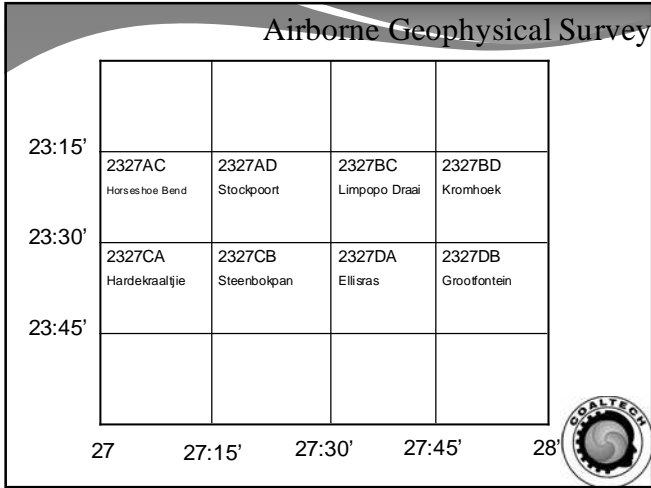
- Airborne Geophysical Survey (November 2007).
- Airborne Geophysical Data Processing and Map production.
- Lineament Interpretation
- Surface Geology Interpretation.
- Physical Property analysis.
- Geophysical Modelling.

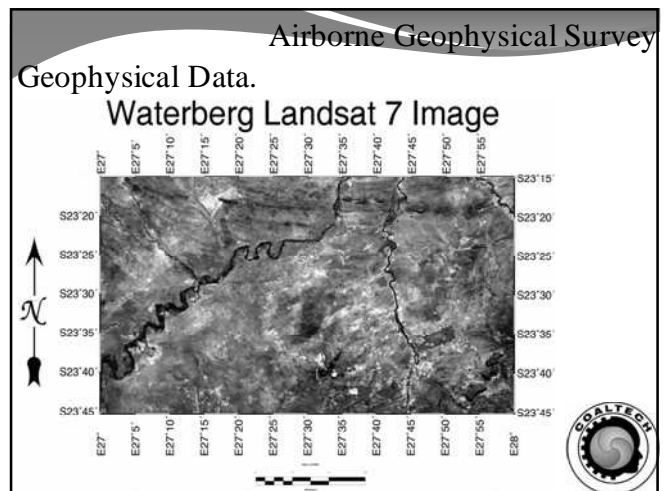
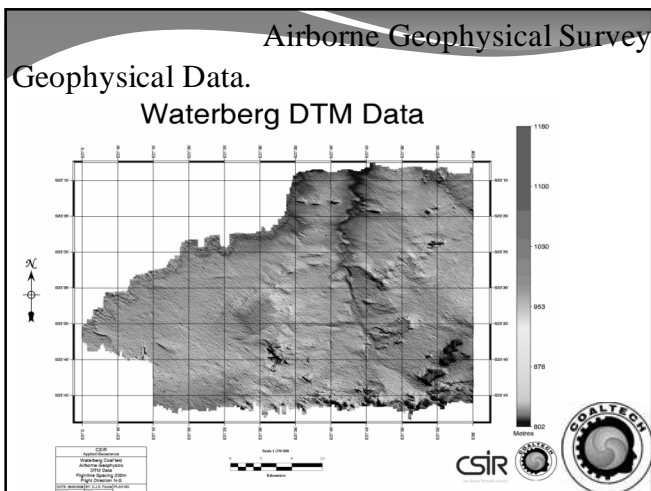
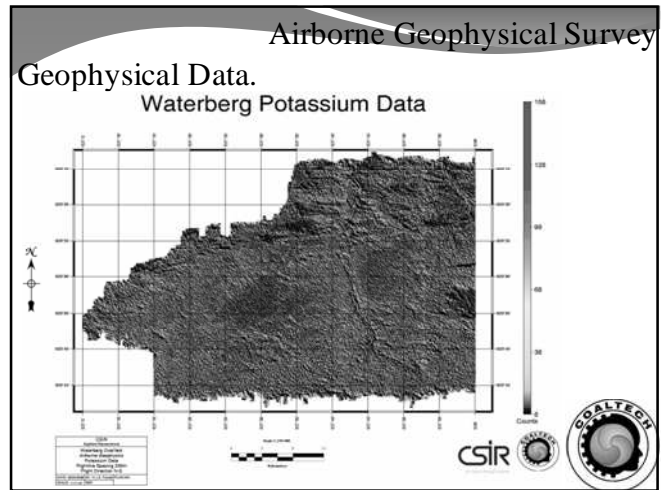
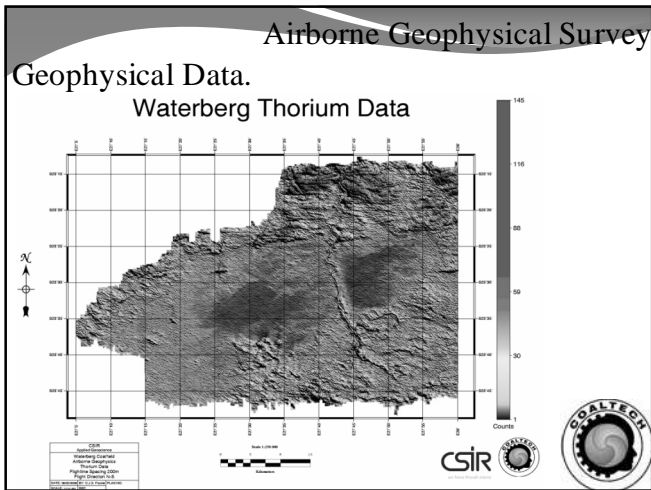
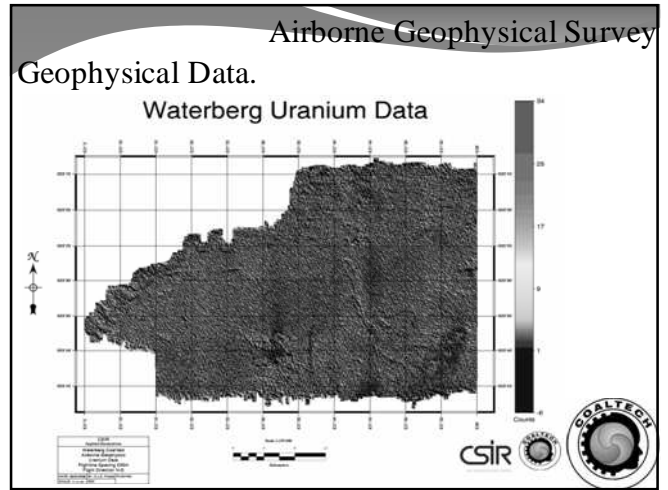
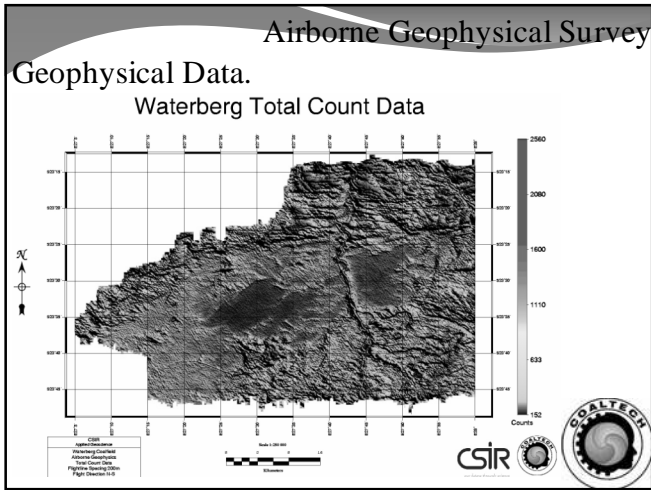
## Airborne Geophysical Survey

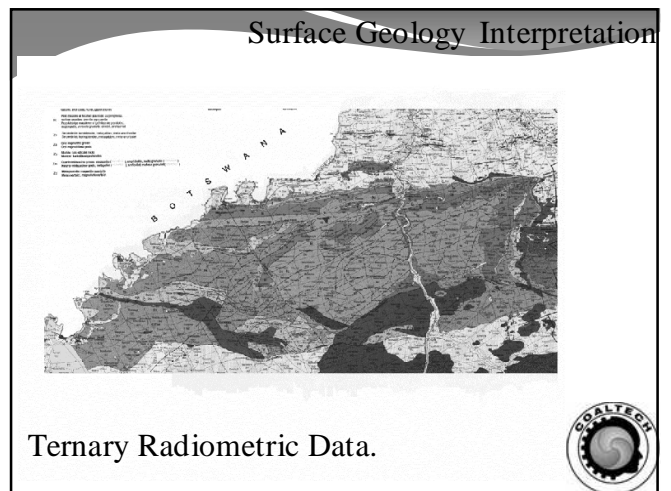
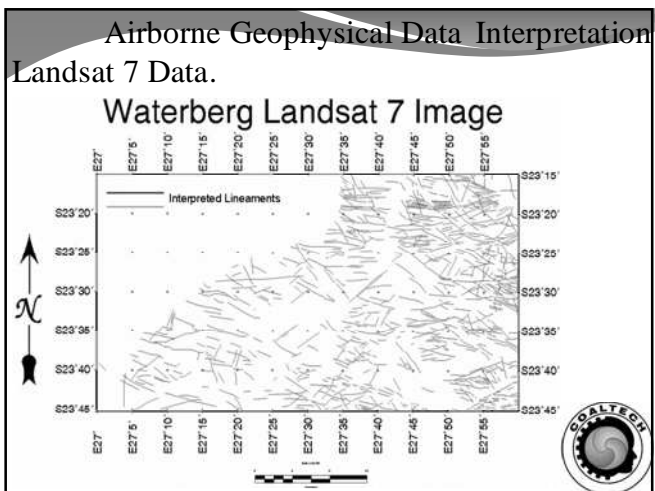
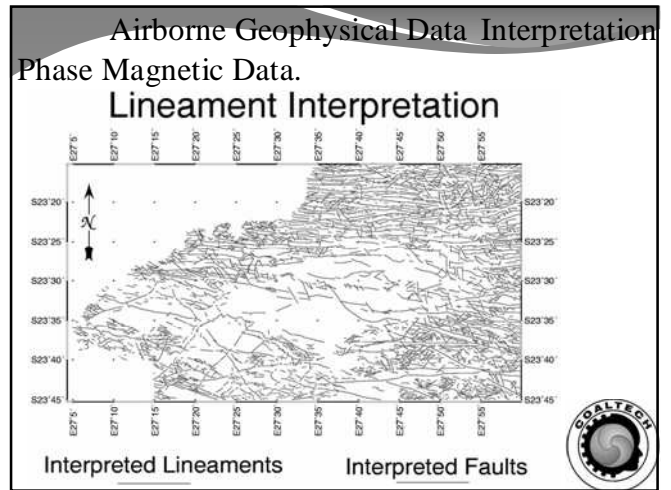
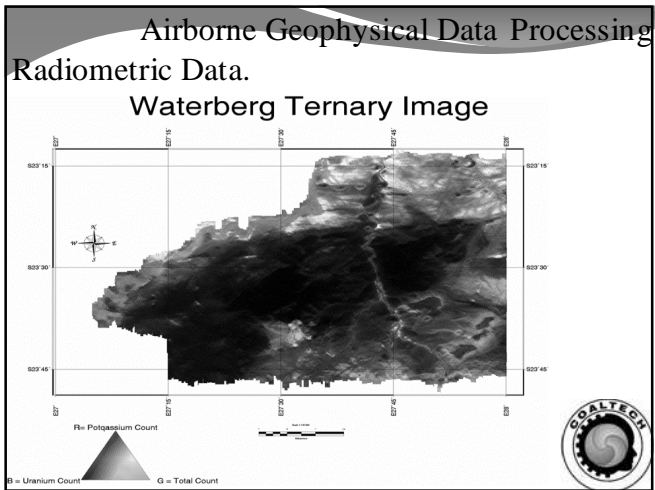
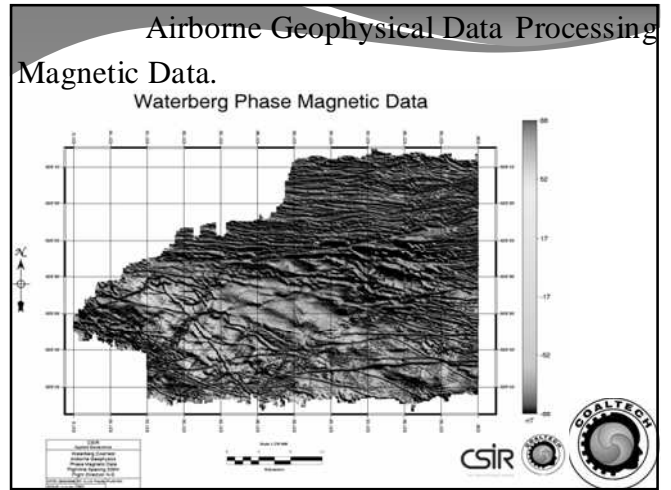
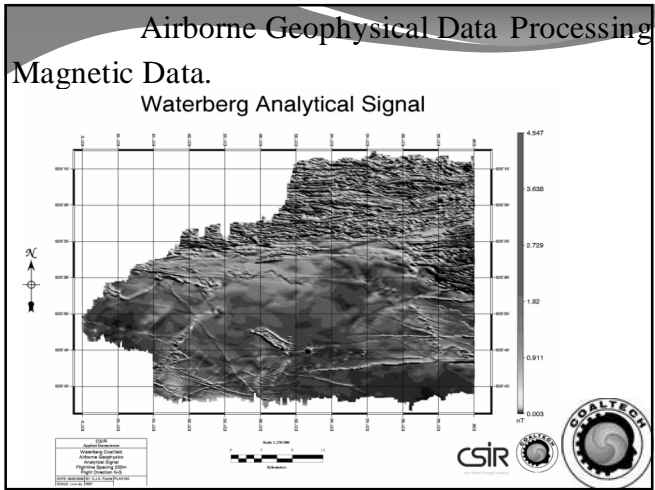


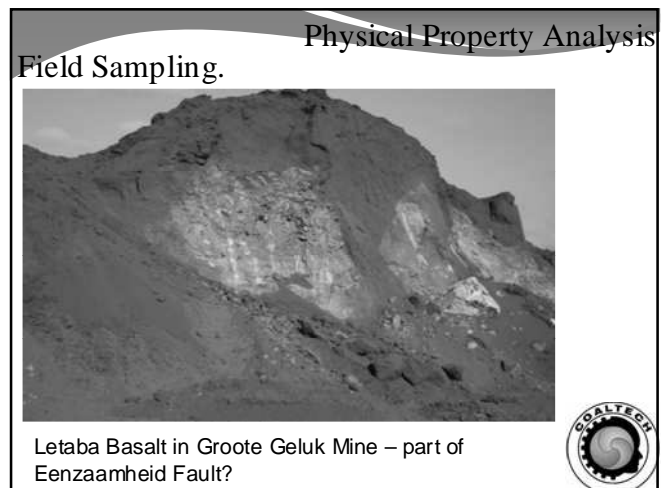
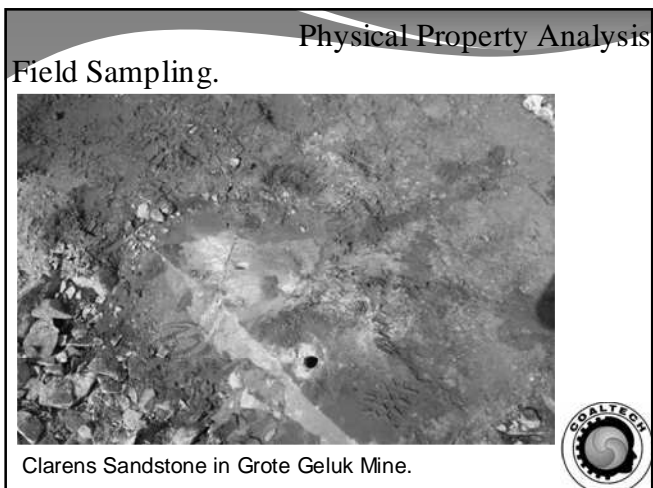
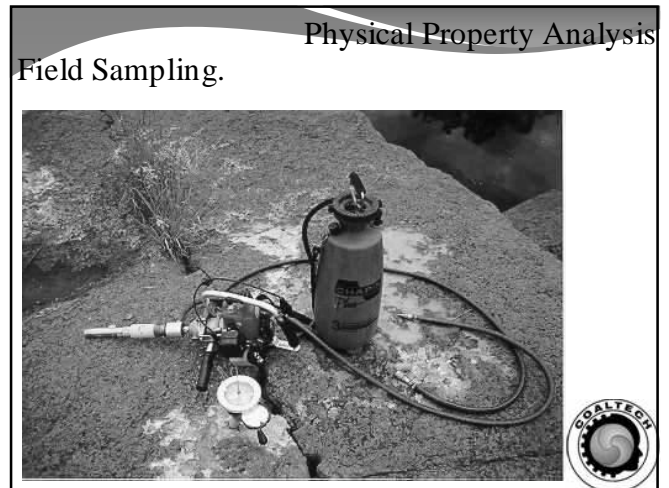
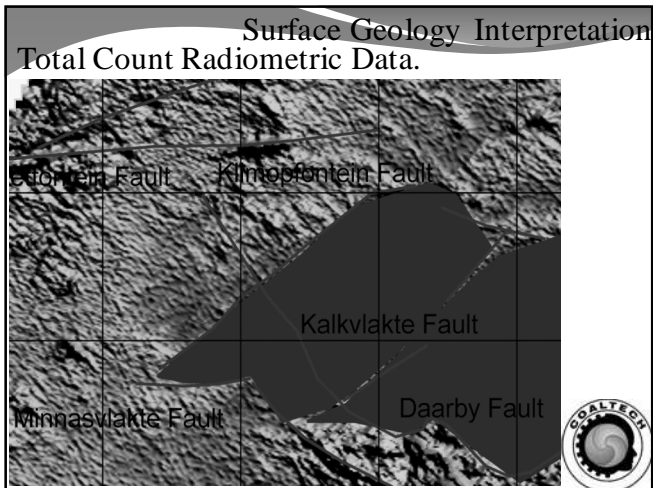
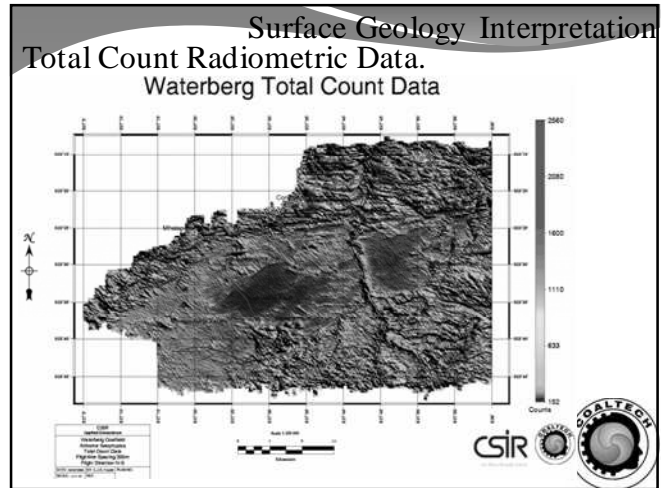
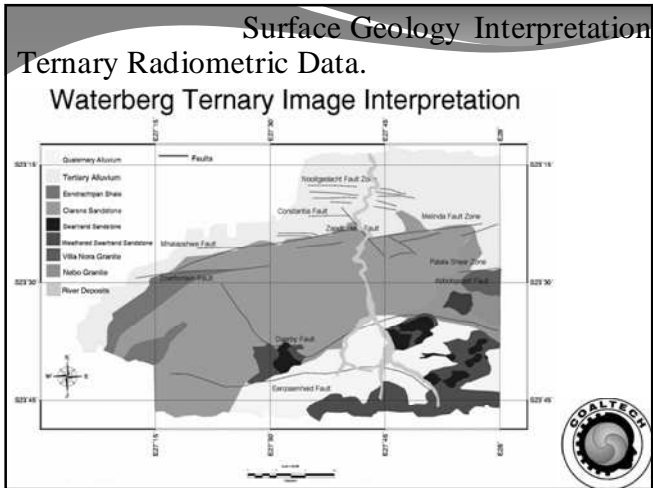
## Airborne Geophysical Survey











Field Sampling.



Holkrans Sandstone



Field Sampling.



Shale



Field Sampling.



Mogolakwena Sandstone – Radar Koppies



Field Sampling.



Dykes – Very weathered



Field Sampling.



Hydrothermal Dyke or Felsite



Field Sampling.




Hydrothermal Dyke or Felsite




Physical Property Analysis

Field Sampling.

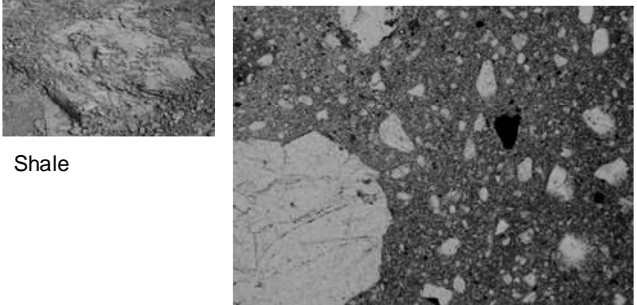


Coal – Old Mine




Physical Property Analysis

Laboratory Analysis.



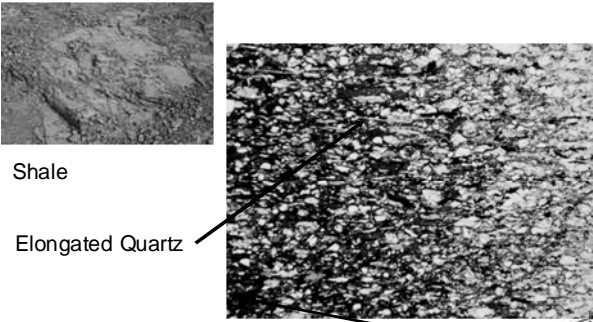
Shale

Rounded intact Quartz



Physical Property Analysis


Laboratory Analysis.



Shale

Elongated Quartz

Fine Grained Black Matrix – possibly Magnetite  
Suggests more Schist-like – not a Shale



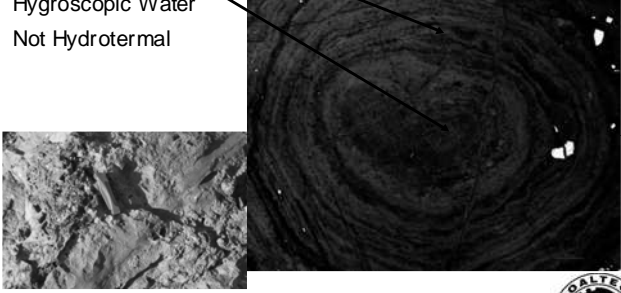
Physical Property Analysis

Laboratory Analysis.


Iron rich Pisolite with growing rings around a Quartz Nucleus

Hygroscopic Water

Not Hydrothermal




Hydrothermal Dyke or Felsite



Physical Property Analysis

Laboratory Analysis.


| SAMPLE  | LOCATION |          | CORE | SAMPLE | DENSITY | P-WAVE |
|---|----------|----------|------|--------|---------|--------|
| DESCRIPTION                                     | LAT      | LONG     | #    | #      | g/cc    | m/s    |
| HOLKRANS SANDSTONE FORMATION                    | -23.6405 | -23.6405 |      |        | 2.248   | 2211   |
| LETABA BASALT                                   | -23.6407 | -23.6407 |      |        | 2.716   | 3007   |
| SWARTRAND SANDSTONE                             | -23.6305 | 27.9531  |      |        | 2.473   | 3862   |
| SHALE   | -23.6533 | 27.466   |      |        | 3.396   | 4903   |
| HYDROTHERMALLY ALTERED SANDSTONE / FELSITE DYKE | -23.7622 | 27.797   |      |        | 2.623   | 4791   |
| MOGALAKWENA SANDSTONE FORMATION                 | -23.8549 | 27.6602  |      |        | 2.679   | 4214   |
| MOGALAKWENA SANDSTONE FORMATION                 | -23.852  | 27.8601  |      |        | 2.753   | 4583   |
| SHALE   |          |          |      |        | 2.488   | 3559   |
| COAL  |          |          |      |        | 1.404   | 941    |



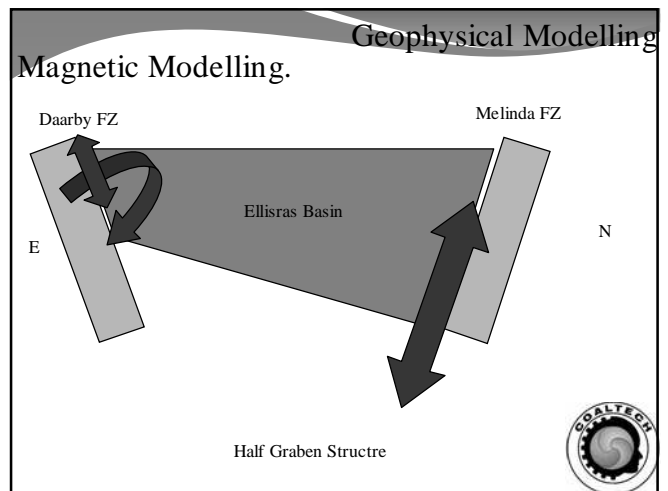
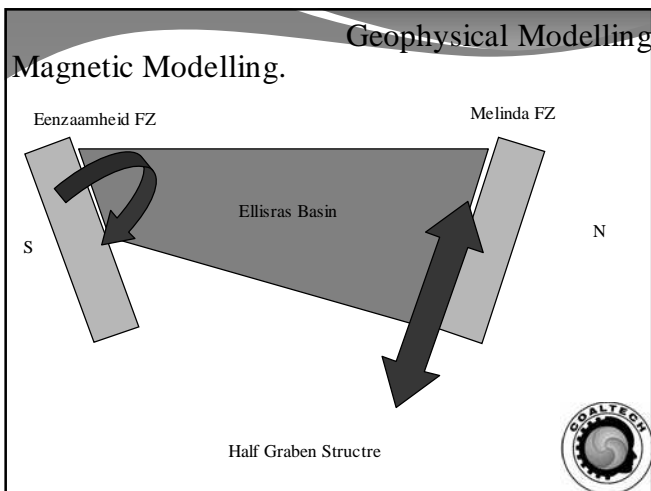
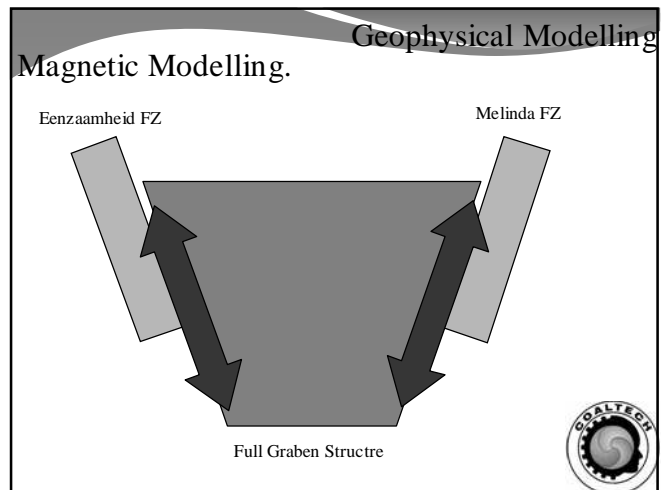
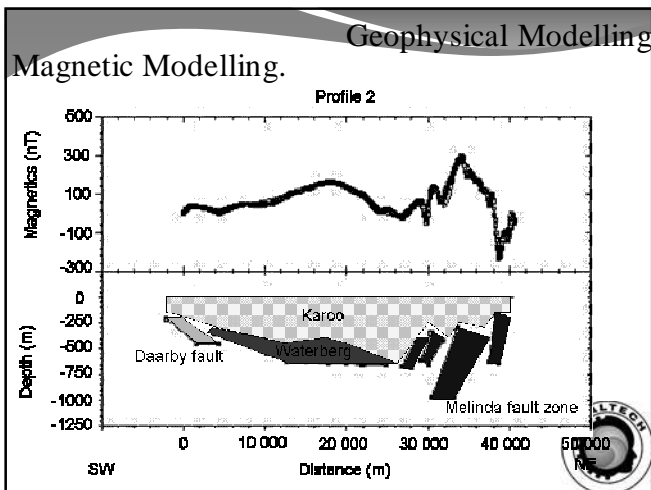
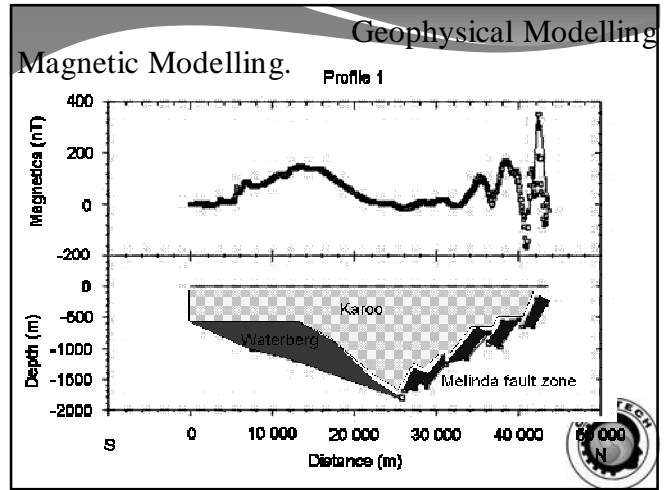
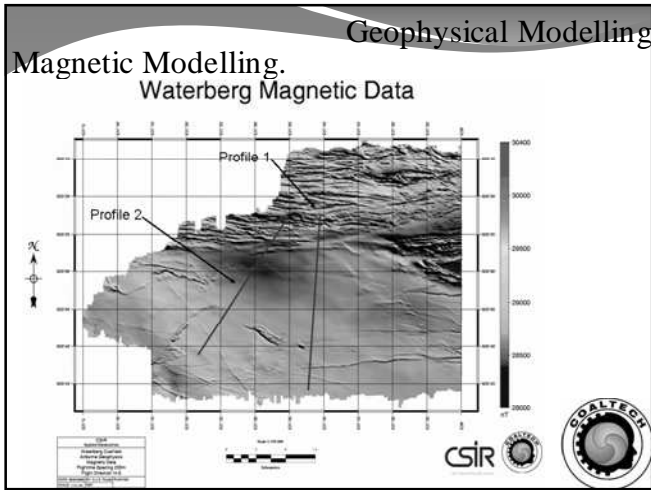
Physical Property Analysis

Laboratory Analysis.

| SITE # | SAMPLE DESCRIPTION                              | LOCATION |          | SUSCEPTIBILITY<br>( $\times 10^{-5}$ ) SI | INTENSITY (mA/m) |         |
|--------|---|----------|----------|---|------------------|---------|
|        |   | LAT      | LONG     |   | NRM              | 15mT    |
| ED1    | HOLKRANS SANDSTONE FORMATION                    | -23.6405 | -23.6405 | 2.858                                     | 0.338            | 0.1     |
| ED2    | LETABA BASALT                                   | -23.6407 | -23.6407 | 368.389                                   | 1234.500         | 325.137 |
| ED3    | SWARTRAND SANDSTONE                             | -23.6305 | 27.9531  | 2.093                                     | 4.294            | 0.233   |
| ED4    | SHALE   | -23.6533 | 27.466   | 277.389                                   | 0.434            | 0.529   |
| ED5    | HYDROTHERMALLY ALTERED SANDSTONE / FELSITE DYKE | -23.7622 | 27.797   | 14.083                                    | 4.380            | 9.914   |
| ED6    | MOGALAKWENA SANDSTONE FORMATION                 | -23.8549 | 27.6602  | 10.632                                    | 6.381            | 3.484   |
| ED7    | MOGALAKWENA SANDSTONE FORMATION                 | -23.852  | 27.8601  | 12.405                                    | 2.816            | 7.147   |
| EDH1   | SHALE   |          |          | 7.533                                     | 0.195            | 0.070   |
| EDH2   | COAL  |          |          | -0.279                                    | 0.030            | 0.037   |

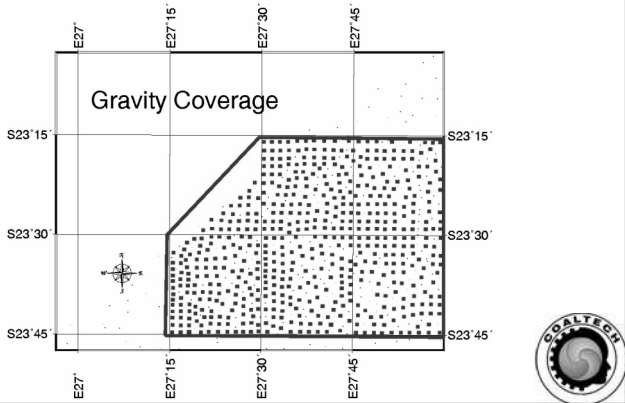




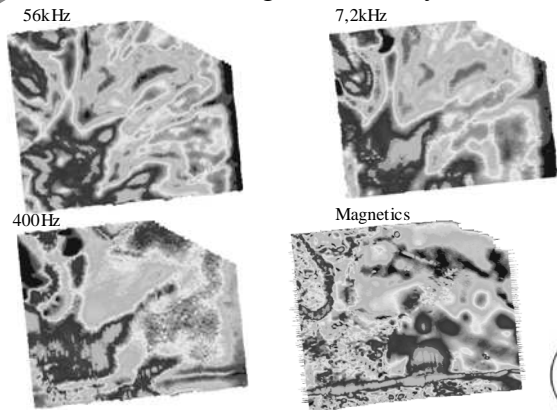




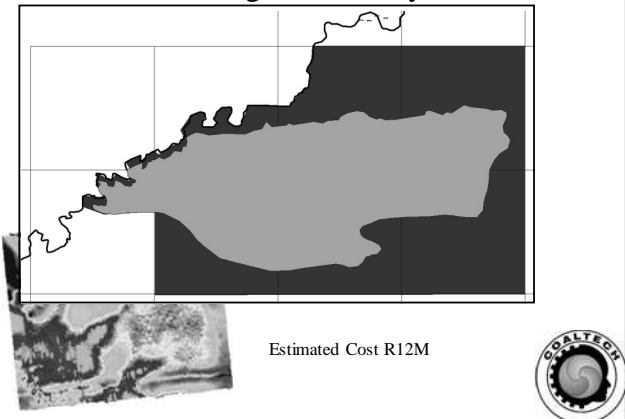
### Semi Regional Infill Survey.



### Airborne Electromagnetic Survey.



### Airborne Electromagnetic Survey.



Thank You

