Airborne and Ground-Based Geophysical Surveys

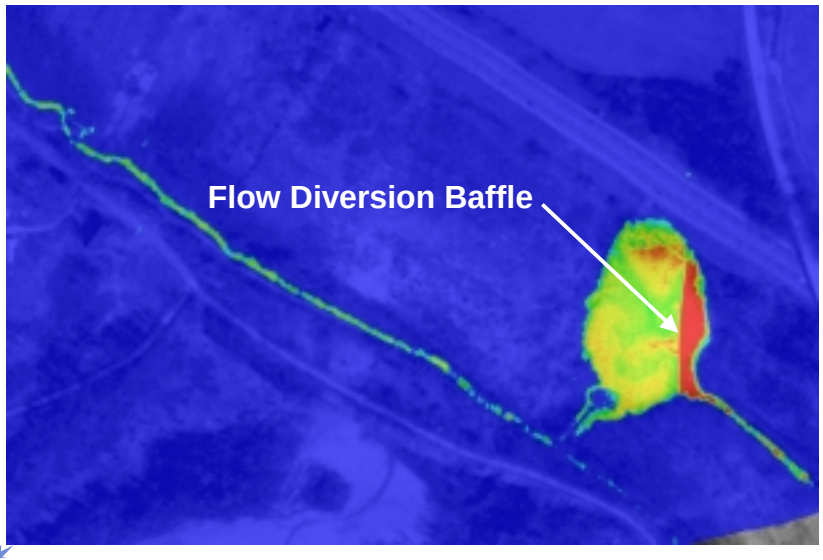
Richard W. Hammack

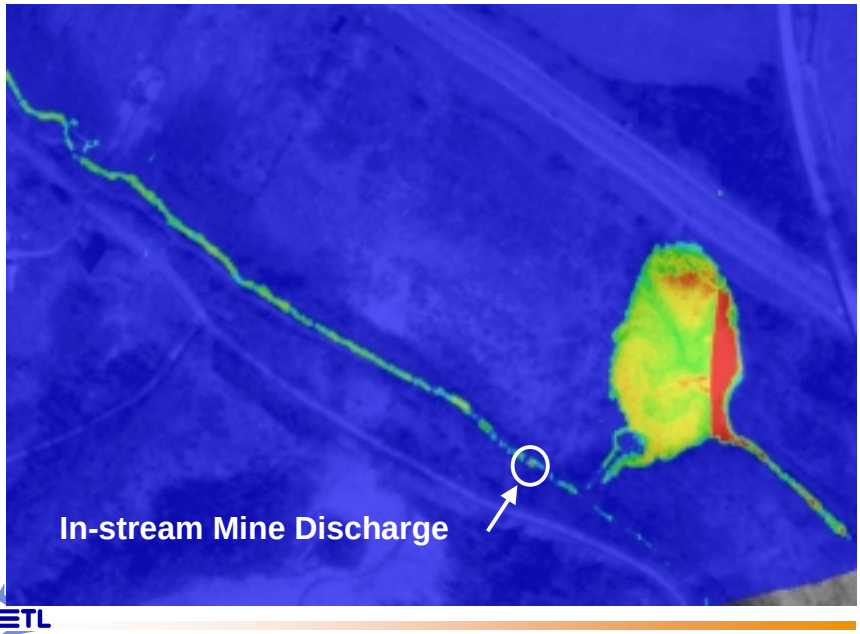
Remote Sensing

- Thermal Infrared Imaging
- Magnetics
- EM Conductivity
- Resistivity

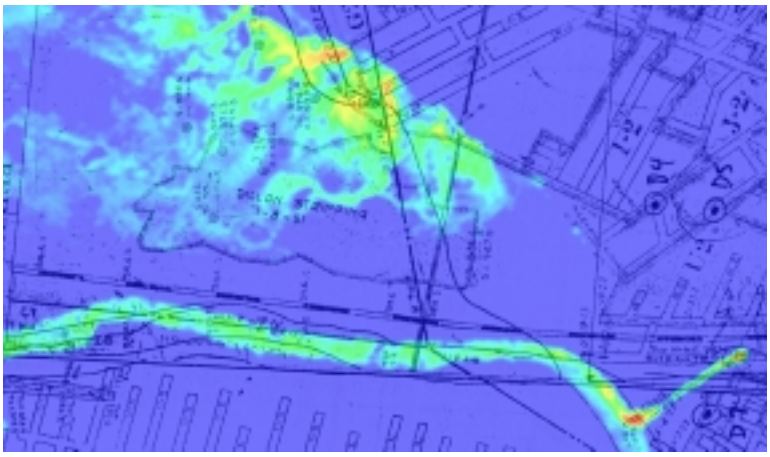
Thermal Infrared Imaging

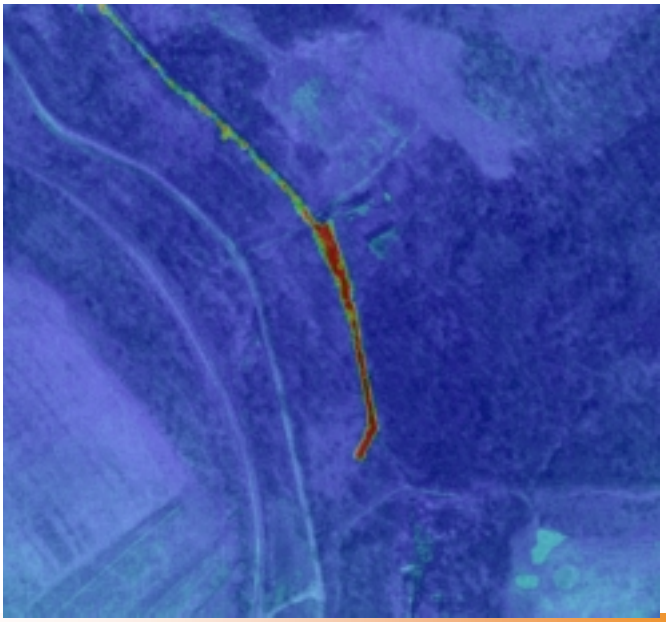
- **Daedalus AADS 1268**
  - 3.16-5.20 micron
  - 8.28-10.67 micron
- **Temperature resolution 0.1 ^{0}C**
- **Night**
- **2600 ft**
- **Applanix 310 POS/AV**
- **Helicopter or fixed wing**



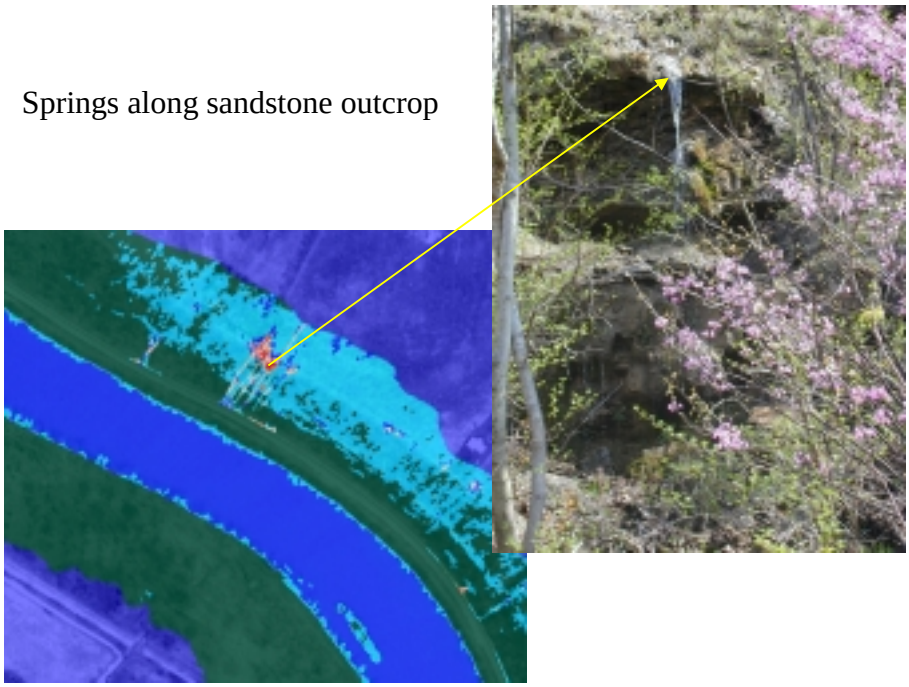

In-stream Mine Discharge

Brinkerton Mine Site Discharges

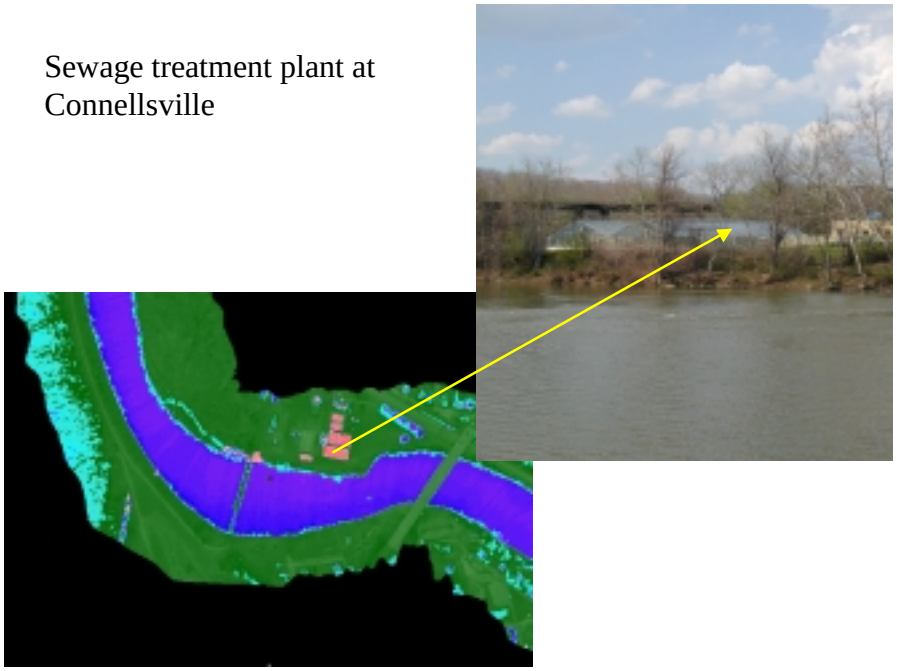




Springs along sandstone outcrop

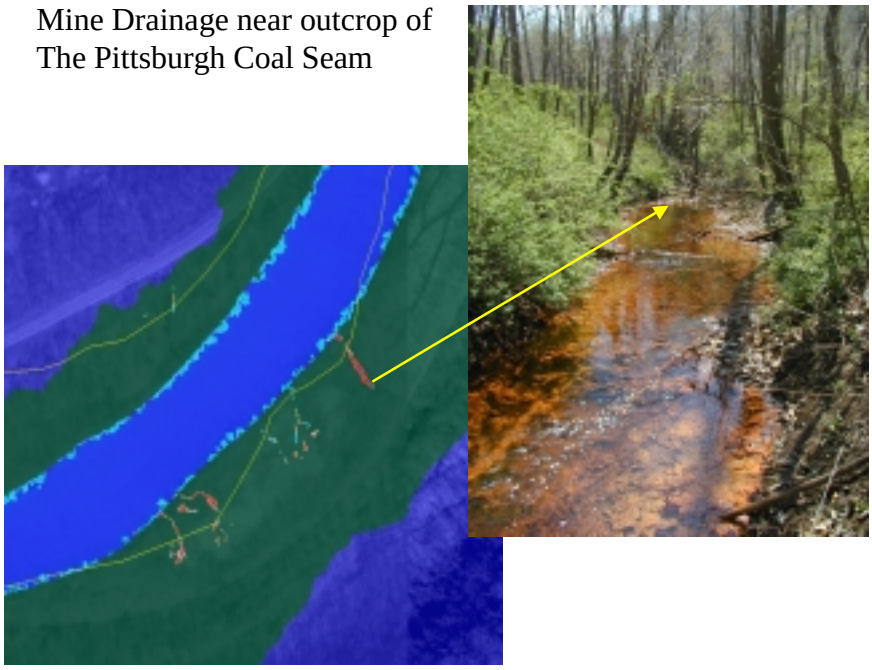


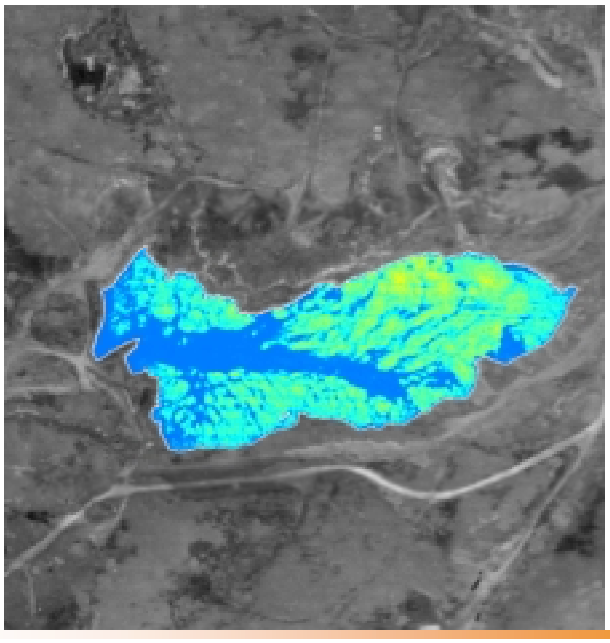
Sewage treatment plant at Connellsville



Treated mine discharge

Mine Drainage near outcrop of
The Pittsburgh Coal Seam





Initials Date

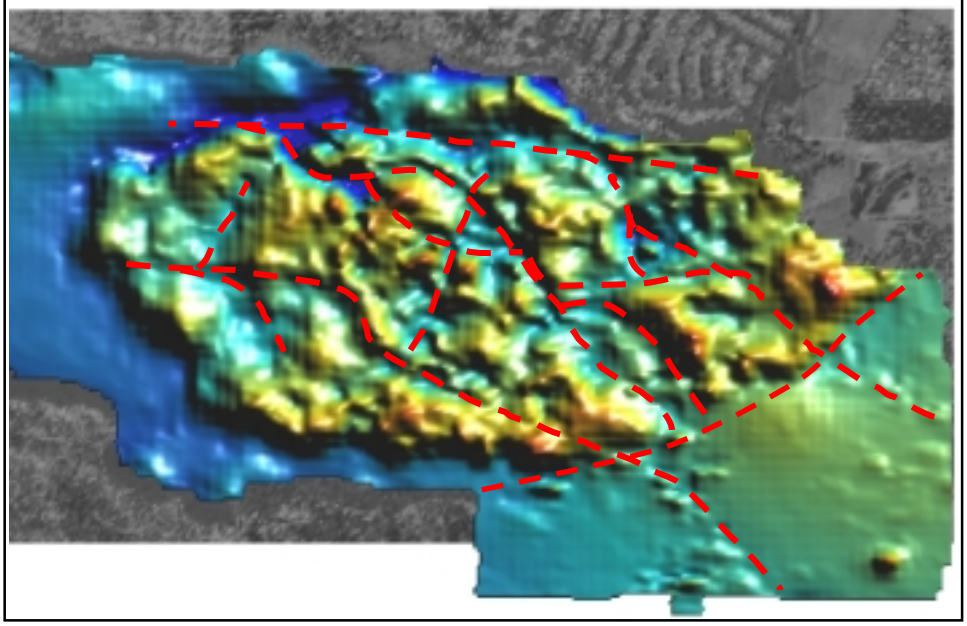
Airborne Geophysical Surveys

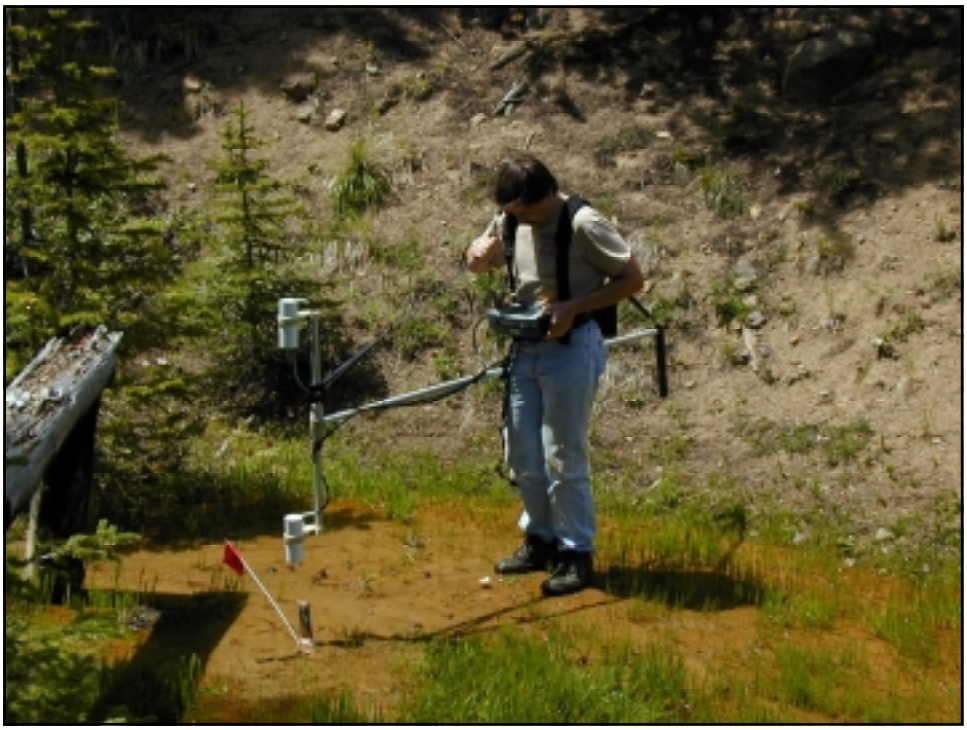
- **AS355F-1 helicopter platform**
- **100 ft elevation**
- **50-m line spacing**
- **Sample every 3 meters**
- **Magnetic survey**
  - Cesium magnetometer
    - 0.01 nT sensitivity
- **Electromagnetic survey**
  - Dighem^{V}
  - Dighem^{VRES}

Sulphur Bank Mercury Mine Superfund Site

Magnetics

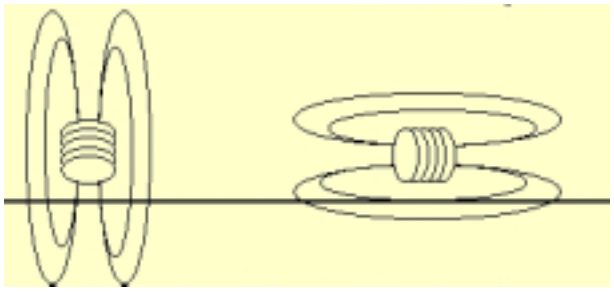
Total Magnetic Field





Effective Exploration Depth

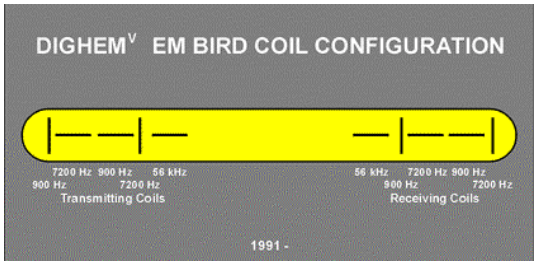
- Increased depth with increased intercoil spacing
- Depth depends on coil orientation



Initials Date

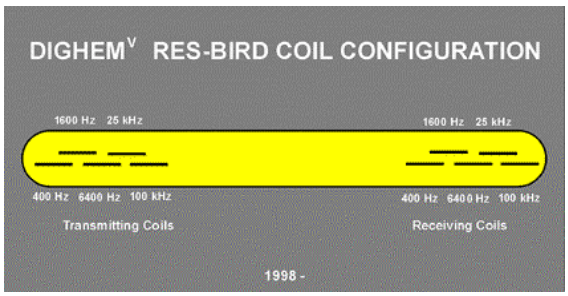
Electromagnetic Conductivity

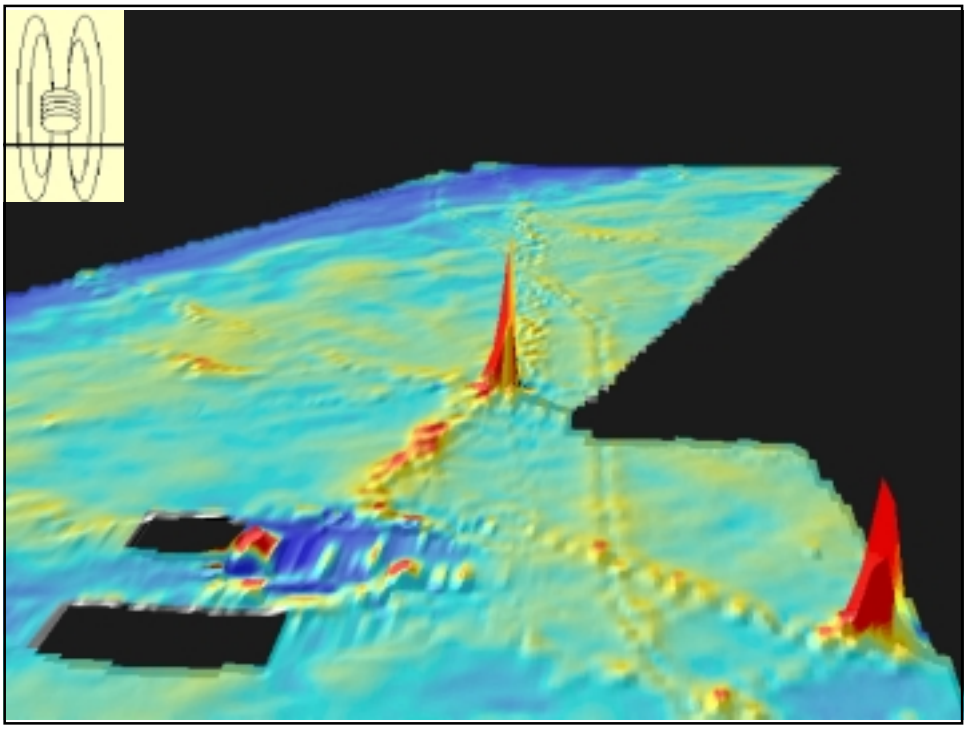
- **Dighem^{V}**
  - Coaxial: 1,075 Hz and 5,968 Hz
  - Coplanar: 865 Hz, 7,252 Hz, and 56,470 Hz
  - Coil separation-8 m; 6.3 m for 56 kHz

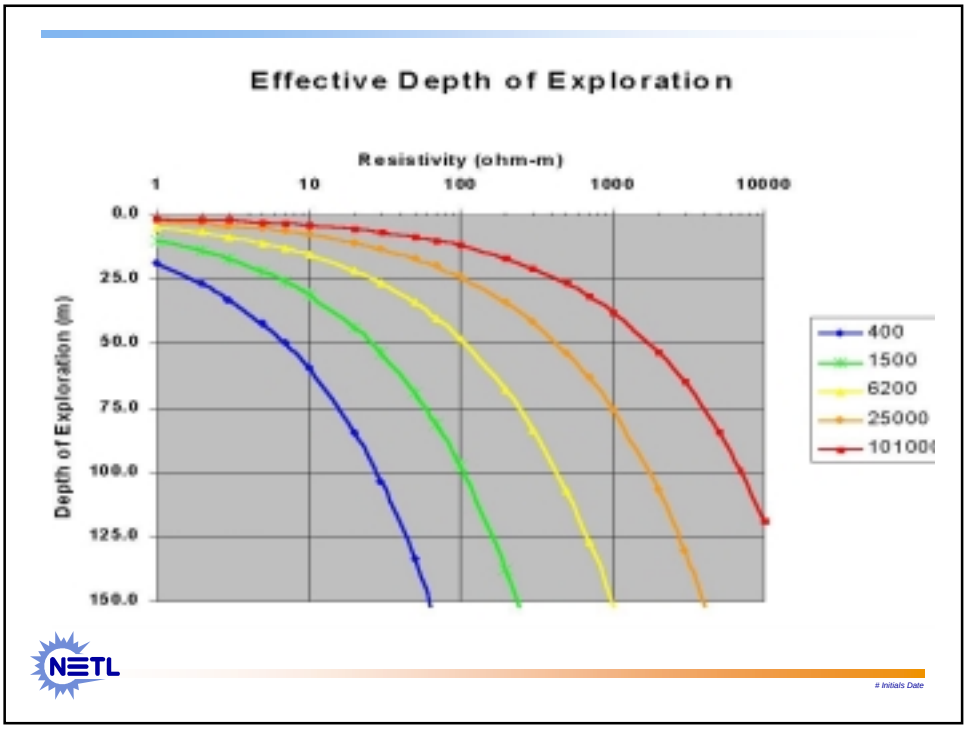


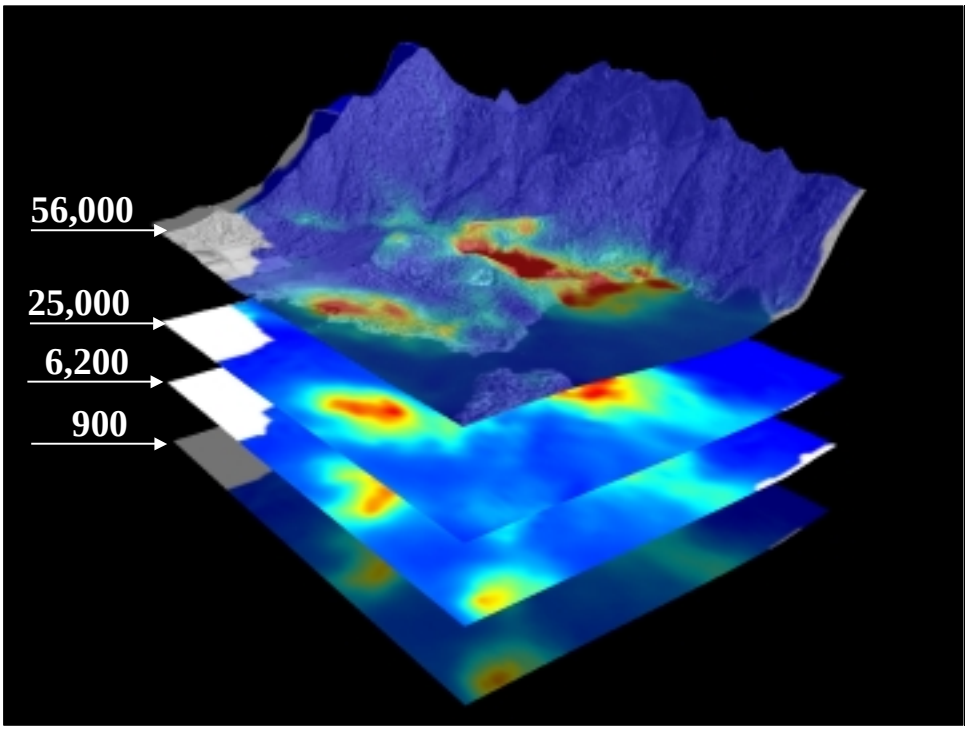
Electromagnetic Survey

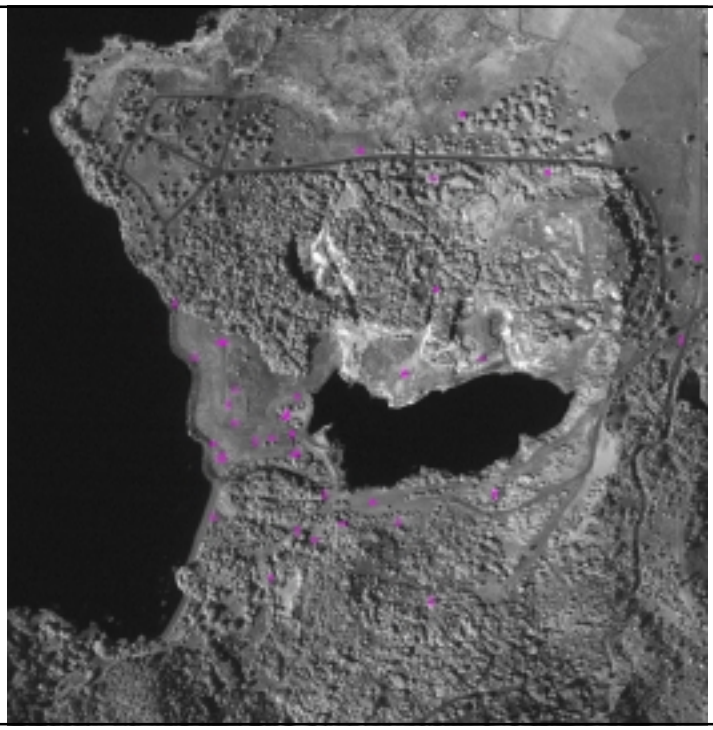
- **Dighem^{VRES}**
  - Coplanar 391 Hz, 1,557 Hz, 6,261Hz, 25,820 Hz and 89,370 Hz
  - Coil separation- 8 m

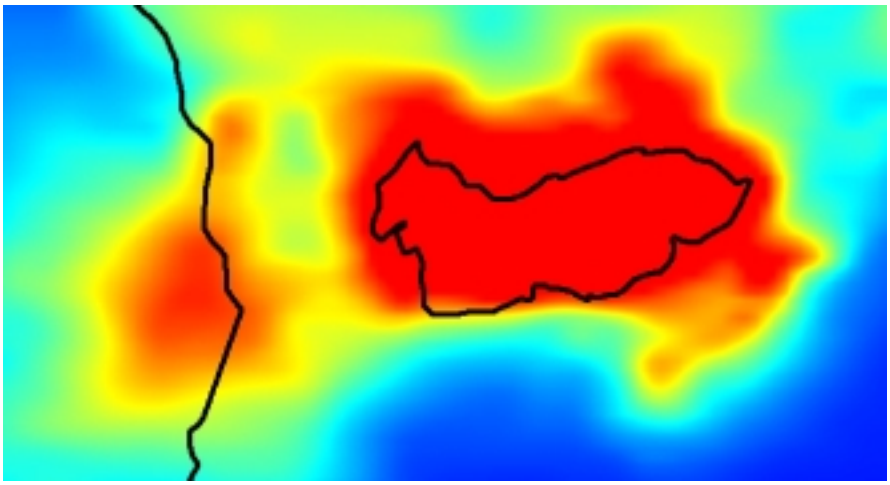


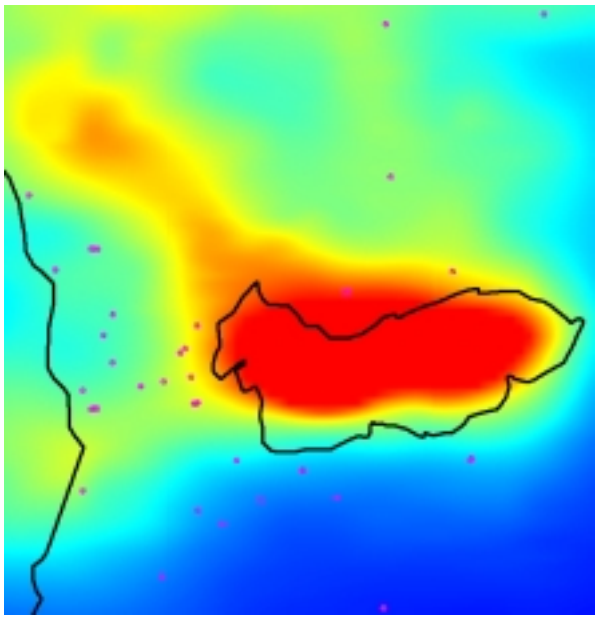


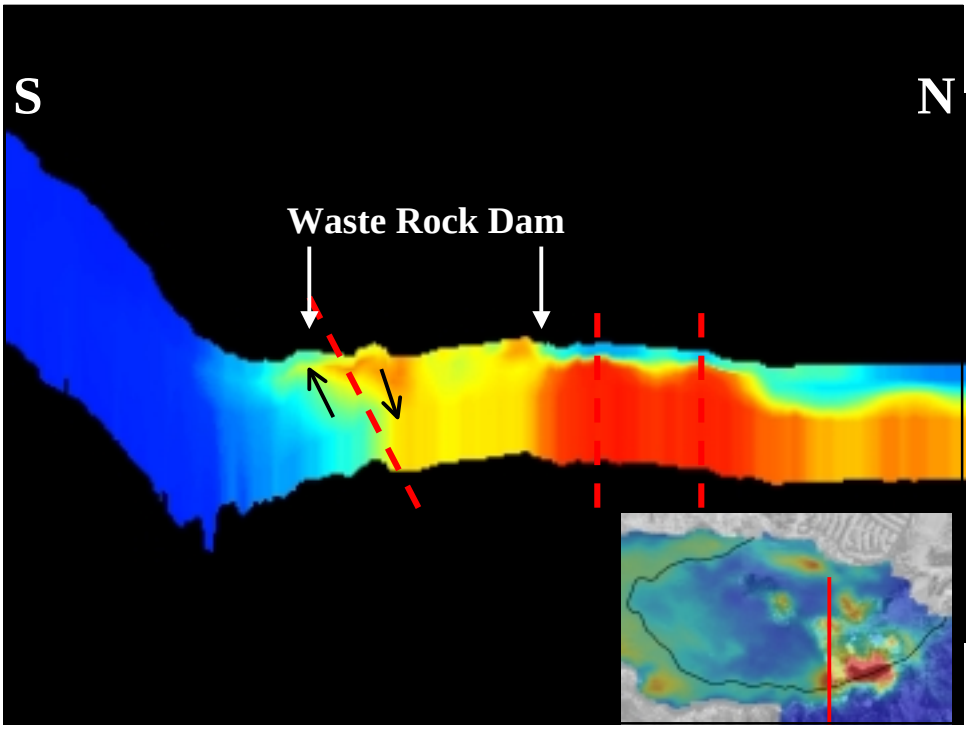

Effective Depth of Exploration
Resistivity (ohm-m)
1
10
100
1000
10000
0.0
25.0
50.0
75.0
100.0
125.0
150.0
Depth of Exploration (m)
400
1500
6200
25000
101000
NETL
Initials Date

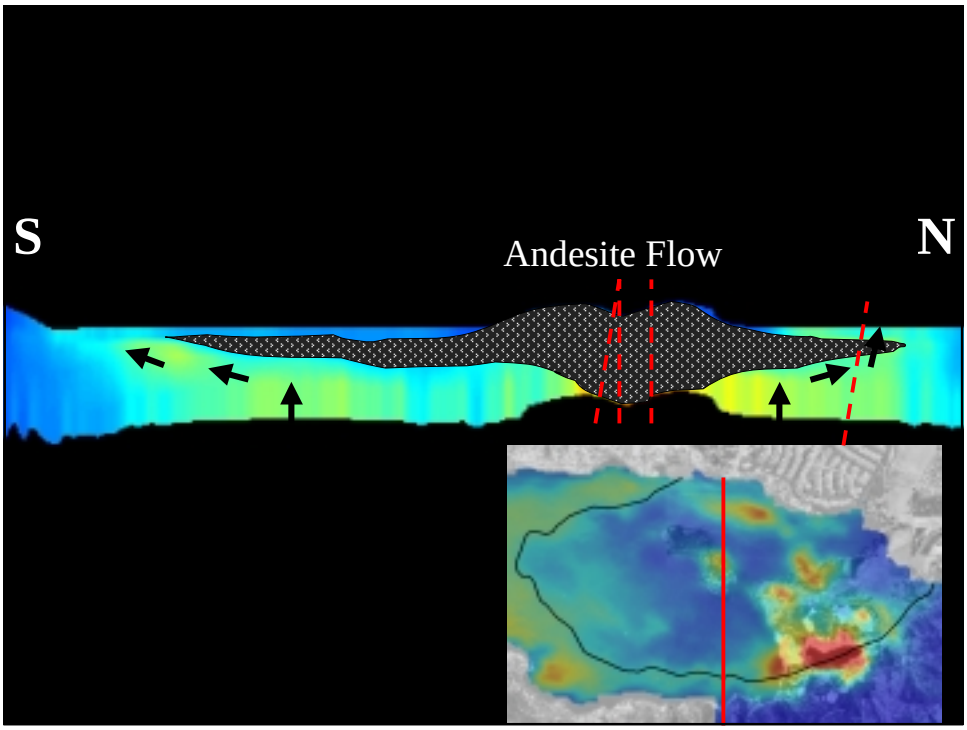

56,000
25,000
6,200
900

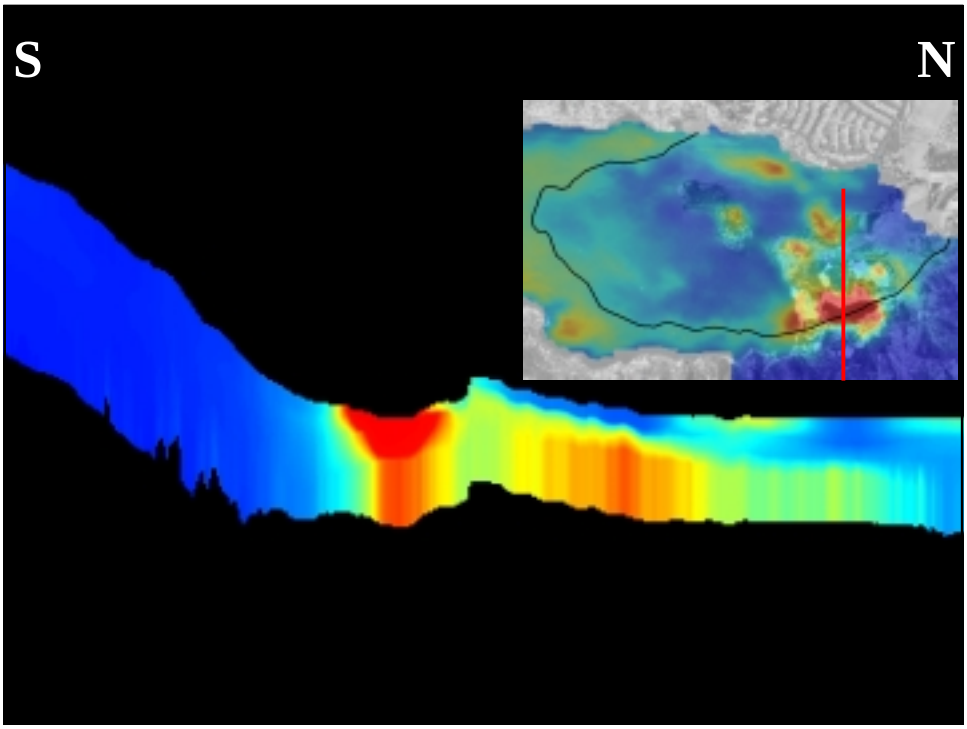


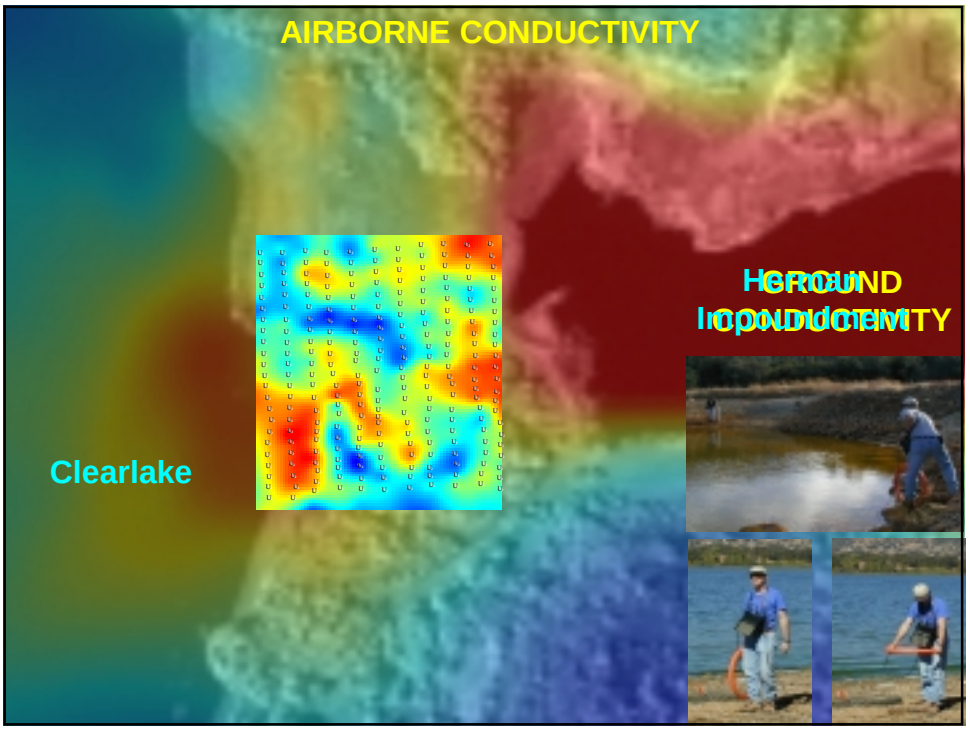




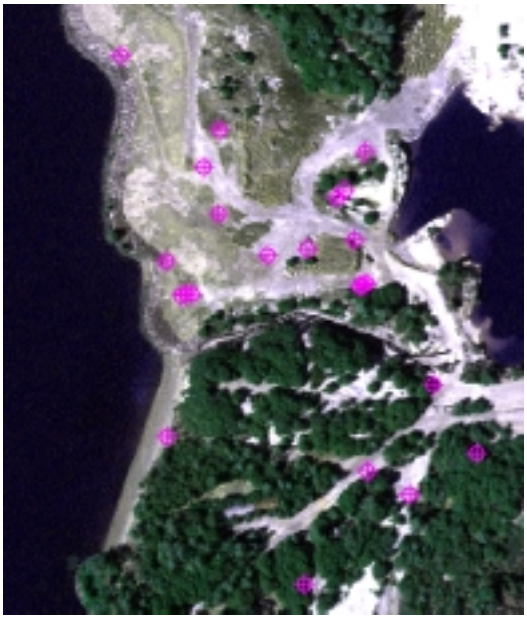

S
N
Waste Rock Dam

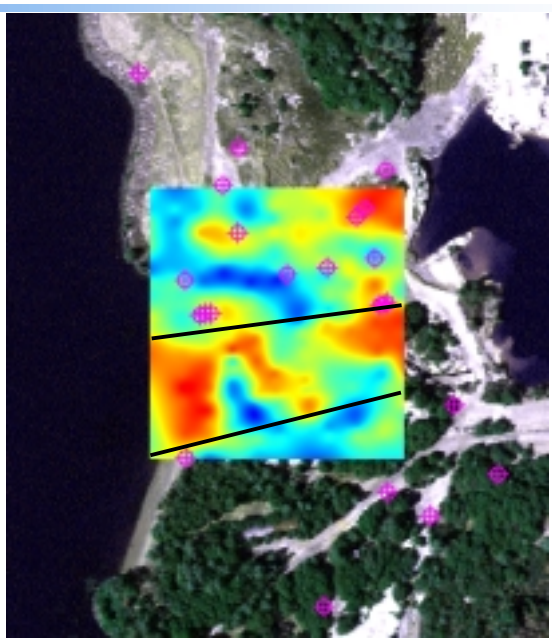

S
N
Andesite Flow


S
N

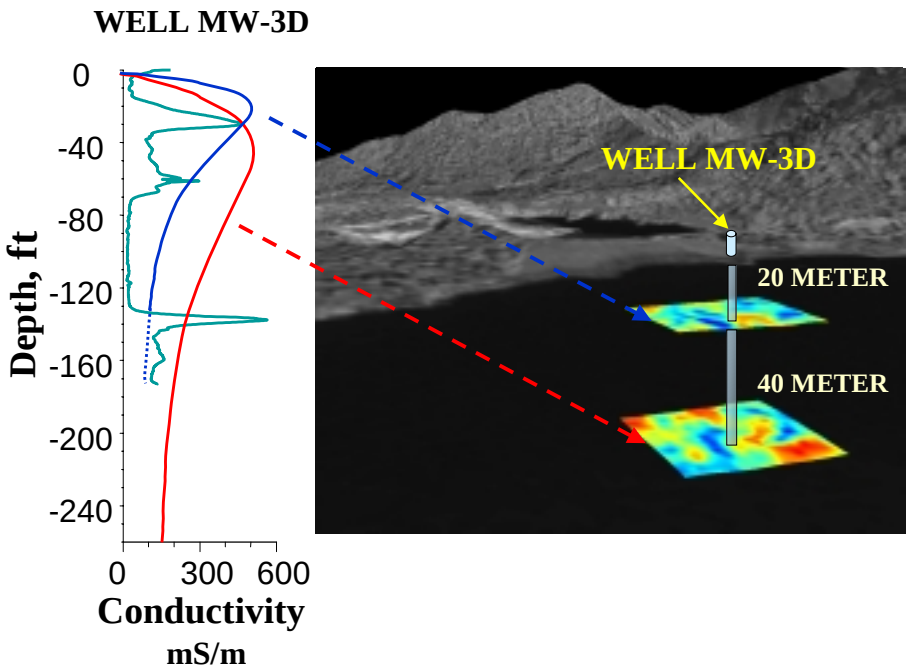

AIRBORNE CONDUCTIVITY
Clearlake

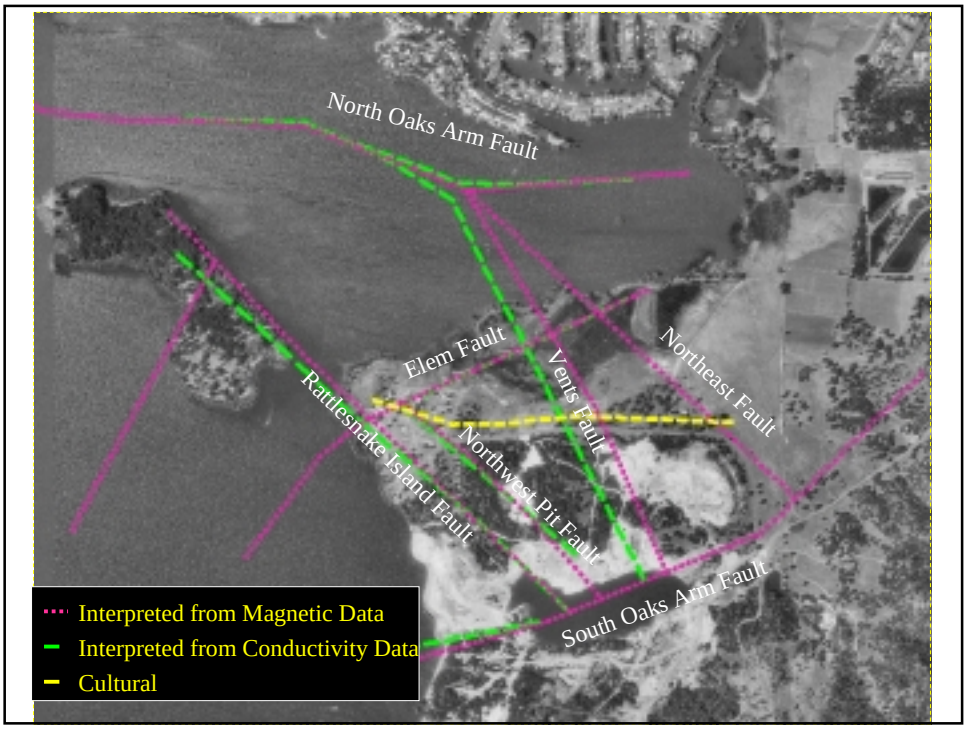
Groundwater Monitoring Wells

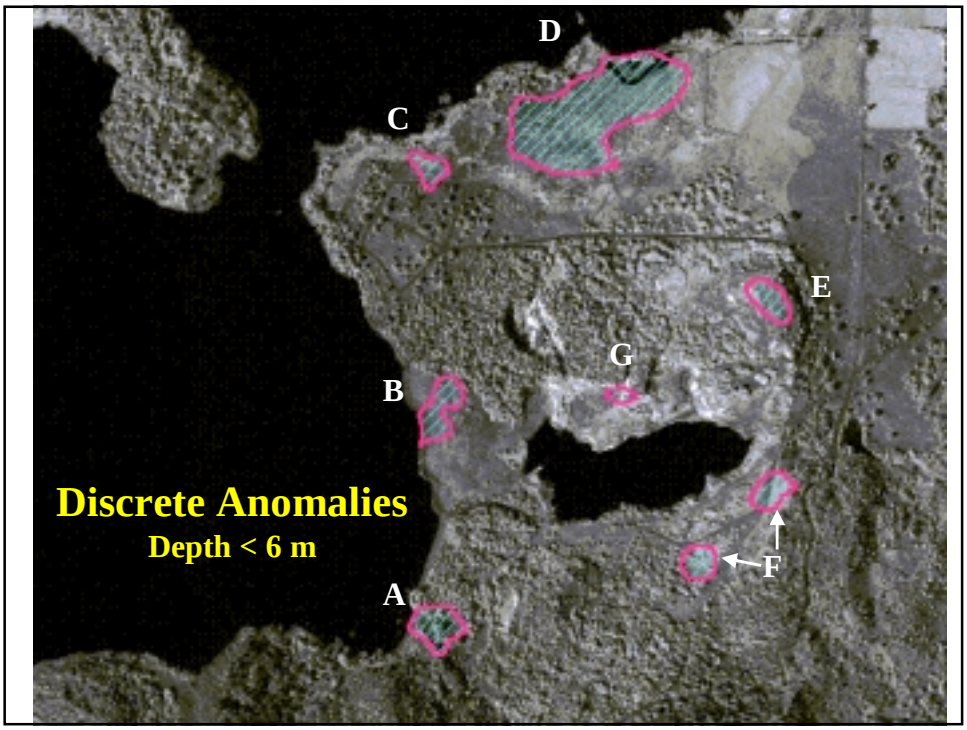




Down-Hole Geophysical Logging



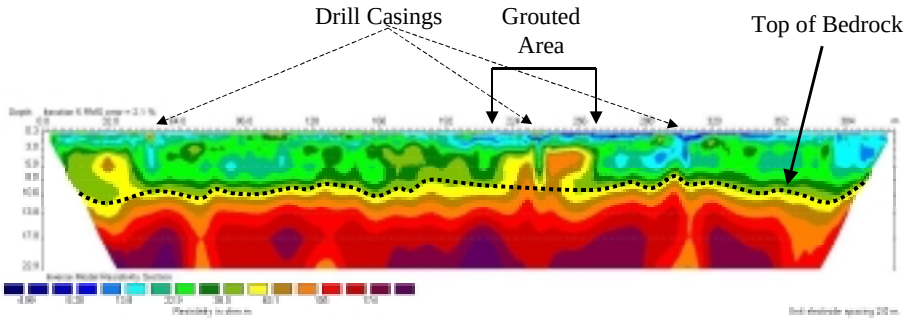

North Oaks Arm Fault
Elem Fault
Vents Fault
Northeast Fault
Rattlesnake Island Fault
Northwest Pit Fault
South Oaks Arm Fault
Interpreted from Magnetic Data
Interpreted from Conductivity Data
Cultural


D
C
E
G
B
Discrete Anomalies
Depth < 6 m
F
A

Resistivity

FedEx

Interstate 70
Guernsey County, Ohio



Initials Date

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