



Jeremy Scott Collyard, PMP

Post Closure Monitoring of Tailings Storage Facilities

**Tempe, Arizona
March 2016**

Drivers

- **Internal**

- Future Land Use
- Future Engineering

- **Regulatory**

- Achieve Closure for a Facility
 - Permit Modification
 - Modification of the Overall Site Closure Strategy
 - Modification of Financial Assurance Requirement



- **Risk Management and Responsible Closure**

- Safety and Security
- Performance Based Engineering and Construction



State of Nevada
Department of Conservation & Natural Resources
Division of Water Resources
Jason King, P.E., State Engineer



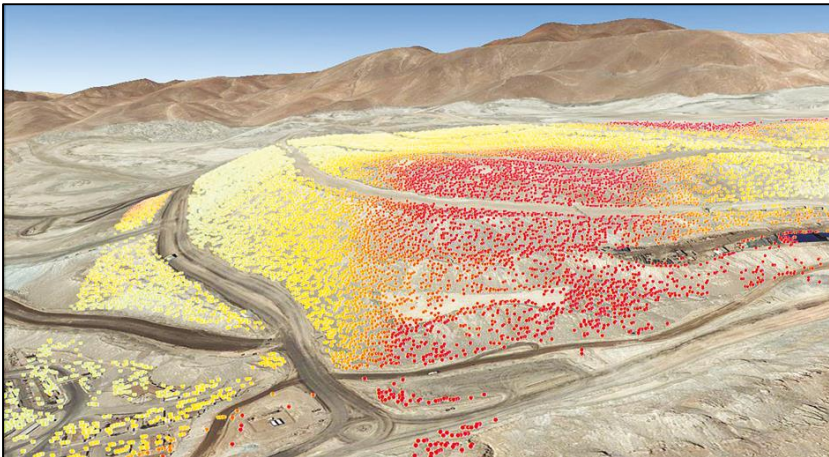
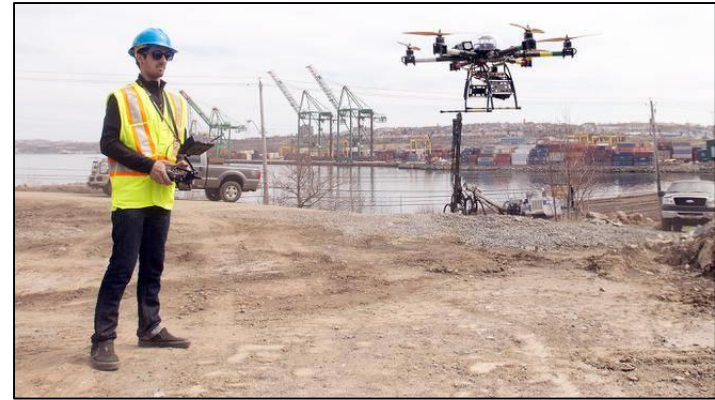
Performance Indicators

- **Geotechnical Stability**
 - Internal
 - Risk Management
- **Migration of Solutions (Drain Down)**
 - Internal
 - Risk Management
- **Surrounding Points of Compliance** (*Facility and Down-gradient Groundwater and Storm Water*)
 - Internal
 - Regulatory
 - Risk Management
- **Performance of Closure (Erosion, Vegetation, Channels, etc.)**
 - Internal
 - Regulatory
 - Risk Management



Instrumentation and Investigation Settlement

- Survey
- Inclinator, Extensometer
- Visual Inspections of the Cover Surface



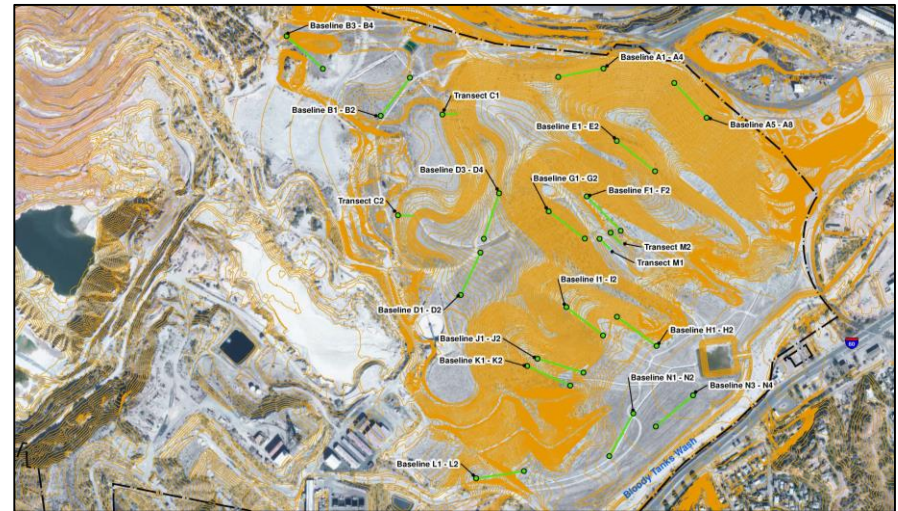
Instrumentation and Investigation Solutions

- Piezometers within Tailings and Surrounding Areas
- Groundwater Monitoring Wells within Tailings and Surrounding Areas
- Flow Monitoring Stations
- Geophysical Investigations within Tailings and Surrounding Areas



Instrumentation and Investigation Performance of Cover Design

- Visual Inspections of the Cover Surface
- Visual Inspections of the Storm Water Management Channels and Ponds
- Flow and Depth Monitoring Stations for Storm Water Management Channels and Ponds
- Vegetation Survey
- Soil Moisture Sensors – Infiltration Monitoring



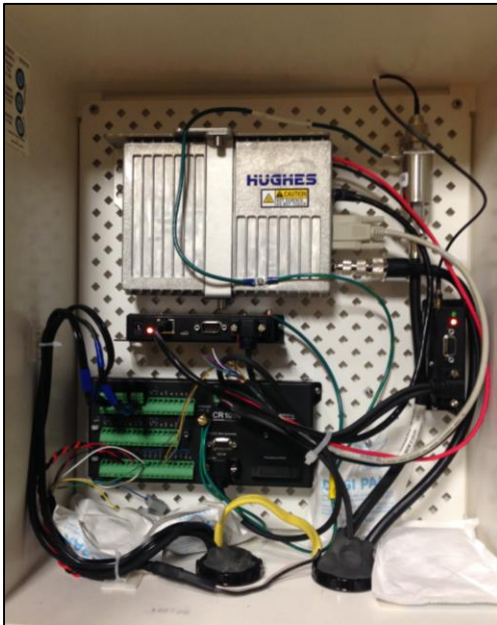
Instrumentation and Investigation Meteorological

- **Meteorological Monitoring Station**
 - Applies to Geotechnical Stability, Solution Management, and Performance of Cover Design



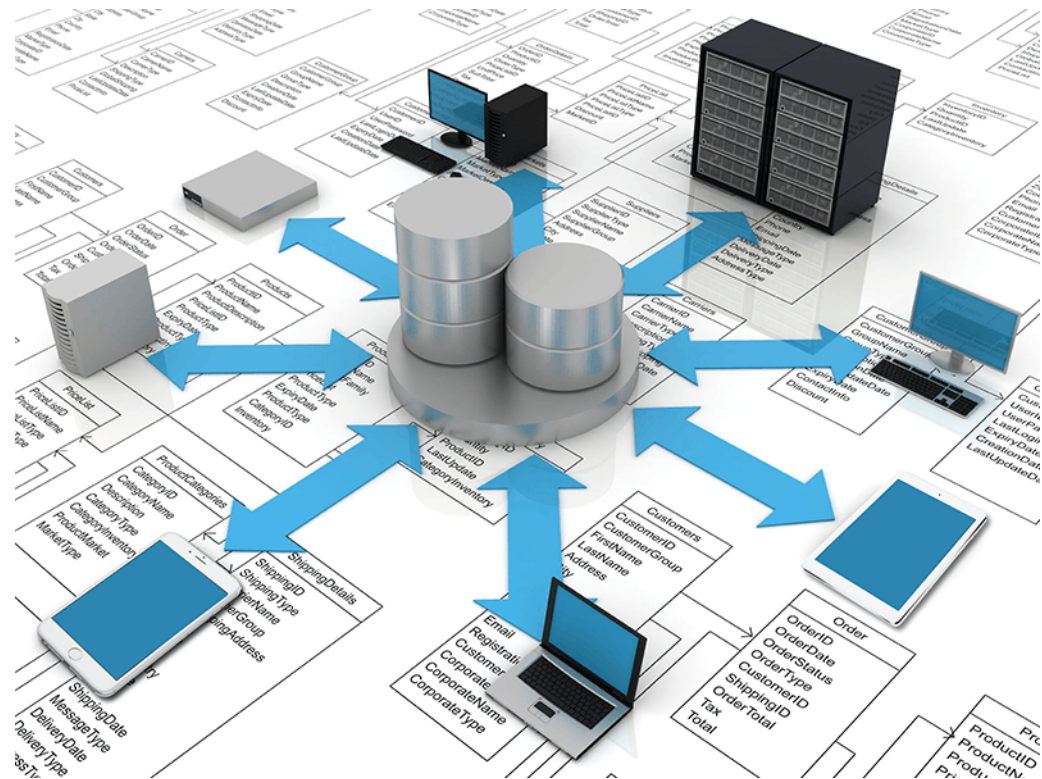
Data Collection

- Field Technicians – Visual Inspections, Direct Connect Data Collection
- Telemetry – Private Radio Frequency, Wi-Fi, Cellular, Satellite



Data Management

- Electronic Database – Local Server or Hosted
- Data Validation – Ensure the Data is Useful and Consistent
- Universal Data Storage – Store All Pertinent Data in One Accessible Place



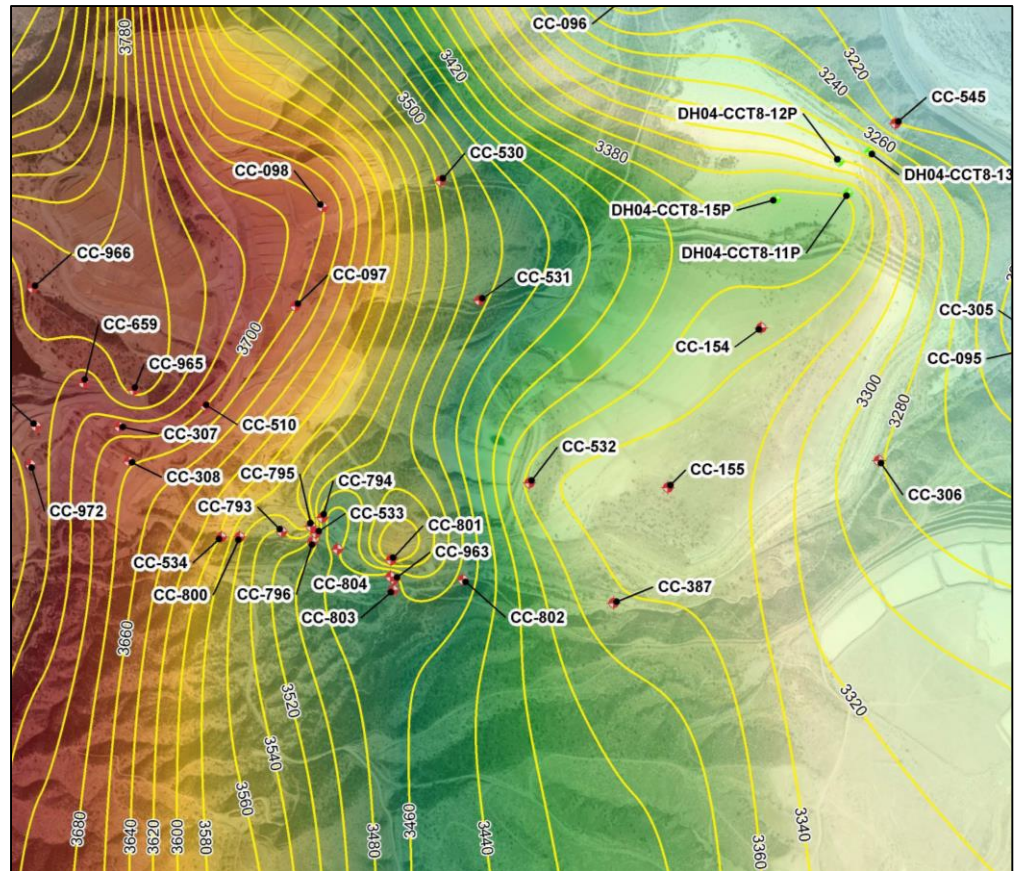
Data Reporting and Utilization

- **Internal Reporting**

- Identification and Response to Risk
- Project Performance Current and Future Engineering

- **Regulatory Reporting**

- “Closure” of Site
- Release of Financial Assurance
- Future Land Use Goals



Implementation and Utilization of Existing Data and Monitoring Locations





Thank you!

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