Planning and Executing Laboratory Services in Remote Environments
PRESENTATION OVERVIEW

- Brief Introduction to AGAT Laboratories
  - Northern and remote environments analytical services

- Remote Environments and Analytical Services
  - What are the unique factors?
  - What can go wrong?
  - How might it impact my project?
  - What can I do about it?

- Case Study
  - Practical application of analytical solutions
INTRODUCTION TO AGAT

Coast to Coast Locations

Service Beyond Analysis  www.agatlabs.com  AGAT Laboratories
INTRODUCTION TO AGAT
Multi-Divisional

We specialize in the following scientific areas:

- Environmental Chemistry
- Ultra-trace Toxicology
- Agricultural Analysis
- Air Quality Monitoring
- Food Testing Services
- Oilsands Analysis
- Routine Core
- Geology and Petrology
- Reservoir Characterization
- Oil and Gas Chemistry
- Tribology Preventative Maintenance
- Mining Geochemistry
Remote Environments
What Are The Unique Factors?

➢ Travel and Site Access
  • Boat, plane, helicopter, or truck? Or all of them?
  • Timing of site access and field work (limited window)
  • Weather and travel delays are common (climate and technology)
  • Shipping logistics are very challenging

➢ Distance from Infrastructure
  • Proximity to the nearest laboratory
  • Proximity to the nearest hardware store

➢ Communication and Support
  • No means of communication (no cell or email service)
  • No support for on-site problems

➢ Costs and Effort
  • Very costly with complex planning and execution
Remote Environments
What Can Go Wrong?

➤ Sample Containers and Storage
  • Shipment late
  • Partial Shipment Arrive
  • Broken Bottles
  • Access to ice or cold storage

➤ Field Program
  • Additional Samples Collected/Required
  • Return Shipping delayed – overbooked, delayed

➤ Communication
  • Access to phone coverage
  • Time Zone differences
Remote Environments
How Might It Impact My Project?

- Challenges can compromise Schedule and DQO’s
  - Missing hold times
  - Additional Travel, Rental Costs
  - Standby time for staff and other contractors
  - Lose access to site due to weather/local conditions
  - Resampling Costs
  - Incurring expense to repeat work performed

- Potential issues are magnified when working in remote environments
  - Significant impacts to the quality analytical data
  - Completeness of the report conclusions and findings
  - Perception of performance (or lack thereof) from your client.
Remote Environments
What Can I Do About It?

- Laboratory testing represents only one aspect of the overall project but it is an integral part of the process.

- Laboratories have a wealth of experience in testing, shipping, and all logistical issues encountered.

- AGAT works with the client to review the scope of the sampling activities, identify the critical issues in the project and then uses our knowledge base and experience to design a program that will work for them.
Remote Environments
How Can the Lab Help?

How are samples being shipped back to the lab?
- All at once
- Multiple shipments – longer sampling program or short hold times
- Shipment to multiple labs

Shipping back to one lab or multiple labs
- Based on testing required
- Quicker to direct ship samples if more than one lab site used
- Logistics more complex, easier to route through single site.
- At very least, single point of contact should be maintained for client.
Remote Environments
How Can the Lab Help?

Need to consider sampling requirements

- What are the Data Quality Objectives for the Project?
- What containers are required?

Can smaller sample sizes be used for analysis –

- Consideration of DQO’s
- Improvements in technology
- Changes to methodology
Remote Environments
How Can the Lab Help?

Can Hold Times be Extended?

1) Methanol Preservation of VOC Soils
2) Re-evaluation of hold times – experimentally, reference based,
3) Freezing of samples
Remote Environments
How Can the Lab Help?

Need to consider ability to resample. If too remote, must ensure contingency built in to accommodate additional analysis, lost, broken samples, etc.
Remote Environments
How Can the Lab Help?

Advantages

• Client and lab are partners in the project

• Better level of service to end user

• Reduced cost to end user, lower cost programs (field and/or testing)

• Ability to respond quickly to issues as they arise (more detailed knowledge of sampling program)

• Fewer Data Quality issues (Hold Time, TAT, missed tests, etc.)

• Can respond to requests for additional testing easily
Remote Environments
Case Study

Case Study
Remote Environments
Case Study

- Trying to delineate area of contamination
- Potential for wide swings in contaminant levels
- High levels would indicate additional sampling in that area
- Sampling at same site is time consuming and costly, tying up resources that could be better used.
Remote Environments
Case Study

Solution

- In consultation with lab the client sampled an entire area and submitted to the lab
- Lab would analyse only specific samples, remainder would be extracted and held pending sample results
- Based on results, client can request analysis of remainder of samples submitted.
Remote Environments
Case Study

Solution

- Laboratory lowest reporting limits compared to site guidelines
- $RL > 100$ times lower than Guideline
- Most samples within calibration range straight or $10x$ dilution
- Method modified to incorporate $10x$ dilution into prep step
- Eliminated sample dilutions and additional time required to run these
Remote Environments

Conclusion

- Potential issues with sampling programs are magnified for Remote Projects
- Analytical Programs pose a number of unique issues
- AGAT has successfully worked through a number of Remote Projects and has expertise to help client identify issues and design a successful remote field program
- Communication between the consultant, field staff and lab staff is critical to the success of these programs
- Contact the laboratory – Project Manager, Technical Representative to discuss any programs
QUESTIONS AND DISCUSSION

Thank you!
Remote Environments
What Can I Do About It?

➢ Travel and Access to the Site
  • Boat, plane, helicopter, or truck? Or all of them?
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All of the above are risks to the success of your project. Even the most experienced field staff must ask ‘what can go wrong’
Transportation of staff, equipment and sampling supplies can be extremely difficult and/or expensive

What are the transportation points?

Is this a single sampling event or an on-going project (quarterly, monthly, etc.)

How are samples being shipped back to the lab?
   All at once
   Multiple shipments – longer sampling program or short hold times
   Shipment to multiple labs

Need to consider ability to resample. If too remote, must ensure contingency built in to accommodate additional analysis, lost, broken samples, etc.
Sampling In Remote Environments

Shipping back to Lab – one lab or multiple – based on testing required

Direct shipping to lab or direct ship to one location

Are all laboratory sites on the same page wrt sampling/analysis DQO requirements of project

Quicker to direct ship samples if more than one lab site used

Logistics more complex, easier to route through single site.

At very least, single point of contact should be maintained for client.
Sampling In Remote Environments

Need to consider sampling requirements – what containers are required?
What are the Data Quality Objectives for the Project?

Can smaller sample sizes be used for analysis – Consideration of DQO’s, improvements in technology, changes to methodology

Smaller containers are easier to transport, easier to handle in the field.

If DQO’s can be met, smaller sample sizes represent potential solutions

Is it possible to sample for multiple parameters in one container
eg. TOC, NH₃ from SWA Bottle
HC, PCB, PAH Metals in Soil from one jar
Sampling In Remote Environments

Extending Hold Time

1) Methanol Preservation of VOC Soils
2) Re-evaluation of hold times – experimentally, reference based,
3) Freezing of samples
In reality, the approach taken is going to be dependent on the sampling plan.

AGAT works with the client to identify the critical issues in the project and then uses our knowledge base and experience to design a program that will work for them.

This is a holistic approach – the goal is to meet all of the requirements of the project and improve the clients project performance, and for

Shipping, bottles,

We have also proposed sampling schemes that are more expensive, but still save the client money.

How – Sampling plan higher on traditional lab costs (bottles, shipping, analytical), but saves the client on field time.
Sampling In Remote Environments

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Reduced cost to end user, lower cost programs (field and/or testing)

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Case Study

Client with soil sampling program.

Soil ranges from sandy to high organic peat

High organic peat samples begin to show detected levels in F3 range

Contaminant is largely in F2

Likely that material in F3 due to boigenic material – high organic soil

Silica Gel cleanup done, but insufficient to remove all – well defined problem with existing methods
AGAT Solution

Additional analysis performed to confirm material is biogenic
GC-FID, GC-MS
Literature review of current processes.

Developed a silica gel regime to remove non-petrogenic hydrocarbons
Validated a 5x silica gel clean-up – removes non-petrogenic hydrocarbons
Does not remove petroleum hydrocarbons
For F2 – 1x, 3x and 5x silica gel values unchanged.

Client submitted select samples on rush basis for 3x or 5x silica gel
Based on expedited results they can decide how to proceed with site
Sampling In Remote Environments

Case Study #1

Potential for wide swings in contaminant levels

Trying to delineate area of contamination

High levels would indicate additional sampling in that area

But – sampling at same site is costly, tying up resources that could be better used.

In consultation with lab the client sampled an entire area and submitted to the lab

Lab would analyse only specific samples, remainder would be extracted and held pending sample results

Based on results, client can request analysis of remainder of samples submitted.
Sampling In Remote Environments
Case Study #1

Increased cost
- additional samples collected (labour)
- Samples extracted and possibly analysed

Manpower savings realized by collecting samples in one session rather than multiple.

Second (thord) sample sessions would delay sample result by several days increasing time to complete project

Sample hold times are not compromised

Data Quality maintained

Time and effort saved on entire project, although cost in one area may appear to be larger than expected.