USE OF THE SAMPLE MANAGEMENT APP TO SIMPLIFY ENVIRONMENTAL DATA COLLECTION AND REPORTING

Outline

- Background- the PIR-a WHY
- What is the SMA?
  - Field data collection
  - Report outputs
- How does the SMA “change the game”?

PIR-a Corp.

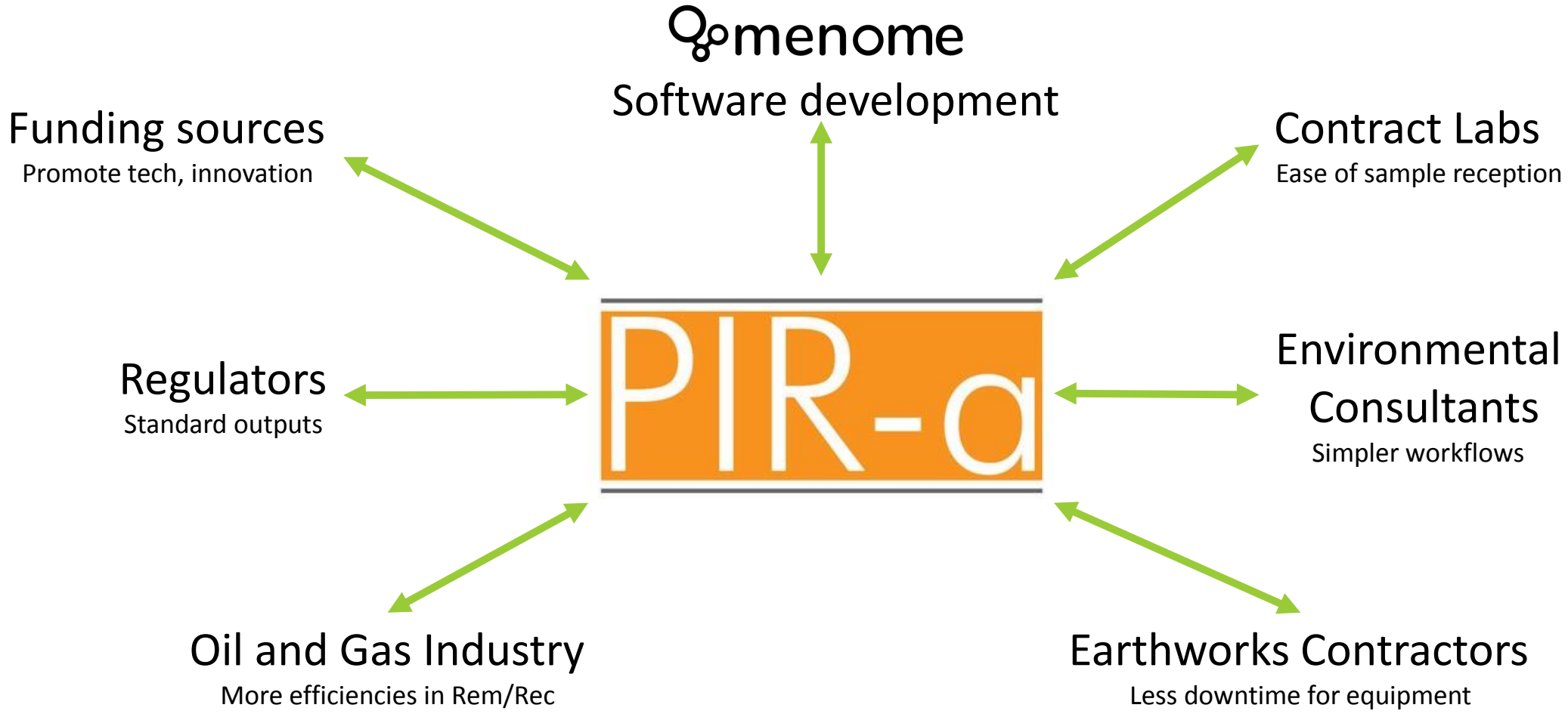
- Downturn in oil prices created a new paradigm- that efficiency and cost control are **critical** to industry

- Saw opportunities in environmental industry to achieve these goals through:
  - Collaboration within sector
  - Rethinking workflow processes

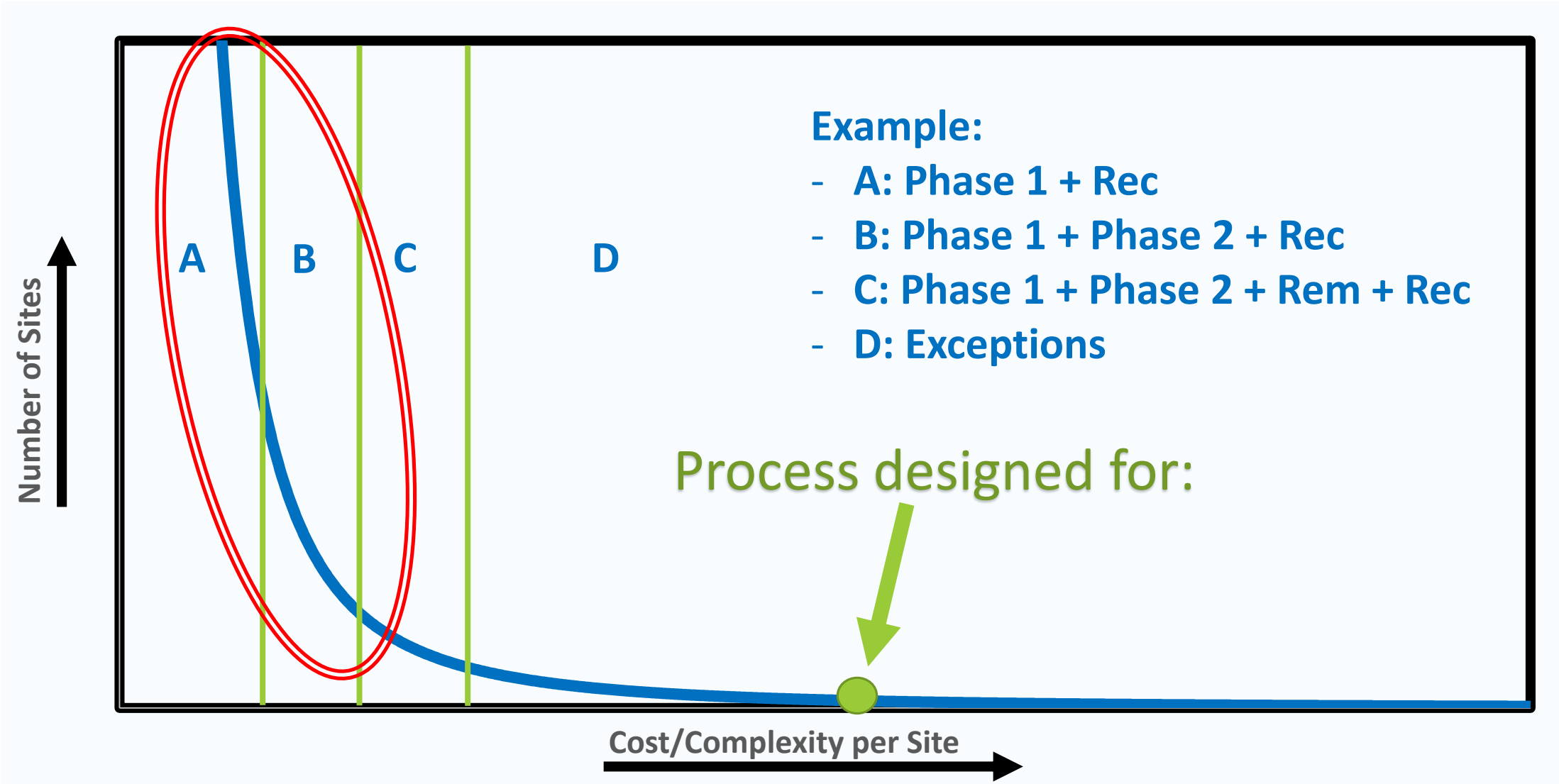
PIR-a

"Providing solutions and products to make lives simple…"

Collaborators and Identifying Needs



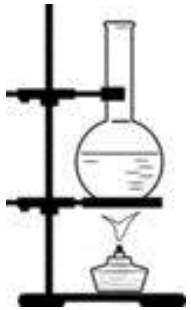
Most Rem/Rec Sites are Relatively Routine



EXAMPLE: Phase 2 Environmental Assessment

Site Sampling

Analytical Laboratory



Samples

Results

Field Notes

Data Analysis and Reporting

Report

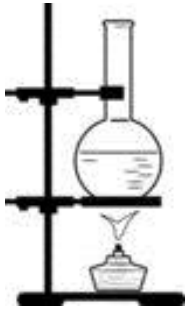
Regulatory Compliance

The SMA Ties Together and Automates the Workflow

Site Sampling

Samples

Analytical Laboratory



Results

Field Notes

Data Analysis and Reporting

Report

Regulatory Compliance

Agility, flexibility and adaptability

- Progressive Web Application- for easy access
- Foundation is Neo4j graph database- for flexibility
- “Offline First”- don’t need Internet to operate in field
- Use WAAS-corrected GPS- for sub-meter horizontal accuracy
- Uses “bots” to automate putting together figures, borehole logs and results tables from the database

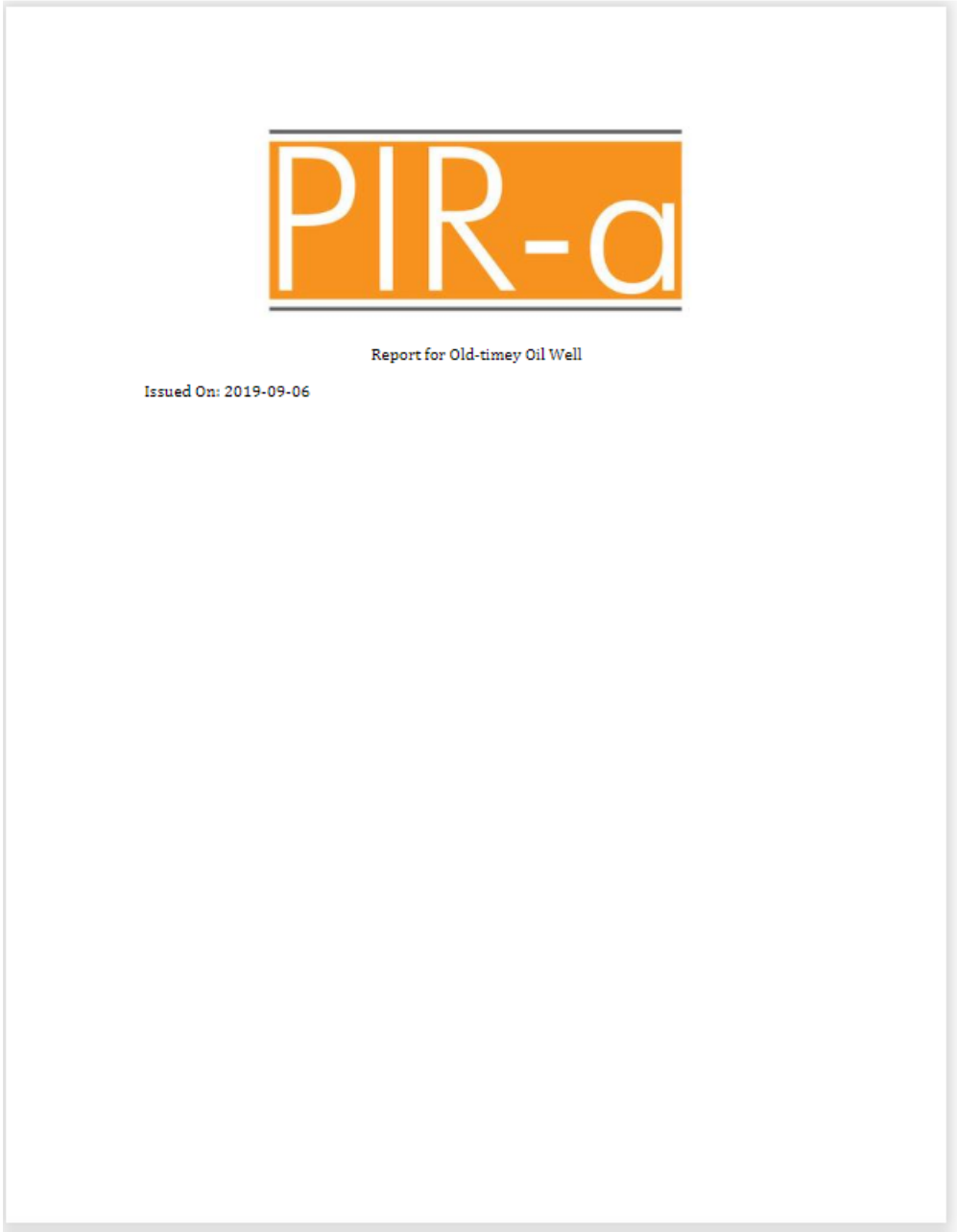
Product Demo

Report outputs- Phase 2 ESAs

- Main pdf:
  - Figures: 3 different depths, data shown as “stop sign” points
  - Borehole logs
  - Data tables- exceedances highlighted

- Data Spreadsheet (xls)- allows manipulation for Tier 2 etc.

Example report Outputs- Demo site

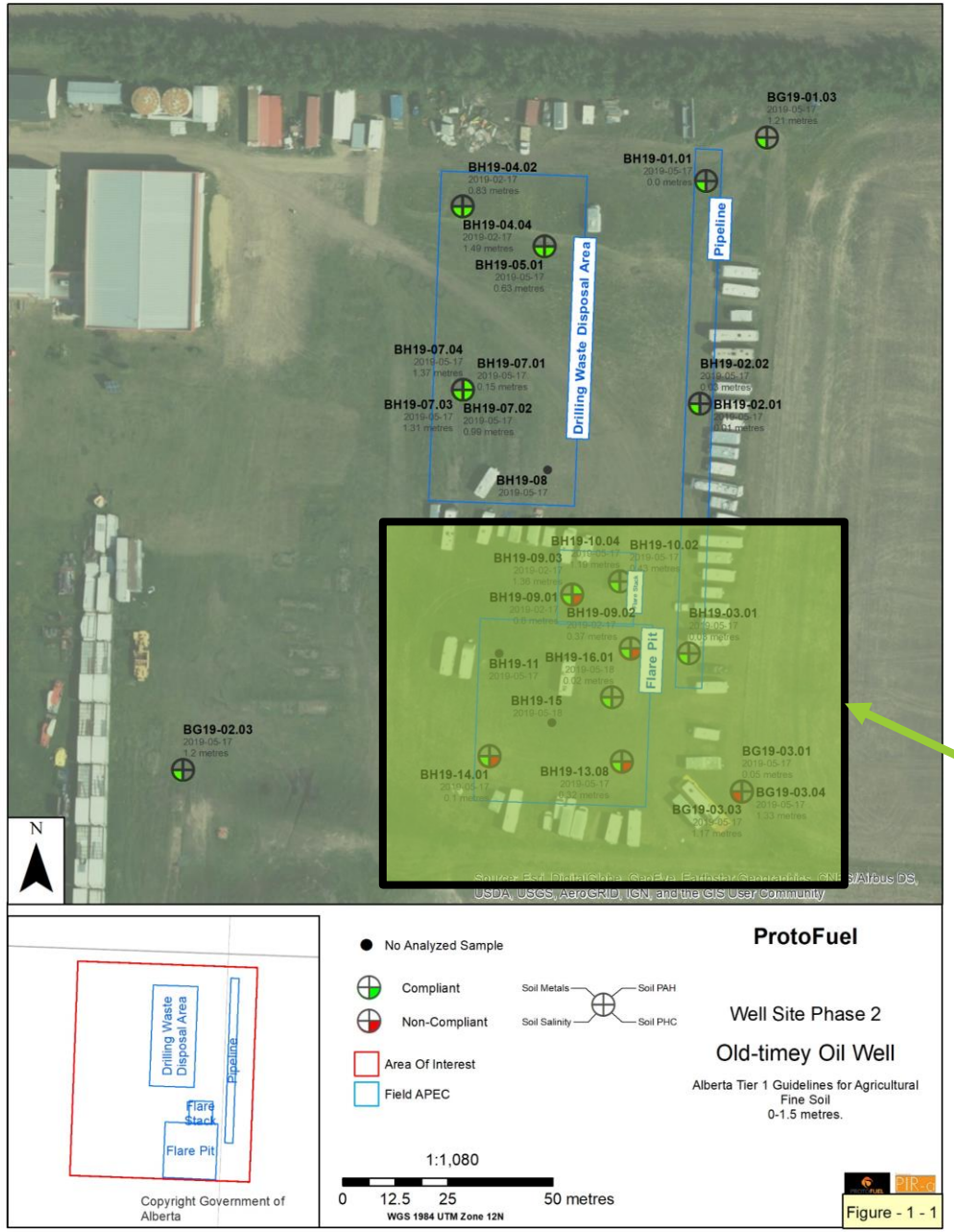

PIR-a

Report for Old-timey Oil Well

Issued On: 2019-09-06

Title page

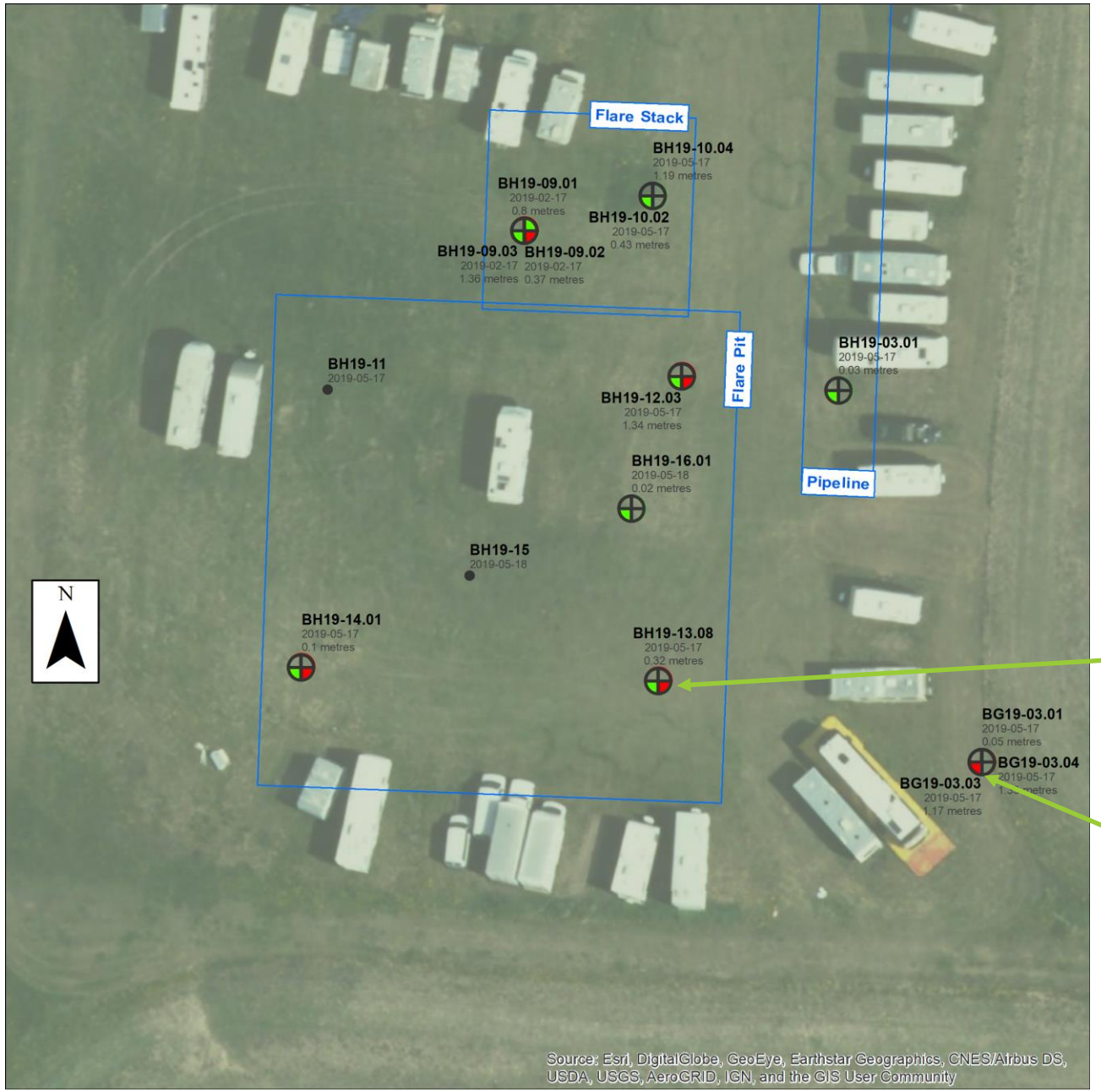
Figures



Depths shown on figures:

- **0 – 1.5 m**
- **1.5 – 3.0 m**
- **3+ m**

Closeup of flare pit area

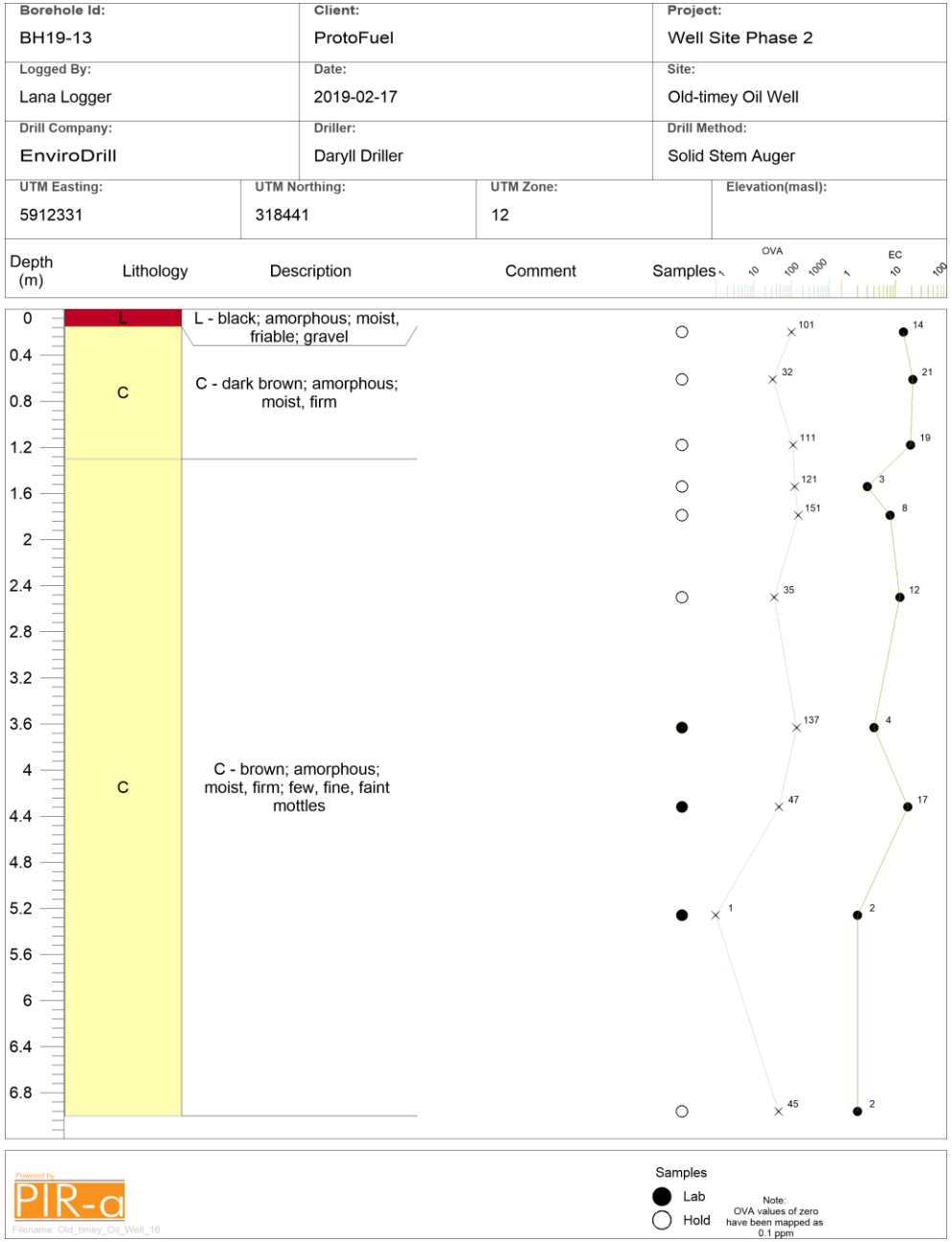


Close up of flare pit area boreholes

PHC exceedance

Salinity exceedance

Borehole logs



Data tables

Table 1 (2 of 2)
ProtoFuel Old-timey Oil Well
Petroleum Hydrocarbon Soil Analysis and Comparative Criteria

APEC Name	Sample Name	Date	Depth	Depth Range	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	C6 - C10 (F1) (mg/kg)	C6 - C10 (F1 minus BTEX) (mg/kg)	C10 - C16 (F2) (mg/kg)	C16 - C34 (F3) (mg/kg)	C34 - C50 (F4) (mg/kg)	Moisture (% by weight)
Flare Pit	BH19-13	2019-05-17	0.32	0 - 1.5	**0.2**	**2.1**	**2.3**	**1.78**	**566**	<10	<25	69	<100	15.1
	BH19-13	2019-05-17	1.63	1.5 - 3	**0.36**	**3.6**	**1.9**	**3.1**	369	<10	<25	<50	<100	18.9
	BH19-13	2019-05-17	5.26	>3	**0.36**	**3.6**	**1.9**	**3.1**	369	<10	<25	<50	<100	18.9
	BH19-14	2019-05-17	0.1	0 - 1.5	**0.12**	**2.5**	**1.35**	**2.3**	**366**	<10	<25	<50	<100	12.1
	BH19-16	2019-05-18	5.06	>3	**0.2**	**2.1**	**2.3**	**1.78**	**566**	<10	<25	69	<100	15.1
Flare Stack	BH19-09	2019-02-17	0.37	0 - 1.5	**0.78**	**2.3**	**1.8**	**1.7**	**899**	<10	<25	63	<100	17.2
	BH19-09	2019-02-17	0.8	0 - 1.5	<0.005	<0.02	<0.005	<0.03	<10	<10	<25	<50	<100	14.5
	BH19-09	2019-02-17	1.36	0 - 1.5	<0.005	<0.02	<0.005	<0.03	<10	<10	<25	<50	<100	17
	BH19-09	2019-02-17	2.54	1.5 - 3	**0.68**	**2.2**	**2.5**	**1.6**	**888**	<10	<25	<50	<100	14
	BH19-10	2019-05-17	2.25	1.5 - 3	<0.005	<0.02	0.006	0.04	<10	<10	<25	184	183	14.8
Pipeline	BH19-03	2019-05-17	1.52	1.5 - 3	<0.005	<0.02	<0.005	<0.99	252	249	36	62	<100	30
	BH19-03	2019-05-17	1.63	1.5 - 3	<0.005	<0.02	<0.005	0.21	22	22	50	350	225	29.9
Criteria*				SURFACE	0.046	0.52	0.073	0.99	210	ng	150	1300	5600	ng
				SUB-SURFACE	0.046	0.52	0.073	0.99	420	ng	300	2600	10000	ng

Criteria* - Alberta Tier 1 Soil and Groundwater Remediation Guidelines (AEP 2019); criteria are for Fine Soil soils in Agricultural areas.
ng = no guideline "BOLD" - value exceeds referenced guideline.

Results quicker and less expensive

- With SMA, reporting costs reduced 40 to 70%.
- Workers can digitize field data, compile results and issue reports in **hours** to **days**; instead of weeks to months- not losing field seasons.

Decision making time reduced

- Can communicate/share results with clients and regulators more quickly
- **Immediately actionable** decision making, examples are:
  - Equipment deployment/optimization
  - Documented remediation decisions
  - Office/field staff collaboration on unified data
  - Ice road management

Returns focus to high value activities

High Effort, Low Value	High Value
Compiling results	Evaluating results
Creating site figures	Understanding the site
Transcribing COCs and notes	Analysing samples
Summarizing/editing data	Developing meaningful conclusions
Comparing to Tier 1 Guidelines	Tier 2 Guidelines

What are PIR-a's products?

- The SMA is a Software-as-a-service (SAAS) platform to automate environmental workflows for liability management and compliance at wells and facilities:
  - **SMA-P2**- for Phase 2 ESAs
  - **SMA-REM**- for remediation

The Future

- Additional SMA modules
- Develop direct links to AER and labs
- Additional collaboration opportunities

Acknowledgements

- **Many dozens of inspiring conversations…**

If you are interested in more information about PIR-a or the SMA:

- Contact: James Freeman

- Email: james.freeman@pir-a.com
- Phone: 403.589.7227