Denison Mines

Uranium Development & Exploration

The Athabasca Basin, Northern Saskatchewan

September 2019 | Core Days, La Ronge

Wheeler River 2019 Field Tour

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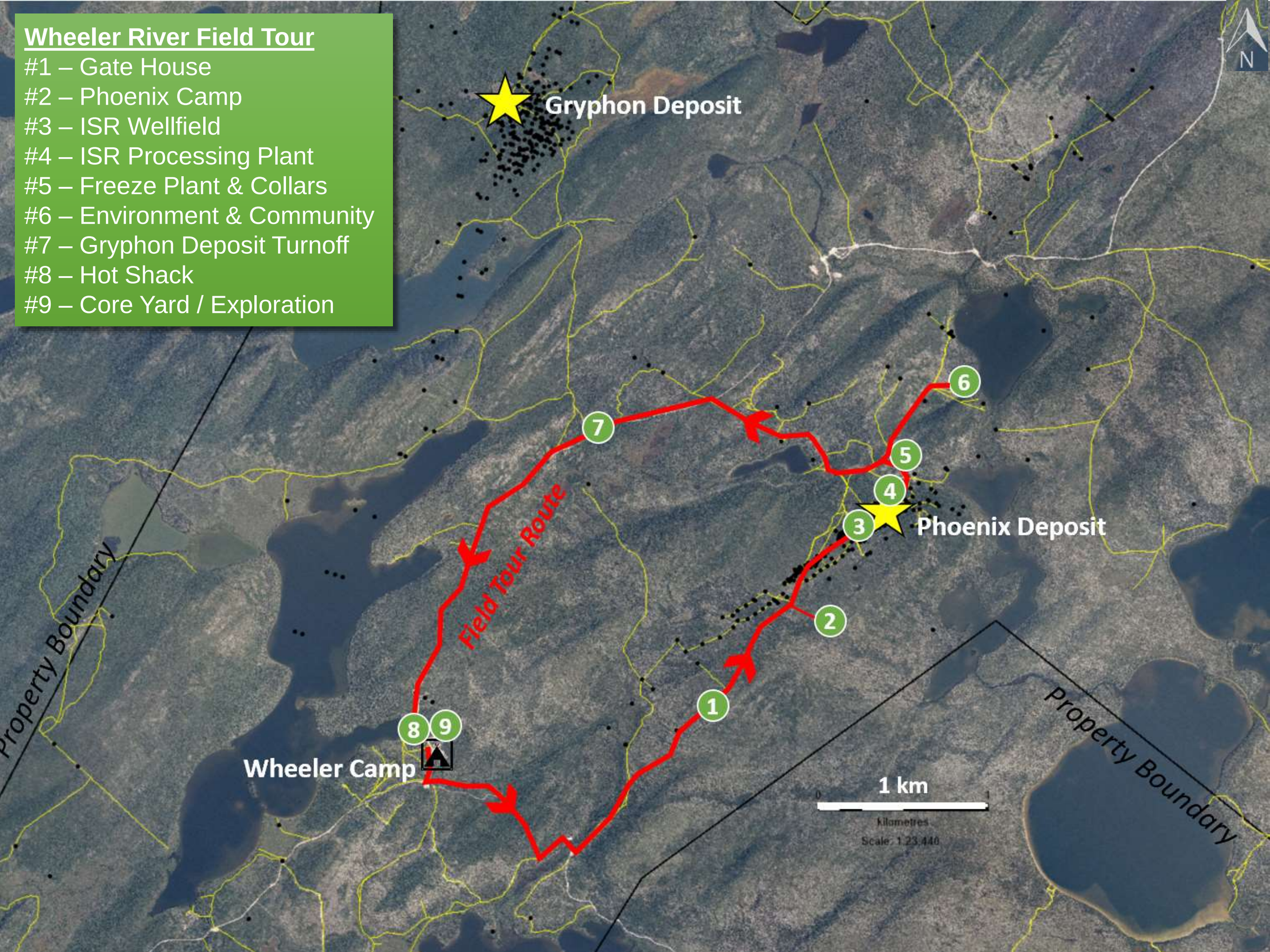
Welcome
Hoʔa
Tānsi pihtikwī
Tânisi pihtiḳwî

Wheeler River Uranium Project

A Joint Venture between Denison Mines Corp (90%) and JCU (Canada) Exploration Company Limited (10%)

We acknowledge and respect that we are working within the boundaries of Treaty 10 and the traditional territory of the English River First Nation and the Métis - who have a strong and significant relationship to this land.


Wheeler River Field Tour
#1 – Gate House
#2 – Phoenix Camp
#3 – ISR Wellfield
#4 – ISR Processing Plant
#5 – Freeze Plant & Collars
#6 – Environment & Community
#7 – Gryphon Deposit Turnoff
#8 – Hot Shack
#9 – Core Yard / Exploration
Gryphon Deposit
Phoenix Deposit
Wheeler Camp
Field Tour Route
Property Boundary
Property Boundary
1 km
N

Wheeler River Field Tour

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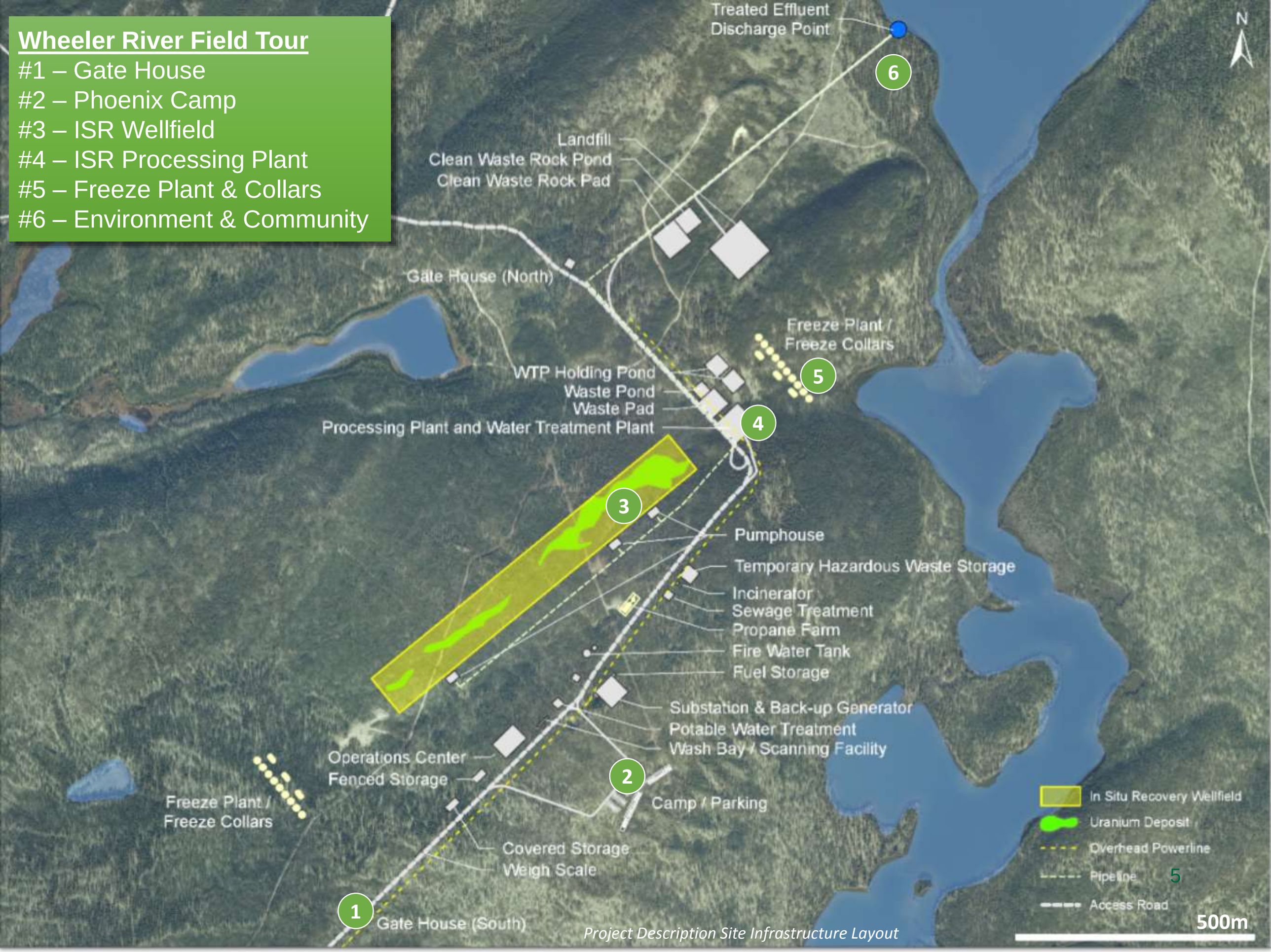


Project Description Site Infrastructure Layout

Off we go …

Station #1 – Gate House

Station #1 – Gate House
Future home of the Phoenix ISR uranium mining operation

Site Location

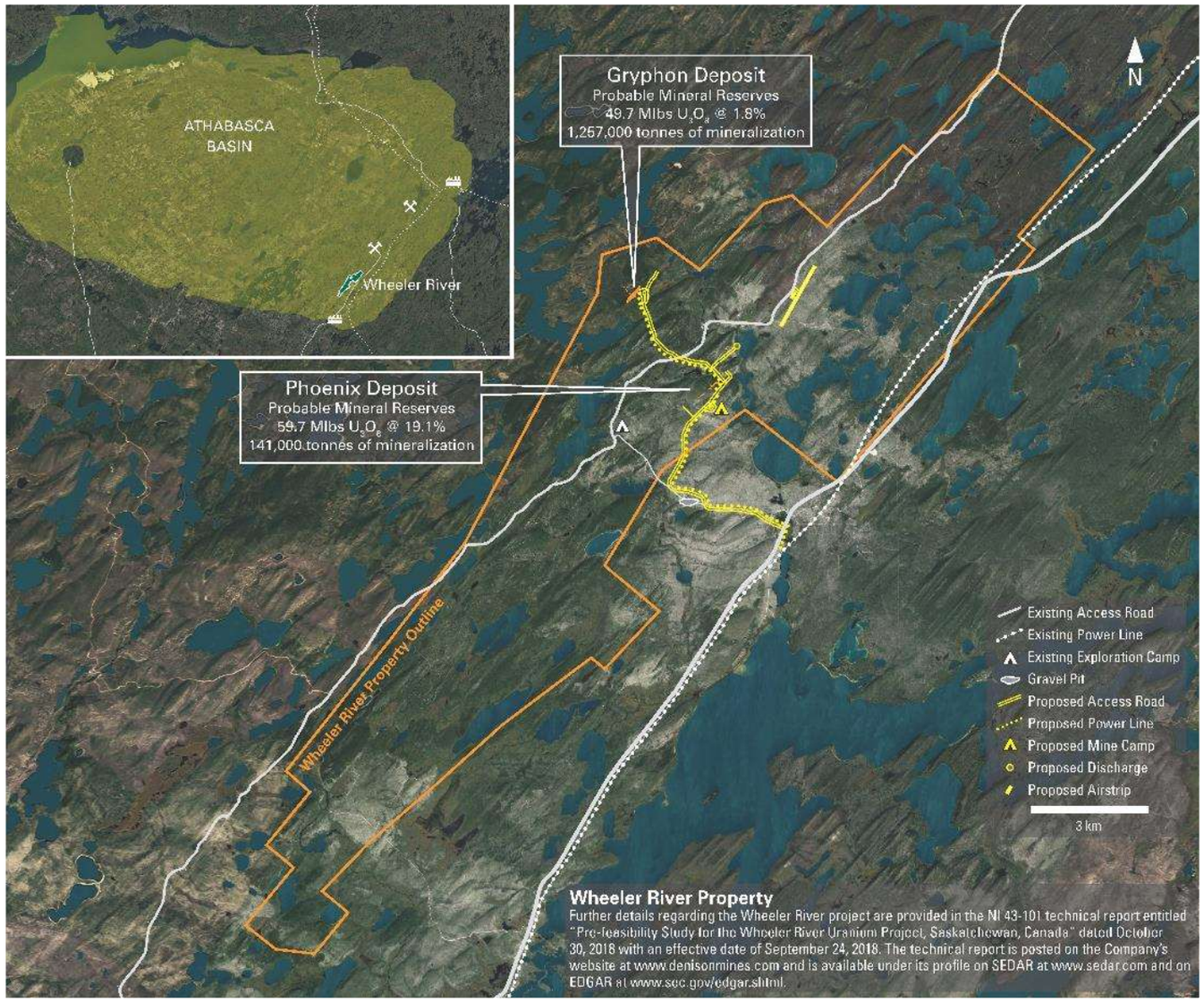
- 35 km north-northeast of the Key Lake mill and 35 km southwest of the McArthur River uranium mine in the southeastern portion of the Athabasca Basin region

Existing Regional Infrastructure

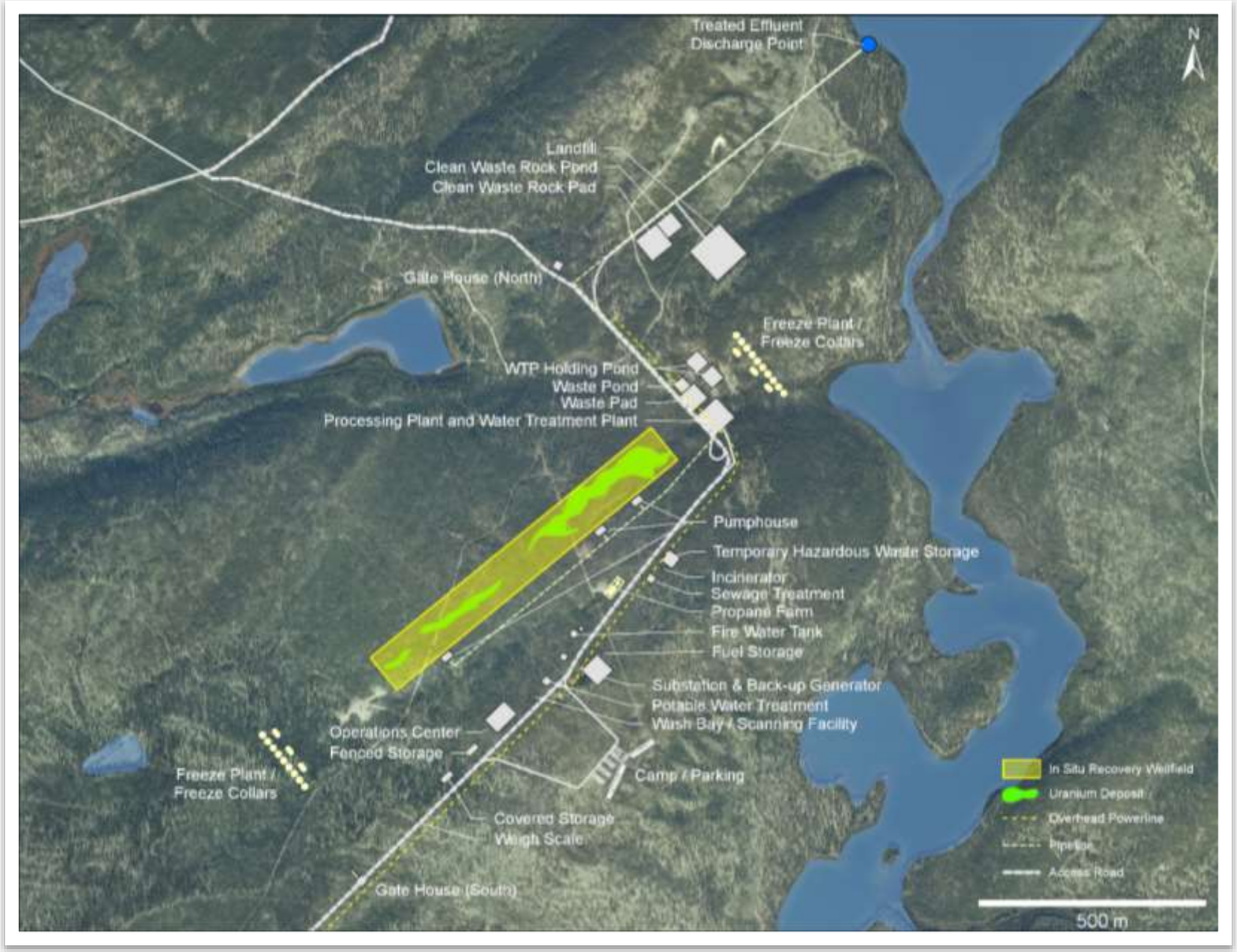
- Highway 914 - eastern edge of property
- Provincial power grid – SaskPower transmission line along Highway 914

Planned Site Infrastructure

- ~7km site road connection to Highway 914 outlined in Project Description
- Powerline connection to SaskPower transmission line
- Airstrip (1600 m length) and associated site road to allow for transport of staff



Station #1 – Gate House
Future home of the Phoenix ISR uranium mining operation



Key Site Elements:

- ~150 person camp facility
- Site operations centre
- ISR wellfield
- Freeze plants
- Processing plant / WTP
- Potential WTP holding ponds and treated effluent discharge point
- Warehousing and fuel storage facilities
- Back-up power generators
- Wash bay, scanning and weight scale facilities
- Potable and waste water treatment / storage

Station #2 – Phoenix Camp
Designing a home away from home

Preliminary Camp Design Features:

- ✓ ~150-person capacity
- ✓ Pre-fabricated design
- ✓ Single-occupancy units
- ✓ Kitchen & recreation facilities
- ✓ Situated within walking distance to work sites
- ✓ Common areas for relaxing, using the computer, doing laundry
- ✓ Layout to promote healthy lifestyle and enjoyment of the surrounding setting (lake view, fishing, etc.)

Station #2 – Phoenix Camp
Building a local workforce

Potential employment opportunities associated with ISR mining operation:

- Targeted to Wheeler Partner Communities
- Up to 300 jobs during ~2 years of construction
- Approximately 100 jobs during operation of the planned ISR mining operation
- Opportunities similar to other uranium mining operations (processing plant, camp, security and EH&S roles)
- Various unique opportunities specific to an ISR mining operation, which will require diploma or technical certification available in Saskatchewan. Examples:
  - ✓ Process Operation Technician (SIIT in Meadow Lake)
  - ✓ Chemical Technology (Sask Polytechnic)
- In-house training programs can be developed once operations begin
- ISR mining positions are all surface-based
- Expected to operate as a fly-in / fly-out operation from planned Wheeler River airstrip

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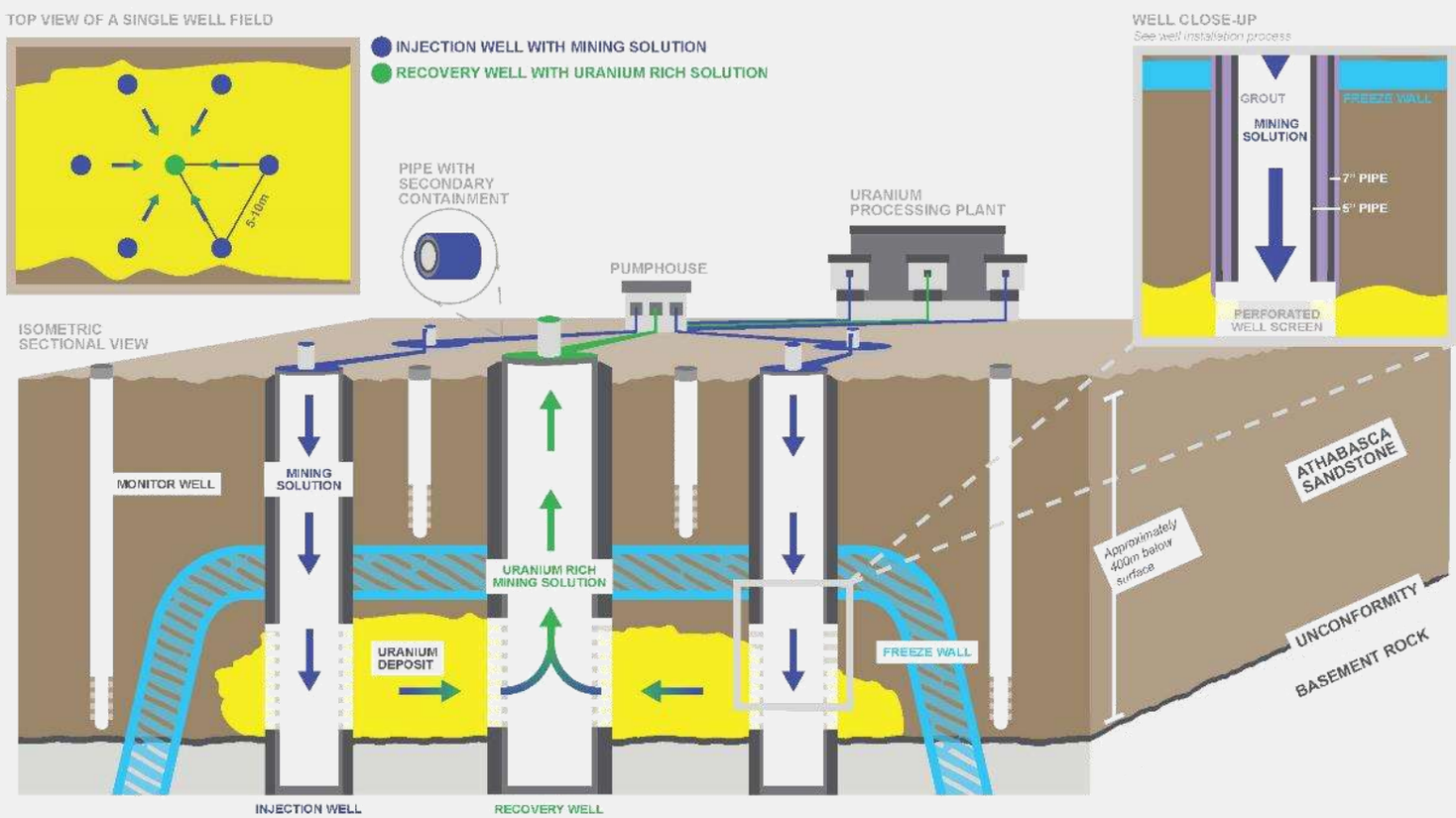
Operational ISR header house in the US

Station #3 – ISR Wellfield

Station #3 – ISR Wellfield

Bringing the world's lowest cost uranium mining method to the jurisdiction hosting the world's highest-grade uranium deposits



Schematic does not represent detailed engineering of the ISR well field and its components. Schematic not drawn to scale.

ISR Mining Process[1]:

1. Mining solution (also known as "lixiviant") is pumped through a permeable orebody via injection well;
2. Lixiviant dissolves the uranium as it travels through the orebody;
3. Uranium rich mining solution (also known as uranium bearing solution or "UBS") is pumped back to surface via recovery well;
4. UBS is sent to a processing plant on surface for chemical separation of the uranium and reconditioning of lixiviant;
5. Lixiviant is returned back to well field for further production

NOTES: (1) Refer to the Wheeler River Technical Report titled "Pre-feasibility Study Report for the Wheeler River Uranium Project, Saskatchewan, Canada" dated September 24, 2018.

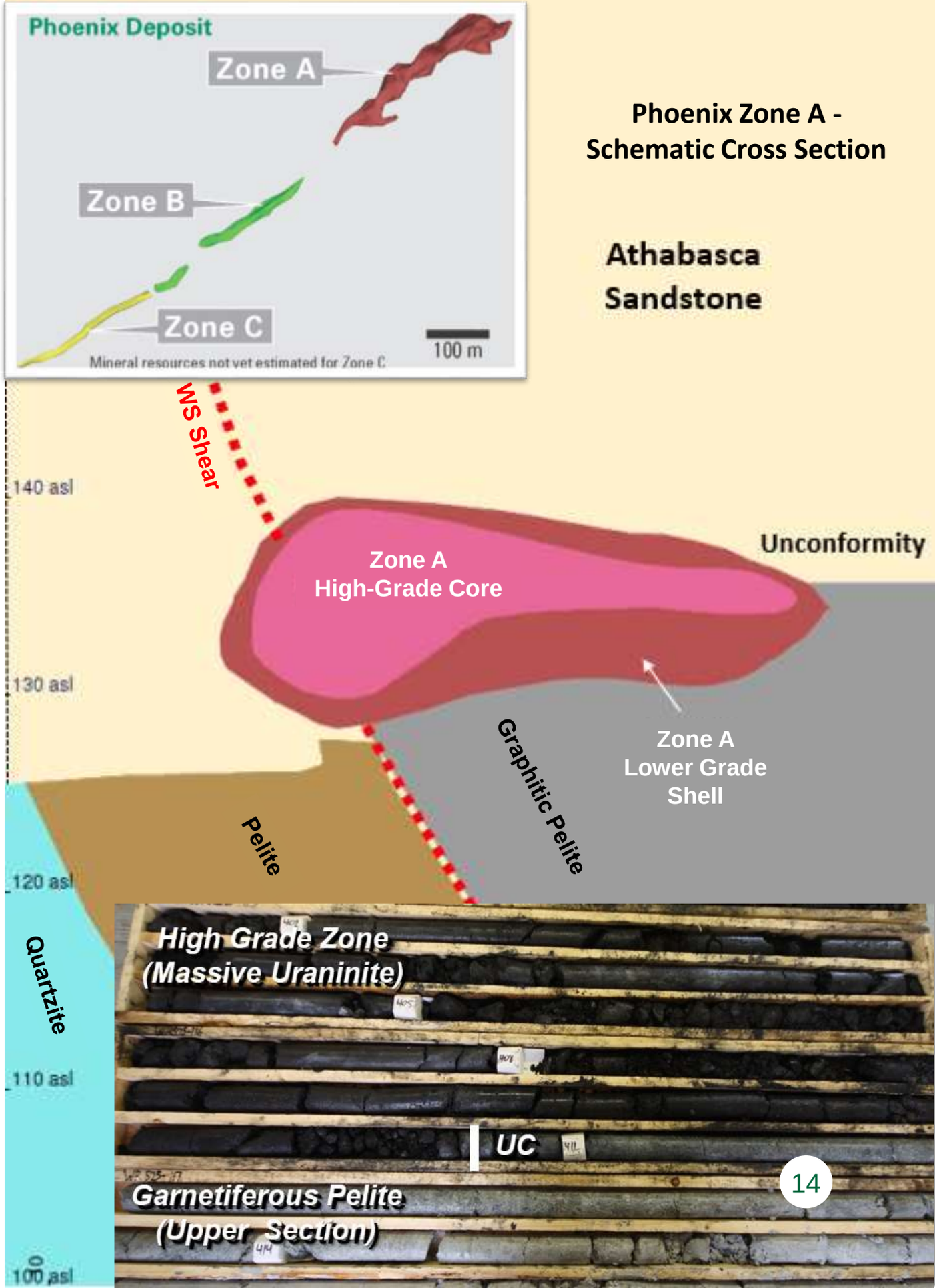
Station #3 – ISR Wellfield

Phoenix Geology: Unique uranium deposit with exceptionally high grades

Highlights[1]:

- Mineralization is situated at or immediately above the unconformity ("UC")
- Two distinct ore zones – Phoenix A + B
- Approximately 400 m below surface
- World's highest-grade undeveloped uranium deposit
- Indicated Mineral Resources 70.2 M lbs U_3O_8 (166,000 tonnes at **19.1% U_3O_8**)
  - ➢ Includes 59.9 M lbs U_3O_8 estimated for Phoenix Zone A High-Grade Core (62,900 tonnes at **43.2% U_3O_8**)
- Inferred Mineral Resources 1.1 M lbs U_3O_8 (9,000 tonnes at 5.8% U_3O_8)
- Cut-off grade of 0.8% U_3O_8

✓Geological setting expected to be amenable to ISR mining, with ~90% of the mineral resource (contained metal) hosted in sandstone



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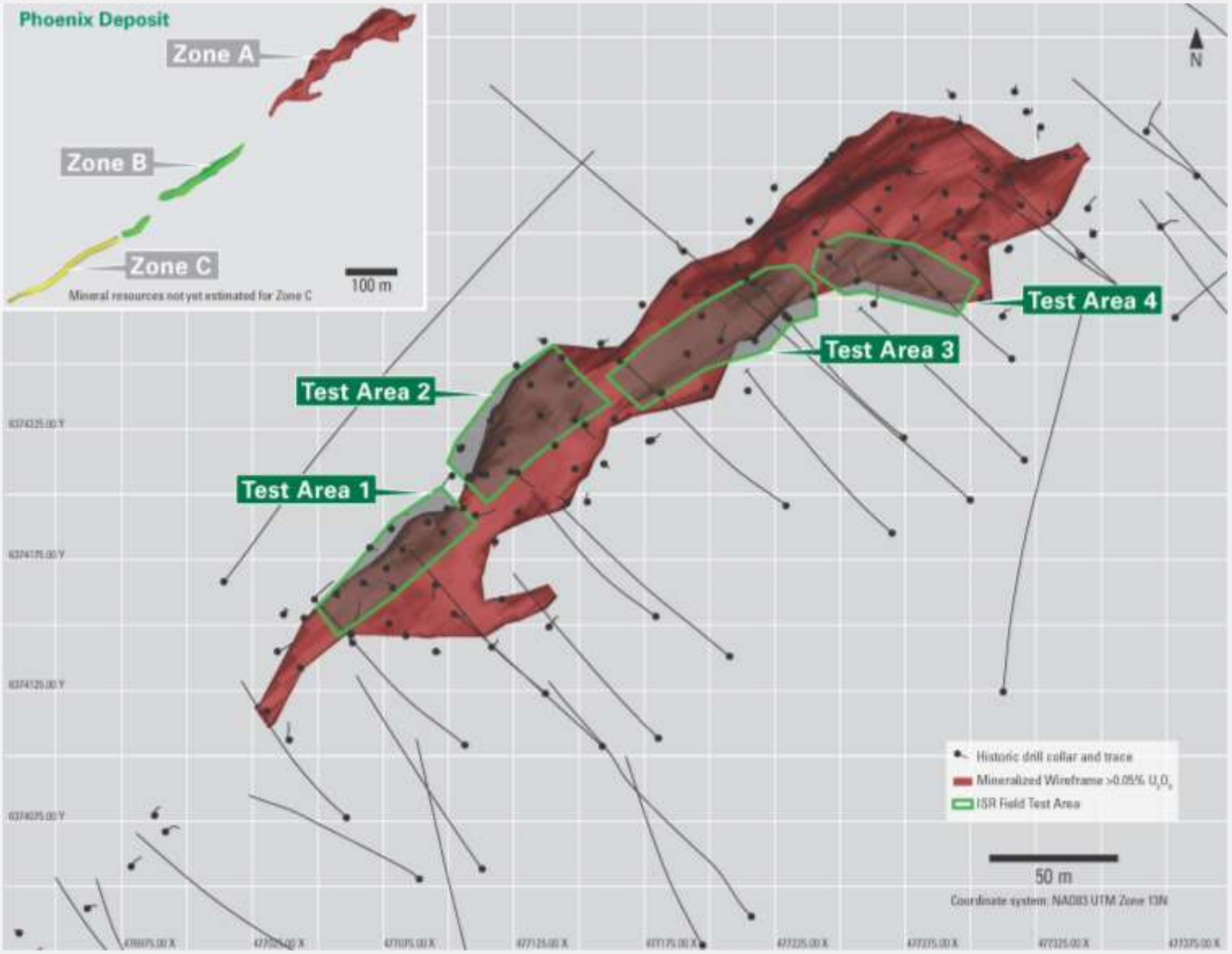
NOTES: (1) Refer to the Wheeler River Technical Report titled "Pre-feasibility Study Report for the Wheeler River Uranium Project, Saskatchewan, Canada" dated September 24, 2018 for further details regarding the mineral resources estimated for the Phoenix deposit.

Station #3 – ISR Wellfield
First of its kind ISR Field Test in the Athabasca Basin

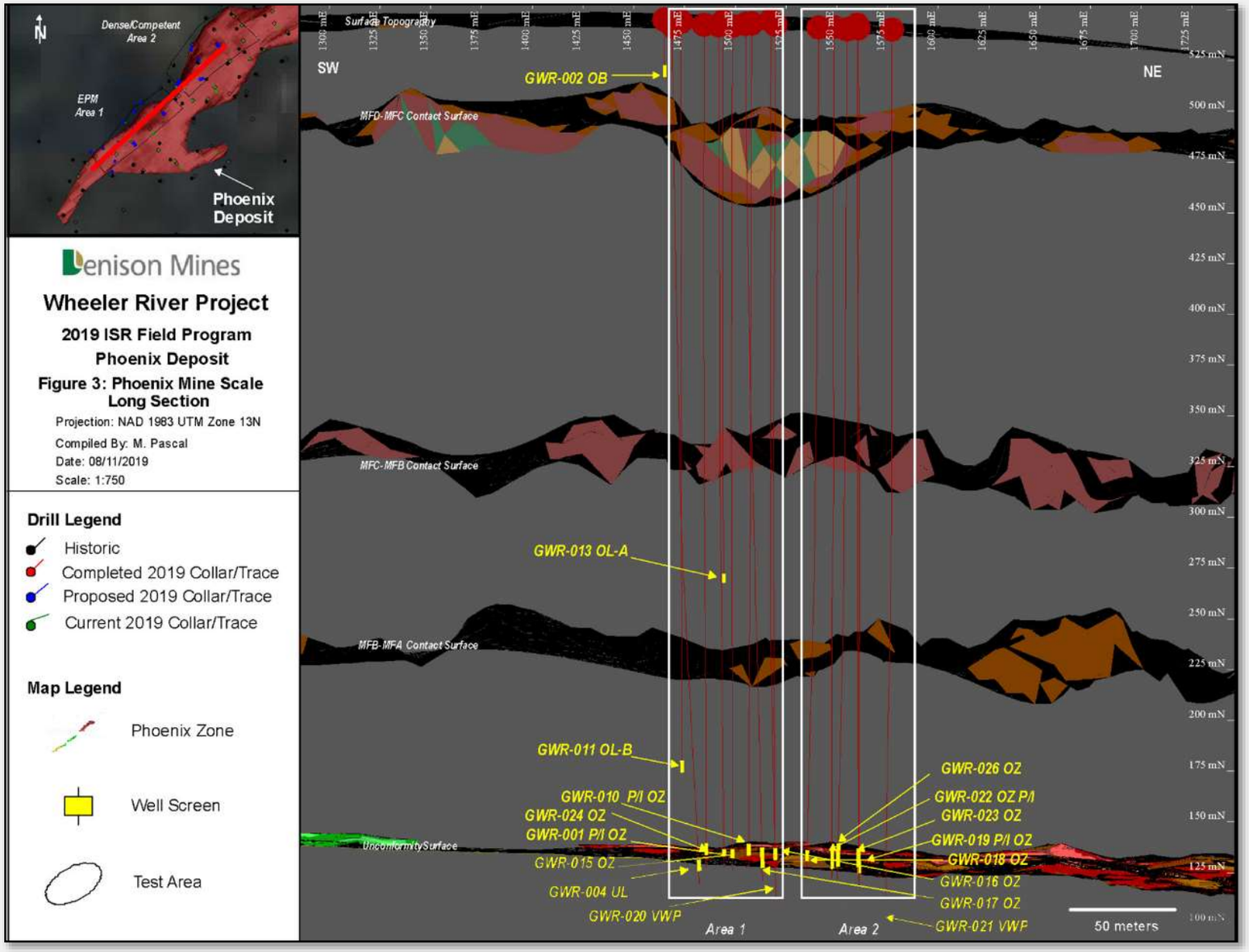
ISR Field Test Objectives:

- In-situ field work is necessary to increase the confidence / reduce the risks associated with application of the ISR mining method at Phoenix
  - ✓ Data required for detailed hydrogeological modelling
  - ✓ Forms the basis for ISR wellfield and freeze dome design necessary for the FS and to support the EIA process.
- Phoenix deposit divided into four (4) representative test areas
  - ✓ Intended to cover each of the various fluid flow domains expected within the deposit
  - ✓ Test areas expected to cover ~65% of the Indicated Mineral Resources estimated for the Phoenix deposit



Station #3 – ISR Wellfield

First of its kind ISR Field Test in the Athabasca Basin



Summer 2019 ISR Field Test:

- Designed to acquire data from Test Areas 1 and Test Area 2
- In-situ testing in the orebody, and surrounding areas, using water to evaluate hydraulic conditions
- 29 wells (17 Phoenix wells + 12 regional wells) installed to allow for preliminary testing
- Existing exploration holes used for installation of near vertical wells, where possible
- One large-diameter well (commercial-scale) planned for each Test Area following preliminary evaluations
- Possible evaluation of certain permeability enhancement techniques

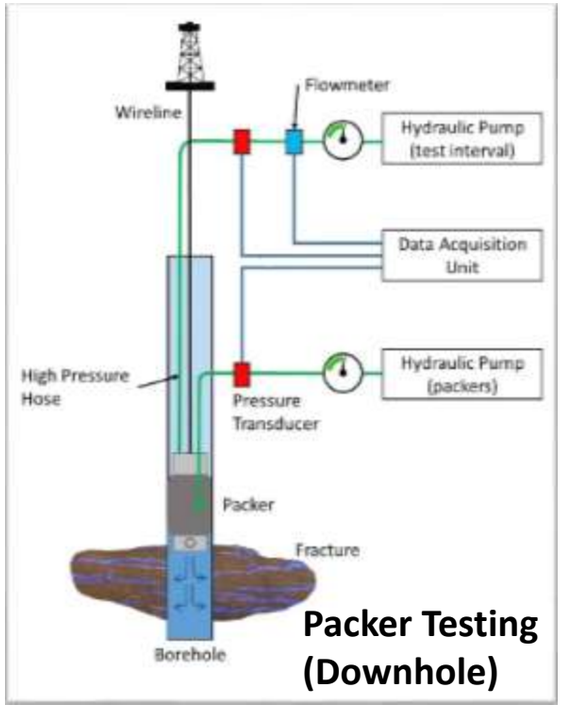
Station #3 – ISR Wellfield

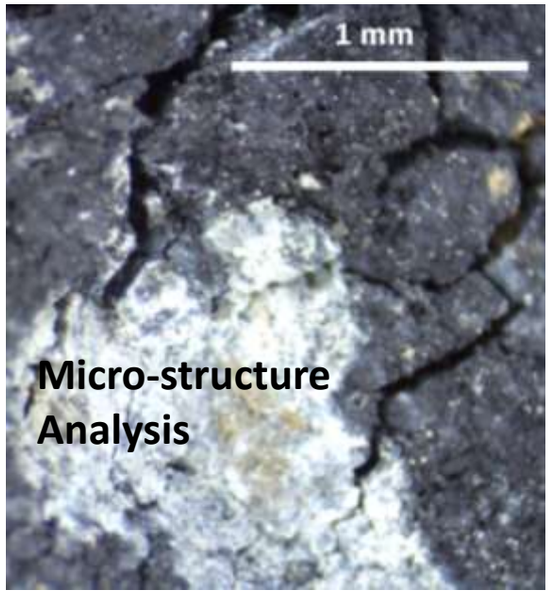
Station #8 - Hot Shack

Station #8 - Hot Shack
Supportive permeability test work & metallurgical sampling

Summer 2019 ISR Field Program designed to facilitate various additional test work:

- Hydraulic conductivity tests (packer testing)
- Downhole geophysics (nuclear magnetic resonance and neutron), where borehole conditions allow.
- Additional mineralized core samples from the orebody, obtained from new drill holes or by wedging from existing boreholes, expected to be subject to the following:
  - Detailed onsite geological and geotechnical (structural & hydrogeological) logging
  - Permeability (permeameter) testing
- Specialized sample collection procedures in place and on-going to allow for metallurgical testing of undisturbed core in future metallurgical test programs





Station #4 – ISR Processing Plant

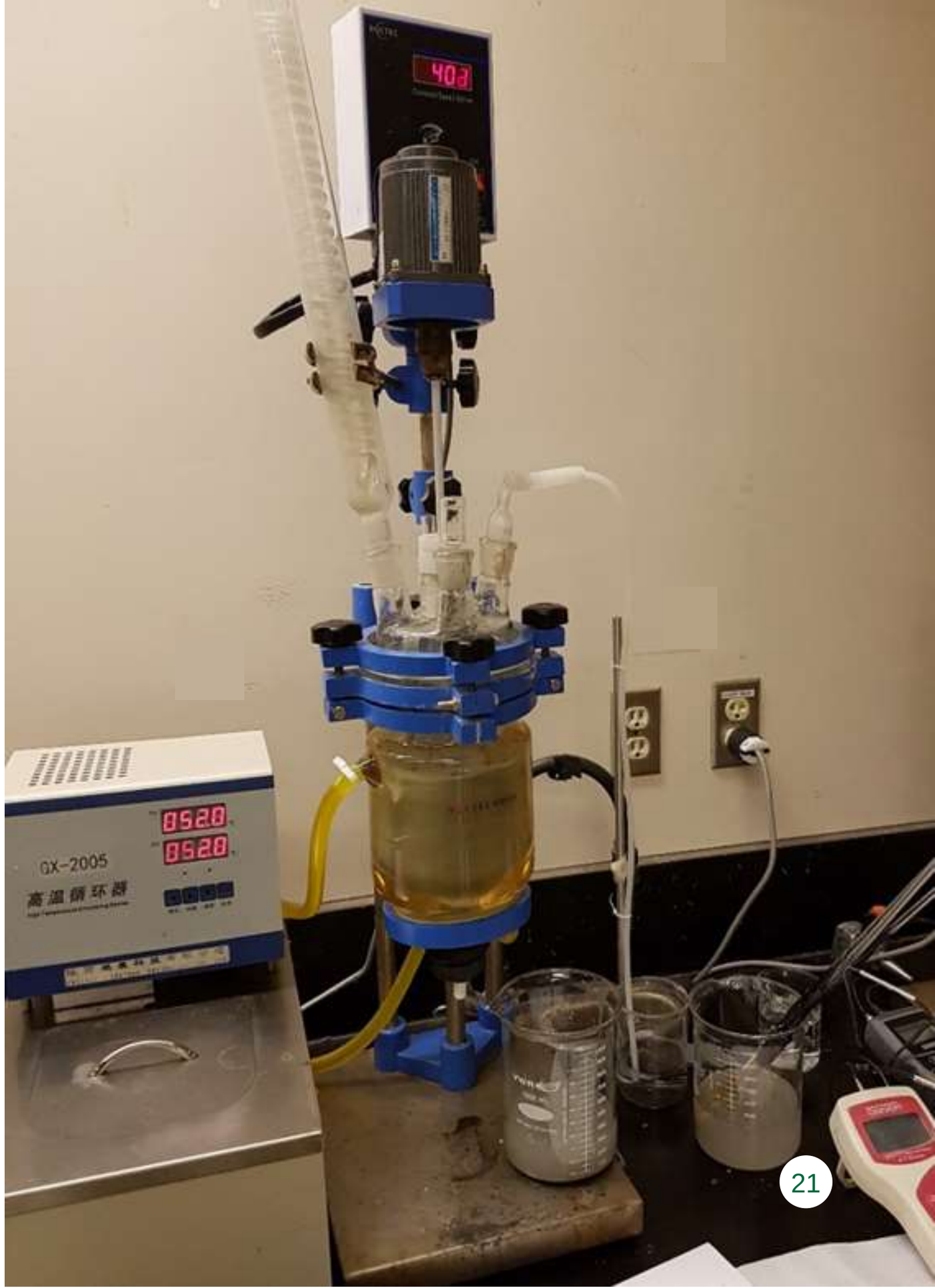
Station #4 – ISR Processing Plant

Phoenix PFS Test Work[1]: Confirms suitability of ISR mining method

Field and laboratory work included drill hole injection, permeability, metallurgical leach, agitated leach and column testing

- **Excellent Recoveries:** High rates of recovery in extraction (+90%) and processing (98.5%)
- **High Grade:** Agitated leach and column tests returned uranium concentrations of 12 to 20 grams per litre (g/L) – significantly higher than conventional low-grade ISR operations
- High uranium concentrations in the mining solution, plus low level of impurities (deleterious elements), allows for **direct precipitation of uranium**

✓ **No need for ion exchange or solvent extraction circuits = reduced costs**



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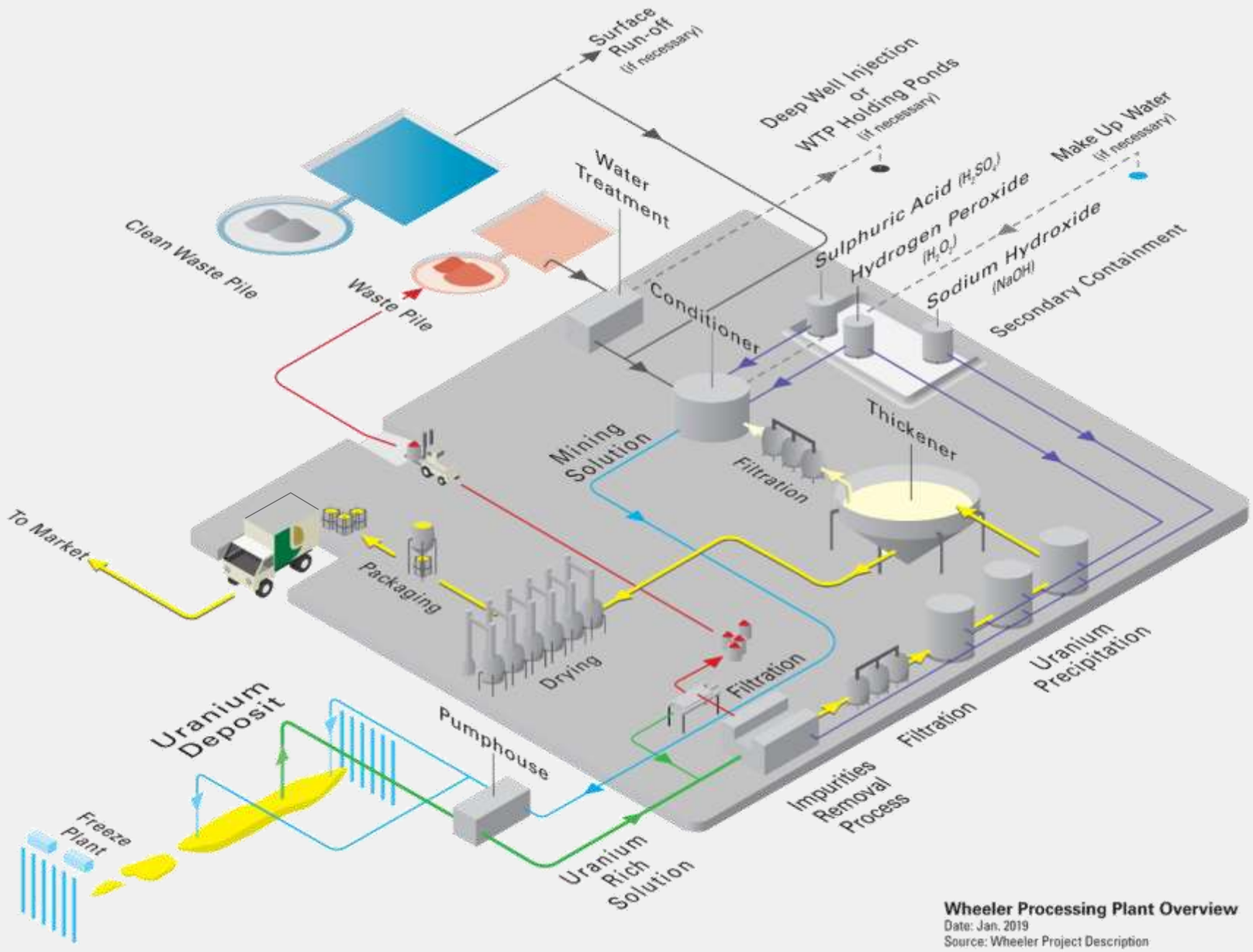
NOTES: (1) Refer to the Wheeler River Technical Report titled "Pre-feasibility Study Report for the Wheeler River Uranium Project, Saskatchewan, Canada" dated September 24, 2018.

Station #4 – ISR Processing Plant
On-site processing to Yellowcake Uranium

On-Site Processing Plant[1]

- Annual production between 6 and 12 million lbs U_3O_8 – depending on uranium concentrations from wellfield (10 g/L → 6M lbs U_3O_8 / year)
- No crushing or grinding circuits required – results in small footprint
- Low impurity solution allows for direct precipitation and eliminates need for ion exchange or solvent extraction
- Potential for closed loop system that recycles mining solution back to ISR wellfield with little to no discharge of effluents
- Drying/calcining to be done on-site in preparation for market
- Plant to be powered by provincial power grid

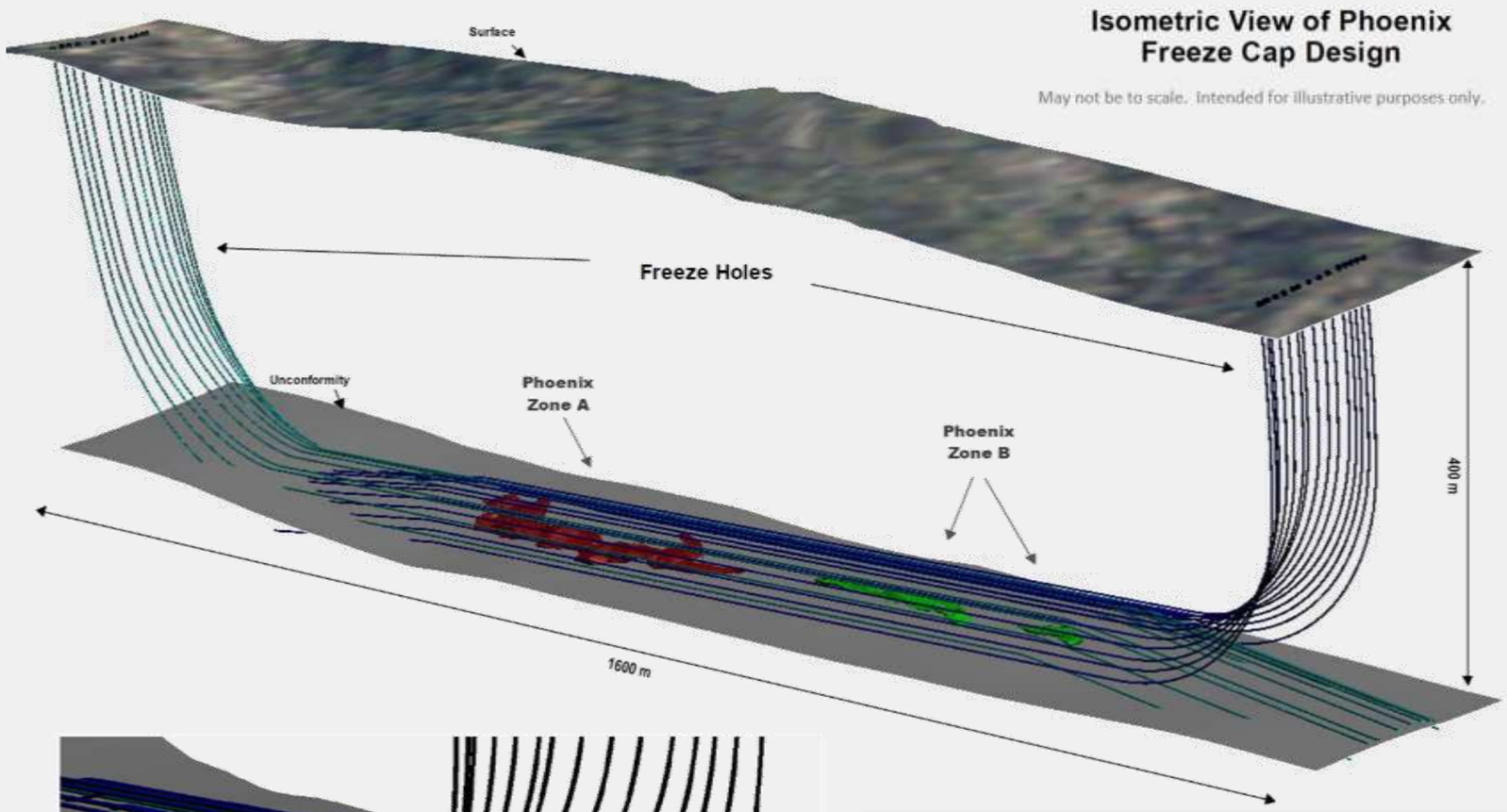


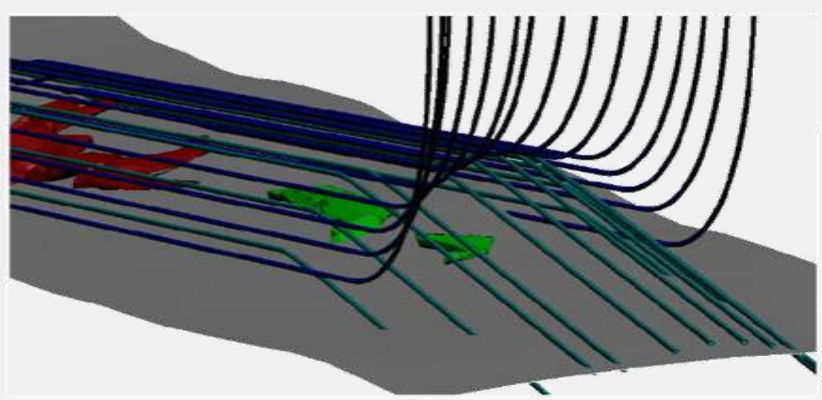
NOTES: (1) Indicative design only. Refer to the Wheeler River Technical Report titled "Pre-feasibility Study Report for the Wheeler River Uranium Project, Saskatchewan, Canada" dated September 24, 2018.

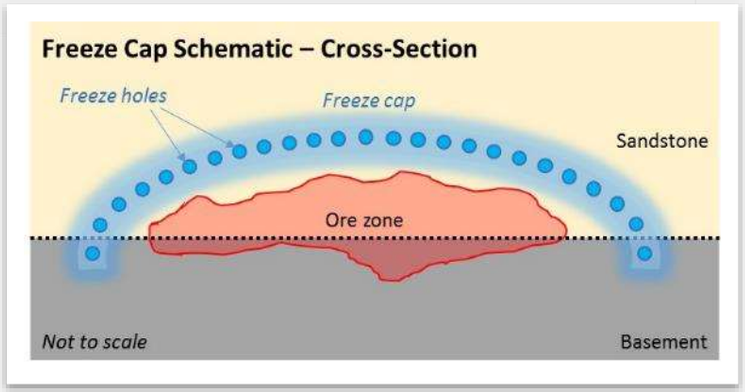
Station #5 - Freeze Plant & Collars

Station #5 - Freeze Plant & Collars

Novel concept to contain lixiviant, using established technology







Artificial freeze cap replicates confining layer typically required for ISR mining operations[1]

- Parallel cased holes drilled from surface and anchored into impermeable basement rock surrounding the Phoenix deposit
- Circulation of low-temperature brine solution through cased pipes will freeze groundwater in sandstone surrounding the deposit
- 10 metre thick freeze wall, together with basement rocks will encapsulate Phoenix deposit

✓ **Eliminates common environmental concerns with ISR mining and facilitates controlled reclamation**

NOTES: (1) Refer to the Wheeler River Technical Report titled "Pre-feasibility Study Report for the Wheeler River Uranium Project, Saskatchewan, Canada" dated September 24, 2018.

Station #6 – Environment & Community

Station #6 – Environment & Community
Environmental benefits of ISR mining

Advantages of ISR mining compared to existing uranium mining in Canada:

- ✓ Small surface footprint
- ✓ Lower water consumption
- ✓ Lower energy consumption
- ✓ Potentially near zero CO_2 emissions
- ✓ Small volume (potentially zero) treated effluent released to surface water bodies
- ✓ Potential for lower radiation doses to workers
- ✓ No tailings production
- ✓ Very small volumes of clean waste rock (sandstone core from wellfield development)

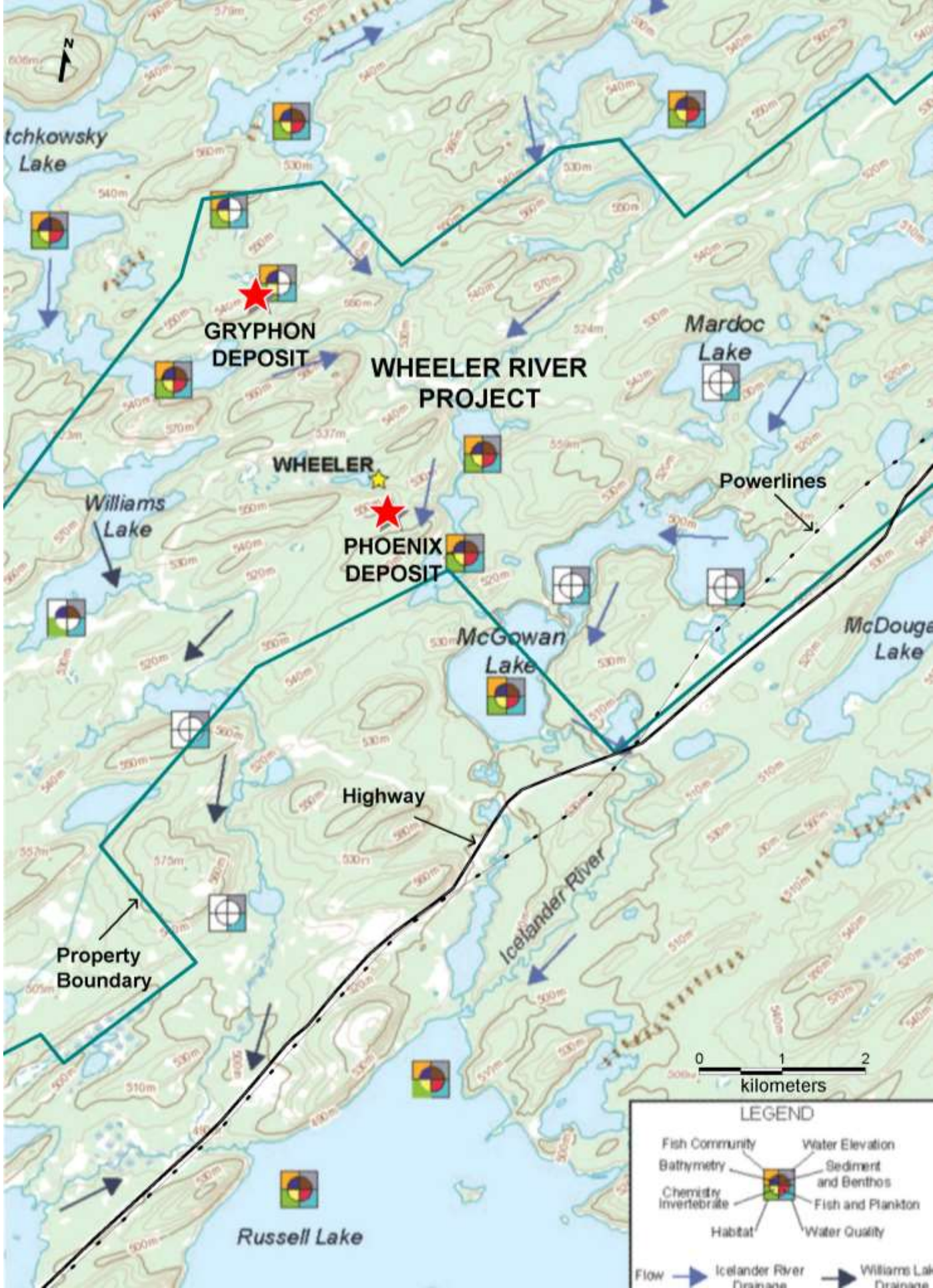
Station #6 – Environment and Community

Environmental baseline studies

Foundation of the environmental impact assessment

- Environmental baseline studies provide an understanding of current or existing conditions
- Overlay the proposed Project with the existing environment
- Identify where Project activities or components could interact with the environment

✓ **Having a robust baseline dataset allows Denison to more accurately predict potential environmental effects**



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Station #6 – Environment and Community
The environmental impact assessment process

Environmental Baseline Studies

- Terrestrial environment
- Aquatic environment
- Groundwater
- Heritage resources
- Air quality
- Noise
- Waste rock geochemistry
- Indigenous land use

2012 - Present

Initiate EIA Process:

Wheeler Provincial Technical Proposal and Federal Project Description accepted

May 2019

Environmental Impact Assessment (EIA) Process

Work with Indigenous communities, the public and technical experts to:

- Identify Valued Components
- Predict project life-cycle interactions with environment
- List potential effects of the Project on the environment
- Describe mitigation measures
- Assess significance of residual effects
- Consider cumulative effects and potential effects of accidents
- Propose monitoring programs to demonstrate compliance with regulations and predictions

2019-2020

Denison submits draft Environmental Impact Statement (EIS)

Targeted for end of 2020

Provincial and Federal governments and the public review and provide comments on the EIS

Denison revises the EIS

Final EIS approved by Provincial and Federal governments ***+ Proceed to next steps****

Community Engagement and Indigenous Consultation (ongoing throughout)

**Following final EIS approval, next steps involve commencement of detailed engineering, licensing, permitting, approvals to operate, and ultimately construction*

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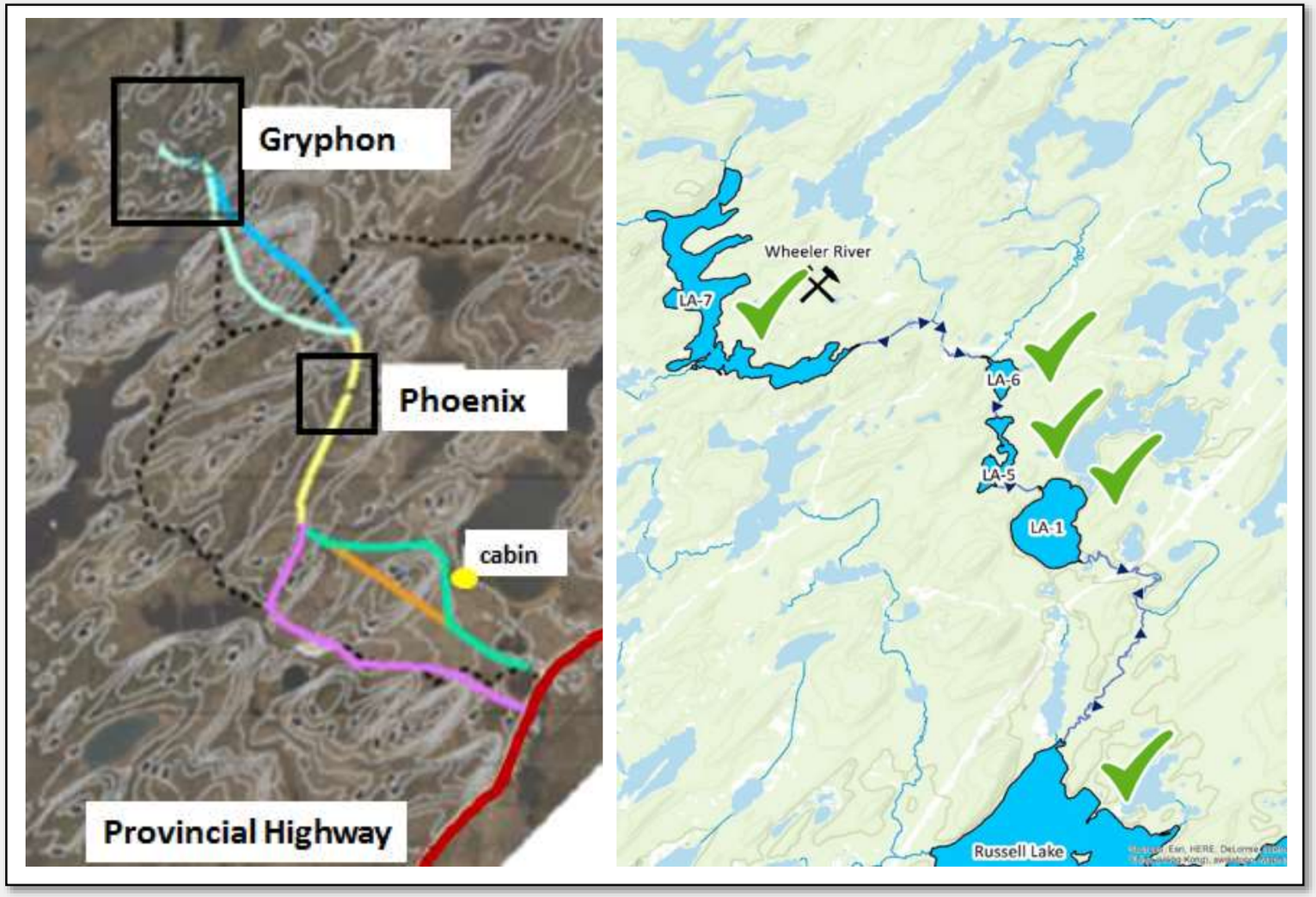
Station #6 – Environment and Community
Committed to collaborative engagement with all interested parties



Project design informed by collaborative engagement:

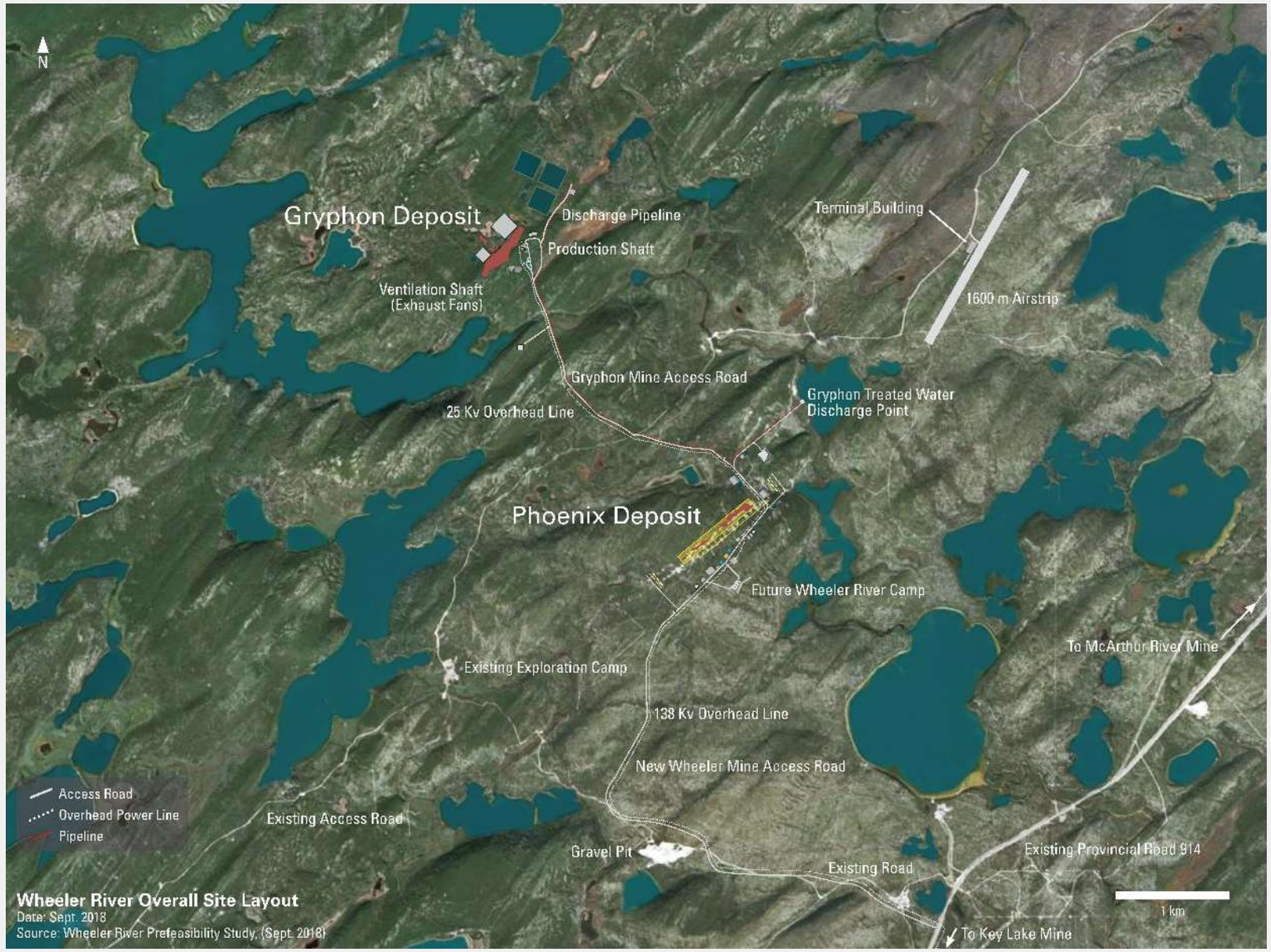
- ✓ Evaluation of alternative mining methods for the Phoenix deposit (ISR mining method)
- ✓ Selection of preferred route for the site access road and power line from existing provincial highway and transmission line
- ✓ Selection of preferred location for possible effluent discharge to surface water bodies

Station #7 – Gryphon Deposit Turnoff

Station #7 – Gryphon Deposit Turnoff
Gryphon uranium deposit

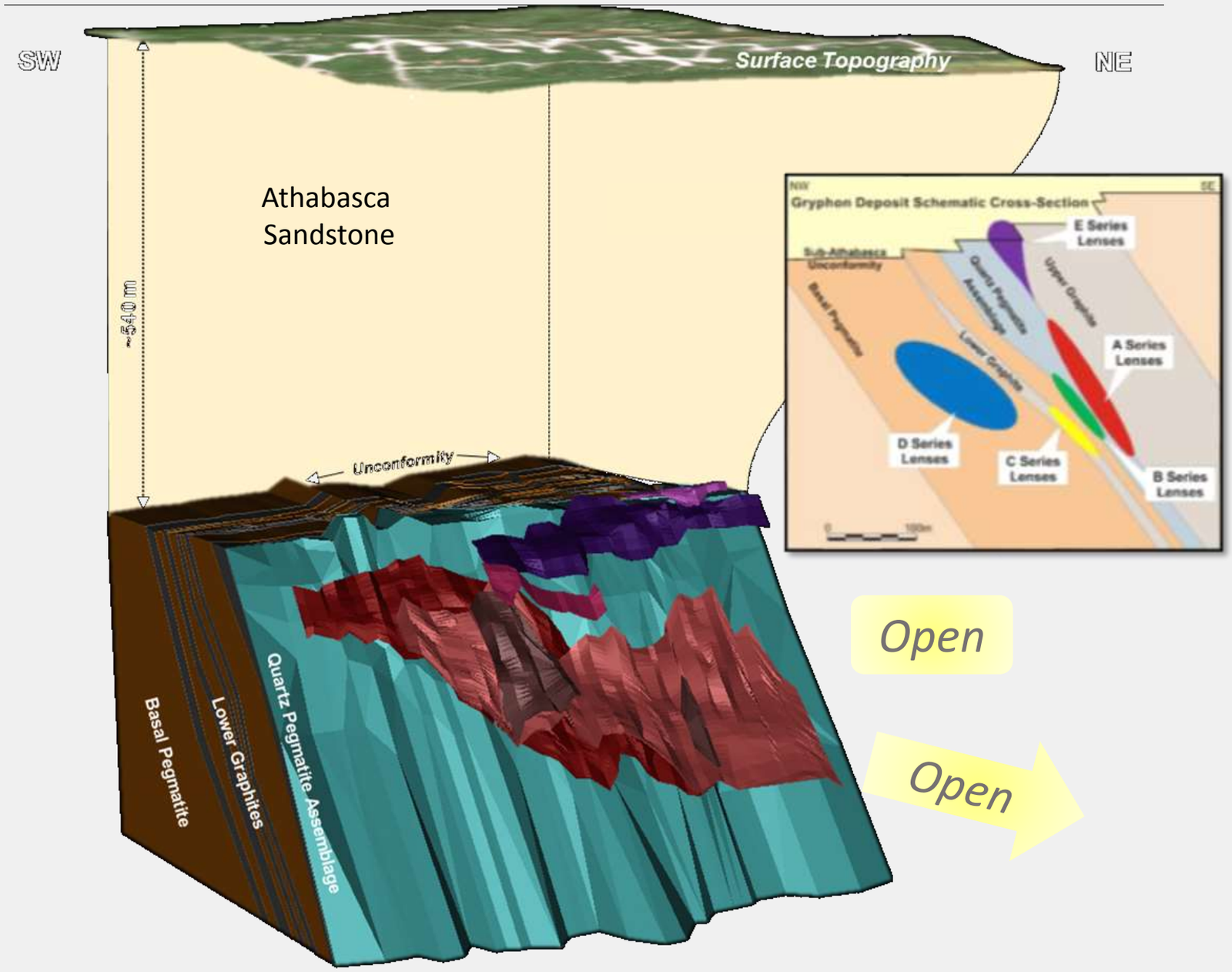
Highlights:

- Basement-hosted, high-grade uranium deposit amenable to conventional underground mining methods
- Not currently approved for advancement, given market conditions – potential to be developed as uranium prices and demand rise in future
- Development expected to make use of existing infrastructure to provide additional low-cost uranium production
- Cash flow from Phoenix operation may be available to fund development



Station #7 – Gryphon Deposit Turnoff

Gryphon uranium deposit



Gryphon Geology & Estimated Mineral Resources

- 'Ingress-style' deposit occurring dominantly within crystalline basement rocks below the sub-Athabasca unconformity
- Consists of numerous stacked lenses of mineralization which are parallel to the dominant foliation and fault structures
- Indicated Mineral Resources 61.9 Mlbs U_3O_8 (1,643,000 tonnes at 1.7% U_3O_8)
- Inferred Mineral Resources 1.9 Mlbs U_3O_8 (73,000 tonnes at 1.2% U_3O_8)
- Cut-off grade of 0.2% U_3O_8

✓ **Deposit remains open for resource expansion down-plunge and within certain areas along strike to northeast**

NOTES: (1) Refer to the Wheeler River Technical Report titled "Pre-feasibility Study Report for the Wheeler River Uranium Project, Saskatchewan, Canada" dated September 24, 2018 for further details regarding the mineral resources estimated for the Gryphon deposit.

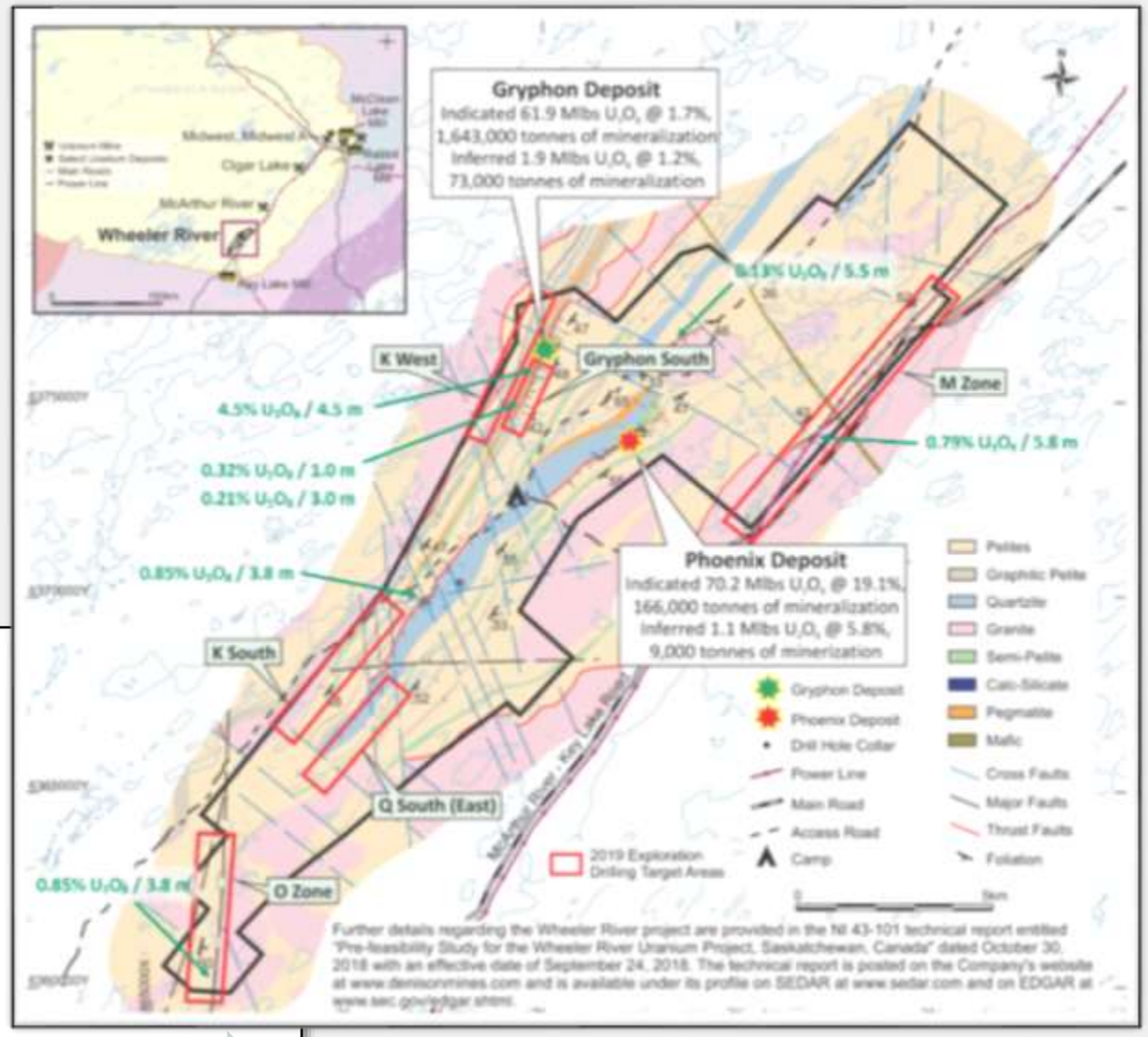
Station #9 – Core Yard

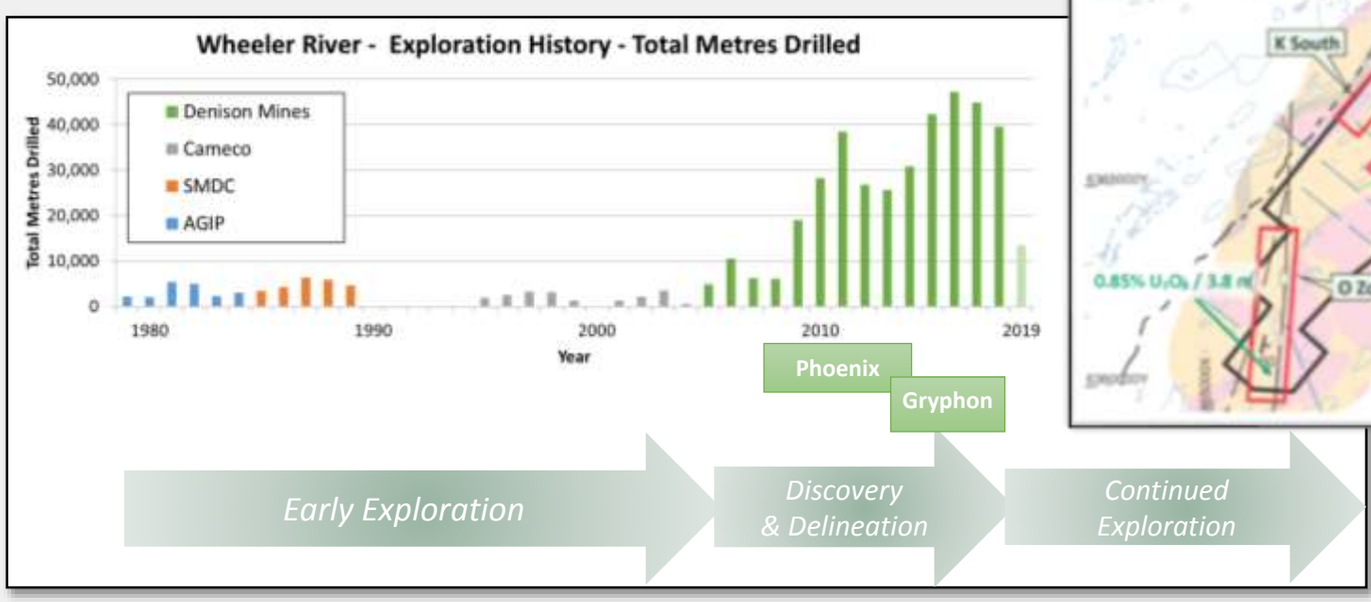
Station #9 – Core Yard

Considerable exploration potential remains at Wheeler River

Recent Exploration at Wheeler River:

- Targeting under or un-explored areas
- Multiple historic intercepts that warrant follow-up
- Focused on the discovery of additional high-grade deposits with the potential to form satellite ISR operations
- Winter 2019 exploration program included 7,434 metres in 14 holes; summer 2019 program ongoing





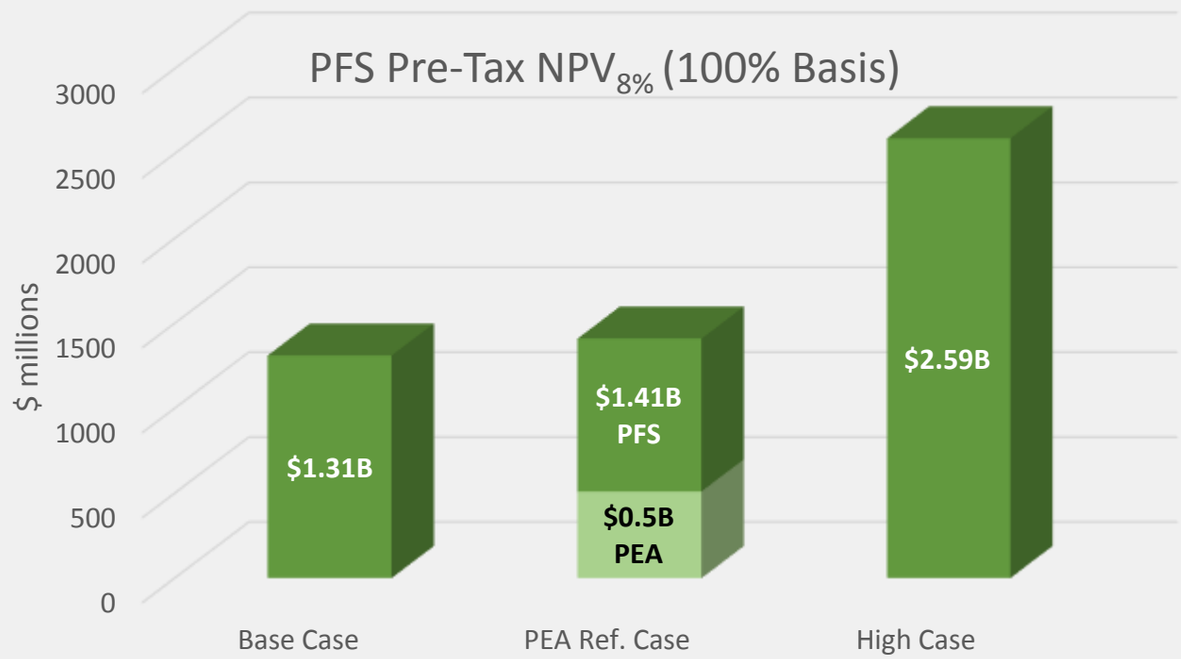
NOTES: Historic intercepts of uranium mineralization at Wheeler River are publically disclosed on the Company's website at www.denisonmines.com and/or on SEDAR (at www.sedar.com) and/or in the mineral assessment files in the Saskatchewan Mineral Assessment Database. https://www.saskatchewan.ca/business/agriculture-natural-resources-and-industry/mineral-exploration-and-mining/saskatchewan-geological-survey/saskatchewan-mineral-assessment-database-smad

Questions?

Photos by Pinehouse Photography Club

Appendix: Pre-Feasibility Study (PFS) Economics

Wheeler River PFS:
Uranium price assumptions, and sensitivities



Assumptions / Results[1]	Base Case	PEA Ref. Case	High Case
Uranium selling price	As above	US$44/lb U_3O_8	US$65/lb U_3O_8
Pre-tax $NPV_{8\%}$[2] (100% Basis)	**$1.31 billion**	**$1.41 billion**	**$2.59 billion**
Pre-tax IRR[2]	38.7%	47.4%	67.4%
Pre-tax payback period[3]	~24 months	~ 15 months	~ 11 months

Base Case Price Assumptions:

- **Phoenix Operation:**
  - ~US$29/lb U_3O_8 to US$45/lb U_3O_8
  - UxC Spot price forecast
  - "Composite Midpoint" scenario
  - Stated in "constant" 2018 dollars
- **Gryphon Operation:**
  - US$50/lb U_3O_8 fixed price

Comparison to 2016 PEA

- 2016 PEA provided pre-tax project $NPV_{8\%}$ of $513 million at fixed uranium price of US$44/lb U_3O_8
  - PFS equivalent $NPV_{8\%}$ at US$44/lb U_3O_8 ($1.4 billion) represents +**275% of pre-tax project NPV from PEA**

NOTES: (1) Refer to the Wheeler River Technical Report titled "Pre-feasibility Study Report for the Wheeler River Uranium Project, Saskatchewan, Canada" dated September 24, 2018; (2) NPV and IRR are calculated to the start of pre-production activities for the applicable operation; (3) Payback period is stated as number of years to pay-back from the start of commercial production.

Phoenix Operation:
ISR mining method delivers industry leading cost per pound U_3O_8

Phoenix Operation	PFS Result[1]
Mine life	**10 years** (6.0 million lbs U_3O_8 per year on average)
Average cash operating costs	**$4.33 (US$3.33) per lb U_3O_8**
Initial capital costs (100% basis)	**$322.5 million**
Operating margin[4]	**89.0%** at US$29/lb U_3O_8
All-in cost[2]	**$11.57 (US$8.90) per lb U_3O_8**

Assumptions / Results	Base Case	High Case
Uranium selling price	UxC Spot Price[3]	US$65/lb U_3O_8
Operating margin[4]	**91.4%**	**95.0%**
Pre-tax $NPV_{8\%}$[5] (100%)	**$930.4 million**	**$1.91 billion**
Pre-tax IRR[5]	43.3%	71.5%
Pre-tax payback period[6]	~ 21 months	~ 11 months

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NOTES: (1) Refer to the Wheeler River Technical Report titled "Pre-feasibility Study Report for the Wheeler River Uranium Project, Saskatchewan, Canada" dated September 24, 2018; (2) All-in cost is estimated on a pre-tax basis and includes all project operating costs and capital costs, divided by the estimated number of total pounds U_3O_8 to be produced; (3) Spot Price is based on the "Composite Midpoint" spot price scenario from UxC's UMO; (4) Operating profit margin is calculated as uranium revenue less operating costs, divided by uranium revenue. Operating costs exclude all royalties, surcharges and income taxes; (5) NPV and IRR are calculated to the start of pre-production activities for the Phoenix operation in 2021; (6) Payback period is stated as number of years to pay-back from the start of uranium production.

Gryphon Operation:
Additional low-cost production with conventional UG mining

Gryphon Operation	PFS Result[1]
Mine life	**6.5 years** (7.6 million lbs U_3O_8 per year on average)
Average cash operating costs	**$15.21 (US$11.70) per lb U_3O_8**
Initial capital costs (100% basis)	**$623.1 million**
Operating margin[3]	**77.0%** at US$50/lb U_3O_8
All-in cost[2]	**$29.67 (US$22.82) per lb U_3O_8**

Assumptions / Results	Base Case	High Case
Uranium selling price	US$50/lb U_3O_8	US$65/lb U_3O_8
Operating margin[3]	**77.0%**	**82.3%**
Pre-tax $NPV_{8\%}$[4] (100%)	**$560.6 million**	**$998.8 million**
Pre-tax IRR[4]	23.2%	31.0%
Pre-tax payback period[5]	~ 37 months	~ 31 months

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NOTES: (1) Refer to the Wheeler River Technical Report titled "Pre-feasibility Study Report for the Wheeler River Uranium Project, Saskatchewan, Canada" dated September 24, 2018; (2) All-in cost is estimated on a pre-tax basis and includes all project operating costs and capital costs, divided by the estimated total number of pounds U_3O_8 to be produced; (3) Operating profit margin is calculated as uranium revenue less operating costs, divided by uranium revenue. Operating costs exclude all royalties, surcharges and income taxes; (4) NPV and IRR are calculated to the start of pre-production activities for the Gryphon operation in 2026; (5) Payback period is stated as number of years to pay-back from the start of uranium production.

Wheeler River PFS [1] :
Statement of Reserves and Denison indicative post-tax results

Reserves[2, 3, 4, 7, 8]

Deposit	Class.	Tonnes	Grade	Lbs U_3O_8	Denison (90%)
Phoenix[5]	Probable	141,000	19.1% U_3O_8	59.7M	53.7M
Gryphon[6]	Probable	1,257,000	1.8% U_3O_8	49.7M	44.7M
Total	**Probable**	**1,398,000**	**3.5%**	**109.4M**	**98.4M**

Indicative Denison post-tax results

Financial Results	Denison (90%)
Initial capital costs	**$290.3 million**
Base case post-tax IRR[9]	32.7%
Base case post-tax $NPV_{8\%}$[9]	$755.9 million
Base case post-tax payback period[10]	~ 26 months
High case post-tax IRR[9]	**55.7%**
High case post-tax $NPV_{8\%}$[9]	**$1.48 billion**
High case post-tax payback period[10]	**~12 months**

Denison Mines

NOTES: (1) Refer to the Wheeler River Technical Report titled "Pre-feasibility Study Report for the Wheeler River Uranium Project, Saskatchewan, Canada" dated September 24, 2018; (2) Reserve statement is as of September 24, 2018; (3) CIM definitions (2014) were followed for classification of mineral reserves; (4) Mineral resources are inclusive of reserves; (5) Mineral reserves for the Phoenix deposit are reported at the mineral resource cut-off grade of 0.8% U_3O_8. The mineral reserves are based on the block model generated for the May 28, 2014 mineral resource estimate. A mining recovery factor of 85% has been applied to the mineral resource above the cut-off grade; (6) Mineral reserves for the Gryphon deposit are estimated at a cut-off grade of 0.58% U_3O_8 using a long-term uranium price of USD$40/lb, and a USD$/CAD$ exchange rate of 0.80. The mineral reserves are based on the block model generated for the January 30, 2018 mineral resource estimate. The cut-off grade is based on an operating cost of CAD$574/tonne, milling recovery of 97%, and 7.25% fee for Saskatchewan royalties. Mineral reserves include for diluting material and mining losses; (7) Mineral reserves are stated at a processing plant feed reference point; (8) Numbers may not add due to rounding; (9) NPV and IRR are calculated to the start of pre-production for the Phoenix operation in 2021; (10) Payback period is stated as number of months to pay-back from the start of uranium production.