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FISSION URANIUM CORP.

TECHNICAL REPORT ON THE PRE-FEASIBILITY STUDY ON THE PATTERSON LAKE SOUTH PROPERTY USING UNDERGROUND MINING METHODS, NORTHERN SASKATCHEWAN, CANADA

NI 43-101 Report

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1 SUMMARY

EXECUTIVE SUMMARY

Roscoe Postle Associates Inc. (RPA), Wood Canada Limited (Wood), BGC Engineering Inc. (BGC), Clifton Associates Ltd. (Clifton), Melis Engineering Ltd. (Melis), Artisan Consulting Services Ltd. (Artisan), Newmans Geotechnique Inc. (Newmans), and Thyssen Mining Construction of Canada Ltd. (TMCC) were retained by Fission Uranium Corp. (Fission Uranium) to prepare a Pre-Feasibility Study (PFS) on the Patterson Lake South Property (the PLS Property, the Property, or the Project), located in northern Saskatchewan, Canada, using underground mining methods (the UG PFS). The purpose of this report is to summarize the results of the PFS. This Technical Report conforms to NI 43-101 *Standards of Disclosure for Mineral Projects*. Wood is responsible for the process plant and infrastructure. Clifton is responsible for environmental and tailings management design. BGC has provided inputs in the areas of geotechnical and hydrogeological design. Newmans and Artisan have provided inputs to the crown pillar recovery using horizontal directional drilling and artificial ground freezing, and TMCC has assisted RPA by providing cost estimates and schedules for some of the underground mine development. RPA has responsibility for geology, mining, and the overall compilation of the report.

Fission Uranium is a Canadian exploration company, which is primarily engaged in the acquisition, evaluation, and development of uranium properties with a view to commercial production. It holds a 100% interest in the PLS Property.

Currently, the major asset associated with the Project is the Triple R uranium deposit.

The UG PFS is based on using underground mining methods, and processing of 1,000 tonnes per day (tpd) via acid leaching, solvent extraction (SX), and precipitation. The Project has the potential to produce up to 15 million pounds (Mlb) of triuranium octoxide (U_3O_8) per year in the form of yellowcake. The UG PFS presents an alternative scenario to the combined open pit and underground plan presented in April 2019 (the Hybrid PFS).

CONCLUSIONS

In RPA's opinion, the PFS indicates that positive economic results can be obtained for the Project. The economic analysis shows an after-tax internal rate of return (IRR) of 25%, and a after-tax net present value (NPV) at a discount rate of 10% of C$561 million at a long term price of US$50/lb U_3O_8 and an exchange rate of C$1.00/US$0.75.

RPA offers the following conclusions by area:

GEOLOGY AND MINERAL RESOURCES

The Triple R deposit is a large, basement hosted, structurally controlled, sub-vertical, near surface, high grade uranium deposit. Drilling has outlined mineralization with three-dimensional (3D) continuity, with size and grades that can potentially be extracted economically. Fission Uranium's protocols for drilling, sampling, analysis, security, and database management meet industry standard practices. The drill hole database was verified by RPA and is suitable for Mineral Resource estimation work.

RPA estimated Mineral Resources for the Triple R deposit using drill hole data available as of October 23, 2018. At a cut-off grade of 0.25% U_3O_8, Indicated Mineral Resources total 2.22 million tonnes at an average grade of 2.1% U_3O_8 for a total of 102.4 Mlb U_3O_8. Inferred Mineral Resources total 1.22 million tonnes at an average grade of 1.22% U_3O_8 for a total of 32.8 Mlb U_3O_8. Estimated grades are based on chemical assays only. Gold grades were also estimated and average 0.61 g/t for the Indicated Mineral Resources and 0.50 g/t for the Inferred Mineral Resources. Revenue from the recovery of gold is excluded from the economic analysis. Mineral Resources are reported inclusive of Mineral Reserves

The Triple R deposit is located within Fission Uranium's PLS Property, which is part of the largest mineralized trend in the Athabasca Basin region. Mineralization is known to occur at five on-strike locations on the PLS Property and all five constitute the Triple R deposit. From west to east, zones of the Triple R deposit are: 1) R1515W, 2) R840W, 3) R00E, 4) R780E, and 5) R1620E. The R780E is the most significant of the zones, as it hosts higher grade, thicker, and more continuous mineralization compared to other areas as defined by current drilling. Mineralization remains open along strike between the individual zones and down dip.

GEOTECHNICAL, MINING, AND MINERAL RESERVES

The Triple R deposit is contained primarily within metamorphosed basement lithologies and, to a much lesser extent, within overlying Meadow Lake Formation sedimentary rocks. Bedrock is overlain by 50 m to 100 m of sandy overburden, with the high grade mineralization located near the bedrock-overburden contact. Although the bedrock is generally competent, rock strengths in the mineralization have been degraded by radiological alteration. The deposit extends under Patterson Lake, and a key technical challenge to developing the operation will be water control related to Patterson Lake and saturated sandy overburden.

The mining method will be longhole retreat mining in both transverse and longitudinal methods, and some localized drift and fill mining based on current block model information. The mining will progress from the bottom levels to the top, and from the southwest to northeast.

The mine will be accessed using a decline originating to the west of the R00E deposit. The decline will include a box cut into the overburden, and a portal face collared in the overburden. The first stage of the decline will be developed through overburden for approximately 405 m. Following this, the decline will transition through weak bedrock for an additional 133 m, until reaching the competent bedrock.

A key component of the underground design is the concept of using artificial ground freezing to extract some of the crown pillar – the mineralized material that approaches the overburden layer. This will be done using horizontal directional drilling from the shore of Patterson Lake and then pumping a refrigerated brine solution through the drill holes to effectively freeze the ground in the areas of stopes.

Over the life of mine (LOM), Mineral Reserves totalling 2.3 million tonnes grading 1.61% U_3O_8 containing 81.4 Mlb U_3O_8 are mined. The Project has a three year construction period, followed by six years of mining, while the process plant operates for an additional half year after the mine ends. Mineral Reserves are estimated using an average long term uranium price of US$50/lb U_3O_8, and an exchange rate of C$1.00/US$0.75.

MINERAL PROCESSING AND METALLURGICAL TESTING

Metallurgical test work completed to date indicates that a uranium recovery of 96.7% is a reasonable assumption for the UG PFS. The metallurgical test program included a bench test program.

The process flowsheet developed by Wood for the Project is based on unit processes commonly used effectively in uranium process plants in northern Saskatchewan and globally. Over the LOM, the process plant will produce a total of 78.7 Mlb U_3O_8. No major deleterious elements or elemental concentrations have been identified to date.

While the Triple R deposit contains gold values that may be recoverable, a high level economic analysis by RPA has shown this to have negligible impact on overall Project economics at current market conditions and gold recovery was thus excluded from the design. Should market forces change in the future, gold recovery could be reasonably easily engineered into the existing design and constructed without impacting throughput of the uranium process plant.

ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS

In support of the UG PFS, a review of the licensing, permitting, and environmental aspects of the Project, including bio-physical, social, and governance, was completed through a literature search, examination of the appropriate Acts and Regulations, review of the PFS design of the Project, discussions with Fission Uranium and the PFS team, examination of selected documents, and a site visit.

The preliminary baseline work has described typical northern Saskatchewan terrain of the Athabasca Basin region and has not identified anything that should significantly delay the Project if proper planning and mitigations are incorporated into the Project design. Such mitigations would include, but not be limited to, habitat compensation for any fish habitat disturbed by the Project, possibly terrestrial habitat compensation for woodland caribou habitat, and sufficient consultation with local First Nations and communities. The primary environmental goal will be the protection of Patterson Lake and the downstream water quality in the Clearwater River system as this will likely be the focus of any concerns under the underground mining only scenario.

Overall, the Project appears to be following applicable regulations governing exploration, drilling, and land use, and Fission Uranium staff and contractors are aware of their duties with respect to environmental and radiation protection. Early in the exploration program, there were some issues related to excess clearing of trails and nearby water bodies, however, Fission Uranium has worked to repair and reclaim these areas. Operations are neat and orderly, with the level of clearing and disturbance now commensurate with similar projects in northern

Saskatchewan. The Project is frequently visited by Saskatchewan Conservation officers to ensure compliance.

A high level, preliminary environmental risk assessment (PERA) was completed to assess potential interactions of the Project with the environment. Under the UG PFS scenario, the main area of concern is development and operation of the tailings management facility (TMF). The mitigations proposed for the TMF appear protective of the environment in the long term post decommissioning.

The TMF will use the proven sub-aqueous deposition and pervious surround methodologies, and it will require sufficient detail to demonstrate that the proposed hybrid facility (partially excavated and partially above ground) will be protective. The hybrid TMF design is optimized to meet the existing geological and hydrogeological conditions and avoids widespread dewatering during operation, although it does require a slight draw on the local groundwater to eliminate contaminant flux. The potential for impacts on Patterson Lake will be much lower in the UG PFS scenario than anticipated in the Hybrid OP/UG PFS and the mitigations will be largely related to protecting the water quality. This will need to be demonstrated in the environmental impact assessment (EIA).

Most of the identified environmental risks are typical of existing uranium operations, which, in the modern era, have been demonstrated to have minimal impact on the local and regional environments.

To date, the environmental baseline detail has been sufficient for the local environment to be included in the EIA, however, the far field, downstream of Patterson Lake area, requires additional work ahead of the EIA to support pathways modelling. This additional baseline work is underway and will be largely completed in 2019 with some work required in the winter 2019/20. Canada North Environmental Services Limited (CanNorth) has reviewed the baseline program against what is necessary to support the pathways modelling required to support the EIA and Canadian Nuclear Safety Commission (CNSC) licensing, and any identified gaps are being addressed in the current work.

The level of environmental review was commensurate with a PFS; it was not an exhaustive examination of all documentation and did not include modelling or a compliance audit. The interpretation relies on the authors with more than 35 years of experience with Saskatchewan

uranium projects and familiarity with mining and the federal and provincial requirements that accrue to such projects. The Project is at a stage where, with proper planning, areas of concern can be addressed in a timely fashion within an orderly project approvals process.

Consultation in support of the EIA will need to be undertaken in a manner that does not materially affect Project timing. This will require ongoing consultation with the CNSC and the Saskatchewan government to ensure that Fission Uranium meets the expected level of First Nations, Métis, and stakeholder consultation. Fission Uranium's level of governance continues to be adequate for the level of work on site, however, it will require significant improvement to support the policy-driven management systems employed at uranium projects, particularly for their safety and control areas.

RISKS AND UNCERTAINTIES

RPA, Wood, BGC, Clifton, TMCC, Artisan, and Newmans have assessed critical areas of the Project and identified key risks associated with the technical and cost assumptions used. In all cases, the level of risk refers to a subjective assessment as to how the identified risk could affect the achievement of the Project objectives. The risks identified are in addition to general risks associated with mining projects, including, but not limited to:

- general business, social, economic, political, regulatory, and competitive uncertainties;
- changes in project parameters as development plans are refined;
- changes in labour costs or other costs of production;
- adverse fluctuations in commodity prices;
- failure to comply with laws and regulations or other regulatory requirements;
- the inability to retain key management employees and shortages of skilled personnel and contractors.

The following definitions have been employed by RPA in assigning risk consequence factors to the various aspects and components of the Project:

1. **Low –** Risks that are considered to be average or typical for a deposit of this nature and could have a relatively insignificant impact on the economics. These generally can be mitigated by normal management processes combined with minor cost adjustments or schedule allowances.
2. **Minor –** Risks that have a measurable impact on the quality of the estimate but not sufficient to have a significant impact on the economics. These generally can be mitigated by normal management processes combined with minor cost adjustments or schedule allowances.
3. **Moderate –** Risks that are considered to be average or typical for a deposit of this nature but could have a more significant impact on the economics. These risks are

generally recognizable and, through good planning and technical practices, can be minimized so that the impact on the deposit or its economics is manageable.

4. **Major –** Risks that have a definite, significant, and measurable impact on the economics. This may include basic errors or substandard quality in the basis of estimate studies or project definition. These risks can be mitigated through further study and expenditure that may be significant. Included in this category may be environmental/social non-compliance, particularly in regard to Equator Principles and IFC Performance Standards.
5. **High –** Risks that are largely uncontrollable, unpredictable, unusual, or are considered not to be typical for a deposit of a particular type. Good technical practices and quality planning are no guarantee of successful exploitation. These risks can have a major impact on the economics of the deposit including significant disruption of schedule, significant cost increases, and degradation of physical performance. These risks cannot likely be mitigated through further study or expenditure.

The following definitions have been employed by RPA in assigning risk probability factors to the various aspects and components of the Project:

1. **Rare –** The risk is very unlikely to occur during the Project life.
2. **Unlikely –** The risk is more likely not to occur than occur during the Project life.
3. **Possible –** There is an increased probability that the risk will occur during the Project life.
4. **Likely –** The risk is likely to occur during the Project life.
5. **Almost Certain –** The risk is expected to occur during the Project life.

A summary of key Project related risks is shown in Table 1-1, and Table 1-2.

TABLE 1-1 RISK SUMMARY TABLE
Fission Uranium Corp. – Patterson Lake South Property

LIKELIHOOD						
	Almost Certain					
	Likely					
	Possible			2, 3, 8, 9	6	
	Unlikely		5, 10	7	1, 4	
	Rare					
		Low	Minor	Moderate	Major	High
		CONSEQUENCE				

TABLE 1-2 RISKS AND UNCERTAINTIES
Fission Uranium Corp. – Patterson Lake South Property

Project Element	Issue	Risk Number	Risk Consequence	Risk Likelihood	Mitigation
Geology	Resource tonnage and/or metal grade are over-estimated	1	Major	Unlikely	Infill drilling is required in areas classified as Inferred. There is upside potential to increase resources along strike and at depth.
Mining	Thickness and nature of overburden sediments, and its impact on ground freezing	2	Moderate	Possible	Continue geotechnical assessment.
Mining	Overburden characteristics, and impact on decline development method	3	Moderate	Possible	Continue geotechnical assessment.
Mining	Ground conditions within the radiologically altered rock cause unmanageable ground conditions	4	Major	Unlikely	Geotechnical drilling and analysis will further refine ground support requirements.
Process	Uranium recovery does not meet expectations	5	Minor	Unlikely	Test work supports recovery assumption. Additional test work will allow optimization of flowsheet.
Environment and Permitting	Permitting is not achieved	6	Major	Possible	Begin the environmental assessment (EA) process and wider consultation.
Environment and Permitting	Management of exposure to radiation is not achieved	7	Moderate	Unlikely	Issues are well-understood for North Saskatchewan operations.
Construction Schedule	Decline development is slower than anticipated	8	Moderate	Possible	Requires detailed planning and control. Further information on geotechnical conditions will refine schedule estimates.
Pre-production Capital Cost Estimate	TMF construction is delayed by geotechnical factors	9	Moderate	Possible	Geotechnical data collection and analysis will result in refined cost estimates.
Operating Cost Estimate	Cost of key materials and supplies is under-estimated	10	Minor	Unlikely	Close management of purchasing and logistics.

RECOMMENDATIONS

RPA recommends that Fission Uranium advance the Project to a Feasibility Study (FS). RPA offers the following recommendations by area:

GEOLOGY AND MINERAL RESOURCES

- The PLS Property hosts a significant uranium deposit and merits considerable exploration and development work. The primary objectives are to advance engineering work, expand the Triple R resource, upgrade Inferred Mineral Resources to Indicated classification, and explore elsewhere on the Property.
- To upgrade a sufficient quantity of Inferred Mineral Resources to Indicated to result in a 10 year Project life would require approximately 37,000 m of diamond drilling targeting R780E and R840W. This would cost approximately C$20 million to C$25 million.
- RPA has reviewed the proposed drilling with Fission Uranium technical staff and agrees with the placement and purpose of advancing the Project. RPA has recommended that the proposed drilling at R1515W be closer spaced to ensure that the Inferred Mineral Resources are properly tested and evaluated.

GEOTECHNICAL CONSIDERATIONS AND MINING

- Continue the geotechnical investigation of soil mechanics to support the crown pillar stabilization, with a primary focus on assessing the viability of artificial ground freezing using horizontal directional drilling.
- Continue the geotechnical investigation of rock mechanics to support the underground design. The program will require drilling of approximately ten oriented core geotechnical holes in rock: four for the main pit, four for the underground (two for the crown and two for the rock mass), and two short holes for a small separate zone (the R00E pit). The total length is estimated at 2,000 m for the program.
- Carry out an assessment of alternative decline development.
- Collect geotechnical data on the mineralized zones that are not included in the current PFS (R1515W, R800W, and R1620E).
- Carry out an assessment of systems such as ventilation on demand and equipment automation.

MINERAL PROCESSING AND METALLURGICAL TESTING

- Optimize the post-leaching solid-liquid separation by considering centrifuging, pressure filtration, and vacuum filtration versus the PFS design which utilizes thickeners.
- Optimize gypsum precipitation to minimize the concentration of uranium co-precipitated with the gypsum and to maximize the underflow solids of the gypsum thickener.
- Conduct testing to confirm that molybdenum removal in carbon columns is not required to produce on-spec yellowcake.

INFRASTRUCTURE

- Perform a logistics study for the Project. Emphasis should be placed on the three traffic bridges on route to site to define the allowable load sizes and weights that the bridges can accommodate.
- Perform an aggregate study to determine if there are suitable quantities of aggregate available to meet the different needs of the Project.

ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS

- Continue the engagement and consultation process, expanding it to reflect the changes in Project scale and progress.
- Carry out a detailed environmental risk assessment (ERA) to ensure that all reasonable mitigations are included in the EIA and the Project design.
- Complete an assessment to ensure all appropriate information is being collected to support the environmental modelling required for the EIA and CNSC licensing.
- Complete the downstream bio-physical work to complete the information required for the EIA.
- Continue bio-physical monitoring to maintain the currency of the existing environmental database.
- Continue to explore options to reduce the footprint of the TMF and the underground mine.
- Explore shared services options with other companies operating in the area (e.g., environmental data sharing, infrastructure, etc.).
- Continue to participate in the woodland caribou discussions for two zones in Saskatchewan: SK1, the Boreal Shield, which includes the Athabasca Basin, and SK2W, the Boreal Plain.
- Ensure that future work on site is of sufficient detail (feasibility level at a minimum) to support the EIA and CNSC licensing process.

BUDGET

RPA, Wood, BGC, Clifton, TMCC, Artisan, and Newmans propose the following budget for work carrying through to the completion of a FS, including completing an EA and licensing process (Table 1-3).

TABLE 1-3 PROPOSED BUDGET
Fission Uranium Corp. – Patterson Lake South Property

Item	Value (C$ millions)
Geotechnical Studies	7.1
Metallurgy Studies	1.0
FS Engineering	9.8
Exploration Drilling	24.0
Social Permitting	3.5
EA and Licensing	20.0
Total	**65.4**

ECONOMIC ANALYSIS

The economic analysis was prepared using the following assumptions:

- No allowance has been made for cost inflation or escalation.
- No allowance has been made for corporate costs.
- The capital structure is assumed to be 100% equity, with no debt or interest payments.
- The model is assessed in constant Canadian dollars (C$), based in the third quarter of 2019.
- No allowance for working capital has been made in the financial analysis.
- The Project has no salvage value at the end of the mine life.

ECONOMIC CRITERIA

Table 1-4 presents the cash flow for the Project. Economic criteria that were used in the cash flow model include:

- Long term price of uranium of US$50/lb U_3O_8, based on long term forecasts.
- 100% of uranium sold at a long term price.
- The recovery and sale of gold was excluded from the cash flow model.
- Exchange rate of C$1.00/US$0.75.
- LOM processing of 2,299,000 t grading 1.61% U_3O_8.
- Nominal 350,000 t of processed material per year during steady state operations.
- Processing life of six and a half years.
- Overall recovery of 96.8%, based on test work.
- Total recovered yellowcake of 78.7 Mlb U_3O_8.
- Transportation costs assumed to be covered by the buyer, FOB mine gate.

- Royalties calculated in accordance with *"Guideline: Uranium Royalty System, Government of Saskatchewan, June 2014".* Consisting of:
  - C$381 million in gross revenue royalties
  - C$436 million in profit based royalties
- Unit operating costs of C$328/t of processed material, or C$9.57/lb U_3O_8.
- Pre-production capital costs of C$1,177 million, spread over three years.
- Sustaining capital costs (including reclamation) of C$282 million, spread over the mine life.
- Corporate income taxes at a rate of 27% totalling C$653 million net of deductions.

TABLE 1-4 CASH FLOW SUMMARY
Fission Uranium Corp. - Patterson Lake South Project

	INPUTS	UNITS	TOTAL	YR -3	YR -2	YR -1	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6	YR 7	YR 8	YR 9	YR 10	YR 11	YR 12	YR 13	YR 14	YR 15
MINING																					
Underground Mine Production																					
Mine Operating Days		days	2,100	-	-	-	350	350	350	350	350	350	-	-	-	-	-	-	-	-	-
Ore Tonnes mined per day		tpd	1,008	-	-	-	1,029	1,210	1,231	1,015	1,029	869	-	-	-	-	-	-	-	-	-
Total Tonnes moved per day		tpd	913	-	-	-	2,033	2,095	1,533	1,050	1,101	906	-	-	-	-	-	-	-	-	-
Ore Tonnes mined		000 t	2,299	-	-	52	360	425	431	355	361	314.7	-	-	-	-	-	-	-	-	-
U3O8 Grade		%	1.61%	0.00%	0.00%	0.73%	1.33%	1.65%	1.99%	1.58%	2.05%	0.99%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Contained U3O8		Mlb U3O8	81.4	-	-	0.8	10.5	15.4	18.9	12.4	16.3	6.9	-	-	-	-	-	-	-	-	-
Overburden		000 t	1,853.4	1,853	-	-	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-
Waste Rock		000 t	1,219	22	56	337	352	309	105	368	24	3	-	-	-	-	-	-	-	-	-
Total Moved		**000 t**	**5,372**	**1,875**	**56**	**389**	**712**	**733**	**536**		**385**	**317**	-	-	-	-	-	-	-	-	-
PROCESSING																					
Mill Feed																					
Plant Operating Days		days	2,286	-	-	-	350	350	350	350	350	350	186	-	-	-	-	-	-	-	-
Plant Daily Throughput		tpd	1,005	-	-	-	1,013	1,010	1,003	1,001	1,008	1,001	1,000	-	-	-	-	-	-	-	-
Tonnes Processed		000 t	2,299	-	-	-	355	353	351	350	353	350	186	-	-	-	-	-	-	-	-
Head Grade		%	1.61%	0.00%	0.00%	0.00%	1.32%	1.73%	2.00%	1.79%	1.90%	1.28%	0.90%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Contained U3O8		Mlb U3O8	77.6	-	-	-	10.4	13.5	15.5	13.8	14.8	9.7	-	-	-	-	-	-	-	-	-
Process Recovery																					
Recovery		%	96.8%	0.0%	0.0%	0.0%	96.5%	96.9%	97.1%	96.9%	97.0%	96.4%	95.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Recovered U_3O_8		Mlb U3O8	75.2	-	-	-	10.0	13.0	15.0	13.4	14.4	9.4	-	-	-	-	-	-	-	-	-
REVENUE																					
Metal Prices		**Input Units**																			
Long-Term U3O8 Price	$ 50	US$ / lb U3O8	$ 50	$ -	$ -	$ -	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50
Exchange Rate	$ 0.75	C$ / US$	$ 0.75	$ -	$ -	$ -	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75
Realized Price		C$ / lb U3O8	$ 67	$ -	$ -	$ -	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67
Total Gross Revenue		**C$ '000**	**$ 5,249,798**	$ -	$ -	$ -	**$ 665,884**	**$ 869,864**	**$ 1,000,969**	**$ 892,653**	**$ 957,457**	**$ 625,619**	**$ 237,251**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Transportation	$ 00 C$/t product	C$ '000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Net Smelter Return	7.250%	**C$ '000**	**$ 5,249,798**	$ -	$ -	$ -	**$ 665,884**	**$ 869,864**	**$ 1,000,969**	**$ 892,653**	**$ 957,457**	**$ 625,619**	**$ 237,251**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Royalties																					
NSR Royalties	0.0%	C$ '000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Gov't SK Gross Revenue Royalty		C$ '000	$ 380,610	$ -	$ -	$ -	$ 48,277	$ 63,072	$ 72,570	$ 64,717	$ 69,416	$ 45,357	$ 17,201	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Royalties		**C$ '000**	**$ 380,610**	$ -	$ -	$ -	**$ 48,277**	**$ 63,072**	**$ 72,570**	**$ 64,717**	**$ 69,416**	**$ 45,357**	**$ 17,201**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Net Revenue		**C$ '000**	**$ 4,869,188**	$ -	$ -	$ -	**$ 617,608**	**$ 806,892**	**$ 928,398**	**$ 827,936**	**$ 888,042**	**$ 580,261**	**$ 220,051**	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Unit NSR - Tonnes Processed		C$ / tonne	$ 2,118	$ -	$ -	$ -	$ 1,742	$ 2,294	$ 2,645	$ 2,364	$ 2,517	$ 1,658	$ 1,183	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Unit NSR - Pounds Produced		C$ / lb U3O8	$ 62	$ -	$ -	$ -	$ 62	$ 62	$ 62	$ 62	$ 62	$ 62	$ 62	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

	INPUTS	UNITS	TOTAL	YR -3	YR -2	YR -1	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6	YR 7	YR 8	YR 9	YR 10	YR 11	YR 12	YR 13	YR 14	YR 15
OPERATING COSTS																					
Underground Mining		C$ '000	$ 314,571	$ -	$ -	$ -	$ 44,770	$ 61,028	$ 63,124	$ 49,933	$ 51,248	$ 44,468	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Processing		C$ '000	$ 266,381	$ -	$ -	$ -	$ 36,076	$ 39,083	$ 41,458	$ 41,262	$ 43,001	$ 40,537	$ 24,964	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Surface and G&A		C$ '000	$ 172,496	$ -	$ -	$ -	$ 26,052	$ 26,182	$ 26,182	$ 26,182	$ 26,143	$ 26,225	$ 15,568	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Operating Cost		**C$ '000**	**$ 753,448**	**$ -**	**$ -**	**$ -**	**$ 106,898**	**$ 126,293**	**$ 130,764**	**$ 117,338**	**$ 120,393**	**$ 111,230**	**$ 40,532**								
UNIT OPERATING COSTS																					
Underground Mining		C$ / t ore	$ 137	$ -	$ -	$ -	$ 124	$ 144	$ 146	$ 141	$ 142	$ 141	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Processing		C$ / t ore	$ 116	$ -	$ -	$ -	$ 102	$ 111	$ 118	$ 118	$ 122	$ 116	$ 134	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Surface and G&A		C$ / t proc	$ 75	$ -	$ -	$ -	$ 73	$ 74	$ 75	$ 75	$ 74	$ 75	$ 84	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Operating Cost		**C$ / t proc**	**$ 328**	**$ -**	**$ -**	**$ -**	**$ 301**	**$ 357**	**$ 373**	**$ 335**	**$ 341**	**$ 317**	**$ 217**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Underground Mining		C$ / lb U3O8	$ 3.99	$ -	$ -	$ -	$ 4.48	$ 4.68	$ 4.20	$ 3.73	$ 3.57	$ 4.74	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Processing		C$ / lb U3O8	$ 3.38	$ -	$ -	$ -	$ 3.61	$ 3.00	$ 2.76	$ 3.08	$ 2.99	$ 4.32	$ 7.01	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Surface and G&A		C$ / lb U3O8	$ 2.19	$ -	$ -	$ -	$ 2.61	$ 2.01	$ 1.74	$ 1.95	$ 1.82	$ 2.79	$ 4.37	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Unit Operating Cost		**C$ / lb U3O8**	**$ 9.57**	**$ -**	**$ -**	**$ -**	**$ 10.70**	**$ 9.68**	**$ 8.71**	**$ 8.76**	**$ 8.38**	**$ 11.85**	**$ 11.39**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Unit Operating Cost		**US$ / lb U3O8**	**$ 7.16**																		
Operating Cash Flow		**C$ '000**	**4,115,739**	-	-	-	**510,710**	**680,598**	**797,635**	**710,598**	**767,649**	**469,031**	**179,518**	-	-	-	-	-	-	-	-
		C$ / t proc	**1,790**																		
CAPITAL COST																					
Pre-Production Direct Cost																					
Underground Mining		C$ '000	$ 200,719	$ 27,823	$ 89,629	$ 83,267	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Processing		C$ '000	$ 349,383	$ 22,820	$ 155,040	$ 194,543	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Infrastructure		C$ '000	$ 119,786	$ -	$ 44,016	$ 75,770	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Direct Cost		**C$ '000**	**$ 670,000**	**$ 50,643**	**$ 288,685**	**$ 330,671**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Indirect Costs																					
EPCM / Owners / Indirect Cost		C$ '000	$ 314,822	$ 48,808	$ 135,586	$ 130,428	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Costs		**C$ '000**	**$ 984,830**	**$ 99,451**	**$ 424,271**	**$ 461,099**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Contingency		C$ '000	$ 192,054	$ 20,748	$ 84,819	$ 86,487	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Initial Capital Cost		**C$ '000**	**$ 1,176,884**	**$ 120,208**	**$ 509,089**	**$ 547,586**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Sustaining Capital																					
Total Sustaining Capital		C$ '000	$ 208,602	$ -	$ -	$ -	$ 103,240	$ 55,479	$ 3,002	$ 39,338	$ 3,573	$ 3,970	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Reclamation and Closure		C$ '000	$ 73,788	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 36,894	$ 18,447	$ 7,379	$ 3,689	$ 3,689	$ 3,689	$ 3,689	$ -
Total Capital Cost		**C$ '000**	**$ 1,459,274**	**$ 120,208**	**$ 509,089**	**$ 547,586**	**$ 103,240**	**$ 55,479**	**$ 3,002**	**$ 39,338**	**$ 3,573**	**$ 3,970**	**$ -**	**$ 36,894**	**$ 18,447**	**$ 7,379**	**$ 3,689**	**$ 3,689**	**$ 3,689**	**$ 3,689**	**$ -**
CASH FLOW																					
Operating Cash Flow		C$ '000	$ 4,115,739	$ -	$ -	$ -	$ 510,710	$ 680,598	$ 797,635	$ 710,598	$ 767,649	$ 469,031	$ 179,518	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Operating Cash Flow less Capital Costs		C$ '000	$ 2,656,466	$ (120,208)	$ (509,089)	$ (547,586)	$ 407,470	$ 625,120	$ 794,632	$ 671,261	$ 764,075	$ 465,061	$ 179,518	$ (36,894)	$ (18,447)	$ (7,379)	$ (3,689)	$ (3,689)	$ (3,689)	$ -	$ -
Pre-Tax Cashflow		C$ '000	$ 2,656,466	$ (120,208)	$ (509,089)	$ (547,586)	$ 407,470	$ 625,120	$ 794,632	$ 671,261	$ 764,075	$ 465,061	$ 179,518	$ (36,894)	$ (18,447)	$ (7,379)	$ (3,689)	$ (3,689)	$ (3,689)	$ -	$ -
Cumulative Pre-Tax Cashflow		C$ '000		$ (120,208)	$ (629,298)	$ (1,176,884)	$ (769,414)	$ (144,294)	$ 650,338	$ 1,321,599	$ 2,085,674	$ 2,550,735	$ 2,730,253	$ 2,693,359	$ 2,674,912	$ 2,667,534	$ 2,663,844	$ 2,660,155	$ 2,656,466	$ 2,656,466	$ 2,656,466
Taxes																					
Less SK Profit Royalties		C$ '000	$ 436,135	$ -	$ -	$ -	$ -	$ -	$ 116,920	$ 103,067	$ 117,162	$ 71,426	$ 27,560	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
EBITDA		C$ '000	$ 3,679,604	$ -	$ -	$ -	$ 510,710	$ 680,598	$ 680,715	$ 607,531	$ 650,487	$ 397,605	$ 151,958	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Less Deductions		C$ '000	$ 1,560,819	$ 7,657	$ 15,095	$ 47,921	$ 446,307	$ 490,286	$ 197,443	$ 152,643	$ 119,371	$ 90,138	$ 67,867	$ 61,805	$ 51,221	$ 39,885	$ 30,389	$ 23,401	$ 18,254	$ 13,353	$ 9,778
Taxable Earnings		C$ '000	$ 2,098,786	$ (7,657)	$ (15,095)	$ (47,921)	$ 64,403	$ 190,311	$ 483,271	$ 454,888	$ 531,115	$ 307,467	$ 84,091	$ (61,805)	$ (51,221)	$ (39,885)	$ (30,389)	$ (23,401)	$ (18,254)	$ (13,353)	$ (9,778)
Corporate Taxes @ 27%	27.0%	C$ '000	$ 652,737	$ -	$ -	$ -	$ 17,929	$ 132,384	$ 130,463	$ 122,820	$ 143,401	$ 83,016	$ 22,705	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Net Profit		**C$ '000**	**$ 1,446,048**	**$ (7,657)**	**$ (15,095)**	**$ (47,921)**	**$ 46,474**	**$ 357,927**	**$ 352,788**	**$ 332,068**	**$ 387,714**	**$ 224,451**	**$ 61,387**	**$ (61,805)**	**$ (51,221)**	**$ (39,885)**	**$ (30,389)**	**$ (23,401)**	**$ (18,254)**	**$ (13,353)**	**$ (9,778)**
After-Tax Cash Flow		C$ '000	$ 1,567,593	$ (120,208)	$ (509,089)	$ (547,586)	$ 389,541	$ 492,736	$ 547,229	$ 445,374	$ 503,512	$ 310,619	$ 129,254	$ (36,894)	$ (18,447)	$ (7,379)	$ (3,689)	$ (3,689)	$ (3,689)	$ -	$ -
Cumulative		C$ '000		$ (120,208)	$ (629,298)	$ (1,176,884)	$ (787,342)	$ (294,607)	$ 252,622	$ 697,996	$ 1,201,508	$ 1,512,127	$ 1,641,380	$ 1,604,487	$ 1,586,040	$ 1,578,661	$ 1,574,972	$ 1,571,282	$ 1,567,593	$ 1,567,593	$ 1,567,593
PROJECT ECONOMICS																					
Pre-Tax Payback Period		yrs	2.2																		
Pre-Tax IRR		%	36%																		
Pre-Tax NPV @ 8%	8%	C$ '000	$1,334,164																		
Pre-Tax NPV @ 10%	10%	C$ '000	$1,117,331																		
Pre-Tax NPV @ 12%	12%	C$ '000	$932,001																		
After-Tax Payback Period		yrs	2.5																		
After-Tax IRR		%	25%																		
After-Tax NPV @ 8%	8%	C$ '000	$791,863																		
After-Tax NPV @ 10%	10%	C$ '000	$580,485																		
After-Tax NPV @ 12%	12%	C$ '000	$440,853																		

CASH FLOW ANALYSIS

Based on the economic criteria discussed previously, a summary of the cash flow is shown in Table 1-5.

TABLE 1-5 SUMMARY OF CASH FLOW
Fission Uranium Corp. – Patterson Lake South Property

Description	Units	Value
Gross Revenue	C$ millions	5,250
Less: Transportation	C$ millions	-
Net Smelter Return	C$ millions	5,250
Less: Provincial Revenue Royalties	C$ millions	(381)
Net Revenue	C$ millions	4,869
Less: Total Operating Costs	C$ millions	(753)
Operating Cash Flow	C$ millions	4,116
Less: Capital Costs	C$ millions	(1,459)
Pre-Tax Cash Flow	C$ millions	2,656
Less: Provincial Profit Royalties	C$ millions	(436)
Less: Taxes	C$ millions	(653)
After-Tax Cash Flow	C$ millions	1,568

Based on the input parameters, a summary of the Project economics is shown in Table 1-6.

TABLE 1-6 SUMMARY OF ECONOMIC RESULTS
Fission Uranium Corp. – Patterson Lake South Property

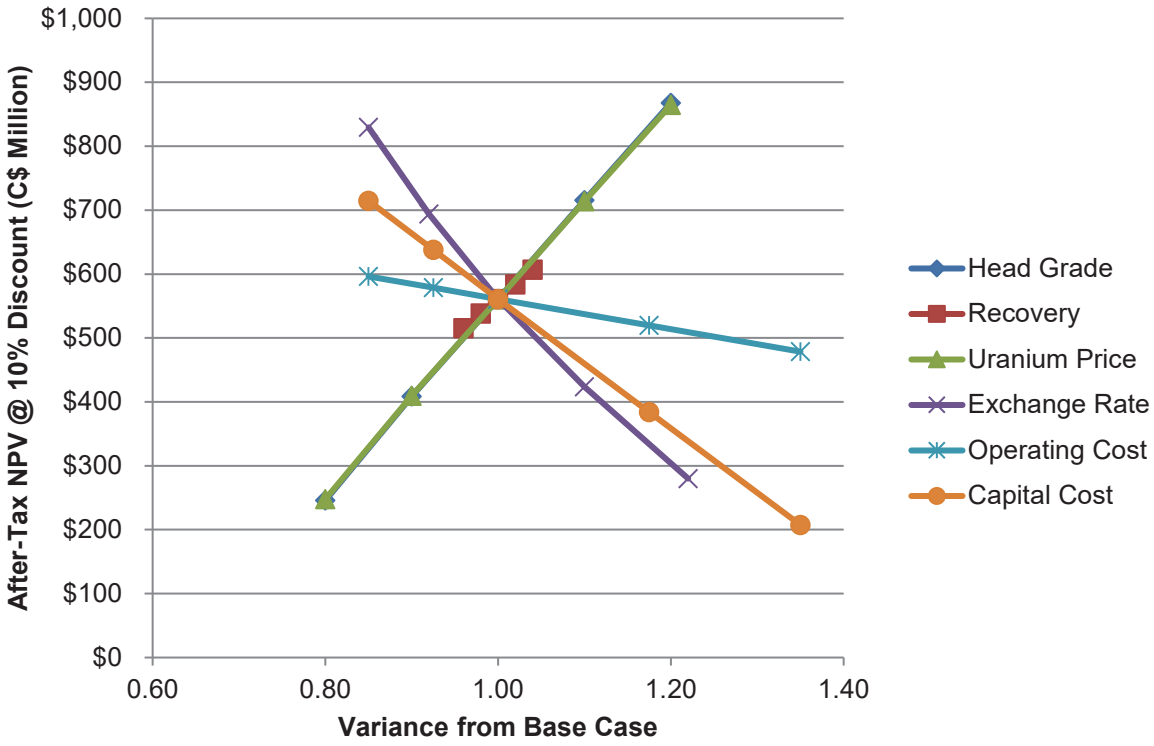
Description	Units	Value
Pre-Tax		
Net Present Value at 8%	C$ millions	1,334
Net Present Value at 10%	C$ millions	1,117
Net Present Value at 12%	C$ millions	932
Internal Rate of Return	%	34
Payback Period	years	2.2
After-Tax		
Net Present Value at 8%	C$ millions	702
Net Present Value at 10%	C$ millions	561
Net Present Value at 12%	C$ millions	441
Internal Rate of Return	%	25
Payback Period	years	2.5

SENSITIVITY ANALYSIS

The cash flow model was tested for sensitivity to variances in head grade, process recovery, input price of yellowcake, C$/US$ exchange rate, overall operating costs, and overall capital

costs. The resulting after-tax NPV at a 10% discount rate sensitivity is shown in Figure 1-1 and Table 1-7.

FIGURE 1-1 SENSITIVITY ANALYSIS



As shown in Figure 1-1, Project cash flow is most sensitive to the price of uranium, head grade, and process recovery. Yellowcake is primarily traded in US$, whereas capital and operating costs for the Project are generally priced in C$. Therefore, the C$/US$ exchange rate also exerts significant influence over Project economics. In addition to the sensitivity analysis shown in Figure 1-1, an extended sensitivity analysis was undertaken solely on uranium price. The extended sensitivity is presented in Table 1-8 and Figure 1-2.

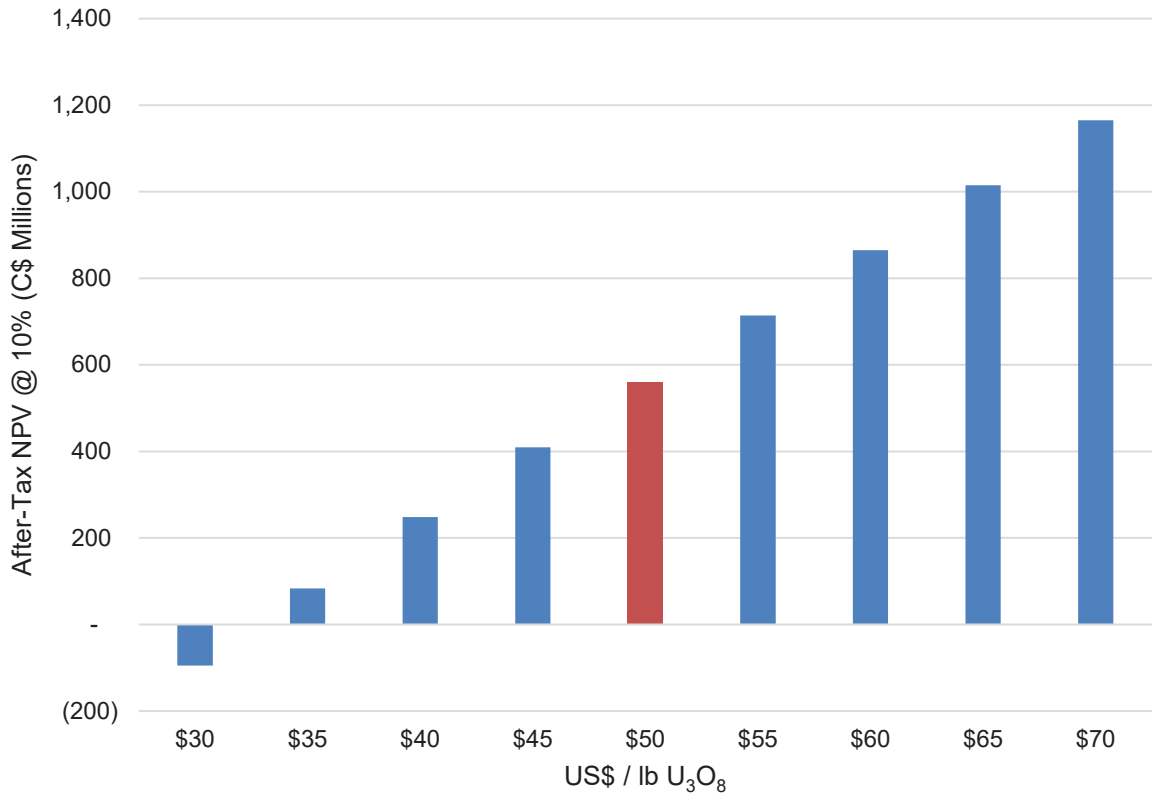
TABLE 1-7 SUMMARY OF SENSITIVITY ANALYSIS
Fission Uranium Corp. – Patterson Lake South Property

Description	Units	Low Case	Mid-Low Case	Base Case	Mid-High Case	High Case
Adjustment Factor						
Head Grade	%	-20%	-10%	N/A	10%	20%
Overall Recovery	%	-3%	-2%	N/A	1%	3%
Uranium Price	%	-20%	-10%	N/A	10%	20%
Exchange Rate	%	-15%	-8%	N/A	10%	22%
Operating Costs	%	-15%	-8%	N/A	18%	35%
Capital Cost	%	-15%	-8%	N/A	18%	35%
Resulting Input Factor						
Head Grade	%	1.28%	1.44%	1.61%	1.77%	1.93%
Overall Recovery	%	93.9%	95.3%	96.8%	98.2%	99.7%
Uranium Price	C$ / lb U_3O_8	$53	$60	$67	$73	$80
Exchange Rate	C$/US$	0.64	0.69	0.75	0.83	0.92
Operating Costs	C$/lb	8.1	8.9	9.6	11.2	12.9
Total Capital Cost	C$ millions	1,240	1,350	1,459	1,715	1,970
Output – After-Tax NPV @ 10%						
Head Grade	C$ millions	246	409	561	715	868
Overall Recovery	C$ millions	515	538	561	584	607
Uranium Price	C$ millions	248	410	561	714	865
Exchange Rate	C$ millions	829	694	561	423	280
Operating Costs	C$ millions	596	579	561	520	479
Capital Cost	C$ millions	715	638	561	384	207

TABLE 1-8 URANIUM PRICE SENSITIVITY ANALYSIS
Fission Uranium Corp. – Patterson Lake South Property

Uranium Price (US$/lb U_3O_8)	Uranium Price (C$/lb U_3O_8)	After-Tax NPV @ 10% (C$ Millions)
30	40	(95)
35	47	84
40	53	248
45	60	410
50 (Base Case)	**67**	**561**
55	73	714
60	80	865
65	87	1,015
70	93	1,165

FIGURE 1-2 URANIUM PRICE EXTENDED SENSITIVITY ANALYSIS



TECHNICAL SUMMARY

PROPERTY DESCRIPTION

The PLS Property consists of 17 contiguous mineral claims covering an area of 31,039 ha located in northwestern Saskatchewan, approximately 550 km north-northwest of the city of Prince Albert. It is centred at approximately 57°37' N latitude and 109°22' W longitude within 1:50,000 scale NTS map sheets 74F/11 (Forrest Lake) and 74F/11 (Wenger Lake). The Property straddles all-weather gravel Highway 955 which leads northward to the past-producing Cluff Lake mine. The Triple R deposit is located on claim S-111376.

The PLS claims were ground staked and are considered to be legacy claims. As of the effective date of this report, all claims are in good standing and are registered in the name of Fission Uranium. Assessment credits are available for multiple annual renewals.

EXISTING INFRASTRUCTURE

With the exception of the all-weather gravel Highway 955, which traverses the Property, there is no permanent infrastructure on the Property.

HISTORY

The Property was geologically mapped as part of a larger area by the Geological Survey of Canada in 1961.

In 1969, Wainoco Oil and Chemicals Ltd. Completed photogeologic mapping and airborne radiometric and magnetic surveys. No notable structures or anomalies were detected.

Canadian Occidental Petroleum Ltd. (CanOxy) completed extensive exploration on and around the Property from 1977 to 1981 including an airborne Questor INPUT electromagnetic (EM) survey; ground horizontal loop EM (HLEM) and magnetic geophysical surveys; geological, geochemical, alphameter (radon), and radiometric surveys; and diamond drilling.

In 1977, CanOxy discovered a very strong six station alphameter (radon) anomaly with dimensions of 1.2 km by 1.7 km on current claim S-111375. This anomaly coincides with high uranium in soil values and anomalous scintillometer (radiometric) values. It was suggested that this alphameter anomaly was responding to radioactive exotic boulders within the till of the Cree Lake Moraine, however, no follow-up work was carried out.

CanOxy's 1977 ground EM survey delineated the Patterson Lake Conductor Corridor that cuts across the middle of Patterson Lake on claim S-111376 and extends onto claim S-111375. Several disrupted conductors and inferred cross cutting features were identified as priority 1, 2, and 3 drill targets on claim S-111376.

CanOxy drill tested an airborne EM conductor on the west shore of Patterson Lake within claim S-111376. Drill hole CLU-12-79 intersected a 6.1 m wide sulphide-graphite "conductor" that contained anomalous uranium, copper, and nickel concentrations. Strong hematite and chlorite alteration were observed in the regolith and basement rock, and two curious spikes in radioactivity were detected in the fresh basement.

GEOLOGY AND MINERALIZATION

The east-west elongate Athabasca Basin lies astride two subdivisions of the Western Churchill Province, the Rae Subprovince (Craton) to the west and the Hearne Subprovince (Craton) to the east. These are separated by the northeast trending Snowbird Tectonic Zone also known as the Virgin River Shear Zone or Black Lake Shear Zone south and north of the Athabasca Basin, respectively. The PLS Property is located within the Clearwater and Taltson Domains of the Rae Subprovince near the southwestern edge of the Athabasca Basin. The western portion of the PLS Property overlies the Clearwater Domain and the eastern portion of the Property overlies the Taltson Domain.

The PLS Property lies within the northeastern limits of the Cretaceous Mannville Group which covers a large portion of western Saskatchewan. The Lexicon of Canadian Geologic Units (the Lexicon) describes the Mannville Group as interbedded marine and non-marine sands, shales, and calcareous sediments.

The PLS Property is covered by a thick layer of sandy to gravelly Quaternary glacial material. The Quaternary material ranges in thickness from less than 10 m in the southeast portion of the Property to greater than 100 m directly west of Patterson Lake. No outcrop has been discovered on the Property to date.

To date, no Athabasca Group sediments have been intersected on the Property, although it may be possible that “islands” of Athabasca sandstone exist within the northeast extent of the Property.

To date, drilling at the PLS Property has been focused on the basement rocks of the Taltson Domain. In the vicinity of PLS mineralization (i.e., along the PLG-3B EM conductor), the basement rocks are comprised of a northeast trending belt of variably altered and sheared pyroxene bearing orthogneisses bounded to the northwest and southeast by an apparently thick package of quartz-feldspar-biotite-garnet gneiss (QFBG-GN). The pyroxene bearing orthogneisses and QFBG-GN are intruded by numerous sheared, fine grained granite lenses.

Uranium mineralization at the PLS Property is hosted primarily within metamorphosed basement lithologies and, to a much lesser extent, within overlying Meadow Lake Formation sedimentary rocks.

Basement hosted mineralization at the PLS Property occurs in a wide variety of styles, the most common of which appears to be fine grained disseminated and fracture filling uranium minerals strongly associated with hydrocarbon/carbonaceous matter within the MSZ. Uranium minerals, where visible, appear to be concordant with the regional foliation and dominant structural trends identified through oriented core and fence drilling (i.e., steeply dipping to the southeast). Typically, mineralization within the MSZ is associated with pervasive, strong, grey-green chlorite and clay alteration. The dominant clay species identified through PIMA analysis are kaolinite and magnesium-chlorite interpreted to be sudoite. The pervasive clay and chlorite alteration eliminate the primary mineralogy of the host rock with only a weakly defined remnant texture remaining. Locally, intense rusty limonite-hematite alteration in the orthogneisses strongly correlates with high grade uranium mineralization and a “rotten”, wormy texture.

Less common styles of uranium mineralization within the MSZ which are often associated with very high grade uranium include: semi-massive and hydrocarbon rich; intensely clay altered (kaolinite) with uranium-hydrocarbon buttons; and massive metallic mineralization. These zones of very high grade mineralization generally occur along the contact of the MSZ and intensely silicified QFBG-GN and comprise a high grade mineralized spine. This spine may represent a zone of intense structural disruption which has been completely overprinted by alteration and mineralization. However, drill holes which undercut the strongly mineralized spine have failed to show signs of significant structural damage. Particularly well mineralized drill holes are often associated with thin swarms of dravite-filled breccia.

Uranium mineralization within the north and south QFBG-GN which bound the MSZ generally occurs as fine grained disseminations and is almost always associated with pervasive whitish-green clay and chlorite alteration with local pervasive hematite. The mineralized zones within the QFBG-GN are interpreted to be stacked structures parallel to the MSZ strike and dip along the PLG-3B conductor.

MINERAL RESOURCES

RPA prepared the Mineral Resource estimate for the Triple R deposit using drill hole data available to October 23, 2018 (Table 1-9). Estimated block model grades are based on chemical assays only. Gold grades were also estimated. Mineral Resources are reported inclusive of Mineral Reserves.

TABLE 1-9 MINERAL RESOURCE STATEMENT – SEPTEMBER 19, 2019
Fission Uranium Corp. – Patterson Lake South Property

Category	Tonnes	Metal Grade		Contained Metal	
	(000 t)	(% U_3O_8)	(g/t Au)	(Mlb U_3O_8)	(000 oz Au)
Indicated	2,216	2.10	0.61	102.4	43.1
Inferred	1,221	1.22	0.50	32.8	19.6

Notes:
1. CIM (2014) definitions were followed for Mineral Resources.
2. Mineral Resources are reported at a cut-off grade of 0.25% U_3O_8.
3. The cut-off grades are based on price of US$50/lb U_3O_8 and an exchange rate of C$1.00/US$0.75.
4. A minimum mining width of 1.0 m was used.
5. Mineral Resources are inclusive of Mineral Reserves.
6. Numbers may not add due to rounding.

A set of cross sections and level plans were interpreted to construct 3D wireframe models for a number of mineralized zones at a minimum grade of 0.05% U_3O_8. Wireframes of the High Grade (HG) domain were created at a minimum grade of approximately 5% U_3O_8. The HG domain consists of two lenses within the R840W zone and 16 lenses within the R780E Main Zone, the largest continuous zone within the Triple R area. Prior to compositing to two metre lengths, high U_3O_8 assays were cut to 55% in the High Grade domain, and to 7%, 10%, 20%, and 35% U_3O_8 in the Low Grade (LG) domain.

Grade interpolations for U_3O_8 and gold were carried out using inverse distance cubed (ID^3) in a single pass with a minimum of two to a maximum of seven composites per block estimate. The search ellipse orientation varied slightly by domain. Block densities were estimated from the density measurements using ID^3 and a similar search strategy as used for uranium grade from more than 16,000 measurements. Unlike most deposits in the Athabasca Basin, the high grade uranium mineralization at the Triple R deposit has relatively low density values. Uranium grade ranges of 20% U_3O_8 to 70% U_3O_8, within the Athabasca Basin, more commonly exhibit density values ranging from 3.0 g/cm^3 to 6.0 g/cm^3 correlated with grade. Triple R high grade mineralization is often associated with carbon which may account for the lower than expected density values. In general, the average density of mineralization ranges from 2.25 t/m^3 to 2.41 t/m^3. Classification into the Indicated and Inferred categories was guided by the drill hole spacing and the continuity of the mineralized zones.

The current PFS contemplates an underground only mining scenario, while the previous resource estimates were based on a hybrid mine approach consisting of both open pit and underground techniques reported in May 2019. Table 1-10 compares the September 19, 2019

Mineral Resource estimate with the October 23, 2018 estimate. Due to an increase in the cut-off grade from 0.15% U_3O_8 to 0.25% U_3O_8 as a result of converting open pit resources to underground resources, Indicated Mineral Resources have decreased by 1.4%, or approximately 1.4 Mlb of U_3O_8 with a grade increase from 1.85% U_3O_8 to 2.10% U_3O_8. Inferred Mineral Resources remain relatively unchanged with a decrease of 0.2%, or approximately 72,000 pounds of U_3O_8 with a small increase in grade from 1.20% U_3O_8 to 1.22% U_3O_8.

TABLE 1-10 COMPARISON TO PREVIOUS RESOURCE ESTIMATE
Fission Uranium Corp. – Patterson Lake South Property

Estimate	Tonnes	Metal Grade		Contained Metal	
	(000 t)	(% U_3O_8)	(g/t Au)	(Mlb U_3O_8)	(000 oz Au)
September 19, 2109 Estimate					
Indicated	2,216.0	2.10	0.61	102.36	43.1
Inferred	1,221.0	1.22	0.50	32.81	19.6
October 23, 2018 Estimate					
Indicated	2,540.4	1.85	0.54	103.77	44.4
Inferred	1,238.4	1.20	0.49	32.89	19.6
Difference					
Indicated	-324.4	0.24	0.06	-1.41	-1.3
Inferred	-17.4	0.01	0.01	-0.072	0
Percent Difference					
Indicated	-12.8%	13.1%	11.3%	-1.4%	-2.9%
Inferred	-1.4%	1.2%	1.2%	-0.2%	0.0%

RPA is not aware of any environmental, permitting, legal, title, taxation, socioeconomic, marketing, political, or other relevant factors that could materially affect the current Mineral Resource estimate.

MINERAL RESERVES

Mineral Reserves for Triple R are based on the Mineral Resources as of September 19, 2019 and include detailed mine designs and modifying factors such as external dilution and extraction factors. Table 1-11 summarizes the Mineral Reserves.

TABLE 1-11 MINERAL RESERVE STATEMENT – SEPTEMBER 19, 2019
Fission Uranium Corp. – Patterson Lake South Property

Category	Tonnes (000 t)	Grade (% U_3O_8)	Contained Metal (Mlb U_3O_8)
Probable			
R00E Zone	15	2.03	0.7
R780E Zone	2,283	1.60	80.7
Total Probable	**2,299**	**1.61**	**81.4**

Notes:
1. CIM (2014) definitions were followed for Mineral Reserves.
2. Mineral Reserves are estimated using an average long term uranium price of US$50/lb U_3O_8, and an exchange rate of C$1.00/US$0.75.
3. Underground Mineral Reserves were estimated by creating stope shapes using a stope optimizing tool. The stope optimizer was run using a cut-off grade of 0.25% U_3O_8, with a minimum mining width of 3.0 m (including hanging wall and footwall dilution), on 20 m vertical stope heights.
4. A mining extraction factor of 95% was applied to the underground stopes, while underground development assumed a 100% mining extraction factor.
5. The density varies according to the block model. Waste density was estimated to be 2.42 t/m^3.
6. By-product credits were not included in the estimation of Mineral Reserves.
7. Numbers may not add due to rounding.

Mineral Resource to Mineral Reserve conversion was moderate within the R780E and R00E zones, with mining losses (part of the “modifying factors” that differentiate Mineral Reserves from Mineral Resources) consisting of:

- Sterilization of material in the vicinity of the bedrock contact
- Underground resource blocks not included in designed stopes due to grade or lack of continuity with other mineral blocks

Mineral Reserves are contained only within the R780E and R00E zones. PLS’s other three zones (R1515W, R840W, and R1620E) were not considered for inclusion as Mineral Reserves.

RPA is not aware of any mining, metallurgical, infrastructure, permitting, or other relevant factors that could materially affect the Mineral Reserve estimate.

MINING METHODS AND GEOTECHNICAL CONSIDERATIONS

The Project hosts the Triple R deposit, a structurally controlled northeast-southwest trending sub-vertical high grade uranium deposit. The deposit is overlain by 50 m to 100 m of sandy overburden, with the high grade mineralization located near the bedrock-overburden contact. The deposit extends under Patterson Lake.

The mining method for the underground will be longhole retreat mining in both transverse and longitudinal methods, and some localized drift and fill mining based on current block model information. The mining will progress from the bottom levels to the top, and from the southwest to northeast. Mining is planned at nominally 1,000 tpd ore.

The mine will be accessed using a decline originating to the west of the R00E deposit. The decline will include a box cut into the overburden, and a portal face collared in the overburden. The first stage of the decline will be developed through overburden for approximately 405 m, using the New Austrian Tunneling Method (NATM), also known as Sequential Excavation Method (SEM), or Sprayed Concrete Liner (SCL). Following this, the decline will transition through weak bedrock for an additional 133 m, until reaching the competent bedrock.

The ventilation system will be a push-pull system with one fresh air raise (FAR) and one exhaust air raise (EAR). The ventilation system also includes a fresh air drift and internal fresh air raises that distribute the air to all of the mine workings, and an exhaust air drift and internal exhaust raises that collect the exhaust air and discharge it out of the mine. The ventilation in the underground workings will be used once in the ore production areas and could possibly be reused from waste headings. Push-pull ventilation systems have been used extensively in uranium mines in the Athabasca Basin.

A key component of the underground design is the concept of using artificial ground freezing to extract some of the crown pillar – the mineralized material that approaches the overburden layer. This will be done using horizontal directional drilling from the shore of Patterson Lake and then pumping a refrigerated brine solution through the drill holes to effectively freeze the ground in the areas of stopes.

GEOTECHNICAL CONDITIONS

The majority of previous geotechnical design work was oriented toward the open pit and underground hybrid option, and most of the previous data is still relevant for the underground mining concept. Geotechnical analysis and design were carried out by BGC and other groups.

505 CUT AND BOX CUT

The 505 Cut is planned to include the fresh air raise, exhaust air raise, propane farm and heater house for the fresh air intake, refrigeration plant, well heads for the freeze holes, and

electrical substation. The 505 Cut is accessed by a road from the process plant. All infrastructure on the 505 Cut is offset from the shore of Patterson Lake by a minimum of 100 m.

The Box Cut is accessed by a road from the process plant and includes an area known as the "Forward Staging Area" which will serve as the launching point for the underground portal and decline. The Forward Staging Area is a level area approximately 40 m by 40 m and is intended to house some parking for mobile equipment, temporary ventilation infrastructure, and other mine services required for decline development. A larger mine laydown area is located several hundred metres away from the Box Cut. The second aspect of the Box Cut is the portal area, which includes extensive ground support requirements to ensure the long term stability of the decline.

PORTAL AND DECLINE

The portal is situated within the Box Cut. The face of the portal is perpendicular to the gradient of the decline, while the sidewalls "fade away" from the face slope to the slope of the Box Cut. The portal face and sidewalls require extensive ground support to ensure stability throughout the LOM. A series of soil nails, spilings, mesh, and shotcrete is all planned to ensure the stability of the portal face in advance of excavation. The ground support will be installed in 1.5 m vertical lifts. Drainage is planned so that precipitation is directed away from the slopes of the Box Cut and portal.

The area around the decline will be dewatered prior to excavation. The decline will be developed on an east-west alignment at a gradient of -15%. The first component of the decline is through overburden, followed by development through transition bedrock, and development through competent bedrock. To develop through overburden, a tunneling method known as the NATM will be utilized.

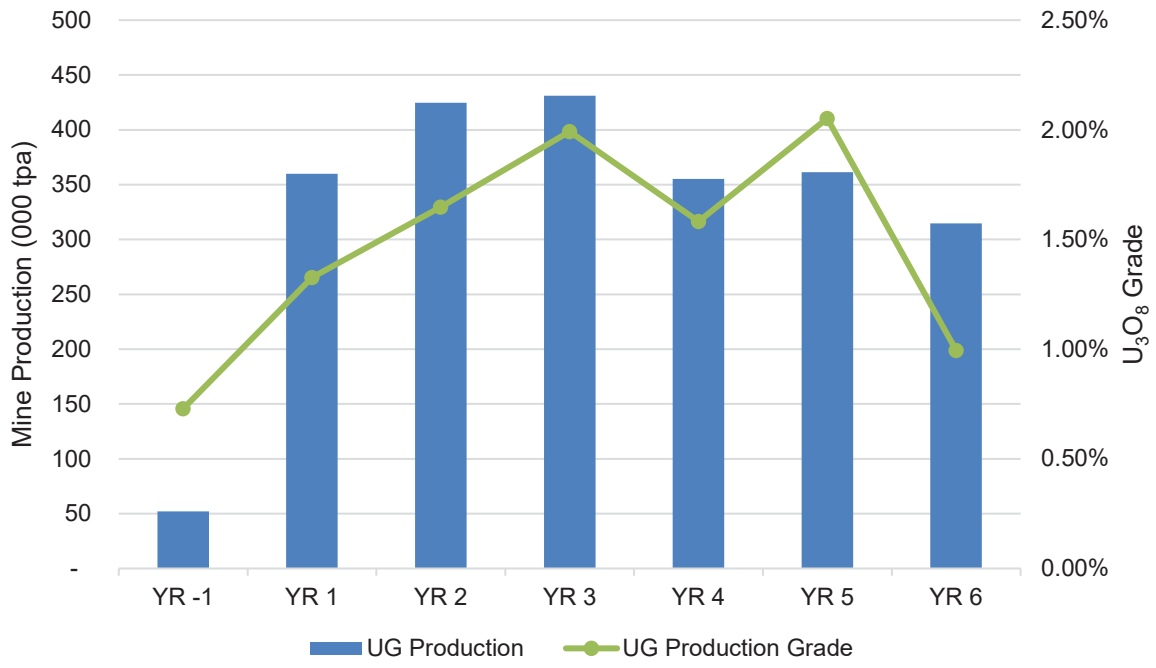
LIFE OF MINE PLAN

A three year pre-production period is envisaged for the Project. The critical path for completing construction revolves around completing the decline through overburden, establishing the ventilation system, and developing in the ore. In Year -3, the box cut, and portal will be collared, along with starting development in the overburden. An area referred to as the "505 Cut" will also be completed. Year -2 will see the continuation of the decline, along with two ventilation raises. Year -3 will include underground development in hard rock, and development in ore drifts in advance of steady-state production.

RPA has envisaged a LOM plan where ore is mined beginning in pre-production Year -1 and continuing over six years of operations. The large amount of overburden moved in Year -3 refers to the 505 Cut and Box Cut.

The LOM production plan is shown in Figure 1-3.

FIGURE 1-3 LIFE OF MINE PRODUCTION SCHEDULE



MINERAL PROCESSING

Wood completed design and costing for the process plant and related infrastructure facilities for the PFS. The process flowsheet selected for the Project is based on unit processes commonly used effectively in uranium process plants in northern Saskatchewan, while utilizing some new innovations in some of these unit process designs to optimize plant performance.

While the Triple R deposit contains gold values that may be recoverable, a high level economic analysis by RPA has shown this to have limited impact on overall project profitability at current market conditions and gold recovery was thus excluded from this design. Should market forces change in the future, gold recoveries could be reasonably easily engineered into the existing design and constructed without harming throughput or recovery from the uranium process plant.

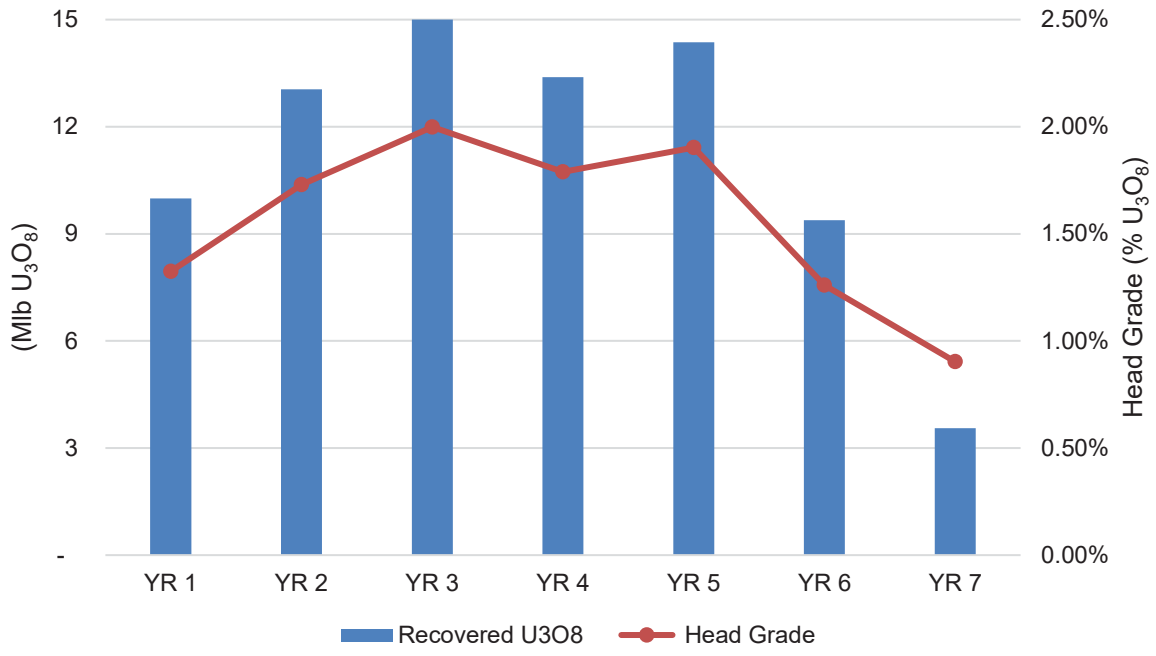
The conceptual mill design will have a nominal feed rate of 350,000 tpa, operate 350 days per year, and be able to produce nominally 15.0 Mlb per year of U_3O_8. The mill design will have an estimated recovery ranging from 95% to 97% and is designed in a manner that can accommodate fluctuations in ore grade that are expected when mining moves from higher grades to lower grades, or vice versa.

The unit processes for uranium recovery are:

- Grinding
- Acid leaching using sodium chlorate as oxidant
- Counter Current Decantation (CCD) and clarification
- SX using strong acid stripping
- Molybdenum removal from the pregnant aqueous solution
- Gypsum precipitation
- Yellowcake precipitation
- Yellowcake calcining and packaging
- Tailings neutralization
- Effluent treatment with monitoring ponds to confirm quality of effluent discharge

The process schedule and recovered uranium schedule are shown in Figure 1-4.

FIGURE 1-4 RECOVERED URANIUM SCHEDULE



PROJECT INFRASTRUCTURE

The Project is located adjacent to Patterson Lake, approximately 550 km north-northwest of the city of Prince Albert and approximately 150 km north of the community of La Loche, Saskatchewan. The Property is accessible by vehicle along all-weather Highway 955 which bisects the Property in a north-south direction. The site will be operated as a remote, fly-In/fly-out (FIFO) operation.

The key infrastructure contemplated for the Project includes:

- Underground mine with access from a Box Cut and Portal
- Mine infrastructure including material handling systems, ventilation, dewatering, maintenance facilities
- Artificial ground freezing system for partial recovery of the crown pillar mineralization
- Site support infrastructure for the mine, including explosive magazine, liquid natural gas (LNG) storage facilities, LNG power plant, and electrical and communications facilities
- Process plant and associated analytical laboratory
- TMF
- Surface waste rock storage facility for benign waste rock, non-benign waste rock (either mineralized or otherwise harmful to the environment), and benign overburden
- Permanent and construction accommodation camps
- Mine support buildings, including maintenance, warehouse, and security buildings
- Water management facilities, including storm water runoff pond and six process ponds
- Airstrip

ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS

The PLS area represents a new mining region with several discoveries in the area with the potential to be developed, and as such the Triple R deposit will garner additional scrutiny as one of the first new projects on the west side of the province since the now decommissioned Cluff Lake mine. The potential impacts from a uranium project in northern Saskatchewan are well known, and with regulatory oversight from both the federal and provincial governments, the actual performance of modern uranium mines has been very good. Environmental protection will continue be a key focus for project success.

PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT

A PERA was conducted for the PLS Property and was designed to incorporate a level of detail consistent with the pre-feasibility stage of the project. It examines what is projected regarding

site facilities, areas of physical disturbance, effluent releases, emissions to the environment, and makes an estimate of the potential impacts after mitigation. While the project is conceptual, preferred options are presented and included in the PFS, and these preferred options are highlighted in the PERA.

The following tables (Tables 1-12 to 1-16) provide a summary of the PERA for the proposed project.

TABLE 1-12 PROJECT PERA SUMMARY TABLE – TERRAIN AND HABITAT DISTURBANCE
Fission Uranium Corp. – Patterson Lake South Property

Disturbance	Description	Mitigations	Discussion
Ground clearing	Clearing for all facilities including: • Roads • Re-alignment of HWY 955 • Mill pad • Waste/ore stockpiles • Camp • Shore for dyke construction/mine access • Airstrip • TMF • Aggregate quarries	Minimization of clearing Reclamation of unused areas Keeping facilities as compact as possible	Remains a major impact to the areas cleared but can be remediated at decommissioning. The goal is to minimize the amount of area disturbed. Provide a Caribou protection plan. Minimize impact on natural drainage
TMF	TMF will be required. Will produce a large amount of excavated material.	Preferred method is hybrid design to use water table properly. Design: sub-aqueous deposition with pervious surround and underdrain system. Immediate reclamation of berms and waste excavation piles. Diversion of fresh water around TMF	TMF designed to minimize footprint, minimize flux to environment, ease of decommissioning. Long term stability. Sub-aqueous design eliminates radioactive dust and radon. Will require a TMF Management Program and design assessment per current standards (e.g. MAC Tailings Guidance)
TMF Operation	Should be few impacts from TMF operation as long sub-aqueous development with underdrain	Should be little impact. May need some dust control for vehicles. Collected water from underdrain for treatment and disposal. Secondary containment for pipeline leakage.	If sub-aqueous system works as designed, little impact during operations and after decommissioning. Will require a TMF Management Program and design assessment per current standards (e.g. MAC Tailings Guidance)
Mine ramp/foreshore excavation	A decline will be developed to ramp through the overburden and access the ore body below the overburden.	Proper location of excavated material in dry stable area with erosion and sediment control. Material should be clean and not require water collection. Immediate stabilization and reclamation of cut slopes and embankments to minimize erosion and sediment transport	Use of NATM to reduce water inflow in the overburden. Collection and treatment of used water during development.

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Disturbance	Description	Mitigations	Discussion
Roadways/including a relocated Hwy 955	Relocation of the highway to prevent traffic accidents and incidental cross contamination. Includes on-site roadways.	The relocation is the mitigation. On site, roadways will have designated clean and dirty roads, and there will be scheduled monitoring for contamination.	Hwy 955 will be designed to move to the west around the TMF. Discuss with MHI will be required. Maintain MHI design standards for relocated roadway. TMF location will be optimized in the FS to minimize the amount of road relocation.
Mining: Underground	Underground option with no impact to Patterson Lake, including any ventilation or access raises (all of these are on shore). Decline access and initially, two vent raises	Handling of waste rock, mine water, ventilation, radiation protection, access, and egress.	Design for single pass air where workers will be present, segregate clean and dirty waste based on ARD potential, mine water collected, degassed for radon, sent to mill for treatment
Ore Stockpile(s) (ARD, leaching potential, potential contamination of soil, water, and groundwater)	Ore storage or blending pads	Bermed, double lined storage pads. Cover with clean waste to prevent dusting. All drainage to runoff collection ponds	Water collected and treated. Ensure not upwind of living facilities to protect from dust or radon emanations
Waste Rock: Clean (No ARD or leaching potential)	Clean overburden and waste rock. Main issues are sedimentation from stockpiles.	Clean waste with erosion controls and sedimentation barriers. All drainage to runoff to collection ponds or drain into sandy terrain, not directly to surface water.	Clean materials available for other uses and reclamation
Waste Rock: Mineralized (ARD, leaching potential, potential contamination of soil, water, and groundwater)	Low grade/sub-ore and contaminated waste stockpiles radon	All drainage to runoff collection ponds. Lined pads and monitoring for contaminated water to protect groundwater. Contaminated water to mill for treatment.	Ensure not upwind of living facilities to protect from dust or radon emanations
Mill/Mill terrace	Disturbance, runoff, Dust and gaseous emissions	Collect runoff water for treatment, keep pad areas clean, site as compact as possible, Wildlife Management	Careful consideration to the clean and dirty parts and keeping them separate.
Ancillary facilities, including camp, offices, shops, clean laydowns, etc.	Disturbance, contaminated and non-contaminated wastes, potable water, sewage, Recycling materials	Recycling, proper design of water and sewage facilities. Training. Domestic waste handling Hazardous waste handling	Many recycling programs mandated by law in SK, such as electronics, tires, cardboard/paper, plastics, refundable containers, oil/oil filters, etc.

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TABLE 1-13 PROJECT PERA SUMMARY TABLE – WATER, CONTAMINATED AND UNCONTAMINATED
Fission Uranium Corp. – Patterson Lake South Property

Disturbance	Description	Mitigations	Discussion
Runoff	Mill terrace, contaminated stockpiles, mine	Collection, to mill for treatment and eventual discharge. Maximize diversion of fresh water from project infrastructure. Full containment of plant island	Given the sandy nature of the terrain, all areas requiring water to be collected will require some form of treatment to allow for water flow and collection.
Mine water	U/G mine, and ramps	Collection, to mill for treatment and eventual discharge	Dewatering wells and additional grouting may be required to minimize flows during operation.
Tailings decant	From the underdrain system. Includes some local groundwater to keep the regional flow towards the TMF.	Collection, to mill for treatment and eventual discharge. Security of tailings solution pipelines.	Use of the underdrain will ensure no release of contaminants until the desired tailings density is achieved during decommissioning. May require running the treatment system for a number of years after production stops.
Sewage	Collect and treat from various locales. Final process to be decided.	Collection, to mill for treatment and eventual discharge, separate sewage TP or septic field.	Final sewage treatment methods have not yet been chosen.
Treated effluent	Discharged to Patterson Lake and the Clearwater River system	Final estimates of quantity and quality will be needed for the EIA.	Must meet licensed objectives, but preferable SSWQO in order to keep downstream impacts to a minimum. This is especially important as there is likely to be another mine discharging to the same system.
Potable water	Collected, treated, stored with reserves for fire	Need inlet and WT facilities prior to distribution.	Inlet upstream from discharge point(s)
Fuels	Diesel Gasoline Lubricants Propane LNG	Licensed with MOE EPB (SK Code) HMWS Regs. WMIS	Properly designed and licensed facilities with trained personnel will minimize any risk to the environment. Emergency Response Plan (ERP).
Reagents	Various, to be identified	HMWS Regs. WMIS Site security	Proper storage, likely within the mill terrace area.
Yellowcake	Produced, drummed, shipped	CNSC licensing TDG Regs. Site security	Proper storage and tracking Compliant with Additional Protocols ERP
Explosives	Handling and use of explosives is required for mining, and possibly quarrying.	Following federal regulations, properly trained personnel, separate magazines depending on the type of explosive used.	Properly handled, explosives are safe. Security will be required to prevent theft or misuse. ERP

TABLE 1-14 PROJECT PERA SUMMARY TABLE – SITE EMISSIONS
Fission Uranium Corp. – Patterson Lake South Property

Disturbance	Description	Mitigations	Discussion
Mine air exhaust	Diesel exhaust, radon, radon progeny, dust	Dilution by having enough fresh air flow, dust control, AQ monitoring,	Modelling in the EIA will provide more information
Mine air conditioning	GHGs, probably propane	Minimize use to the extent practicable	May or may not be required.
Generators	Diesel or LNG, diesel exhaust emissions, GHG	While LNG is the cleaner option (virtually no particulate matter, NOx, or Sox) there are practical issues that may not favour this option	Chance of spill with diesel fuel
Mill	Various emission sources	Protection against dust – need capture and baghouse with filters	Emission sources will be determined and modelling in EIA.
Vehicles	Exhaust – GHG calculation	Utilize current emissions control standards, maintain equipment well	Look at electric where possible
TMF	Subaqueous, so emissions should be low	Water cover eliminates dusting, promotes settling, and minimizes radon emanation	Releases and long term impacts to be defined in EIA by pathway modelling
Ore and special waste stockpiles	Radon, radon progeny, dust, runoff	Proper design and monitoring	Ensure not upwind from camp or offices.

TABLE 1-15 PROJECT PERA SUMMARY TABLE – DECOMMISSIONING
Fission Uranium Corp. – Patterson Lake South Property

Disturbance	Description	Mitigations	Discussion
Underground	Contaminant flow to surface receptors, interaction with GW,	Plug openings, allow to flood, monitor, grout/shotcrete/backfill to limit water movement.	Will need rigorous modelling to show limited movement of GW after closure
Surface facilities	Decontaminate as much as possible, tear down, recycle to max. extent possible	Dispose of materials that cannot be decontaminated in TMF, remove, or cover concrete pads, clean up any contaminant spills,	Per CNSC guidelines for contaminant removal. Mill WTP will be needed until the TMF underdrain is decommissioned.
Roads	Remove, scarify, revegetate once no longer needed.	Survey for contamination prior to decommissioning, remove contaminated soils to TMF for disposal.	
TMF	Will need a cover design and implementation plan to encourage ongoing dewatering and settling.	Likely scenario is an initial cap/cover designed to weight the tailings to encourage dewatering and compaction. Once target density is achieved, redo cap/cover in final form, seal off the underdrain, and revegetate. Monitor.	Timing would have to be modelled. Mill water treatment facility will be required until tailings meet density target.

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TABLE 1-16 PROJECT PERA SUMMARY TABLE – COMMUNITY AND SOCIO-ECONOMICS
Fission Uranium Corp. – Patterson Lake South Property

Disturbance	Description	Mitigations	Discussion
Consultation and engagement	Consultation and engagement with First Nations, Métis and communities	Must fulsomely engage with the communities, writ large Establish relationships with all the potential Impact Communities related to the project. Document all activities and participants	It is essential that this be done for the success of the project.
Roads	Increased traffic on northern roads and through towns such as Buffalo Narrows and La Loche, and north on Hwy 955. Are bridges adequate over Clearwater River?	Work with local authorities and MHI to minimize safety risks in communities. Work with MHI to improve Hwy 955 and upgrade bridges if necessary.	Project will need a traffic analysis for the increase of traffic in NW Saskatchewan. The road relocation around site will also be addressed.
Employment	A new mining operation will bring jobs and opportunities for local employment.	Start now to work with communities to ensure there is a trained workforce available.	For safety reasons, mines in northern Saskatchewan now require Grade 12 education at a minimum. Given the long approvals process, expectations need to be realistic with respect to availability of employment and timing. Experience elsewhere in SK indicates businesses work best when they are not solely reliant on the mine(s) for their survival given the cyclical nature of mining (witness the current Cameco shutdowns)
Business opportunities	A new mine will bring opportunities for business to supply goods and services.	Work with local communities and entrepreneurs to develop businesses.	
Community	Potential impacts on communities range from demand on health care and social services, policing, etc.	Monitor and work with local authorities and communities. Increased employment likely to be an improvement in community health. Continue with engagement and sponsorship activities.	Target communities are La Loche as the nearest community followed by the west-side communities (Métis communities, Buffalo Narrows, Ile-a-la Crosse, Beauval, etc.).

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CAPITAL AND OPERATING COSTS

Capital costs have been estimated for the Project based on comparable projects, first principles, subscription based cost services, budgetary quotes from vendors and contractors, and information within RPA's project database. In RPA's opinion, the capital cost estimate is consistent with an Association for the Advancement of Cost Engineering (AACE) Class 4 estimate. Wood is responsible for capital costs related to the process plant and infrastructure, while RPA is responsible for capital costs related to mining, and the compilation of the overall capital cost estimate. Clifton, BGC, Newmans, Artisan, and TMCC have provided input, where appropriate, to develop the capital cost estimate. Broadly, pre-production capital costs are divided among mining, processing, infrastructure, and project indirect expenses. Sustaining capital costs are related to ongoing mine development, the crown pillar recovery, and miscellaneous infrastructure or process plant refurbishments that continue to occur after commercial production has been declared. Capital costs are summarized in Table 1-17.

TABLE 1-17 SUMMARY OF CAPITAL COSTS
Fission Uranium Corp. – Patterson Lake South Property

Description	Units	Cost
Underground Mining	C$ millions	200.7
Processing	C$ millions	349.6
Infrastructure	C$ millions	119.7
Subtotal Pre-Production Direct Costs	**C$ millions**	**670.0**
Pre-Production Indirect Costs	C$ millions	314.8
Subtotal Direct and Indirect	**C$ millions**	**984.8**
Contingency	C$ millions	192.1
Initial Capital Cost	**C$ millions**	**1,176.9**
Sustaining Capital	C$ millions	208.6
Closure and Reclamation	C$ millions	73.8
Total	**C$ millions**	**1,459.3**

Operating costs were estimated for the Project and allocated to either mining, processing, or general and administration (G&A). LOM operating costs are summarized in Table 1-18.

TABLE 1-18 LIFE OF MINE OPERATING COSTS
Fission Uranium Corp. – Patterson Lake South Property

Description	LOM Cost (C$ millions)	Average Annual (C$ millions)	Unit Cost (C$/t proc)	Unit Cost (C$/lb U_3O_8)
Mining	314.6	52.4	137	3.99
Processing	266.4	40.2	116	3.38
G&A	172.5	26.2	75	2.19
Total	**753.4**	**118.8**	**328**	**9.57**

2 INTRODUCTION

Roscoe Postle Associates Inc. (RPA), Wood Canada Limited (Wood), BGC Engineering Inc. (BGC), Clifton Associates Ltd. (Clifton), Melis Engineering Ltd. (Melis), Artisan Consulting Services Ltd. (Artisan), Newmans Geotechnique Inc. (Newmans), and Thyssen Mining Construction of Canada Ltd. (TMCC) were retained by Fission Uranium Corp. (Fission Uranium) to prepare a Pre-Feasibility Study (PFS) on the Patterson Lake South Property (the PLS Property, the Property, or the Project), located in northern Saskatchewan, Canada, using underground mining methods (the UG PFS). The purpose of this report is to summarize the results of the PFS. This Technical Report conforms to NI 43-101 *Standards of Disclosure for Mineral Projects*. Wood is responsible for the process plant and infrastructure. Clifton is responsible for environmental and tailings management design. BGC has provided inputs in the areas of geotechnical and hydrogeological design. Newmans and Artisan have provided inputs to the crown pillar recovery using horizontal directional drilling and artificial ground freezing, and TMCC has assisted RPA by providing cost estimates and schedules for some of the underground mine development. RPA has responsibility for geology, mining, and the overall compilation of the report.

Fission Uranium is a Canadian exploration company, which is primarily engaged in the acquisition, evaluation, and development of uranium properties with a view to commercial production. It holds a 100% interest in the PLS Property.

Currently, the major asset associated with the Project is the Triple R uranium deposit.

The UG PFS is based on using underground mining methods, and processing of 1,000 tonnes per day (tpd) via acid leaching, solvent extraction (SX), and precipitation. The Project has the potential to produce up to 15 million pounds (Mlb) of triuranium octoxide (U_3O_8) per year in the form of yellowcake. The UG PFS presents an alternative scenario to the combined open pit and underground plan presented in April 2019 (the Hybrid PFS).

SOURCES OF INFORMATION

A site visit was carried out by Mark B. Mathisen, C.P.G., Principal Geologist with RPA, from August 6 to 8, 2018. Mr. Mathisen examined core from several drill holes, visited active drill sites, and reviewed logging and sampling methods. Jason Cox, P.Eng., Principal Mining

Engineer and Executive Vice President, Mine Engineering with RPA, David M. Robson, M.B.A., P.Eng., Senior Mine Engineer with RPA, Charles (Chuck) R. Edwards, P.Eng., Senior Engineering Consultant with Wood, and Mark Wittrup, M.Sc., P.Geo., P.Eng., CMC, Vice-President Environmental and Regulatory Affairs with Clifton, visited the site on August 14, 2018, accompanied by representatives from BGC Engineering Ltd. (BGC).

Discussions have been held with:

- Ross McElroy, P.Geol., President and COO, Fission Uranium;
- Kanan Sarioglu, B.Sc., P.Geo., Project Geoscientist, Fission Uranium;
- Sam Hartmann, B.Sc., P.Geo., Project Manager, Fission Uranium;
- Raymond Ashley, P.Geoph., VP Exploration, Fission Uranium;
- Richard Elkington, Operations Manager, Fission Uranium

Previously, Fission Uranium has contracted Mineral Services Canada Inc. (MSC) to assist in various aspects of exploration and drilling. Several MSC reports were used and referenced in this Technical Report. MSC is part of the MS Group, a consulting company and laboratory that specializes in providing expert services to the exploration and mining industry. The MS Group operates out of offices in Vancouver, Canada, and Cape Town, South Africa.

The PFS was prepared by independent consultants led by RPA, who carried out resource estimation and mining work, assisted by BGC (geotechnical aspects), Wood (process and infrastructure), Clifton (environmental and tailings management), TMCC (mine decline design and cost estimation), Newmans (artificial ground freezing), and Artisan (horizontal directional drilling).

Responsibilities of the qualified persons are outlined in Table 2-1.

TABLE 2-1 QUALIFIED PERSON RESPONSIBILITY MATRIX
Fission Uranium Corp. – Patterson Lake South Property

Section	Title	QP	Group	Notes
Section 1	Summary	All	All	Responsibility corresponds to that identified for the remainder of the Technical Report
Section 2	Introduction	J. Cox	RPA	
Section 3	Reliance on Other Experts	All	All	

Section	Title	QP	Group	Notes
Section 4	Property Description & Location	M. Mathisen	RPA	
Section 5	Accessibility, Climate, Local Resources, etc.	M. Mathisen	RPA	
Section 6	History	M. Mathisen	RPA	
Section 7	Geological Setting and Mineralization	M. Mathisen	RPA	
Section 8	Deposit Types	M. Mathisen	RPA	
Section 9	Exploration	M. Mathisen	RPA	
Section 10	Drilling	M. Mathisen	RPA	
Section 11	Sample Preparation, Analysis, and Security	M. Mathisen	RPA	
Section 12	Data Verification	M. Mathisen	RPA	
Section 13	Mineral Processing and Metallurgical Testing	C. Edwards	Wood	
Section 14	Mineral Resource Estimates	M. Mathisen	RPA	
Section 15	Mineral Reserve Estimates	D. Robson	RPA	
Section 16	Mining Methods	D. Robson	RPA	
Section 17	Recovery Methods	C. Edwards	Wood	
Section 18	Project Infrastructure	C. Edwards	Wood	
Section 19	Market Studies and Contracts	D. Robson	RPA	
Section 20	Environmental Studies, Permitting, and Social or Community Impact	M. Wittrup	Clifton	
Section 21	Capital and Operating Costs	D. Robson	RPA	Mining costs and overall collation
		C. Edwards	Wood	Processing and infrastructure costs
Section 22	Economic Analysis	D. Robson	RPA	Financial Modelling
		J. Cox	RPA	Peer review
Section 23	Adjacent Properties	M. Mathisen	RPA	
Section 24	Other Relevant Data and Information	D. Robson	RPA	
Section 25	Interpretation and Conclusions	J. Cox	RPA	Overall Conclusions
		M. Mathisen	RPA	Geology and Mineral Resources
		D. Robson	RPA	Mining and Mineral Reserves

Section	Title	QP	Group	Notes
		C. Edwards	Wood	Processing and infrastructure
		M. Wittrup	Clifton	Environmental and Permitting
Section 26	Recommendations	J. Cox	RPA	Overall Recommendations
		M. Mathisen	RPA	Geology and Mineral Resources
		D. Robson	RPA	Mining and Mineral Reserves
		C. Edwards	Wood	Processing and infrastructure
		M. Wittrup	Clifton	Environmental and Permitting
Section 27	References	All	All	
Section 28	Data and Signature Page	All	All	
Section 29	Certificate of Qualified Person	All	All	

LIST OF ABBREVIATIONS

Units of measurement used in this report conform to the metric system. All currency in this report is Canadian dollars (C$) unless otherwise noted.

A	annum
A	ampere
bbl	barrels
btu	British thermal units
°C	degree Celsius
C$	Canadian dollars
cal	calorie
cfm	cubic feet per minute
cm	centimetre
cm^2	square centimetre
cpm	counts per minute
cps	counts per second
dia	diameter
dmt	dry metric tonne
dwt	dead-weight ton
°F	degree Fahrenheit
ft	foot
ft^2	square foot
ft^3	cubic foot
ft/s	foot per second
g	gram
G	giga (billion)
Gal	Imperial gallon
g/L	gram per litre
Gpm	Imperial gallons per minute
g/t	gram per tonne
gr/ft^3	grain per cubic foot
gr/m^3	grain per cubic metre
ha	hectare
hp	horsepower
hr	hour
Hz	hertz
in.	inch
in^2	square inch
J	joule
k	kilo (thousand)
kcal	kilocalorie
kg	kilogram
km	kilometre
km^2	square kilometre
km/h	kilometre per hour
kPa	kilopascal
kVA	kilovolt-amperes
kW	kilowatt
kWh	kilowatt-hour
L	litre
lb	pound
L/s	litres per second
m	metre
M	mega (million); molar
m^2	square metre
m^3	cubic metre
µ	micron
MASL	metres above sea level
µg	microgram
m^3/h	cubic metres per hour
mi	mile
min	minute
µm	micrometre
mm	millimetre
mph	miles per hour
mV	millivolts
MVA	megavolt-amperes
MW	megawatt
MWh	megawatt-hour
oz	Troy ounce (31.1035g)
oz/st, opt	ounce per short ton
pCi	picocuries
ppb	part per billion
ppm	part per million
psia	pound per square inch absolute
psig	pound per square inch gauge
RL	relative elevation
s	second
st	short ton
stpa	short ton per year
stpd	short ton per day
t	metric tonne
tpa	metric tonne per year
tpd	metric tonne per day
US$	United States dollar
Usg	United States gallon
Usgpm	US gallon per minute
V	volt
W	watt
wmt	wet metric tonne
wt%	weight percent
yd^3	cubic yard
yr	year

3 RELIANCE ON OTHER EXPERTS

This report has been prepared by RPA, BGC, Wood, TMCC, Clifton, Artisan, and Newmans for Fission Uranium. The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to RPA, BGC, Wood, TMCC, Clifton, Artisan, and Newmans at the time of preparation of this report,
- Assumptions, conditions, and qualifications as set forth in this report.

For the purpose of this report, the authors have relied on ownership information provided by Fission Uranium. The authors have not researched property title or mineral rights for the PLS Property and express no opinion as to the ownership status of the PLS Property. RPA did review the status of the mineral claims on the web site of the Saskatchewan Ministry of Economy (http://economy.gov.sk.ca/mining). The information for the mineral claims constituting the PLS Property is as noted in Section 4 of this report as of May 6, 2019, the date of RPA's review.

RPA has relied on Fission Uranium and their tax advisors for guidance on applicable taxes, royalties, and other government levies or interests, applicable to revenue or income from the Project.

Except for the purposes legislated under provincial securities laws, any use of this report by any third party is at that party's sole risk.

4 PROPERTY DESCRIPTION AND LOCATION

The PLS Property is located in northern Saskatchewan, approximately 550 km north-northwest of the city of Prince Albert and 150 km north of the community of La Loche (Figure 4-1). The Property is accessible by vehicle along all-weather gravel Highway 955, which bisects the Property in a north-south direction.

The Universal Transverse Mercator (UTM) co-ordinates for the approximate centre of the Property are 600,000mE, 6,387,500mN (NAD83 UTM Zone 12N). The geographic co-ordinates for the approximate centre of the Property are 57°37' N latitude and 109°22' W longitude. The Property is located within 1:50,000 scale NTS map sheets 74F/11 (Forrest Lake) and 74F/12 (Wenger Lake). It is irregularly shaped and extends for approximately 29 km in the east-west direction and for approximately 19 km in the north-south direction. The approximate centre of the Triple R deposit is located at UTM coordinates 598,000mE, 6,390,000mN (NAD83 UTM Zone 12N).

MINERAL RIGHTS

In Canada, natural resources fall under provincial jurisdiction. In the Province of Saskatchewan, the management of mineral resources and the granting of exploration and mining rights for mineral substances and their use are regulated by the *Crown Minerals Act* and *The Mineral Tenure Registry Regulations, 2012*, that are administered by the Saskatchewan Ministry of the Economy. Mineral rights are owned by the Crown and are distinct from surface rights.

As of December 6, 2012, mineral dispositions are defined as electronic mineral claims parcels within the Mineral Administration Registry System (MARS) using a Geographical Information System (GIS). MARS is a web based electronic tenure system for issuing and administrating mineral permits, claims, and leases. Mineral claims are now acquired by electronic map staking and administration of the dispositions is also web based.

In order to maintain mineral claims in good standing in the Province of Saskatchewan, the claim holder must undertake prescribed minimum exploration work on a yearly basis. The

current requirements are $15/ha per year for claims that have existed for ten years or less and $25/ha per year for claims that have existed in excess of ten years.

Mineral claims in good standing may be converted to mineral lease(s) upon application. Mineral leases allow for mineral extraction, have ten year terms, and are renewable. A lease proffers the holder with the exclusive right to explore for, mine, work, recover, procure, remove, carry away, and dispose of any Crown minerals within the lease lands which are nonetheless owned by the Province.

Surface rights are a distinct and separate right from subsurface or mineral rights. To obtain surface rights in support of mining operations, negotiation with the landowner may be required in the case of private property. In the case of Crown lands, a surface permit must be obtained.

Surface facilities and mine workings constructed in support of mineral extractions require a surface lease from the Province of Saskatchewan. A surface lease carries a maximum term of 33 years, and may be extended as necessary, to allow the lessee to develop and operate the mine and plant and thereafter to carry out the reclamation of the lands involved.

LAND TENURE

The PLS Property consists of 17 contiguous mineral claims covering an area of 31,039 ha (Figure 4-2). The Triple R deposit is located on claim S-111376. Table 4-1 lists the relevant tenure information for the Property.

TABLE 4-1 LAND TENURE
Fission Uranium Corp. – Patterson Lake South Property

Claim	Effective Date	Anniversary Date	Good Standing Date	Area (ha)	Status
S-110707	28-Mar-07	27-Mar-19	25-Jun-39	812	Active
S-110955	31-May-07	30-May-19	28-Aug-39	1,327	Active
S-111375	13-Jun-08	12-Jun-19	10-Sep-39	2,493	Active
S-111376	13-Jun-08	12-Jun-19	10-Sep-39	3,310	Active
S-111377	13-Jun-08	12-Jun-19	10-Sep-39	1,645	Active
S-111783	30-Apr-10	29-Apr-19	28-Jul-39	1,004	Active
S-112217	13-Dec-11	12-Dec-19	12-Mar-39	1,202	Active
S-112218	13-Dec-11	12-Dec-19	12-Mar-39	1,299	Active
S-112219	13-Dec-11	12-Dec-19	12-Mar-39	987	Active
S-112220	13-Dec-11	12-Dec-19	12-Mar-39	1,218	Active
S-112221	13-Dec-11	12-Dec-19	12-Mar-39	2,621	Active
S-112222	13-Dec-11	12-Dec-19	12-Mar-39	846	Active
S-112282	22-Jun-11	21-Jun-19	19-Sep-39	3,789	Active
S-112283	22-Jun-11	21-Jun-19	19-Sep-39	1,003	Active
S-112284	22-Jun-11	21-Jun-19	19-Sep-39	2,021	Active
S-112285	22-Jun-11	21-Jun-19	19-Sep-39	5,404	Active
S-112370	23-Nov-11	22-Nov-19	20-Feb-39	58	Active

The mineral claims constituting the PLS Property were ground staked and are therefore designated as non-conforming legacy claims. As of December 6, 2012, the Property and component claim locations were defined as electronic mineral claim parcels within the MARS. As of the effective date of this report, the mineral claims are all in good standing and are all registered in the name of Fission Uranium. As of December 31, 2018, assessment credits totalling C$14,680,205.00 were available for claim renewal. Assessment credits totalling C$561,455.00 are required to renew the property claims upon their respective annual anniversary dates. In the absence of sufficient assessment credits, there is a provision in Saskatchewan to keep the claims in good standing by making a deficiency payment or a deficiency deposit.

As of the effective date of this report, all 17 mineral claims comprising the Property are in good standing and registered in the name of Fission Uranium. The Project is located on Provincial Crown land; surface rights are obtained after successful ministerial decision, after an environmental decision, and following successful negotiation of a mineral surface lease agreement. Fission Uranium currently has a surface lease agreement that covers the core storage, core handling, Hub Camp, and laydown areas.

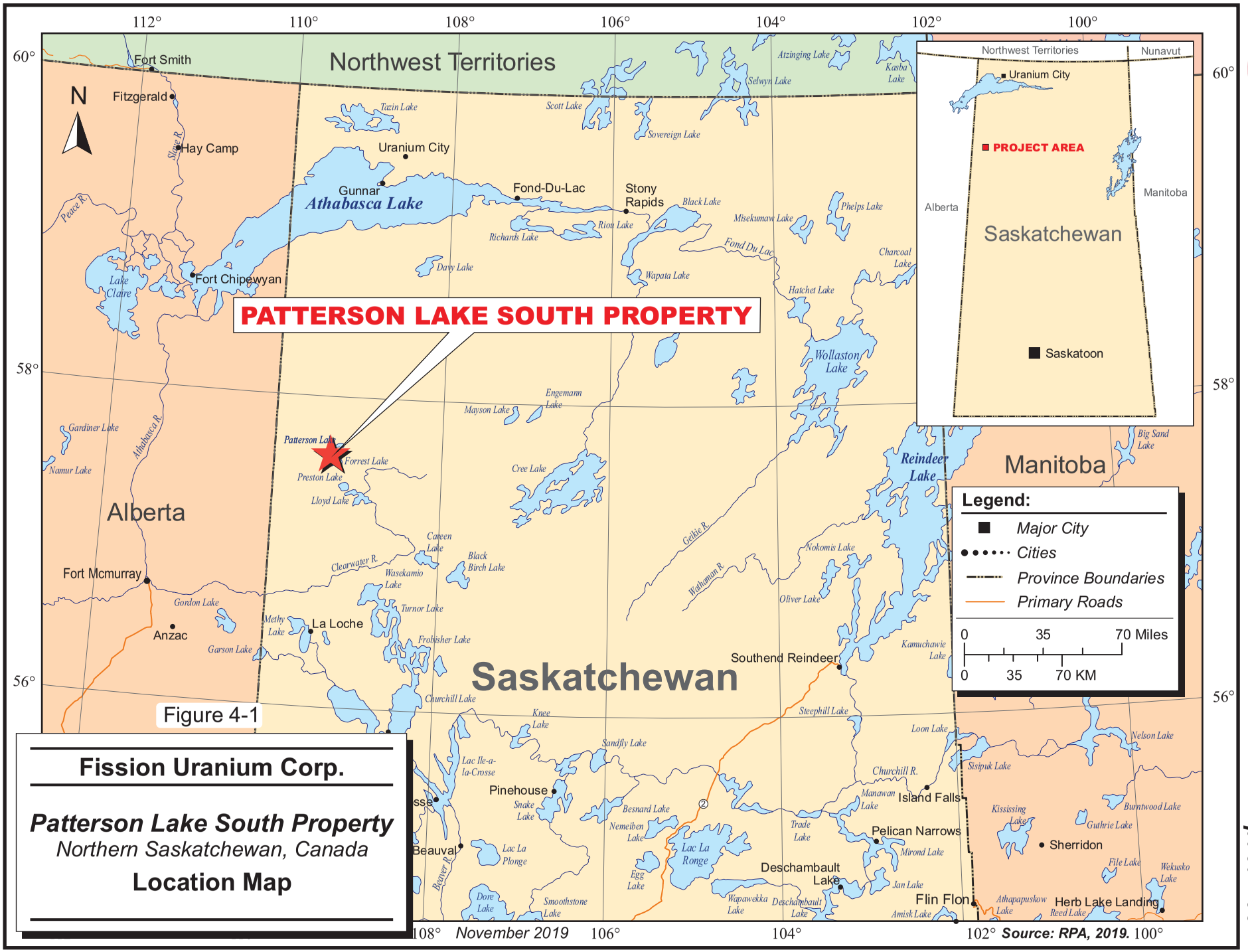
ROYALTIES AND OTHER ENCUMBRANCES

RPA is not aware of any royalties due, back-in rights, or other encumbrances by virtue of any underlying agreements.

PERMITTING

RPA is not aware of any environmental liabilities associated with the PLS Property.

RPA understands that Fission Uranium has all the required permits to conduct the proposed work on the PLS Property. RPA is not aware of any other significant factors and risks that may affect access, title, or the right or ability to perform the proposed work program on the PLS Property.


PATTERSON LAKE SOUTH PROPERTY
Northwest Territories
Nunavut
Alberta
Saskatchewan
Manitoba
Saskatoon
Uranium City
PROJECT AREA
Fort Smith
Fitzgerald
Hay Camp
Uranium City
Gunnar
Athabasca Lake
Fond-Du-Lac
Stony Rapids
Fort Chipewyan
Lake Claire
Wollaston Lake
Reindeer Lake
Patterson Lake
Forrest Lake
Preston Lake
Lloyd Lake
Fort Mcmurray
Anzac
La Loche
Southend Reindeer
Pinehouse
Beauval
Deschambault Lake
Pelican Narrows
Island Falls
Sherridon
Flin Flon
Herb Lake Landing
Legend:
Major City
Cities
Province Boundaries
Primary Roads
0 35 70 Miles
0 35 70 KM
112°
110°
108°
106°
104°
102°
100°
60°
58°
56°
N
Figure 4-1
Fission Uranium Corp.
Patterson Lake South Property
Northern Saskatchewan, Canada
Location Map
November 2019
Source: RPA, 2019.
www.rpacan.com
4-5

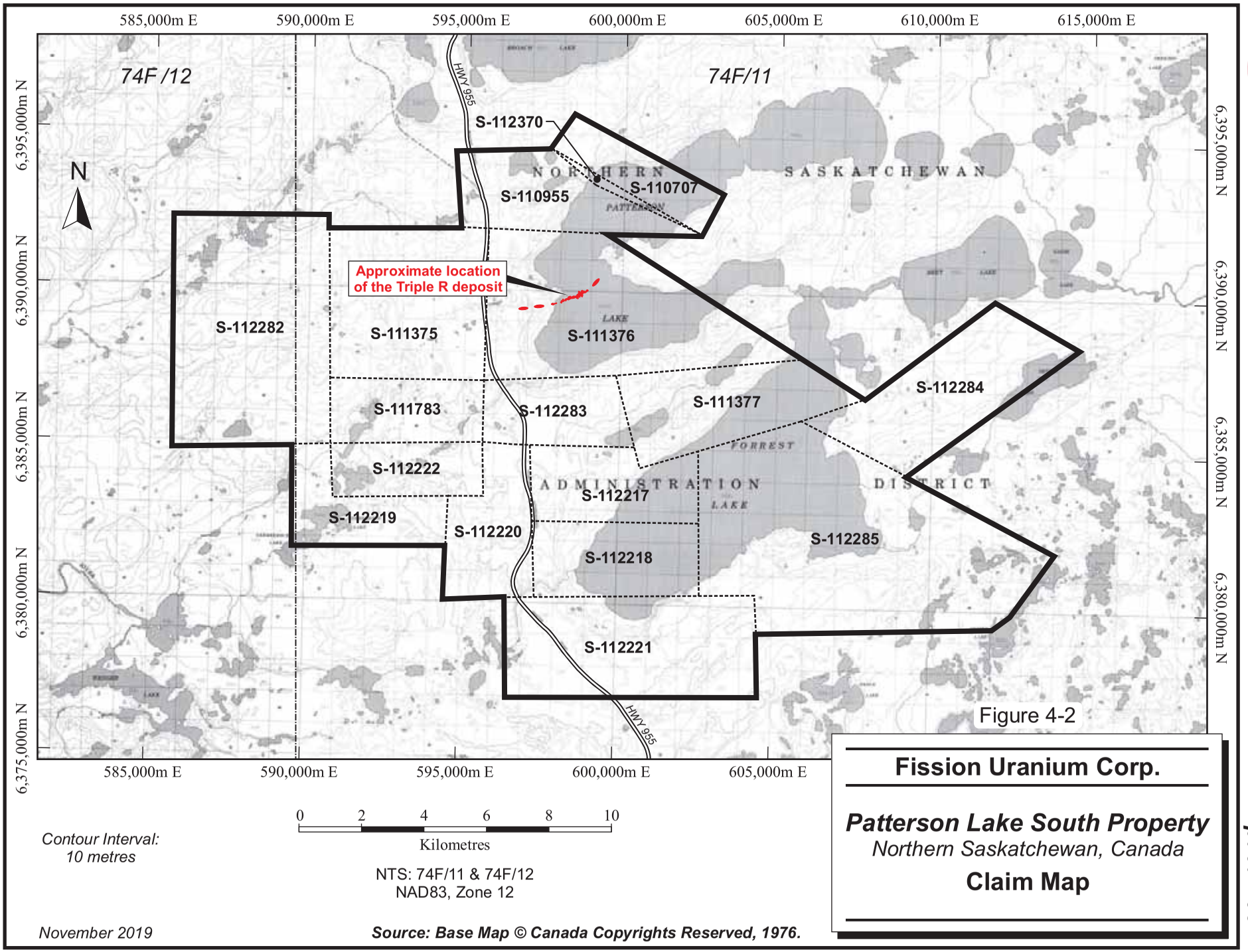


Figure 4-2

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Claim Map

Contour Interval: 10 metres

NTS: 74F/11 & 74F/12
NAD83, Zone 12

November 2019

Source: Base Map © Canada Copyrights Reserved, 1976.

www.rpacan.com

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE, AND PHYSIOGRAPHY

ACCESSIBILITY

The PLS Property is located approximately 550 km north-northwest of the city of Prince Albert, Saskatchewan. Prince Albert is serviced by multiple flights daily from Saskatoon. The Property can be reached by driving northward along paved Highway 155 for a distance of approximately 300 km to the community of La Loche. At La Loche, the all-weather gravel Highway 955 (Cluff Lake Mine Road) heads northwards and enters the PLS Property at the 144 km marker. Highway 955 bisects the Property in a north-south direction. Two four-wheel drive roads branch off from Highway 955 allowing access to the east and west halves of the Property.

CLIMATE

The PLS Property is located within the Mid-Boreal Upland Ecoregion of the Boreal Shield Ecozone (Marshall and Schutt, 1999). The summers are short and cool, and the winters are long and cold. The ground is snow covered for six to eight months of the year. The ecoregion is classified as having a sub-humid high boreal ecoclimate. Table 5-1 illustrates the climatic data for the two most proximal Environment Canada weather stations.

TABLE 5-1 CLIMATIC DATA – CLUFF LAKE AND FORT CHIPEWAYAN
Fission Uranium Corp. – Patterson Lake South Property

	Cluff Lake (SK) 58°22'N 109°31'W	Fort Chipewayan (AB) 58°46'N 111°07'W
Mean January temperature	-20.4°C	-21.9°C
Mean July temperature	16.9°C	14.1°C
Extreme maximum temperature	36.0°C	34.7°C
Extreme minimum temperature	-49.0°C	-50.0°C
Average annual precipitation	451.0 mm	365.7 mm
Average annual rainfall	N/A	250.4 mm
Average annual snowfall	162.8 cm	116.9 cm

Despite the harsh conditions, drilling and geophysical surveys can be performed year-round. Surface geochemical surveys are generally restricted to the snow free months.

LOCAL RESOURCES

Various services are available at La Loche including temporary accommodations, fuel, and emergency medical services. A greater range of services is available in Prince Albert and Saskatoon. Fixed wing aircraft are available for charter at Fort McMurray in Alberta, and Buffalo Narrows, La Loche, and La Ronge in Saskatchewan. Helicopters are available for charter at Fort McMurray and La Ronge.

INFRASTRUCTURE

With the exception of the all-weather gravel Highway 955, which traverses the Property, there is no permanent infrastructure on the Property.

PHYSIOGRAPHY

The topography of northern Saskatchewan is characterized by low hills, ridges, drumlins, and eskers, with lakes and muskeg common in the low-lying areas. Outcrop of the underlying Athabasca sandstone and basement rocks is rare. Numerous lakes and ponds generally show a north-easterly elongation imparted by the most recent glaciation. Elevation varies between 500 MASL and 565 MASL.

Loamy, grey soils produce taller trees than in the Shield. Aspen, white spruce, jack pine, black spruce, and tamarack are common.

Wildlife consists of moose, woodland caribou, mule deer, white-tailed deer, elk, black bear, timber wolf, and beaver. Birds include white-throated sparrow, American redstart, bufflehead, ovenbird, and hermit thrush. Fish include northern pike, pickerel, whitefish, lake trout, rainbow trout, and perch.

The Property is at the resource development stage. RPA is of the opinion that, to the extent relevant to the mineral project, there is a sufficiency of surface rights and water.

6 HISTORY

PRIOR OWNERSHIP

Claims comprising the PLS Property were ground staked from February 2007 to December 2011. Claim S-110707 was originally staked on behalf of ESO Uranium Corporation (ESO). Claim S-110955 was originally staked on behalf of Strathmore Minerals Corp (Strathmore) and transferred to Fission Energy Corp. (Fission Energy) in its plan of arrangement. In January 2008, Fission Energy and ESO entered into a 50/50 joint venture and contributed the claims existing at that time. As part of the agreement, Fission Energy contributed mineral claims S-110954 and S-110955 while ESO contributed S-110707 and S-110723. Mineral claims S-110954 and S-110723 were eventually allowed to lapse. Subsequently, additional claims were staked for the benefit of the joint venture, including S-111376 which is now known to host the Triple R deposit.

On March 7, 2013, Fission Energy announced that it had entered into an agreement (the Agreement) with Denison Mines Corp. (Denison) whereby Denison agreed to acquire all the issued and outstanding shares of Fission Energy. Under this Agreement, Fission Energy spun out certain of its assets, including its 50% interest in the PLS Property, into a newly formed, publicly traded company, Fission Uranium, by way of a court-approved plan of arrangement.

Pursuant to the Agreement, Denison acquired a portfolio of uranium exploration projects including Fission Energy's 60% interest in the Waterbury Lake uranium project, as well as Fission Energy's exploration interests in all other properties in the eastern part of the Athabasca Basin, its interests in two joint ventures in Namibia, plus its assets in Quebec and Nunavut. Fission Uranium's assets consisted of the remaining assets of Fission Energy including the 50% interest in the PLS Property.

EXPLORATION AND DEVELOPMENT HISTORY

The following description of historic exploration work conducted on the PLS Property and its immediate vicinity is taken from Armitage (2013).

The Property was geologically mapped as part of a larger area by W.F. Fahrig for the Geological Survey of Canada (GSC) in 1961 (Hill, 1977). Another geological mapping project completed in 1961 by L.P. Tremblay of the GSC covered the Property and Firebag River Area at a scale of four miles to the inch (Hill, 1977).

In 1969, photogeologic mapping and airborne radiometric and magnetic surveys were completed on the Property for Wainoco Oil and Chemicals Ltd. The surveys did not detect any notable structures or anomalies (Atamanik, Downes and van Tongeren, 1983).

Canadian Occidental Petroleum Ltd. (CanOxy) completed extensive exploration on and around the Property from 1977 to 1981. Exploration comprised an airborne Questor INPUT electromagnetic (EM) survey; ground horizontal loop EM (HLEM) and magnetic geophysical surveys; geological, geochemical, alphameter (radon), and radiometric surveys; and diamond drilling.

In 1977, CanOxy discovered a very strong six station alphameter (radon) anomaly with dimensions of 1.2 km by 1.7 km on what is now claim S-111375. This anomaly coincides with high uranium in soil values and anomalous scintillometer (radiometric) values. It was suggested that this alphameter anomaly was responding to radioactive exotic boulders within the till of the Cree Lake Moraine, however, no follow-up work was carried out (Hill, 1977).

CanOxy's 1977 ground EM survey delineated the Patterson Lake Conductor Corridor that traverses the centre of Patterson Lake on claim S-111376 and extends onto claim S-111375. Several disrupted conductors and inferred cross cutting features were identified as priority 1, 2, and 3 drill targets on claim S-111376.

CanOxy drill hole CLU-12-79 was positioned based on an airborne EM conductor, which was later refined by ground EM surveys. This drill hole is located on the northernmost conductor of the Patterson Lake conductor corridor and is on the west shore of Patterson Lake within claim S-111376. Drill hole CLU-12-79 was highlighted by a 6.1 m wide sulphide-graphite "conductor" that contained anomalous uranium, copper, and nickel concentrations. Strong hematite and chlorite alteration were observed in the regolith and fresh basement rock, and two spikes in radioactivity occurred in the fresh basement lithologies (Robertson, 1979).

PREVIOUS RESOURCE ESTIMATES

An initial Mineral Resource estimate was reported for the Triple R deposit in a NI 43-101 Technical Report by RPA dated February 12, 2015 (RPA, 2015a). An updated Mineral Resource estimate for the Triple R deposit was prepared by RPA on September 14, 2015 (RPA, 2015b). A further updated Mineral Resource estimate for the Triple R was prepared by RPA, Wood and Clifton on May 30, 2019 (RPA, 2019).

All previous Mineral Resource estimates are superseded by the updated Mineral Resource estimate in Section 14 of this Technical Report.

PAST PRODUCTION

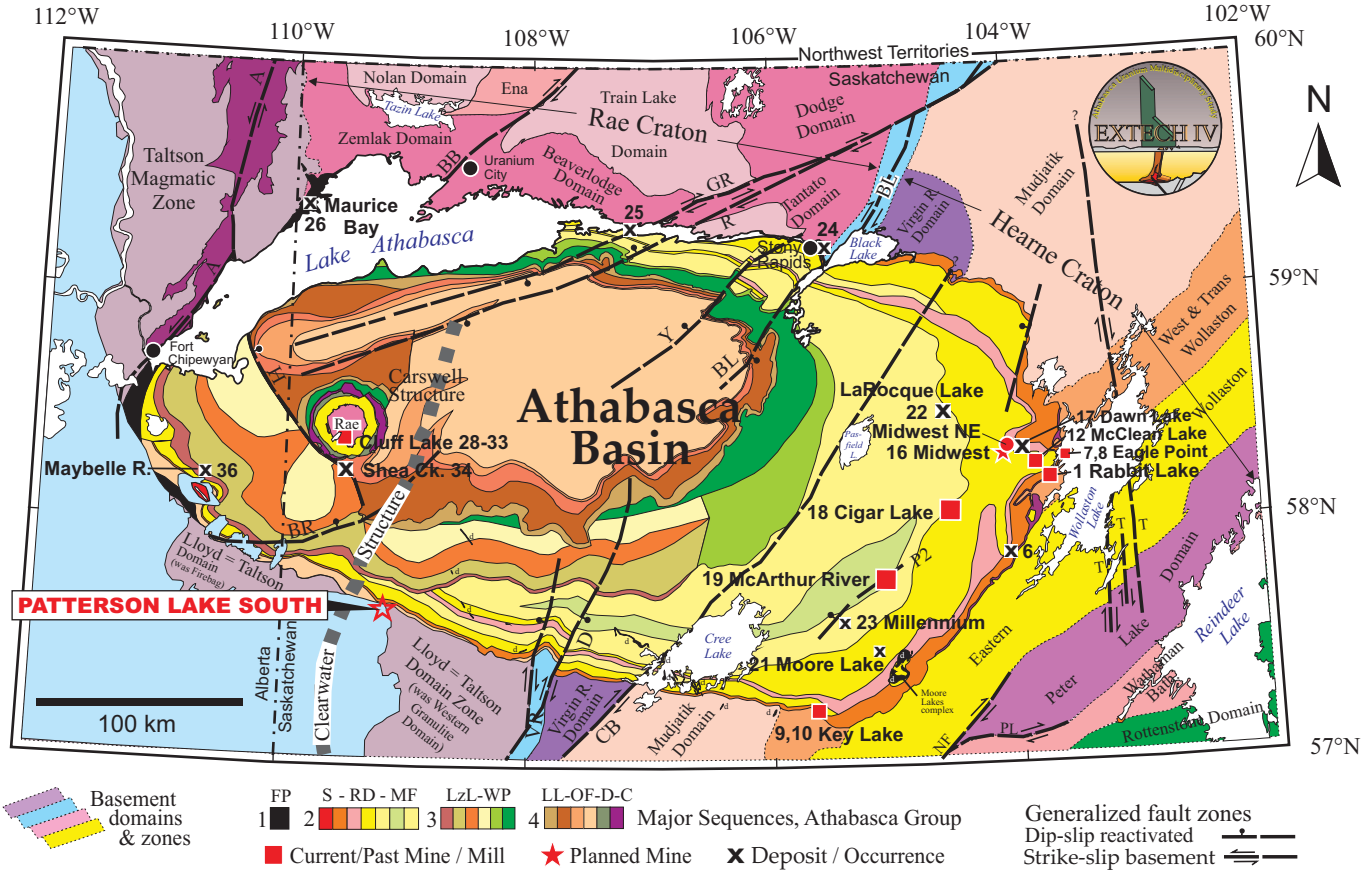
There has been no production from the PLS Property up to the effective date of the report.

7 GEOLOGICAL SETTING AND MINERALIZATION

REGIONAL GEOLOGY

The most significant uranium metallogenic district in Canada is the Athabasca Basin, which covers over 85,000 km^2 in northern Saskatchewan and northeastern Alberta (Figure 7-1). The Athabasca Basin is oval shaped at surface with approximate dimensions of 450 km by 200 km and reaches a maximum thickness of approximately 1,500 m near the centre. The basin itself is a relatively undeformed and unmetamorphosed sequence of Paleoproterozoic to Mesoproterozoic clastic rocks known as the Athabasca Group, lying unconformably on the deformed and metamorphosed rocks of the Western Churchill Province of the Canadian Shield.

The east-west elongate Athabasca Basin lies astride two subdivisions of the Western Churchill Province, the Rae Subprovince (Craton) to the west and the Hearne Subprovince (Craton) to the east. These are separated by the northeast trending Snowbird Tectonic Zone also known as the Virgin River Shear Zone or Black Lake Shear Zone south and north of the Athabasca Basin, respectively. The PLS Property is located within the Clearwater and Taltson Domains of the Rae Subprovince near the southwestern edge of the Athabasca Basin. The western portion of the PLS Property overlies the Clearwater Domain and the eastern portion of the Property overlies the Taltson Domain.



Basement domains & zones

FP 1 | S - RD - MF 2 | LzL-WP 3 | LL-OF-D-C 4 — Major Sequences, Athabasca Group

Current/Past Mine / Mill ★ Planned Mine ✕ Deposit / Occurrence

Generalized fault zones
Dip-slip reactivated
Strike-slip basement

Figure 7-1

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Regional Geology

Source:
After GSC - Mineral Deposits of Canada, Unconformity Associated Uranium Deposits.

November 2019

LOCAL GEOLOGY

The following description of the local geology is revised after Armitage (2013).

The PLS Property lies within the northeastern limits of the Cretaceous Mannville Group which covers a large portion of western Saskatchewan (Figure 7-2). The Lexicon of Canadian Geologic Units (the Lexicon) describes the Mannville Group as interbedded marine and non-marine sands, shales, and calcareous sediments.

Regionally discontinuous Devonian age Elk Point Group exists beneath the Cretaceous sediments. The Lexicon describes the Elk Point Group as being comprised of nine distinct lithologies consisting primarily of carbonates, evaporites, and clastic rocks.

To date, no Athabasca Group sediments have been intersected on the Property.

Basement rocks of the PLS Property consist of the Clearwater and Taltson Domains. Although not well defined due to limited exposure and mapping, the Clearwater Domain is recognized to consist of gneissic granitoids, anorthosite, monzodiorite, and granites (Card et al., 2014). The Paleoproterozoic Taltson Domain rocks are comprised of granulite facies orthogneisses derived predominantly from diorite, quartz diorite and quartz monzodiorite, with subordinate tonalite, granodiorite, and granite (Card et al., 2014). Mafic to ultramafic rocks commonly intrude the orthogneisses.

PROPERTY GEOLOGY

The following description of the property geology is taken from Mineral Services Canada Inc. (2014a) with revisions after 2018 drilling.

QUATERNARY GEOLOGY

The PLS Property is covered by a thick layer of sandy to gravelly Quaternary glacial material. The Quaternary material ranges in thickness from less than 10 m in the southeast portion of the Property to greater than 100 m directly west of Patterson Lake. No outcrop has been discovered on the Property to date. Eskers, drumlins, and other glacial features show a general north-easterly trend imparted by the most recent glaciation. A roughly north-south orientation is present in the glacial features in the vicinity of the radioactive boulder field west

of Patterson Lake, which is interpreted to reflect a glacial outwash plain. Occasional drill holes west of Patterson Lake also intersect apparently thick intervals of glacial diamictite. The diamictite is comprised of dark grey to black silty matrix material with subangular pebble to gravel sized Athabasca sandstone and basement clasts throughout.

MANNVILLE GROUP

Intermittently on the PLS Property, particularly to the west of Patterson Lake, intervals of dark grey, Cretaceous Mannville Group mudstone have been intersected, interpreted to be the Cantuar Formation. The thickness of the Cantuar Formation appears highly variable, which is likely a result of being washed away during drilling, however, it has been intersected in lengths in excess of 20 m (e.g., PLS12-017). Thin seams of coal are occasionally present within the mudstone.

ELK POINT GROUP

The lowest formation of the Elk Point Group, the Meadow Lake Formation, occurs as a thin intermittent lens on the PLS Property. The greatest proportion of Meadow Lake Formation cored to date occurs in holes drilled to intersect the R00E and R780E mineralized zones. The Meadow Lake Formation is generally medium grained, brownish in colour when fresh and contains numerous poorly sorted subangular basement and Athabasca sandstone clasts. The matrix around mineral and lithic clasts is well developed and made up of carbonate (MSC12/018R, 2012). Typical thicknesses of Meadow Lake Formation range widely, from tens of centimetres to over ten metres. The Meadow Lake Formation is interpreted to be the remaining infill of a basement low over mineralization and has been found to taper off rapidly away from the mineralized zone.

Alteration within the Meadow Lake Formation, when present, is dominated by pervasive chlorite and illite, which turns the sediments whitish green to dark green. Pervasive pink-red hematite alteration also commonly occurs in more competent intervals.

Due to the limited amount of drilling in the Meadow Lake Formation, no significant structures have been noted within this area of the Property to date.

BASEMENT ROCKS

The PLS Property covers two geological domains; the western portion covers the Clearwater Domain while the eastern portion covers the Taltson Domain. To date, drilling at the PLS Property has been focused on the basement rocks of the Taltson Domain. In the vicinity of PLS mineralization (i.e., along the PLG-3B EM conductor), the basement rocks are comprised of a northeast trending belt of variably altered and sheared pyroxene bearing orthogneisses bounded to the northwest and southeast by an apparently thick package of quartz-feldspar-biotite-garnet gneiss (QFBG-GN). The pyroxene bearing orthogneisses and QFBG-GN are intruded by numerous sheared, fine grained granite lenses.

The pyroxene bearing orthogneiss comprises the core of a northeast trending belt of alteration and structural disruption along the PLG-3B EM conductor and dips steeply to the southeast. The orthogneisses are intensely sheared, faulted, and altered into an intercalated sequence of fine grained ribbony graphite-sulphide gneiss and medium grained garnet porphyroblast gneiss with subordinate garnetite, graphitic mylonite, and cataclasite. The sheared graphitic rocks are collectively termed the Main Shear Zone (MSZ).

The MSZ is constrained to the north and south by QFBG-GN. The QFBG-GN is comprised of approximately 60% quartz and plagioclase, 20% biotite, 15% garnet and trace pyrite, sillimanite, and graphite.

Lenses of dark green to black, sheared, fine grained granitoid intrude the QFBG-GN and MSZ along the extent of the PLG-3B drilled to date. The sheared granitoids are interpreted to be roughly concordant with the regional geology (i.e., steeply dipping to the southeast) except in the eastern R780E where a thick lens is interpreted to dip shallowly to the east.

Away from mineralization, the basement rocks immediately in the PLS area are either paleoweathered, weakly altered, or fresh. The paleoweathered rock displays the typical downward gradational profile of a thin bleached and strongly kaolinite altered zone to a hematite dominated and then into a chlorite dominated zone. The paleoweathering profile can extend several metres into the basement rock and completely alters the primary mineralogy to secondary clay minerals and quartz. Away from paleoweathered areas, later-stage hydrothermal alteration is common throughout the basement. In particular, a broad zone of alteration occurs around mineralization where fresh basement is rarely encountered. Dark green chlorite alteration of garnet, biotite, and Al-silicates along with fracture infill to

disseminated graphite and whitish green clay alteration of feldspar is the most abundant type of basement alteration. Patchy pink to red hematite occurs in the basement lithologies and is often associated with elevated radioactivity. Similarly, patchy, blebby limonite alteration almost entirely occurs with moderate to strong intervals of radioactivity. Along the MSZ and hanging wall QFBG-GN contact, a broad zone of silicification almost completely overprints the QFBG-GN. This silicified unit was initially considered as quartzitic gneiss, but later was reinterpreted as a silicified version of the southern QFBG-GN based on textural observations and the gradational nature of the contact between the southern QFBG-GN and silicified zone.

On a regional scale, the paleotopography in the vicinity of the PLG-3B EM conductor is flat lying. The mineralized zones occur in slight basement topographic lows and are separated by relative highs. In the vicinity of the mineralized zones, the basement surface shows many small-scale offsets, which are interpreted to be caused by a series of stacked reverse faults. Based on processed oriented core data and closely spaced grid drilling, the dominant structural trends along the PLG-3B EM conductor appear to be steeply southeast dipping reverse faults and dextral strike-slip movement. Significant northeast and northwest trending faults interpreted from DC Resistivity surveys crosscut the PLG-3B conductor and appear to be associated with broad, strong zones of uranium mineralization. These faults are yet to be positively identified in drill core as they are roughly parallel to the dominant drilling direction. Around zones of intense uranium mineralization microbreccia, dravite filled breccia, graphitic cataclasite and mylonite occur, however, the intense alteration associated with uranium mineralization often makes these features difficult to identify.

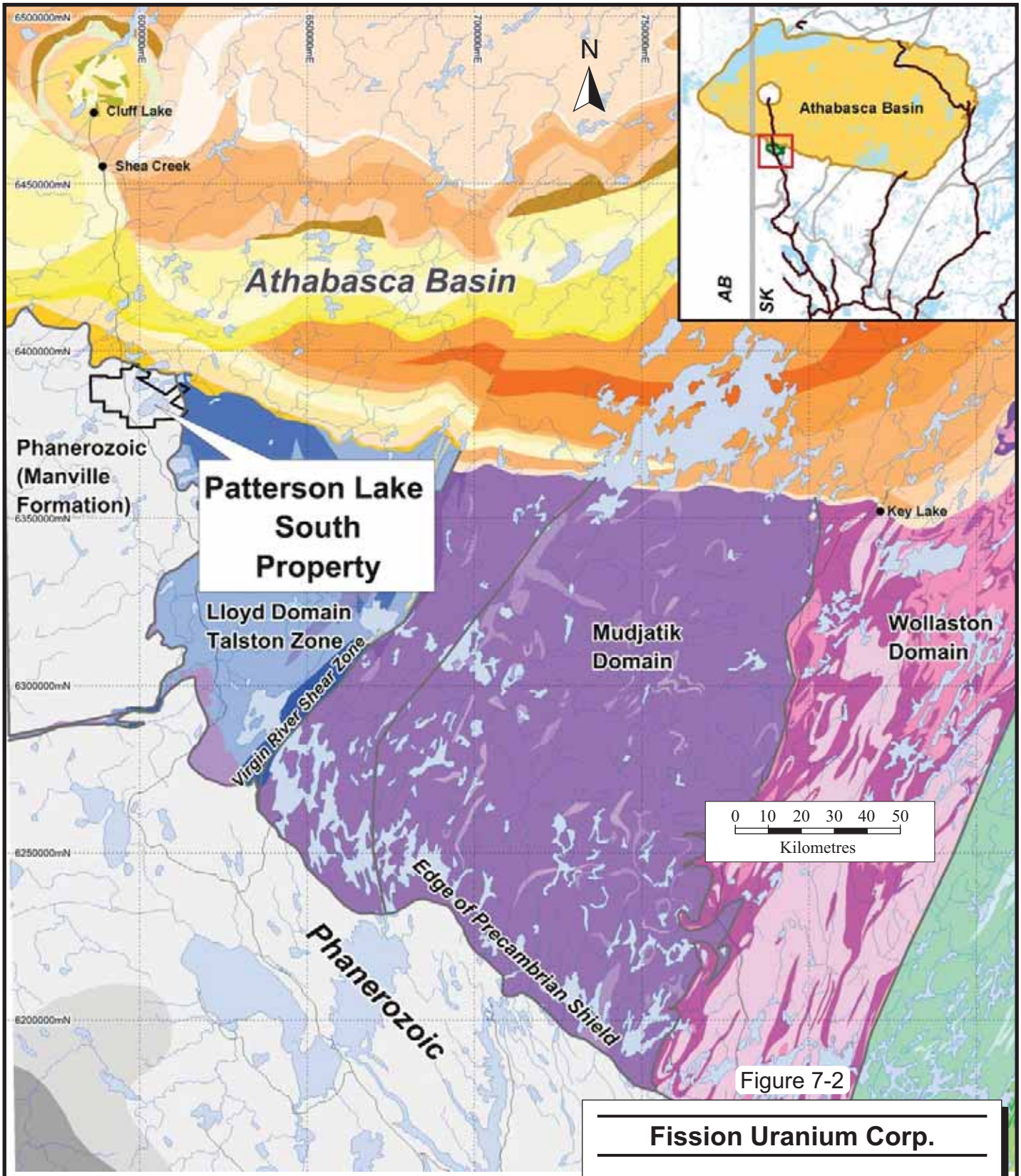


Figure 7-2

Fission Uranium Corp.

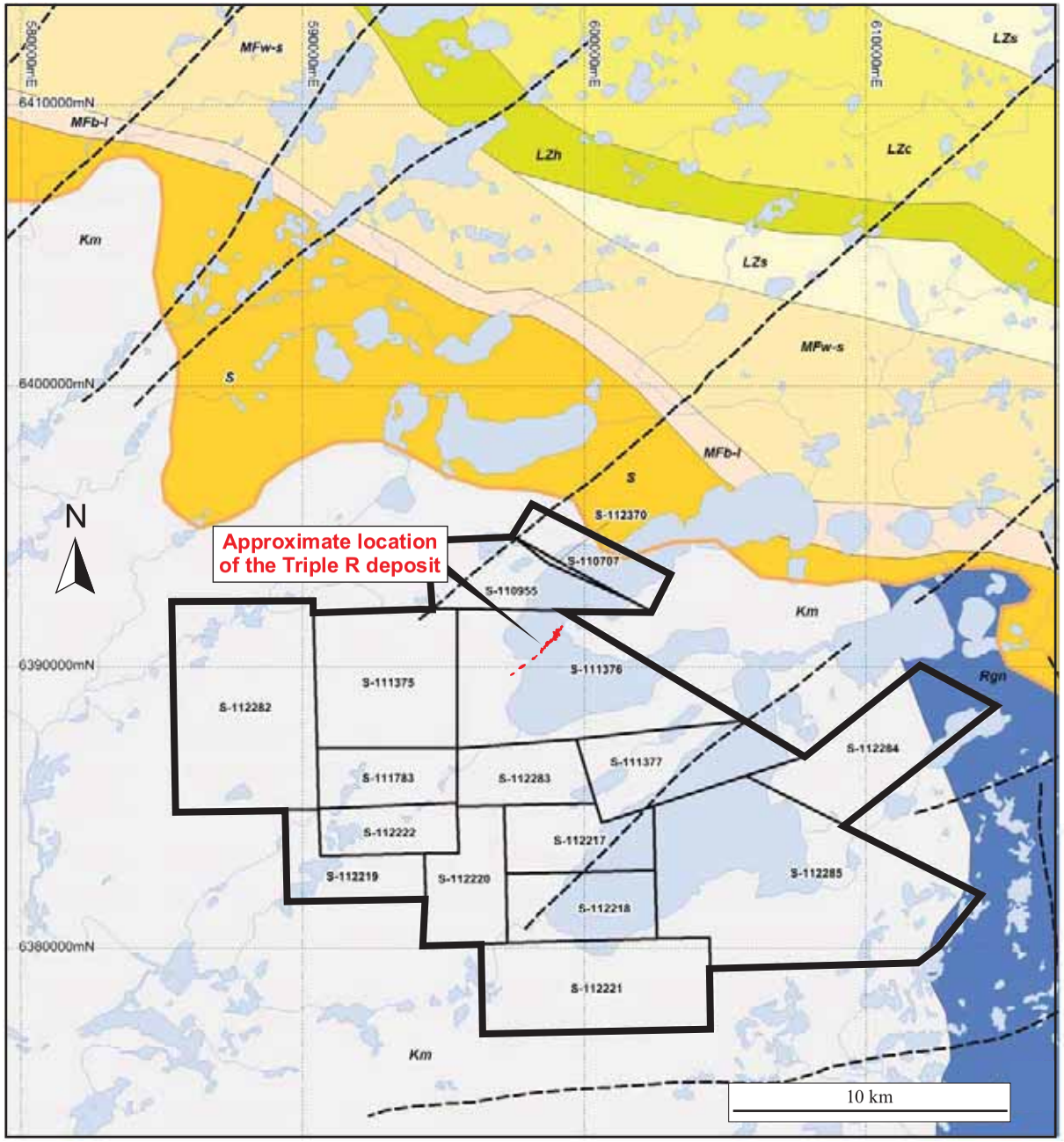
Patterson Lake South Property

Northern Saskatchewan, Canada

Local Geology

November 2019

Source: Fission Energy Corp., 2014.



Legend:

Phanerozoic

- Km — *Mannville Group*

Athabasca Group

- LZs — *Lazenby Lake: Quartzanerite with pebbly layers*
- LZc — *Lazenby Lake: Quartzanerite > siltstone + mudstone*
- LZh — *Lazenby Lake: Pebbly quartzarenite + conglomarate*
- MFw-s — *Manitou Falls: Quartzarenite*
- MFb-l — *Manitou Falls: Lower conglomeratic quartzarenite*
- S — *Smart: Quartzarenite, local pebbly mudstone*

Archean Basement

- Rgn — *Granite - granodiorite gneiss*

- *Patterson Lake South Holdings*
- *Lake*
- *River*
- *Fault*
- *Estimated Athabasca Basin Margin*

Figure 7-3

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Property Geology

November 2019

Source: Fission Energy Corp., 2015.

www.rpacan.com

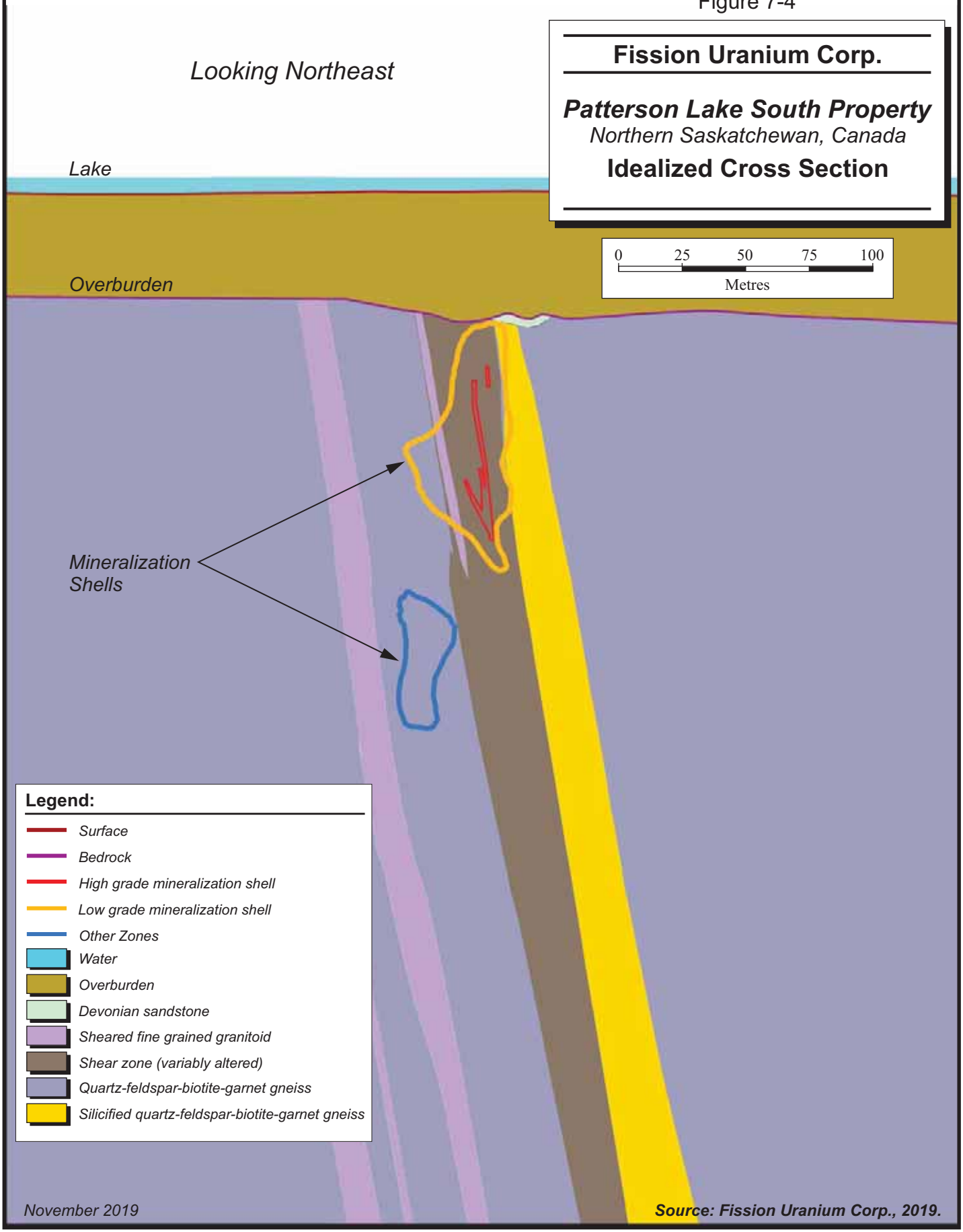
Figure 7-4

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Idealized Cross Section



November 2019

Source: Fission Uranium Corp., 2019.

MINERALIZATION

As of the effective date of this report, mineralization is known to occur at five locations on the PLS Property, from west to east: 1) R1515W, 2) R840W, 3) R00E, 4) R780E, and 5) R1620E, the most significant of which is the R780E zone (Figure 7-5). Uranium mineralization discovered on the Property to date is hosted primarily in basement lithologies with subordinate amounts intersected in the overlying Devonian sedimentary rocks. Mineralized zones occur within or near to the MSZ over a 3.17 km strike length along the PLG-3B EM conductor. The R1620E zone is currently defined by 23 drill holes and is located on the PLG-3C EM conductor which, based on geology, is considered to be the eastern extension of the MSZ.

No significant uranium mineralization has been intersected in exploration drilling away from the PLG-3B and 3C conductors.

Parts of the following description of the mineralization on the PLS Property are taken from Mineral Services Canada Inc. (2014a) and revised after drilling to the end of 2018.

Uranium mineralization at the PLS Property is hosted primarily within metamorphosed basement lithologies and, to a much lesser extent, within overlying Meadow Lake Formation sedimentary rocks.

Mineralization within the Meadow Lake Formation sedimentary rocks typically occurs as fine grained disseminations, sooty blebs, and rarely semi-massive uranium mineralization. Uranium concentrations within the Meadow Lake Formation are generally low to moderate, however, grades greater than 1.00 wt% U_3O_8 have been intersected. When mineralized, the Meadow Lake Formation is typically strongly clay and chlorite altered, though locally can be pervasively hematite stained a deep red. Relative to basement hosted mineralization, only a very small amount of mineralized Meadow Lake Formation has been intersected on the PLS Property to date.

Basement hosted mineralization at the PLS Property occurs in a wide variety of styles, the most common of which appears to be fine grained disseminated and fracture filling uranium minerals strongly associated with hydrocarbon/carbonaceous matter within the MSZ. Uranium minerals, where visible, appear to be concordant with the regional foliation and dominant structural trends identified through oriented core and fence drilling (i.e., steeply dipping to the

southeast). Typically, mineralization within the MSZ is associated with pervasive, strong, grey-green chlorite and clay alteration. The dominant clay species identified through PIMA analysis are kaolinite and magnesium-chlorite interpreted to be sudoite. The pervasive clay and chlorite alteration eliminate the primary mineralogy of the host rock with only a weakly defined remnant texture remaining. Locally, intense rusty limonite-hematite alteration in the orthogneisses strongly correlates with high grade uranium mineralization and a “rotten”, wormy texture.

Less common styles of uranium mineralization within the MSZ, which are often associated with very high grade uranium, include: semi-massive and hydrocarbon rich; intensely clay altered (kaolinite) with uranium-hydrocarbon buttons; and massive metallic mineralization. These zones of very high grade mineralization generally occur along the contact of the MSZ and intensely silicified QFBG-GN and comprise a high grade mineralized spine. This spine may represent a zone of intense structural disruption which has been completely overprinted by alteration and mineralization, however, drill holes that undercut the strongly mineralized spine have failed to show signs of significant structural damage. Particularly well mineralized drill holes are often associated with thin swarms of dravite-filled breccia.

Uranium mineralization within the north and south QFBG-GN which bound the MSZ generally occurs as fine grained disseminations and is almost always associated with pervasive whitish-green clay and chlorite alteration with local pervasive hematite. The mineralized zones within the QFBG-GN are interpreted to be stacked structures parallel to the MSZ strike and dip along the PLG-3B conductor.

Results of the detailed mineralogical work at the PLS Property indicate that the dominant uranium mineral present is uraninite, with subordinate amounts of coffinite, possible brannerite and U-Pb oxide/oxyhydroxide. Uranium minerals occur mainly as anhedral grains and polycrystalline aggregates with irregular terminations; irregularly developed veinlets, locally showing extremely complex intergrowths with silicates; micrometric inclusions and dendritic intergrowths with silicates; and very fine-grained dissemination intercalated with clays. In the samples studied, uranium minerals also occur as fine-grained inclusions in carbonaceous matter (hydrocarbon).

R00E ZONE

The R00E mineralized zone was the first mineralized zone discovered on the PLS Property and was intersected during the fall 2012 drill program. The sixth drill hole of the campaign,

PLS12-022, was a vertical hole drilled from the western shore of Patterson Lake testing for the up-dip extension of the strong alteration and weak mineralization intersected in PLS12-016 (0.07% U_3O_8 over 1.0 m). PLS12-022 intersected a total of 12.5 m of uranium mineralization beginning at the top of bedrock (55.3 m) including a main zone averaging 1.1% U_3O_8 over 8.5 m from 70.5 m to 79.0 m.

The R00E zone is currently defined by 23 drill holes intersecting uranium mineralization over a combined grid east-west strike length of 120 m and a maximum grid north-south width of 50 m. Uranium mineralization at R00E trends north-easterly, in line with the MSZ.

At R00E, uranium mineralization is generally found within several metres of the top of bedrock which occurs at a depth of 50 m to 60 m vertically from surface. Several holes (e.g., PLS13-037, PLS13-039) drilled along the southern edge of the mineralization have intersected the down dip uraniferous root over 100 m below the top of bedrock. Uranium mineralization at R00E is hosted within the MSZ, northern QFBG-GN, and Meadow Lake Formation sediments. No uranium mineralization has been intersected to date in the silicified hanging wall or in the southern QFBG-GN.

As the R00E zone had been interpreted to be roughly flat lying at the top of bedrock, vertical holes have dominantly been utilized to delineate mineralization. Vertical holes intersect the mineralized zone roughly perpendicular and therefore provide an approximate true thickness. Table 7-1 lists a selection of significant mineralized drill hole intersections at the R00E zone.

Drilling since the effective date of the previous Mineral Resource estimate did not affect the interpretation of the R00E zone; therefore, the resource model in that area has not changed.

TABLE 7-1 R00E ZONE SIGNIFICANT INTERSECTIONS
Fission Uranium Corp. – Patterson Lake South Property

Drill Hole	Interval Length (m)	Average Grade[1] ($\%U_3O_8$)	GT[2] ($\%U_3O_8$*m)
PLS13-059	20.50	8.36	171.38
PLS13-043	22.00	4.80	105.60
PLS13-079	17.50	5.98	104.65
PLS13-041	25.00	3.02	75.50
PLS13-052	16.49	3.89	64.15
PLS13-027	38.00	1.05	39.90
PLS13-049	17.00	2.10	35.70

Note:
1. Average grades are based on uncut chemical assay values.
2. GT – grade by thickness

R780E ZONE

The R780E zone was discovered during the winter 2013 drill program with drill hole PLS13-038. PLS13-038 targeted an intense radon-in-water anomaly occurring along the PLG-3B conductor, approximately 390 m east of the PLS discovery hole. Drill hole PLS13-038 intersected a 34.0 m wide zone of very strong uranium mineralization, beginning at 87.0 m, averaging 4.9% U_3O_8.

The R780E zone is currently defined by 258 drill holes over a grid east-west strike length of 960 m and a maximum grid north-south width of 101 m. Similar to R00E, R780E mineralization trends approximately northeast, in line with the MSZ. Representative sections and plans from the R780E zone are provided in Section 14, Mineral Resources.

As with the R00E zone, R780E uranium mineralization has varying thickness, from tens of centimetres along the flanks to very wide intervals within the MSZ, as seen in PLS14-248 which intersected a lens of high grade uranium mineralization over 15 m in true thickness. In section view, R780E mineralization generally occurs as sub-vertically and southeast dipping zones, concordant with the regional dip. A very high grade spine of uranium mineralization occurs within the main zone and has been traced as a series of lenses across almost the entire strike length of the R780E zone. The high grade spine occurs adjacent to the contact between the MSZ and silicified QFBG-GN.

At the western R780E zone, uranium mineralization extends to near the top of bedrock. Moving eastward, the top of mineralization appears to be plunging at approximately -7° to the

east. In general, the western R780E mineralization morphology is similar to the R00E, spatially restricted to the northern QFBG-GN, MSZ, and Meadow Lake Formation sediments. Moving eastward through the R780E zone, mineralization has been intersected within the MSZ, northern QFBG-GN, and Meadow Lake Formation sediments and, unlike the R00E zone, strong mineralization has been cored in the silicified QFBG-GN and southern QFBG-GN.

Initial drilling at the R780E zone consisted of only vertical holes for three main reasons: testing for subhorizontal mineralization similar to the R00E zone, limitations with the reverse circulation (RC) drill rig used to pre-case holes, and summer barge drilling where angled holes were not technically achievable. From drill hole PLS14-192, which was drilled during the winter 2014 campaign, onwards, the majority of drill holes at R780E were angle holes, mostly drilled south to north in order to best intersect the steeply south dipping mineralized lenses. The Mineral Resource estimate for the R780E zone has been updated with results of the summer 2018 drill program. Table 7-2 lists a selection of significant drill hole intersections at the R780E zone.

TABLE 7-2 R780E ZONE SIGNIFICANT INTERSECTIONS
Fission Uranium Corp. – Patterson Lake South Property

Drill Hole	Interval Length (m)	Average Grade[1] ($\%U_3O_8$)	GT[2] ($\%U_3O_8$*m)
PLS14-248	31.50	28.05	883.58
PLS13-075	60.49	20.26	1225.53
PLS14-129	21.00	28.05	589.05
PLS18-588	26.00	22.62	588.12
PLS14-201	13.05	26.47	345.43
PLS13-051	27.50	27.28	750.20
PLS14-215	30.99	11.49	356.08
PLS14-187	41.50	10.10	419.15
PLS13-053	27.45	22.60	620.37
PLS14-209	42.50	21.97	933.73
PLS13-080	18.48	19.01	351.30
PLS14-290	38.50	32.52	1252.02
PLS18-584	37.90	11.43	433.20

Note:
1. Average grades are based on uncut chemical assay values.
2. GT – grade by thickness

R1620E ZONE

The R1620E mineralized zone was discovered during the winter 2014 drill program with hole PLS14-196 which was testing a moderate radon-in-water anomaly along the PLG-3C EM

conductor, interpreted to be the extension of the PLG-3B EM conductor. PLS14-196 intersected 28.5 m of uranium mineralization beginning at a depth of 100.0 m down hole, which averaged 0.17% U_3O_8.

The R1620E zone is currently defined by 23 drill holes. Uranium mineralization at the R1620E occurs in what is interpreted to be the eastern extension of the MSZ and appears to be associated with the MSZ – silicified QFBG-GN contact. Table 7-3 lists a selection of significant drill hole intersections at the R1620E zone. Additional drilling is recommended.

TABLE 7-3 R1620E ZONE SIGNIFICANT INTERSECTIONS
Fission Uranium Corp. – Patterson Lake South Property

Drill Hole	Interval Length (m)	Average Grade[1] (%U_3O_8)	GT[2] (%U_3O_8*m)
PLS16-500	14.00	9.53	133.42
PLS16-460	27.50	3.79	104.23
PLS16-485	10.00	9.75	97.50
PLS16-498	25.50	3.74	95.37
PLS16-464	23.14	6.59	152.49
PLS16-496	15.40	6.45	99.33
PLS16-489	12.00	2.30	27.60
PLS17-518	16.48	1.09	17.96
PLS17-531	9.49	0.74	7.02
PLS16-487	18.50	0.46	8.51
PLS14-196	28.50	0.17	4.85

Note:
1. Average grades are based on uncut chemical assay values.
2. GT – grade by thickness

R840W ZONE

The R840W (formerly known as R600W) mineralized zone, located 840 m west of R00E, was discovered during the summer 2013 exploration drill program. PLS13-116 was an angle hole drilled to the north, targeting a radon-in-soil anomaly along the western end of the PLG-3B conductor. The drill hole intersected a thin zone of anomalous radioactivity hosted in the northern QFBG-GN. Follow-up drilling during the 2015 winter program intersected high grade uranium mineralization in drill hole PLS15-352 returning 31.5 m averaging 11.09 wt% U_3O_8.

The R840W zone is currently defined by 59 drill holes with a total grid east-west strike length of 425 m. Similar to the R00E and R780E zones, mineralization trends north-easterly in line with the MSZ. Table 7-4 lists a selection of significant drill hole intersections at the R840W

zone. Additional drilling is recommended. Drill holes intersecting the near vertical mineralized zones at shallow angles or nearly parallel the mineralization do not reflect the true thickness of the fractures which range from 10 m to 20 m wide.

TABLE 7-4 R840W ZONE SIGNIFICANT INTERSECTIONS
Fission Uranium Corp. – Patterson Lake South Property

Drill Hole	Interval Length (m)	Average Grade[1] ($\%U_3O_8$)	GT[2] ($\%U_3O_8$*m)
PLS15-439	20.41	15.96	325.74
PLS15-343	26.50	15.30	405.45
PLS16-504	10.50	12.25	128.63
PLS17-517	51.00	1.89	96.39
PLS16-512	54.00	1.39	75.06
PLS17-515	23.00	2.64	60.72

Note:
1. Average grades are based on uncut chemical assay values.
2. GT – grade by thickness

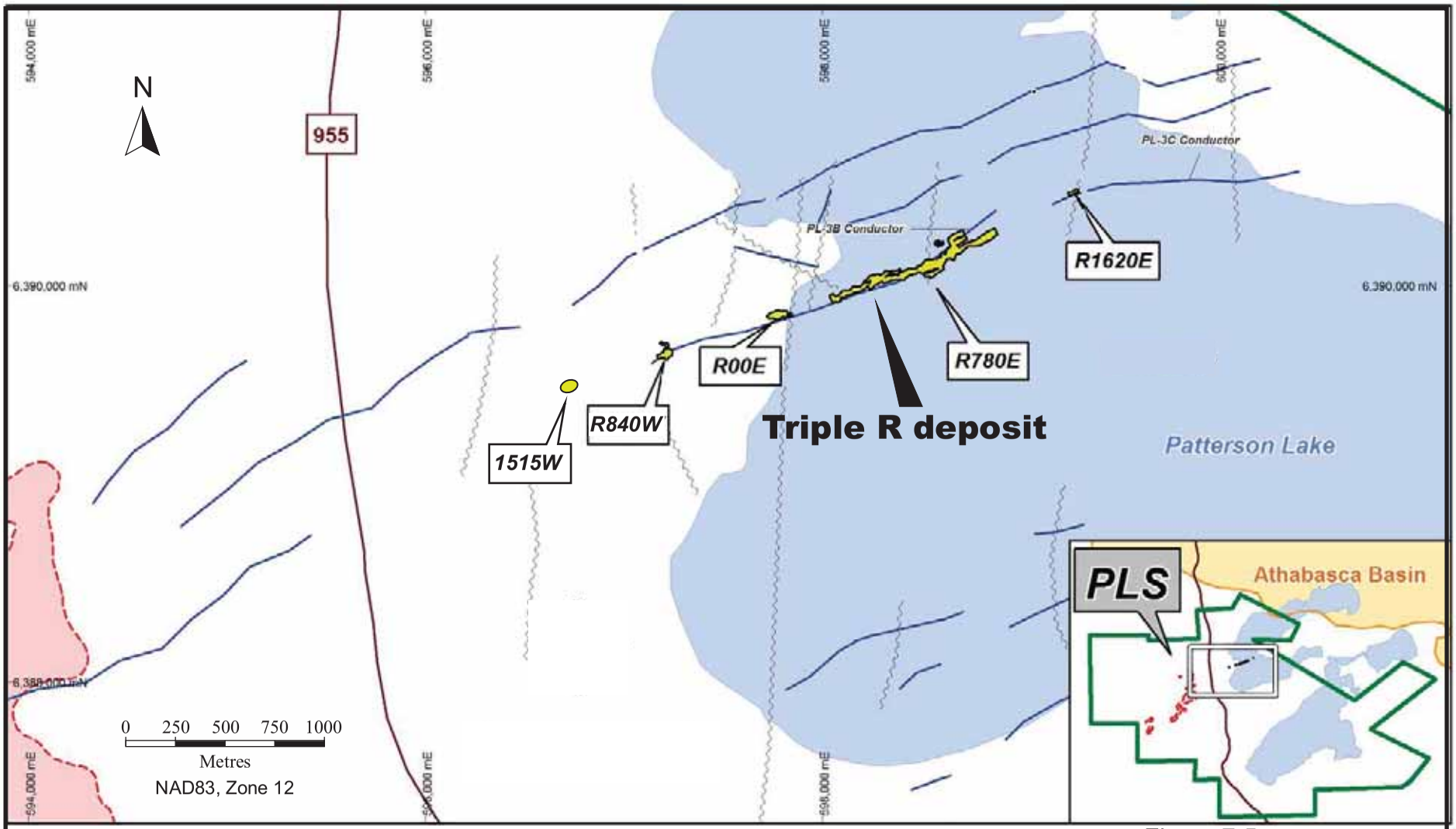
R1515W ZONE

The R1515W mineralized zone was discovered during the winter 2017 drill program with hole PLS17-539 located 500 m west of R840W. The R1515W zone is currently defined by 25 drill holes with the best mineralized intersection returned in PLS17-564 which cored 14.5 m of uranium mineralization averaging 3.39 wt% U_3O_8. Uranium mineralization at the R1515W occurs in the MSZ and appears to be associated with the MSZ – silicified QFBG-GN contact. Table 7-5 lists a selection of significant drill hole intersections at the R1515W zone. Additional drilling is recommended.

TABLE 7-5 R1515W ZONE SIGNIFICANT INTERSECTIONS
Fission Uranium Corp. – Patterson Lake South Property

Drill Hole	Interval Length (m)	Average Grade[1] ($\%U_3O_8$)	GT[2] ($\%U_3O_8$*m)
PLS17-557	42.95	1.17	50.25
PLS17-553	28.99	1.72	49.86
PLS17-566	49.08	2.06	101.10
PLS18-571	27.98	2.96	82.82
PLS18-572	22.49	1.66	37.33
PLS18-574	17.17	2.72	46.70
PLS18-569	30.47	3.59	109.39
PLS17-561	15.00	1.74	26.10
PLS17-562	27.65	1.90	52.54
PLS17-560	45.99	0.64	29.43
PLS17-563	29.52	1.40	41.33
PLS18-577	15.50	0.73	11.32
PLS18-578A	24.98	0.26	6.49
PLS18-570	35.00	0.71	24.85
PLS17-539	14.53	0.39	5.67

Note:
1. Average grades are based on uncut chemical assay values.
2. GT – grade by thickness



Legend

- Patterson Lake South Holdings (100% Fission Uranium Corp.)
- Highway
- EM Conductors
- Interpreted Fault
- Outline of Mineralized Boulder Field
- Location of Mineralization
- Radioactive Intersection (Previously Reported)

Figure 7-5

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Location of Target Areas

November 2019

Source: Fission Uranium Corp., 2019.

www.rpacan.com

8 DEPOSIT TYPES

The Triple R deposit is considered to be an example of a basement hosted vein-type or fracture-filled uranium deposit.

At numerous locations in Saskatchewan and fewer in Alberta, uranium deposits have been discovered at, above, and below the Athabasca Group unconformity. Mineralization can occur hundreds of metres into the basement or can be perched up to 100 m above in the sandstone. At Triple R, relatively minor amounts of uranium have been identified in the overlying Devonian sediments and mineralization has been discovered in the basement at depths ranging from immediately at or just below the unconformity to 400 m below it. Typically, uranium is present as uraninite/pitchblende which occurs as veins and semi-massive to massive replacement bodies. In most cases, mineralization is also spatially associated with steeply dipping, graphitic basement structures that have penetrated into the sandstones and offset the unconformity during successive reactivation events. Such structures are thought to represent both important fluid pathways as well as chemical/structural traps for mineralization through geologic time as reactivation events have likely introduced further uranium into mineralized zones and provided a means for remobilization.

Unconformity-associated uranium deposits are pods, veins, and semi-massive replacements consisting of mainly uraninite, close to basal unconformities, in particular those between Proterozoic conglomeratic sandstone basins and metamorphosed basement rocks. Prospective basins in Canada are filled by thin, relatively flat-lying, and apparently un-metamorphosed but pervasively altered, Proterozoic (~1.8 Ga to <1.55 Ga), mainly fluvial, redbed quartzose conglomerate, sandstone, and mudstone. The basement gneiss was intensely weathered and deeply eroded with variably preserved thicknesses of reddened, clay-altered, hematitic regolith grading down through a green chloritic zone into fresh rock. The basement rocks typically comprise highly metamorphosed interleaved Archean to Paleoproterozoic granitoid and supracrustal gneiss including graphitic metapelite that hosts many of the uranium deposits. The bulk of the U-Pb isochron ages on uraninite are in the range of 1600 Ma to 1350 Ma. Mines comprise various proportions of two styles of mineralization. Monometallic, generally basement-hosted uraninite fills veins, breccia fillings, and replacements in fault zones. Polymetallic, commonly subhorizontal, semi-massive replacement uraninite forms lenses just above or straddling the unconformity,

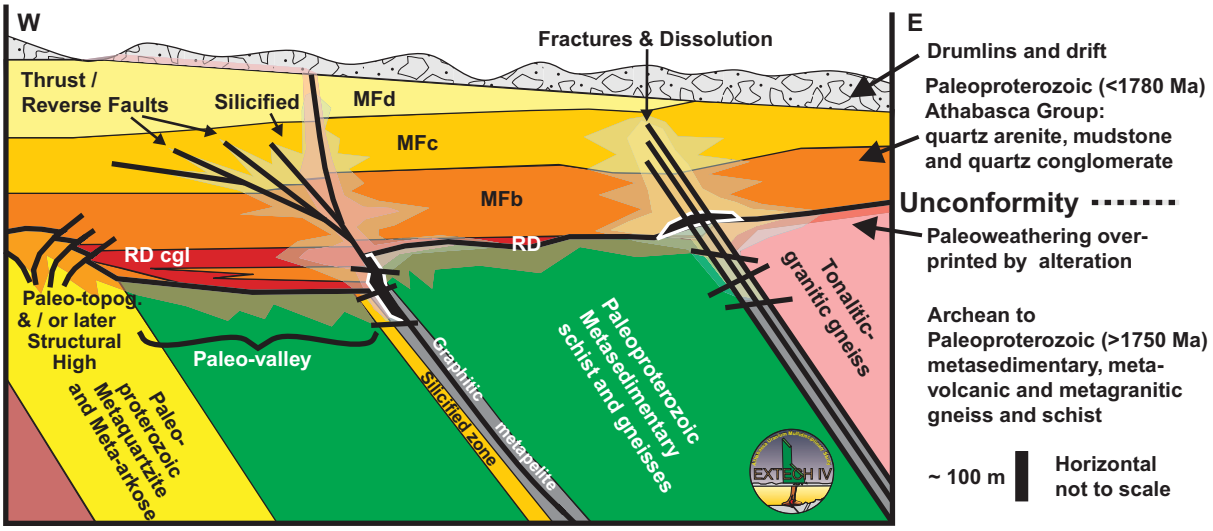
with variable amounts of uranium, nickel, cobalt, and arsenic; and traces of gold, platinum-group elements, copper, rare-earth elements, and iron.

Fundamental aspects of the Athabasca unconformity-type uranium deposit model are reactivated basement faults and two distinct hydrothermal fluids. Typically rooted in basement graphitic gneiss, brittle reactivated faults are manifest upward with brittle expression through the overlying sandstones and provide plumbing for the requisite mineralizing system. One of the necessary fluids is reducing, originates in the basement, and is channelled along basement faults.

Two end-members of the deposit model have been defined (Quirt, 2003). A sandstone-hosted egress-type (e.g., Midwest A) involved the mixing of oxidized, sandstone brine with relatively reduced fluids issuing from the basement into the sandstone. Basement-hosted, ingress-type (e.g., Triple R, Rabbit Lake) deposits formed by fluid-rock reactions between oxidizing sandstone brine entering basement fault zones and the wall rock. Both types of mineralization and associated host rock alteration occurred at sites of basement-sandstone fluid interaction where a spatially stable redox gradient/front was present. Although either type of deposit can be high grade, with a few percent to 20% U_3O_8, they are not physically large. In plan view, the deposits can be 100 m to 150 m long and a few metres to 30 m wide and/or thick. Egress-type deposits tend to be polymetallic (U-Ni-Co-Cu-As) and typically follow the trace of the underlying graphitic gneisses and associated faults, along the unconformity. Ingress-type, essentially monomineralic uranium deposits, can have more irregular geometry.

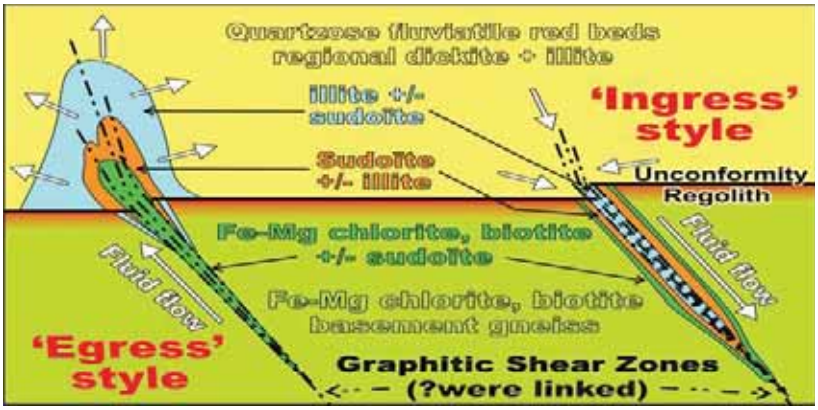
Unconformity-type uranium deposits are surrounded by extensive alteration envelopes. In the basement, they are relatively narrow but become broader where they extend upwards into the Athabasca Group for tens to even 100 m or more above the unconformity. Hydrothermal alteration is variously marked by chloritization, tourmalinization (high boron, dravite), hematization (several episodes), illitization, silicification/de-silicification, and dolomitization (Hoeve, 1984).

Figure 8-1 illustrates various models for unconformity-type uranium deposits of the Athabasca Basin.



Mono-metallic:
- basement hosted
- uranium
- lower total REEs; HREEs / LREEs >1

Poly-metallic:
- 'sandstone' hosted
- U, Ni, Co, Cu, As
- high total REEs; HREEs / LREEs ~1



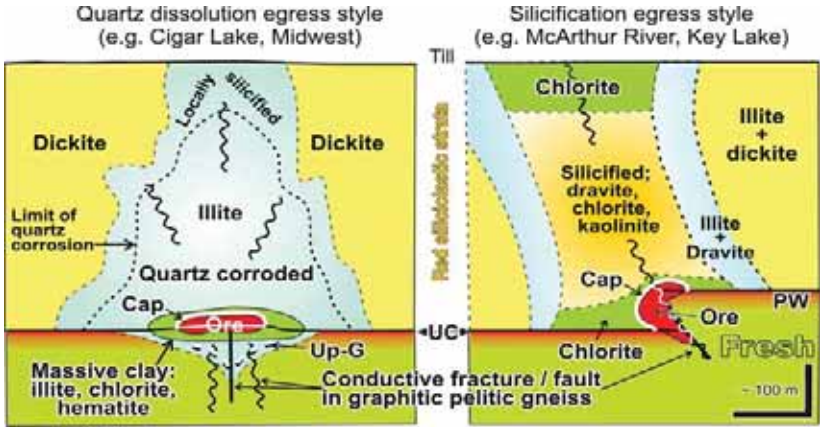


Figure 8-1

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Illustrations of Various Models for Unconformity Type Deposits of the Athabasca Basin

November 2019

Source: From Jefferson et al., 2007.

9 EXPLORATION

With the exception of drilling, exploration work performed on the PLS Property by Fission Energy, ESO, and their successor companies since 2007 is summarized in this section. Work completed on the Property and its immediate vicinity by other parties prior to 2007 is summarized in Section 6 of this report. Drilling completed on the Property since 2011 is summarized in Section 10 of this report.

RADON AND GROUND RADIOMETRIC SURVEYS

2008 RADON AND RADIOMETRIC SURVEYS

From early to mid-October 2008, a preliminary Electret Ion Chamber (EIC) radon detection survey consisting of 280 sample locations on the northernmost portion of the Property was completed by RadonEx Ltd. (RadonEx). A radiometric gamma survey was done concurrently with the radon survey. Sample locations were spaced 200 m apart along four east-west running lines. Locations were 100 m apart along Highway 955 and both branching four-wheel drive roads. Up to five tightly spaced sample locations were completed for each CanOxy alphameter anomaly on the Property. Step out and confirmation sample locations were completed as time allowed. Radon sampling was not conducted during or within 24 hours of a precipitation event.

Radon and radiometric values were generally low across the PLS Property (Armitage, 2013).

2011 RADON AND RADIOMETRIC SURVEYS

Throughout June 2011, a radon survey consisting of 462 sample locations on two grids was completed. A radiometric total count gamma-ray survey was carried out concurrently with the radon survey. Sample locations were spaced at 100 m intervals along north-south oriented lines, which were spaced 200 m apart. Grids 1 and 2 are located west and east of Highway 955, respectively. Radon sampling was not conducted during or within 24 hours of a precipitation event.

Radon values show strong anomalies related to the historical CanOxy alphameter anomalies and the 2009 airborne radioactive hotspots on Grid 1. Strong radon anomalies are associated with historical CanOxy EM conductors on Grid 2.

Three sample locations of interest are located in the northwest corner of Grid 1, away from the bulk of coincident radon and radiometric anomalies found in the south half of Grid 1.

The southeast corner of Grid 2 shows radon and radiometric anomalies south of the EM conductors. There are five radiometrically anomalous sample locations (PR11-404 to 408) in a column with only one of these locations (PR11-407) having strongly anomalous radon values. East of this anomalous radiometric column, sample location PR11-420 shows anomalous radon (1.65 pCi/m^2/sec) with a low radiometric value (50 cps) (Ainsworth, 2011b).

2013 RADON AND GROUND RADIOMETRIC SURVEYS

During January and February 2013, RadonEx conducted an EIC radon in lake water (radon-in-water) and radon in lake sediment (radon-in-sediment) survey on the Property (Charlton, Owen, and Charlton, 2013). Time-domain EM (TDEM and VTEM) conductors with coincident resistivity lows located along strike of the discovery hole PLS12-022 were targeted. Station spacing was 20 m on 60 m north-south oriented lines within four main areas across Patterson Lake. A total of 186 radon-in-water and 167 radon-in-sediment samples were collected.

In Areas 1 and 2, the western side of the survey, an east-west to east-northeast–west-southwest (ENE-WSW) trend appears in both sets of data. In Areas 3 and 4, the eastern side of the survey, the correlation between sediment and water results is less evident and results in these areas were generally lower than in the western section of the lake.

During April 2013, RadonEx conducted additional EIC radon-in-water and radon-in-sediment surveying on Patterson Lake (Charlton, Owen, and Charlton, 2013b). Station spacing was generally 20 m and line spacing was generally 60 m. This survey was intended to infill areas from a previous radon-in-water and sediment survey, and to extend the coverage. A total of 151 sediment samples and 220 water samples were collected.

Most of the sediments collected were fine sand with small pebbles and small amounts of organic matter. Two areas were characterized by sediments with high iron content and

pebbles with iron nodules, namely, the southwest portion of the survey area, where the highest concentration of anomalous radon readings is located, and the northeast portion of the survey area, where a few moderately anomalous readings were collected during the February 2013 radon survey. Iron enrichment in the northeast portion of the survey area is much less prominent than in the southwest portion of the grid.

A clear ENE-WSW trend in the radon-in-water results is coincident with the strong VTEM conductor and with the Triple R deposit. The trend also appears in the radon-in-sediment results to a lesser degree.

During August 2013, an EIC radon detection survey consisting of 434 sample locations was completed by RadonEx. A radiometric gamma survey was performed concurrently with the radon survey. Samples were located at 10 m intervals. Survey lines were from 100 m to 450 m in length and spaced from 10 m to 40 m.

The survey area extended approximately 700 m westward from discovery diamond drill hole PLS12-022 on the west shore of Patterson Lake, and was conducted to locate any additional mineralization down-ice and westward of the known mineralized zone.

Results suggested generally moderate variations in radon flux measurements across the survey area. Measurements appeared to increase towards the north end of the two north-reaching extension lines

2014 RADON SURVEYS

From January to March 2014, RadonEx conducted additional EIC radon-in-water and radon-in-sediment surveying on the Property (Charlton, Owen, and Charlton, 2014). The surveys covered four separate areas: three on Patterson Lake and one on nearby Forrest Lake. In total, the surveys consisted of 2,610 radon-in-water sample stations and 266 radon-in-sediment sample stations. Station spacing was generally 20 m and line spacing was generally 60 m, locally 30 m. The survey was intended to locate radon anomalous zones and trends along previously located geophysical conductor corridors interpreted from TDEM and VTEM surveys.

At Area A, covering the area of the mineralized zone and the primary conductive corridor, a series of discontinuous radon trends is evident, and eleven radon-in-water anomalies and

trends were chosen for potential drill testing. The top ten Area A radon-in-water results compare well with the R780E Zone radon-in-water results from 2013. A discordant set of radon anomalies is suggestive of east-southeast striking cross-faulting.

At Area B, in the northeastern section of Patterson Lake, two parallel radon trends are recognized, of which the north one is very strong and appears to correspond to a conductor axis. Radon trends are suggestive of north trending cross-faulting through the grid area.

The Area C radon coverage in the southwest part of Patterson Lake reveals two anomalous parallel radon trends, which partially correlate to conductors. Area C radon-in-water results compare very favourably with the 2013 R780E results. A north-trending fault is interpreted to displace and reorient the radon trends.

Area D is a large irregular grid covering northern parts of Forrest Lake. Water depths are much greater here, particularly in the D-2 area (>70 m), where the bottom is covered with a thick layer of organics. Radon signatures are masked and muted in this part of the lake and no radon targets are identified at D-2.

In the D-1 area to the northeast, where the lake is shallower, five very high radon-in-water anomalies were found, including some of the highest radon-in-water results yet recorded on the Property.

During August 2014, Remote Exploration Services (Pty) Ltd (RES) conducted a RadonX radon cup survey over the 600W Zone at PLS (RES, 2014a). In total, 580 cups were deployed in a grid with 20 m line spacing and 10 m cup spacing along line. The total area of the grid was 0.11 km^2. The survey was conducted in order to compare and confirm results from 2013 RadonEx radon cup surveying over the same grid area.

The survey results confirmed zones of anomalous and highly anomalous radon flux values (RnV) that in general are centred on or slightly to the north of the main ENE-WSW trending EM conductor that is associated with the mineralization. The orientation of this EM conductor parallels the interpreted strike of major fault structures in the area. Faults are known conduits for radon gas emanating from uraniferous mineralized bodies.

The western zone of anomalous RnV correlates with a delineated mineralized zone defined from drilling. Additionally, there is a northwest trend of slightly anomalous to anomalous RnV that intersects the north-northeast trend and could represent subordinate structures in this direction.

During October 2014, RES conducted a radon cup survey over three separate areas east of Forrest Lake, approximately 10 km southeast of the Triple R deposit (RES, 2014b). In total, 867 cups were deployed. The grids consisted of 30 m line spacing and 20 m cup spacing along each line. The total area of the three grids encompassed 0.481 km^2.

The three grids targeted high priority conductors identified by airborne VTEM surveying and/or ground TDEM surveying, namely the PLV-68A conductor (Grid S1), the PLV-63D conductor (Grid S3), and the PLV-63C conductor (Grid S4). Areas and trends of anomalous radon flux measurements were observed on each of the three grids.

A helium-hydrogen-neon soil gas survey consisting of 110 stations was conducted by Petro-Find Geochem Ltd. In October 2014. The survey provided coverage along trend to the east and over top of the R600W zone and was also designed to duplicate previous radon-in-soil measurement locations. Helium anomalies coincided with the R600W zone mineralization and with at least one prominent radon gas anomaly to the north.

AIRBORNE SURVEYS

2007 MEGATEM MAGNETIC AND ELECTROMAGNETIC SURVEY

During November 2007, prior to the execution of the PLS joint venture between Fission Energy and ESO, Fission Energy and ESO completed a fixed wing combined electromagnetic (MEGATEM) and magnetic airborne survey over their respective mineral claims: S-110954 and S-110955 (Fission Uranium) and S-110707 and S-110723 (ESO). The results of the survey were of very low resolution (Armitage, 2013).

2009 AIRBORNE MAGNETIC AND RADIOMETRIC SURVEY

In mid-October 2009, Special Projects Inc. (SPI) completed a combined fixed wing Light Detection and Ranging (LiDAR), radiometric, and high resolution airborne magnetic geophysical survey over the northern portion of the Property totalling approximately 3,342 line-

km. Flight lines were oriented at 135° and were spaced at 50 m intervals. The aeromagnetic survey successfully delineated different basement lithologies. A structural interpretation was completed which identified the traces of surface and basement faults, shear zones, and areas of structural complexity (McElroy and Jeffrey, 2010). The airborne radiometric spectrometer survey outlined a number of uraniferous hot-spots within a 3.9 km long by 1.4 km wide area, which was subsequently found to be the result of a radioactive boulder field that contained boulders composed of massive or semi-massive uranium oxide minerals. This radioactive area extended south of claim S-111375, which led to the staking of claim S-111783 in April 2010.

2012 GEOTECH MAGNETIC AND ELECTROMAGNETIC SURVEY

In mid-February 2012, Geotech Ltd. Completed a detailed, combined helicopter-borne versatile time-domain electromagnetic (VTEMplus) survey with Z and X component measurements and a horizontal magnetic gradiometer survey over the entirety of the Property. Flight lines totalling 1,711.3 line-km and oriented at 135° were flown at 200 m line spacing.

The survey was instrumental in defining conductive packages over the Property. Figure 9-1 illustrates the results of the survey.

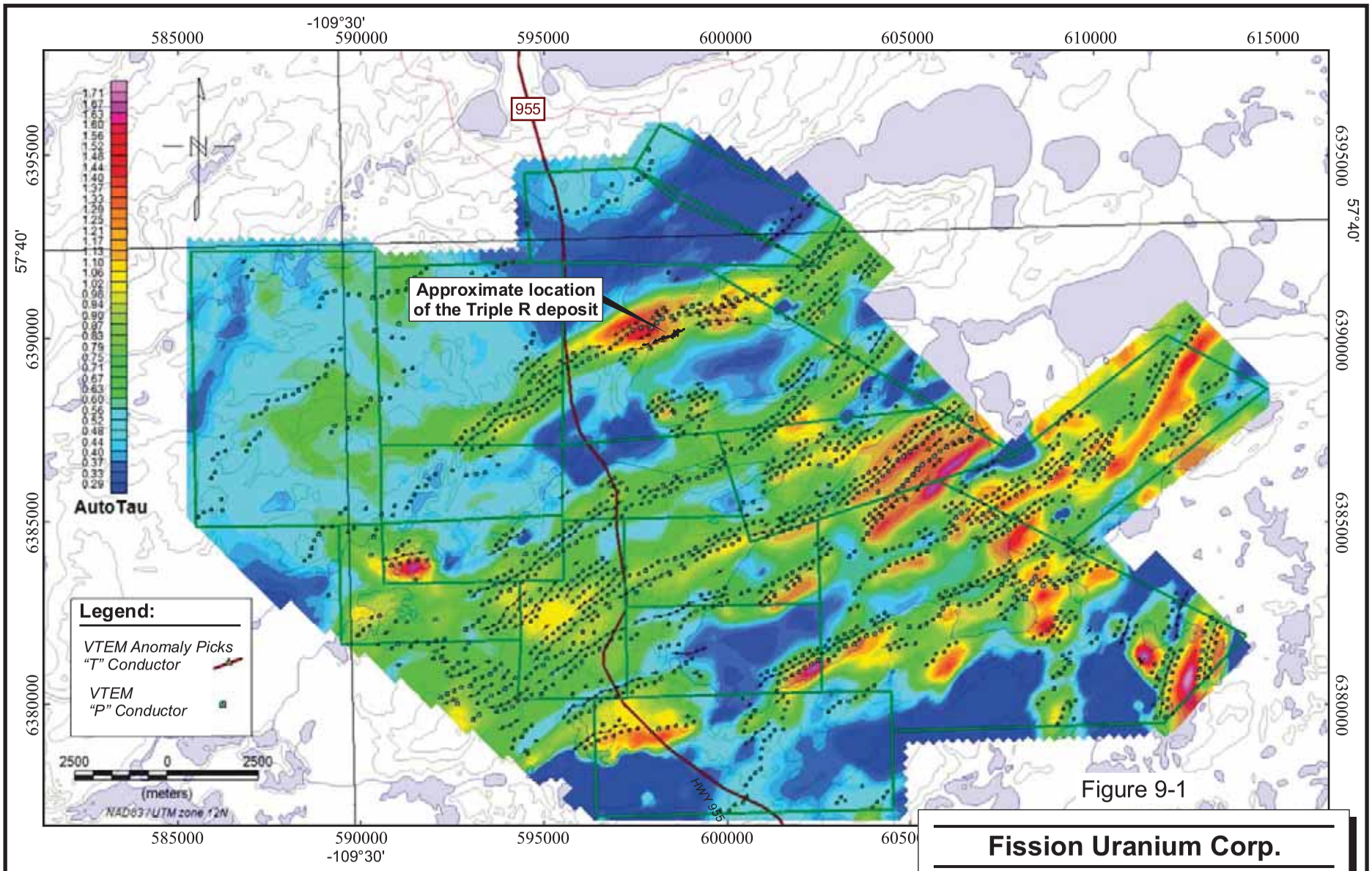


Figure 9-1

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

2012 VTEM Interpretation

November 2019

Source: Bingham, 2013-2014.

www.rpacan.com

2012 AIRBORNE RADIOMETRICS AND MAGNETIC SURVEY

From mid- to late September 2012, SPI completed a combined fixed wing LiDAR, radiometric, and magnetic survey over the southern portion of the Property totalling 5,611.5 line-km of which 5,147.3 line-km were flown within the Property boundary. The flight lines were oriented at 126° and were spaced at 50 m intervals.

The data was merged with the previous 2009 SPI high resolution survey to create a seamless magnetic grid over the Property area.

From the analysis of the field data, it was apparent that the geological setting of the Property area is complicated and that there are numerous lineaments related to contacts and structures between basement units.

The Property area has several predominant trends. The survey area is divided into three magnetic zones: a central zone (A) of relatively low magnetism characterized as predominantly northeast magnetic trends (conforming to the general domain orientation of the Athabasca Basin), a western zone (B) of relatively high magnetism with predominant northwest magnetic trends, and an eastern zone (C) of low magnetism with predominant north-northeast trends (Bingham, 2012).

Figure 9-2 illustrates the results of the merged, processed magnetic data and the three magnetic zones as interpreted by Bingham (2012).

In April 2014, SPI was commissioned to survey two blocks over the Triple R deposit and over part of the Forrest Lake conductor trend. The blocks were flown with orthogonal line directions and 50 m line spacing. The purpose of the survey was to provide a more detailed magnetic grid for better definition of structures, lithology, and magnetite depletion. Total survey coverage was 2,136 line-km.

During October 2014, Eagle Mapping Ltd. Was contracted to obtain high resolution airborne LiDAR survey data from a 154 km^2 area encompassing the known mineralization.

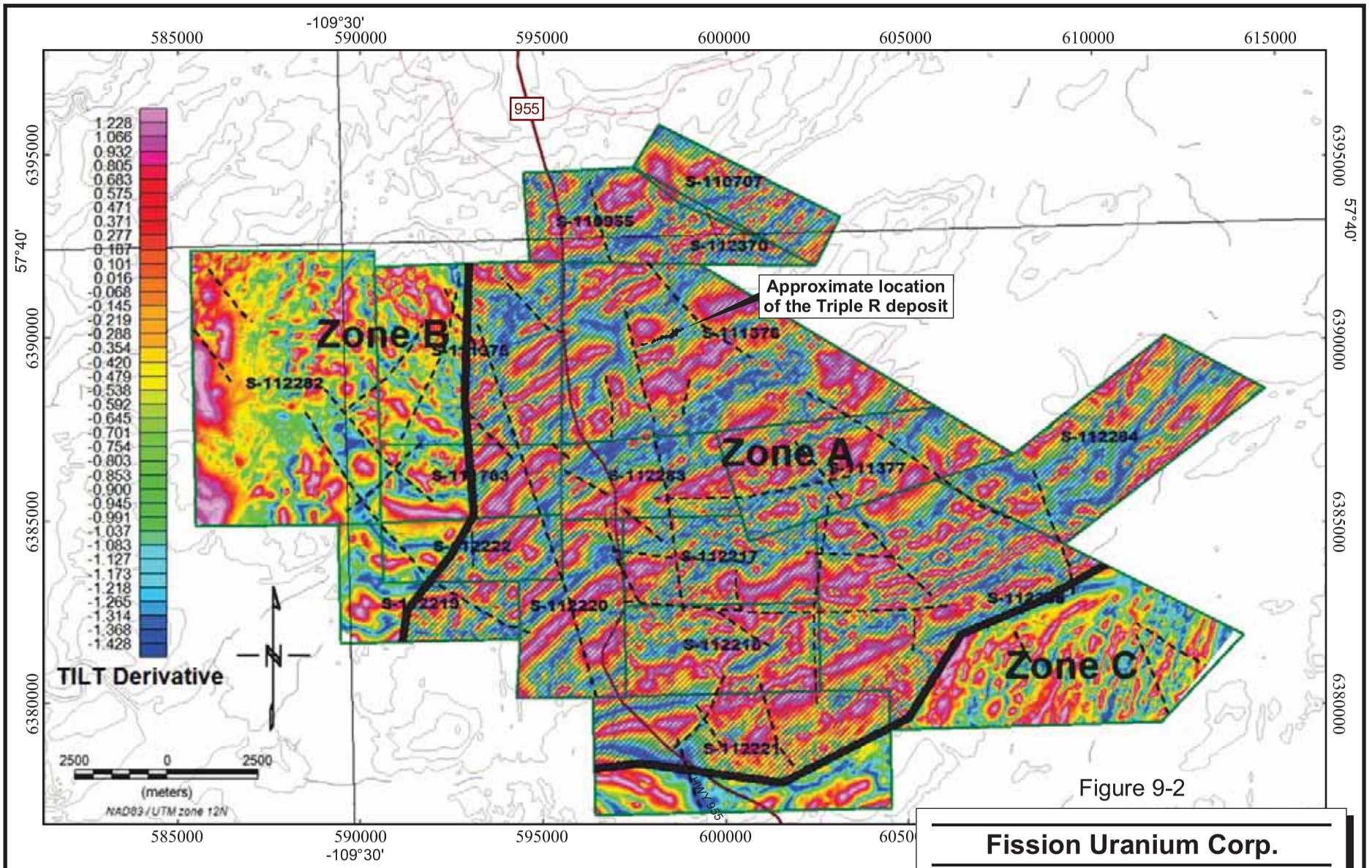


Figure 9-2

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Interpreted Major Structures and Tilt Derivative Magnetics

November 2019

Source: Bingham, 2012.

www.rpacan.com

TRENCHING AND BOULDER SURVEYS

Several trenching and boulder surveys have been carried out on the Property since 2011. Results are compiled in Figure 9-3.

JUNE 2011 BOULDER PROSPECTING

In June 2011, 89 radioactive hotspots from the 2009 airborne radiometric survey were investigated on the ground. The radioactive hotspots were spread out over an area of approximately 3.9 km long by up to 1.4 km wide that trended north-northeast to south-southwest.

Eight soil samples were also taken (PS11-01 to PS11-08), with only one of these samples having off-scale radioactivity.

Based on this small sample set, the strong pathfinder elements for the high grade uranium oxide include Au, B, Co, Cr, Cu, Li, Mo, Pb, Sb, Sr, Th, W, Zr, and most rare earth elements (REE). Nickel was not found to be a strong pathfinder element (Ainsworth, 2011b).

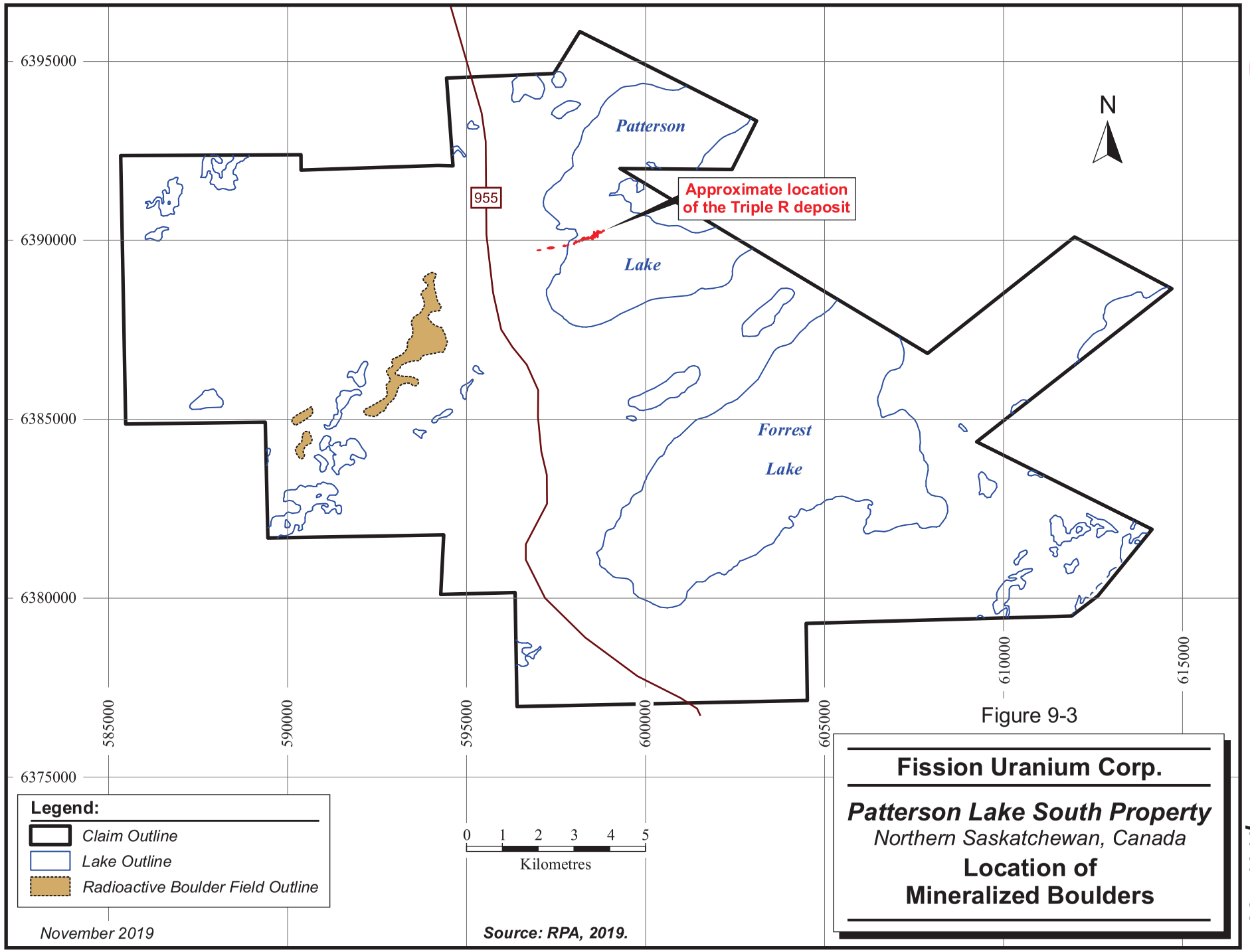
OCTOBER 2011 TRENCHING AND BOULDER PROSPECTING

From mid- to late October 2011, a program consisting of trenching and boulder prospecting was completed on mineral claims S-111375, S-111376, and S-111783.

A total of 18 trenches were excavated to assess the uraniferous boulder field that had been discovered in June 2011. The uraniferous boulders lie between two major terminal moraines of the Cree Lake Moraine. The trenches were located on three lines traversing the terrain in the up-ice direction. These trenches covered the region from the westernmost moraine to the northeast where surficial material bearing uraniferous boulders is overlain by non-radioactive overburden. The trenches were located on the ground using a handheld Garmin GPS unit.

A total of 25 soil samples and 21 boulder samples were recovered from the trenches.

The magnetic susceptibility of the materials was measured in trenches using an Exploranium KT-9 Kappameter. In general, the magnetic susceptibility of the surficial materials is much lower, less than 0.5 x 10-3 SI units, than in rock.


6395000
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Patterson
Lake
Forrest
Lake
955
Approximate location
of the Triple R deposit
N
Legend:
Claim Outline
Lake Outline
Radioactive Boulder Field Outline
0 1 2 3 4 5
Kilometres
November 2019
Source: RPA, 2019.
Fission Uranium Corp.
Patterson Lake South Property
Northern Saskatchewan, Canada
Location of
Mineralized Boulders
RPA
www.rpacan.com

Figure 9-3

An Exploranium GR-110 scintillometer was used to measure radioactivity. If a strongly radioactive area was found near the profile, the profile readings were located away from that area or otherwise recorded in the notes. In general, the radioactivity reflected the stratigraphy more strongly than the magnetic susceptibility, however, this may be a result of the values occurring over a wider range.

A total of 25 soil samples were recovered from trenches PT11-01 to PT11-16. Maximum radiometric values of the in-situ soil samples ranged from 80 cps to 2,418 cps. Uranium-in-soil values ranged from below detection limits (less than 2 ppm U) to 336 ppm. All samples identified as non-radioactive assayed below detection limits, and all soils identified as radioactive assayed above detection limits, indicating a correlation between radioactivity and uranium values.

Eight boulders were found in trench PT11-08, three were found in trench PT11-06, two were found in each of trenches PT11-03, PT11-05, PT11-10, and PT11-11, and one was found in each of trenches PT11-12 and PT11-14. A total of 21 uraniferous boulders were recovered from the trenches (Ainsworth and Thomas, 2012).

In mid- to late October 2011, the boulder survey consisted of prospecting with an Exploranium GR-110 handheld scintillometer while trenches were being excavated or backfilled, and while traversing between trenches. The survey resulted in the discovery of many uraniferous boulders. Where radiometric readings were elevated, hand-dug test pits were excavated until a uranium mineralized boulder was found or no obvious radioactive source was located.

Forty-nine of the boulder samples (PB11-67 to PB11-115) were recovered within claims S-111375 and S-111783. All 49 uranium oxide mineralized boulders were found within the limits of the June 2011 boulder field over an area of approximately 4.9 km long by up to 0.9 km wide. These were composed of massive or semi-massive uranium oxide minerals or were basement rocks that contained blebs and/or finely disseminated uranium oxide minerals. The boulder samples ranged from gravel sized up to 25 cm x 30 cm x 40 cm. Radioactivity of these boulders ranged from 701 cps to greater than 9,999 cps (off-scale), and assays ranged from 0.07% U_3O_8 to 31.4% U_3O_8 (Ainsworth and Thomas, 2012).

OCTOBER 2012 BOULDER PROSPECTING

From early to mid-October 2012, radioactive hotspots in two separate areas identified by the September 2012 SPI airborne survey were investigated on the ground.

Boulder surveying in the Patterson Lake area recovered 40 radioactive boulders of which 17 had off-scale radioactivity (greater than 9,999 cps). Thirty-six of these 40 boulder samples were composed of massive or semi-massive uranium oxide minerals or were basement rocks that contained visible blebs and/or finely disseminated uranium oxide minerals. The boulder samples ranged from gravel sized to 30 cm in the longest dimension and assayed from 9 ppm U to 40.0% U_3O_8. These additional boulder samples increased the size of the Patterson Lake boulder field to approximately 7.35 km long by up to 1.0 km wide.

The strong pathfinder elements for the high grade uranium oxide are consistent with previous surveys, namely: Au, B, Co, Cr, Cu, Li, Mo, Pb, Sb, Sr, Th, W, Zr, and most REE.

Boulder prospecting in the Forest Lake area recovered eight radioactive boulders with radioactivity ranging from 139 cps to 1,060 cps. No visible uranium mineralization was observed in any of the basement boulders that comprised lithologies of quartz-feldspar gneiss, schist, and quartz-feldspar-mafic granite and pegmatite. These boulders ranged from cobble sized to over 80 cm in the longest dimension. The boulders assayed from 6 ppm U to 84 ppm U (Ainsworth, 2012b).

GROUND GEOPHYSICAL SURVEYS

2008 SELF-POTENTIAL SURVEY

In early October 2008, a preliminary self-potential (SP) survey consisting of three lines totalling 8.7 km was completed. SP stations were spaced at 20 m intervals along the lines. Negative values represent most SP anomalies. Lithologic conditions targeted in this survey were clay altered zones, which were conductive and exhibited a negative SP anomaly.

The SP survey values ranged from -339 mV to +124 mV. Four anomalies were delineated (Ainsworth and Beckett, 2008).

2011 AND 2012 DC RESISTIVITY, HLEM AND SQUID-EM SURVEYS

Geophysics carried out during November and December 2011 and February through April 2012 consisted of DC Resistivity, MaxMin HLEM, and very Small Moving Loop SQUID-EM (SQUID-EM) surveys. The ground geophysics was carried out on the PLS Main Grid area as a follow-up over a radioactive uraniferous boulder field located five kilometres to the southwest that had been discovered in June 2011. Survey totals were 30.58 km of MaxMin HLEM, 83.60 km of resistivity, and 14.40 km of SQUID-EM.

The DC Resistivity was successful in defining a number of potential targets based on conductivity, changes in the width of conductive packages, and more subtle features indicating possible cross structures. The Resistivity and VTEM were initially used for drill targeting with a limited amount of ground SQUID-EM used to follow up some VTEM targets (Bingham, 2012).

2012 AND 2013 RESISTIVITY AND SQUID-EM SURVEYS

Geophysics carried out during 2012 and 2013 consisted of DC Resistivity, SQUID-EM surveys on the PLS West Grid area, and SQUID-EM surveys and Small Moving Loop Transient EM survey coverage on the PLS Main Grid area. Survey totals were 24.6 line-km of resistivity and 30.9 line km of EM surveys.

The extended resistivity data of both the PLS Main Grid and PLS West Grid appeared to be more effective in mapping the expected conductive Cretaceous sediments in this area.

Three conductors were outlined with the ground SQUID-EM survey on the PLS West Grid. The south conductor is the most prospective due to strike length, conductivity, and an association with an enhanced basement resistivity low in the vicinity of the conductor on lines 2400E and 2600E. Line 2400E shows a marked increase in amplitude and conductivity. The west end of the central conductor may have a structural association. The north conductor is of low priority mostly due to its apparent shallow dip.

On the PLS Main Grid, the SQUID-EM surveys infilled and located the south (mineralized), central, and north conductors along the main conductor trends. The amplitude of the south (mineralized) “B” conductor is very weak and flat lying on lines 7200E and 7400E. The south (mineralized) “B” conductor is interpreted as much deeper and weaker on the east extent (Lines 7000, 7200, and 7400) (Bingham, 2013).

2013 AND 2014 RESISTIVITY AND SQUID-EM SURVEYS

Geophysics carried out during late 2013 and early 2014 consisted of DC Resistivity and very Small Moving Loop SQUID-EM surveys conducted by Discovery Int'l Geophysics Inc. (Discovery). During the periods July to August 2013 and September to October 2013, pole-dipole resistivity surveys were completed over the Verm and Far East Grids. During December 2013, pole-dipole resistivity surveys were carried out over the Area B and Forrest Lake grids. During December 2013 to February 2014, Discovery carried out HT SQUID Small Moving Loop TEM surveys over the Area B, Far East, Forrest Lake, and Verm grids. A total of 93.9 km of pole-dipole DC Resistivity and 43.7 km of Small Moving Loop EM surveys were conducted.

The 2013-2014 geophysical surveys were successful in defining priority ground targets based on a combination of resistivity and EM surveys over priority areas based on previous VTEM surveys. Follow-up drilling was conducted on the identified targets in 2015 but no significant mineralization was encountered.

2014 AND 2015 LAKE BOTTOM SPECTROMETER SURVEY

A proprietary lake bottom spectrometer survey system developed by SPI was operated during April-May 2014 at Area A, covering the area of known mineralization and the primary conductive corridor, and at Area B in the northeastern section of Patterson Lake. The system consisted of a 150 $in.^3$ sodium-iodide crystal with digitizing electronics for remote data acquisition and control, housed in a temperature controlled casing. The survey was carried out from lake ice utilizing snowmobile/sled and a Novatel L1-L2 Glonass GPS. A total of 1,185 measurements were collected at 20 m stations along 50 m spaced lines that were designed to run parallel to the EM conductor trend in the target areas.

Analysis of the results indicate that the system detected uranium mineralization at 585E and 1080E, and elsewhere anomalous uranium values generally coincided with RadonEx EIC radon-in-water values.

During the same timeframe as the lake bottom spectrometer survey, SPI utilized a proprietary four channel ground penetrating radar (GPR) system towed behind a tracked vehicle to complete approximately 180,000 water depth measurements in the central and northeast areas of Patterson Lake. The water depths matched up well with depths from diamond drilling and earlier radon-in-water surveys.

10 DRILLING

Diamond drilling on the Rook I Property is the principal method of exploration and delineation of uranium mineralization after initial targeting using geophysical surveys. Drilling can generally be conducted year-round on the Property.

As of the effective date of this report, Fission Uranium and its predecessor companies have completed 198,946 m of drilling in 647 holes on the PLS Property of which 11 holes were drilled prior to 2011 and are considered historical with minimal information available and were excluded from the resource estimate. Table 10-1 lists the holes by drilling program. Figure 10-1 illustrates the collar locations of the drill holes. Sample acquisition, preparation, security, and analysis were essentially the same for all drill programs and are described in Section 11.

TABLE 10-1 DIAMOND DRILLING PROGRAMS
Fission Uranium Corp. – Patterson Lake South Property

Year	Drilling Program	Type	Number of Holes	Total Depth (m)
Unknown	Historic	Historical	1	200
1978	Historic	Historical	2	240
1979	Historic	Historical	6	639
1980	Historic	Historical	2	217
2011	2011W	DD	7	863
2012	2012W	DD	16	2,175
	2012S	DD	9	1,659
		Dual Rotary	12	1,548
2013	2013W	DD	46	9,942
	2013S	DD	53	15,564
2014	2014W	DD	92	34,252
	2014S	DD	82	28,329
2015	2015W	DD	88	28,297
	2015S	DD	62	22,038
2016	2016W	DD	43	12,987
	2016S	DD	34	11,121
2017	2017W	DD	57	17,605
	2017S	DD	11	3,437
2018	2018W	DD	15	4,906
	2018S	DD	9	2,928
Grand Total			**647**	**198,946**

Notes:
1. “W” refers to Winter, and “S” refers to Summer (i.e. 2018S refers to the 2018 Summer drill program)
2. “DD” refers to diamond drill.

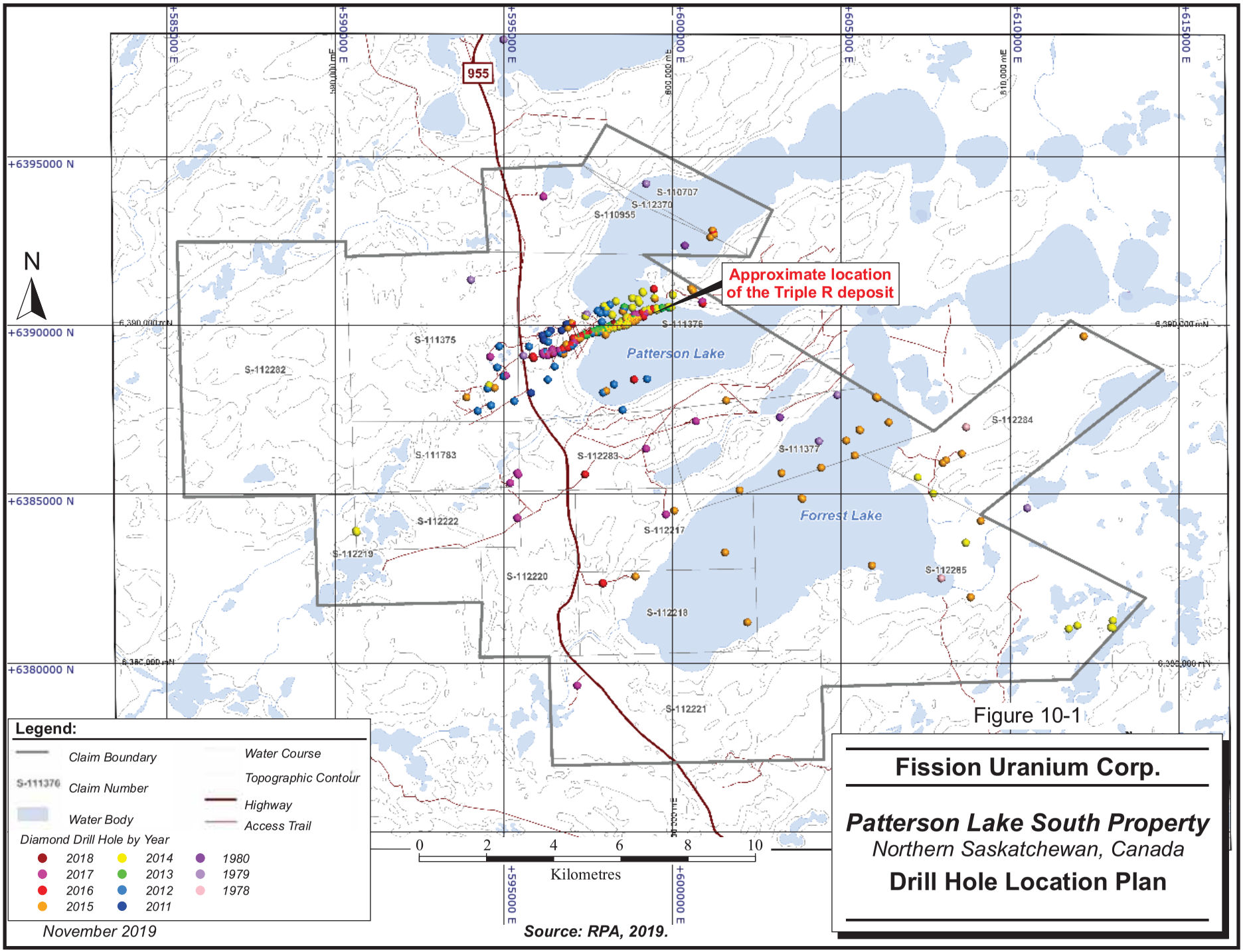


Figure 10-1

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Drill Hole Location Plan

November 2019

Source: RPA, 2019.

www.rpacan.com

DIAMOND DRILLING

From November 2011 to September 2015, 144,668 m of drilling was completed in 467 diamond drill holes on the Property. During the winter 2015 drill program, an initial Inferred Mineral Resource estimate for the Triple R Deposit was published (RPA, 2015). Following the spring 2015 drill program, RPA completed a preliminary economic assessment on the Triple R Deposit (RPA, 2015).

Since 2015, Fission Uranium has continued to conduct both delineation and step out drilling programs along strike of the Triple R deposit by completing 52,983 m of drilling in 169 holes. Drill holes were primarily designed to both infill in support of an Indicated Mineral Resource classification in the R780E high grade and R780E_MZ domain and materially expand the footprint of Inferred mineralization in the R00E and R780E areas. Step out regional drilling during this time was also successful in identifying two significant new areas of mineralization (R1515W and R1620E) and expanding mineralization at R840W. The most recent drilling program occurred during the summer of 2018 in which nine holes totalling 2,928 m were drilled. The goal of the summer 2018 program was to drill key areas of the R780E high grade zone that are presently classified as “Inferred” and upgrade them to “Indicated”. To that extent, the nine drill holes intersected width and strength of mineralization where expected and allowed for upgrading the classification in these areas.

A total of 197,651 m of drilling in 636 drill holes have been completed across the Property since 2011.

The initial drill program in 2011 was contracted to Aggressive Drilling Ltd. From Saskatoon, Saskatchewan, that used a skid-mounted Boart Longyear LF-70 drill. From February 2012 to April 2013, the drilling was contracted to Hardrock Diamond Drilling Ltd. From Penticton, British Columbia, which used Atlas Copco CS-10 and CS-1000 skid-mounted drills. From July 2013 onwards, drilling was carried out by Bryson Drilling Ltd. From Archerwill, Saskatchewan, using Zinex Mining Corp A5 diamond drills.

Unless the hole was pre-cased using an RC drill, the usual procedure was to drill through the overburden with HQ (60.3 mm diameter) equipment and sink HW (117.65 mm) casing until the rods became stuck or bedrock was reached. If the HQ rods became stuck, the hole was

deepened using NQ (47.6 mm diameter) equipment until competent bedrock was reached at which time NW (91.95 mm) casing was reamed into bedrock.

DUAL ROTARY DRILLING

From October to November 2012, twelve 4.5 in. (11.43 cm) diameter dual rotary drill holes totalling 1,548 m were completed by J.R. Drilling Ltd. Of Cranbrook, British Columbia, using a Foremost DR-12 drill. These drill holes were not used in the resource evaluation but designed to penetrate the glacial sediments overlying bedrock so that the specific (and more radioactive) till sheet hosting uranium mineralized boulders could be traced back to bedrock source by gamma probing the overburden. Additionally, some rotary drill hole collars were planned to also test bedrock VTEM and TDEM conductors by drilling approximately 20 m into solid bedrock. The overburden and basement material were collected on site in sampling buckets at one metre intervals. Each bucket was measured using an Exploranium GR-110G total count gamma-ray scintillometer, and a one to three kilogram sub-sample was removed for logging using a scoop from a five-gallon bucket.

Each drill hole was logged using a Mount Sopris 2PGA-1000 gamma probe. Additionally, holes PLSDR12-001 and PLS12-009 through PLSDR12-012 were surveyed using a custom downhole spectrometer probe, built, and operated by SPI. A Trimble GeoXH handheld GPS instrument and a Trimble 5800 base station for differential corrections were utilized to locate all dual rotary drill hole locations.

According to Ainsworth (2012b), accurate and precise sample collection for geochemical analysis was challenging due to several factors. Sample volume returned through the cyclone was at times overwhelming and was further complicated by the large influx of groundwater. The drilling itself introduced sample bias especially in terms of size fraction and relative abundance. It was found that fine materials were prone to be either washed or blown away. Since the maximum size of returned samples was approximately two centimetres to three centimetres, it can be presumed that material larger than small pebbles was either pushed out of the way or crushed by the advancing drill bit and casing.

The current working depth of each rotary hole was determined by marking the casing every metre. The inaccuracies of this method were confirmed by comparing the determined final

depth to the gamma probe wire line measured final depth; discrepancies of several metres were common.

Caving of material around the casing and subsequent transport to surface introduced sample contamination, especially in thick sand units beneath the water table.

REVERSE CIRCULATION DRILLING

In January 2013, the process of pre-drilling the casings of most holes was initiated. Northspan Explorations Ltd. (Northspan) was contracted to set the casing to a targeted depth of one metre to two metres above bedrock. Northspan used either a Hornet XL or Attacus RC drill to sink the HW (117.65 mm) casing. No samples were recovered during the RC drilling. A Trimble GeoXH handheld GPS instrument and Trimble 5800 base station for differential corrections were utilized to locate all drill collar locations during the winter 2013 program. From the summer 2013 drill program onwards, all holes were located using a Trimble R10 GNSS real time kinematic (RTK) system.

DRILL HOLE SURVEYING

The collars of the 2011 and winter 2012 program holes were located using a handheld Garmin GPSMAP 60CSx instrument. During the winter 2013 program, drilled holes were located using a Trimble GeoXH handheld GPS instrument and a Trimble 5800 base station for differential correction. From the summer 2013 drill program onwards, all holes were located using a Trimble R10 GNSS RTK system. All drill hole positions from the 2012 fall program onwards were surveyed again upon completion of the hole to account for moving of the drill, due to either ground conditions or drilling difficulty. All roads and traverses travelled were located with a handheld Garmin GPSMAP 60CSx or Trimble instrument noted above.

DOWNHOLE ORIENTATION SURVEYING

Until the summer of 2014, all holes drilled from the lake were oriented vertically. Holes drilled during the 2011 and winter 2012 drilling programs were tested for dip deviation with acid tests. The fall 2012 drilling program holes were either acid tested or surveyed with a Reflex EZ-Shot instrument. Upon completion, all holes drilled in 2013 were surveyed using an Icefields gyro

survey tool. The Icefields gyro was replaced in 2014 by a Stockholm Precision Tools north seeking gyro. For the winter 2015 drill program, an Icefields gyro shot instrument was used to survey all drill holes. From the summer 2013 drill program onwards, drill holes were also surveyed while drilling was underway using a Reflex EZ-Shot at 50 m intervals.

DRILL CORE HANDLING AND LOGGING PROCEDURES

All holes were systematically probed within the rods using a Mount Sopris 500 m (4MXA-1000) or 1,000 m (4MXC-1000) winch, Matrix logging console, and either a 2PGA-1000 or 2GHF-1000 total gamma count probe upon completion of the hole.

Core recovery is generally very good, allowing for representative samples to be taken and accurate analyses to be performed.

The drill core was placed sequentially in wooden core boxes at the drill by the drillers. Twice daily, the core boxes were transported by Fission Uranium personnel to the core logging and sampling facility where depth markers were checked, and the core was carefully reconstructed. The core was logged geotechnically on a run by run basis including the number of naturally occurring fractures, core recovery, rock quality designation (RQD), and range of radiometric counts per second. The core was scanned using a handheld Exploranium GR-110G total count gamma-ray scintillometer until the winter 2014 program, after which Radiation Solutions RS-121 scintillometers were used. During the 2015 winter program and onwards clay mineralogy was identified in the field using an ASD Inc. TerraSpec Halo near infrared mineral analyzer.

The core was descriptively logged utilizing a Panasonic Tough Book laptop computer by a Fission Uranium geologist paying particular attention to major and minor lithologies, alteration, structure, and mineralization. Logging and sampling information was entered into a spreadsheet based template which was integrated into the Project digital database.

All drill core was photographed wet with a digital camera, before splitting.

Fission Uranium's sampling protocol calls for representative samples to be taken of both sandstone and basement lithologies. At least one representative sample of sandstone (Devonian or Athabasca) was taken when intersected. In thicker zones of sandstone (more

than 5 m), representative samples were taken at 2.5 m intervals. Representative samples of basement lithologies consisting of 50 cm of split core (halved) were taken every 10 m within the basement, starting immediately in bedrock.

In addition to the representative samples, point samples were taken in both sandstone and basement lithologies.

All sandstone and basement intervals with handheld scintillometer readings greater than 300 cps, or containing significant faults and associated alteration, were continuously sampled with a series of 50 cm split core samples. In areas of strong to intense alteration, evenly spaced 50 cm split core samples were taken from the start of the alteration. The spacing of the samples varied with the width of the alteration zone as follows: one metre spacing for alteration zones less than or equal to five metres long, two metre spacing for alteration zones between five metres and 30 m long, and five metre spacing for alteration zones more than 30 m long.

Samples for density measurements were taken in both sandstone and basement lithologies. Because of the limited thickness of sandstone intersected on the Property, Sarioglu (2014) recommended that a least one sandstone sample be taken for density measurement per hole, where possible. Density samples in mineralized basement or sandstone giving handheld scintillometer readings greater than 300 cps were taken at 2.5 m intervals. No density samples were taken in barren sandstone from the 2014 summer drill program onwards. Basement samples for density outside the mineralized zone were taken at 20 m intervals until the winter 2014 drill program, after which no barren basement density samples were taken.

Core marked for sampling was split in half using a manual core splitter. Half the core was returned to the core box and the other half was placed in plastic sample bags and secured with an impulse sealer.

Split core samples were tracked using three part ticket booklets. One tag was stapled into the core box at the start of the appropriate sample interval, one tag was placed into the sample bag, and the final tag was retained in the sample booklet for future reference. For each sample, the date, drill hole number, project name, and sample interval depths were noted in the sample booklet. The data were transcribed to a Microsoft Excel spreadsheet and stored on the Fission Uranium data server. Sample summary files were checked for accuracy against the original

sample booklets after the completion of each drill program. The digital sample files also contain alteration and lithology information.

Core trays were marked with aluminum tags.

The plastic sample bags were put into five-gallon sample pails and sealed and were held in a secure area until they were ready for transportation. The samples were picked up on site by Marsh Expediting and transported by road to La Ronge before transhipment to Saskatchewan Research Council (SRC) in Saskatoon. SRC operates in accordance with International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) 170:2005 (CAAN-P-4E) General Requirements of Mineral Testing and Calibration Laboratories and is also compliant with CAN-P-1579, Guidelines for Mineral Analysis Testing Laboratories.

At SRC, sandstone and basement samples were prepared in separate areas of the laboratory to minimize the potential for contamination. Sample preparation in the laboratory involved drying the samples and sorting them according to radioactivity before jaw crushing.

In RPA's opinion, the logging and sampling procedures meet or exceed industry standards and are adequate for the purpose of Mineral Resource estimation.

DRILL CORE STORAGE

The core from the first drilling programs was stored at the Big Bear Lodge on Grygar Lake, but since August 2013, all the core has been stored at a purpose-built storage facility located west of Patterson Lake.

11 SAMPLE PREPARATION, ANALYSES, AND SECURITY

SAMPLE PREPARATION AND ANALYSIS

DRILL CORE GEOCHEMICAL ANALYSIS

All geochemistry core samples were analyzed by the ICP1 package offered by SRC, which includes 62 elements determined by inductively coupled plasma optical emission spectrometry (ICP-OES). All samples were also analyzed for boron until the end of the winter 2012 drill program and uranium by fluorimetry (partial digestion). Uranium by fluorimetry was replaced at SRC in late 2012 by inductively coupled plasma mass spectrometry (ICP-MS) analysis, which was discontinued on Fission Uranium's samples after the winter 2013 drill program.

For partial digestion analysis, samples were crushed to 60% passing -2 mm and a 100 g to 200 g sub-sample was split out using a riffler. The sub-sample pulverized to 90% passing -106 µm using a standard puck and ring grinding mill. The sample was then transferred to a plastic snap top vial. An aliquot of pulp was digested in a mixture of HNO_3:HCl in a hot water bath for an hour before being diluted by 15 mL of de-ionized water. The samples were then analyzed using a Perkin Elmer ICP-OES instrument (models DV4300 or DV5300). For total digestion analysis, an aliquot of pulp was digested to dryness in a hot block digester system using a mixture of concentrated HF:HNO_3:$HCLO_4$. The residue was then dissolved in 15 mL of dilute HNO_3 and analyzed using the same instrument(s) as above.

Select samples with low concentrations of uranium (less than 100 ppm) identified by the partial and/or total ICP-OES analysis were also analyzed by fluorimetry (2012) and ICP-MS (winter 2013). After being analyzed by ICP-OES, an aliquot of digested solution was pipetted into a 90% Pt – 10% Rh dish and evaporated. A NaF/LiF pellet was placed on the dish and fused on a special propane rotary burner then cooled to room temperature. The uranium concentration of the sample was then read using a spectrofluorometer. Uranium by fluorimetry has a detection limit of 0.1 ppm (total) or 0.02 ppm (partial). In the fall of 2012 uranium analysis by fluorimetry was replaced at SRC with uranium by ICP-MS. For ICP-MS partial digestions, an aliquot of sample pulp is digested in a mixture of concentrated nitric hydrochloric acid (HNO_3:HCl) in a test tube in a hot water bath, then diluted using de-ionized water.

For boron analysis, an aliquot of pulp was fused in a mixture of NaO_2/$NaCO_3$ in a muffle oven. The fused melt was dissolved in de-ionized water and analyzed by ICP-OES.

DRILL CORE ASSAY

Drill core samples from mineralized zones were sent to SRC for uranium assay. The laboratory offers an ISO/IEC 17025:2005 accredited method for the determination of U_3O_8 in geological samples. The detection limit is 0.001% U_3O_8. Samples were crushed to 60% -2 mm and a 100 g to 200 g sub-sample was split out using a riffle splitter. The sub-sample was pulverized to 90% -106 µm using a standard puck and ring grinding mill. An aliquot of pulp was digested in a concentrated mixture of HNO_3:HCl in a hot water bath for an hour before being diluted by de-ionized water. Samples were then analyzed by a Perkin Elmer ICP-OES instrument (models DV4300 or DV5300).

In addition to uranium assaying, all samples from mineralized zones were also assayed by SRC for gold and, until mid-summer 2014, platinum group elements (Pt, Pd). Samples are prepared using the same method as described above. An aliquot of sample pulp was mixed with fire assay flux in a clay crucible and a silver inquart was added prior to fusion. The mixture was fused at 1,200°C for 90 minutes. After the mixture had fused, the slag was poured into a form which was cooled. The lead bead was recovered and chipped until only the precious metal bead remains. The bead was then parted in diluted HNO_3. The precious metals were dissolved in aqua regia and then diluted for analysis by ICP-OES and/or Atomic Absorption Spectrometry (AAS). The analysis has a detection limit of 2 ppb for all three elements. SRC participates in CANMET (CCRMP/PTP-MAL) proficiency testing for elements assayed using this method.

DRILL CORE PIMA ANALYSIS

Core chip samples for clay analysis were sent to Rekasa Rocks Inc., a private facility in Saskatoon, for analysis on a PIMA spectrometer using short wave infrared spectroscopy. Samples were air or oven dried prior to analysis in order to remove any excess moisture. Reflective spectra for the various clay minerals present in the sample were compared to the spectral results from Athabasca samples for which the clay mineral proportions have been determined in order to obtain a semi-quantitative clay estimate for each sample.

DRILL CORE PETROGRAPHIC ANALYSIS

Samples collected for petrography were sent to Vancouver Petrographics Ltd., Langley, British Columbia, for the preparation of thin sections and polished slabs. Petrographic analysis was performed in MSC's office using a Nikon Eclipse E400 microscope equipped with transmitted and reflected light. The results of that work are in two internal report prepared by Mineral Services Canada Inc for Fission Uranium: MSC12-018R-Patterson Lake and MSC14-012R_PLS rock types.

DRILL CORE BULK DENSITY ANALYSIS

Drill core samples collected for bulk density measurements were sent to SRC. Samples were first weighed as received and then submerged in de-ionized water and re-weighed. The samples were then dried until a constant weight was obtained. The sample was then coated with an impermeable layer of wax and weighed again while submersed in de-ionized water. Weights were entered into a database and the bulk density of each sample was calculated. Water temperature at the time of weighing was also recorded and used in the bulk density calculation.

Results were used to convert volumes to tonnages when estimating Mineral Resources. The method and results are described in Section 14, Mineral Resource Estimate.

QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance/quality control (QA/QC) programs provide confidence in the geochemical results and help ensure that the database is reliable to estimate Mineral Resources. Fission Uranium's program includes the following components:

1. Determination of accuracy – achieved by regular insertion of standards or certified reference materials (CRM) of known grade and composition;
2. Determination of precision – achieved by regular insertion of duplicates for each stage of the process where a sample is taken or split;
3. Checks for contamination – by insertion of blanks.

The QA/QC program used at Triple R included the insertion of CRMs, blanks, and duplicates into the sample stream per type (Table 11-1) and at the frequency summarized in Table 11-2. Prior to the winter 2012 drill program, the only QA/QC procedures implemented on samples from the PLS Property were those performed internally by SRC as discussed below.

TABLE 11-1 SUMMARY OF QA/QC SOURCE AND TYPE BY YEAR
Fission Uranium Corp. – Patterson Lake South Property

	2011 Fall	2012 Winter	2012 Fall	2013 Winter	2013 Summer	2014 Winter	2014 Summer	2015 Winter
Blanks (pulp)	N	N	N	Y	N	N	N	N
Blanks (rock)	N	N	N	N	Y	Y	Y	Y
Fission Uranium CRMs	N	N	N	Y	N	N	N	N
CANMET CRMs	N	N	N	N	Y	Y	Y	Y
Field Duplicate, Prep & Pulp Duplicates								
Partial and total (ppm) duplicates (1/4 split)	N	Y	Y	Y	Y	Y	N	N
Partial and total (ppm) duplicates (1/2 split)	N	N	N	N	N	Y	Y	Y
U_3O_8 wt.% duplicates (1/4 split)	N	N	Y	Y	Y	Y	N	N
U_3O_8 wt.% duplicates (1/2 split)	N	N	N	N	N	Y	Y	Y
SRC CRMs for U_3O_8	N	Y	Y	Y	Y	Y	Y	Y
SRC CRMs for Au	N	Y	Y	Y	N	N	N	N
SRC ICP repeats	Y	Y	Y	Y	Y	Y	Y	Y
SRC U_3O_8 wt.% repeats	N	N	Y	Y	Y	Y	Y	Y
SRC Au repeats	N	Y	Y	Y	Y	Y	Y	Y
Umpire laboratory repeat analyses	N	N	Y	Y	Y	Y	Y	Y

	2015 Summer	2016 Winter	2016 Summer	2017 Winter	2017 Summer	2018 Winter	2018 Summer
Blanks (pulp)	N	N	N	N	N	N	N
Blanks (rock)	Y	Y	Y	Y	Y	Y	Y
Fission Uranium CRMs	N	N	N	N	N	N	N
CANMET CRMs	Y	Y	Y	Y	Y	Y	Y
Field Duplicate, Prep & Pulp Duplicates							
Partial and total (ppm) duplicates (1/4 split)	N	N	N	N	N	N	N
Partial and total (ppm) duplicates (1/2 split)	Y	Y	Y	Y	Y	Y	Y
U_3O_8 wt.% duplicates (1/4 split)	N	N	N	N	N	N	N
U_3O_8 wt.% duplicates (1/2 split)	Y	Y	Y	Y	Y	Y	Y
SRC CRMs for U_3O_8	Y	Y	Y	Y	Y	Y	Y
SRC CRMs for Au	N	N	N	N	N	N	N
SRC ICP repeats	Y	Y	Y	Y	Y	Y	Y
SRC U_3O_8 wt.% repeats	Y	Y	Y	Y	Y	Y	Y
SRC Au repeats	Y	Y	Y	Y	Y	Y	Y
Umpire laboratory repeat analyses	Y	Y	Y	Y	Y	Y	Y

TABLE 11-2 SUMMARY OF QA/QC SAMPLING INSERTIONS BY YEAR
Fission Uranium Corp. – Patterson Lake South Property

	Fall 2011	Winter 2012	Fall 2012	Winter 2013	Summer 2013	Winter 2014	Summer 2014	Winter 2015
Number Drill Holes	7	16	9	46	53	92	82	88
Total No. Samples	49	530	518	4,791	9,058	26,732	17,045	15,039
Blanks	0	0	0	39	49	114	74	64
Field Duplicates	0	53	42	151	425	1,269	800	660
Coarse Reject Duplicates	0	53	42	151	425	1,269	800	660
Pulp Duplicates	0	53	42	151	425	1,269	800	660
Fission Uranium CRMs	0	0	0	119	151	273	203	201
SRC CRMs	3	48	132	672	1,503	3,953	2,462	2,099
SRC Repeats	2	30	69	545	1,749	4,094	2,174	1,865
Umpire laboratory repeats	0	0	0	0	0	0	0	300
Total QA/QC	5	237	327	1,828	4,727	12,241	7,313	6,509

	Summer 2015	Winter 2016	Summer 2016	Winter 2017	Summer 2017	Winter 2018	Summer 2018	Total
Number Drill Holes	61	37	30	47	15	34	9	626
Total No. Samples	8,142	4,862	4,486	6,764	3,139	3,916	2,912	107,983
Blanks	41	25	19	26	10	14	9	484
Field Duplicates	331	229	161	204	122	155	135	4,738
Coarse Reject Duplicates	331	229	161	204	122	155	135	4,738
Pulp Duplicates	331	229	161	204	122	155	135	4,738
Fission Uranium CRMs	132	103	63	114	48	58	47	1,510
SRC CRMs	1,035	424	511	693	446	554	455	15,110
SRC Repeats	689	732	334	482	363	789	416	14,726
Umpire laboratory repeats	100	100	100	100	100	160	120	1,180
Total QA/QC	2,990	2,71	1,510	2,027	1,333	2,040	1,409	47,081

Note:
1. Counts are for the entire PLS Property

Results from the QA/QC samples are continually tracked by MSC as certificates for each sample batch are received. If QA/QC samples of a sample batch pass within acceptable limits, the results of the sample batch are imported into the master database.

Results from the QA/QC program are documented in various reports by MSC. RPA relied on these reports in addition to independent verifications and review of QA/QC data. RPA considers the QA/QC protocols in place at Triple R to be acceptable and in line with standard industry practice and is of the opinion that the resource database is suitable to estimate Mineral Resources for the Triple R deposit.

CERTIFIED REFERENCE MATERIAL

During the winter 2016 drilling campaign, Fission Uranium started a changeover to a new medium uranium (U_3O_8) grade CRM (DH-1A) and implemented a very high grade CRM (CUP-2). The 2018 winter campaign also started to use a gold (Au) CRM (CH-4) for analysis.

CRM's were obtained from Canadian Centre for Mineral and Energy Technology (CANMET). These include UTS-3 (0.06% U_3O_8), RL-1 (0.237% U_3O_8), DH-1A (.310% U_3O_8), BL5 (8.36% U_3O_8), and CUP-2 (88.94% U_3O_8) which represent a low, medium, medium, high, and very high grade CRM for uranium, respectively. CRM CH-4 (0.88 g/t Au) is used as the gold grade CRM.

One of each CRM was inserted into the sample batch for each drill hole that intersected mineralization. CRM containers were shaken prior to use to ensure homogeneity and 15 g of material was required per sample. Samples were taken with clearly marked plastic spoons to avoid cross contamination between containers. For holes that did not intersect mineralization, only the low grade reference sample was inserted.

A total of 1,510 CRM samples were submitted by Fission Uranium for analysis at SRC. The precision and performance over time of the laboratory is displayed graphically in Figures 11-1 to 11-5 for uranium and Figure 11-6 for gold. The variation from the CRM's mean value in standard deviations (SD) defines the QA/QC variance and is used to determine acceptability of the CRM sample assay. Results within +/- two standard deviations (±2SD) are considered acceptable. Failure criteria for CRM samples are met when either (a) two consecutive samples return values outside two standard deviations from the mean, on the same side of the mean, or (b) any sample returns a value outside three standard deviations (±3SD) from the mean.

On average, less than 1.3% of 1,501 uranium samples were outside the precision limits. Seven samples from UTS-3, five samples from RL-1, four samples from BL-5, and three samples from CUP-2 returned values in excess of 3SD from the respective mean. No failures have occurred for gold assays.

RPA is of the opinion that the results of the CRM samples from 2013 to 2018 support the use of samples assayed at the SRC laboratory during this period in Mineral Resource estimation.

FIGURE 11-1 CRM CONTROL CHART – UTS-3 (U_3O_8 LOW GRADE STANDARD)

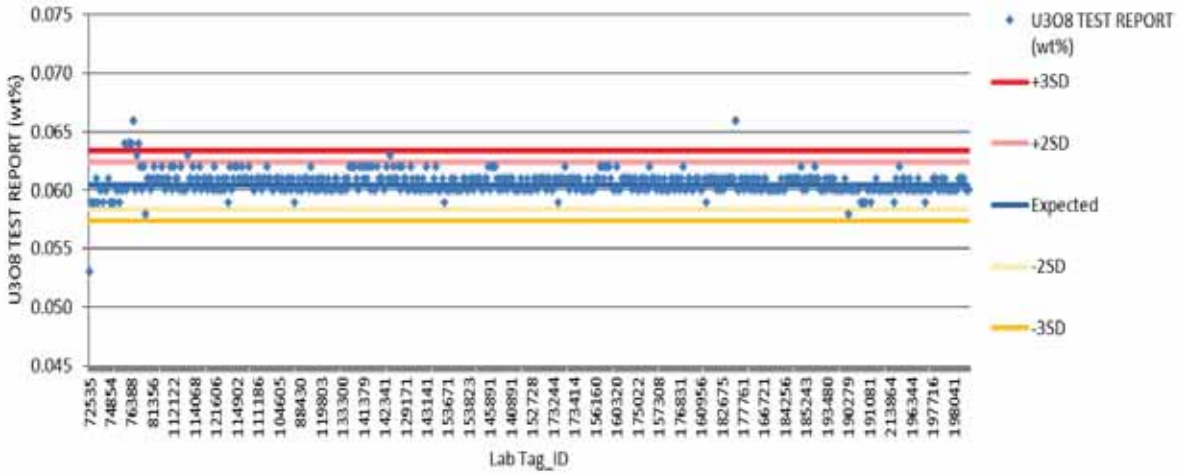


FIGURE 11-2 CRM CONTROL CHART – DH-1A (U_3O_8 MEDIUM GRADE STANDARD)

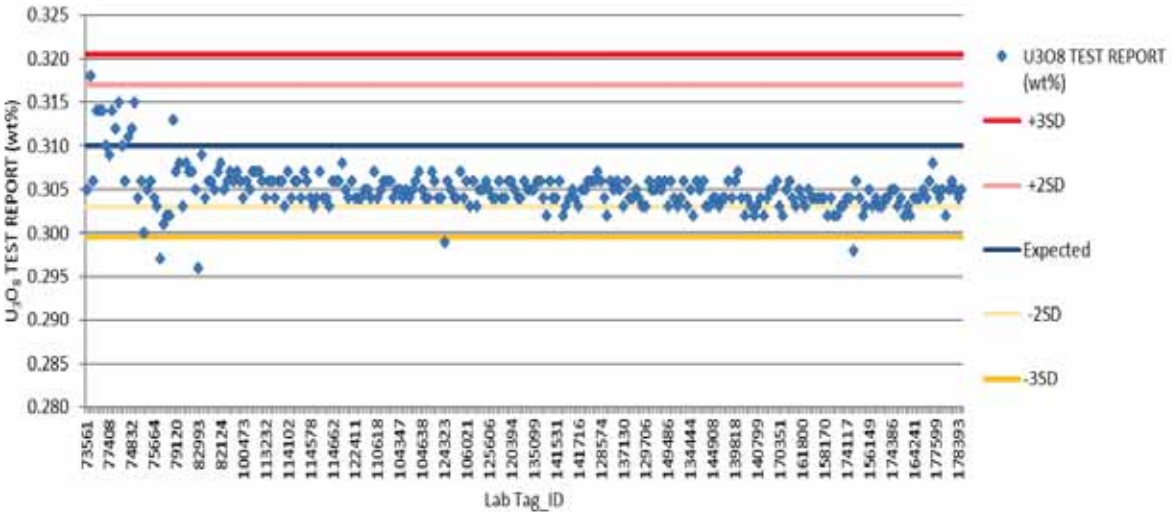


FIGURE 11-3 CRM CONTROL CHART – RL-1 (U_3O_8 MEDIUM GRADE STANDARD)

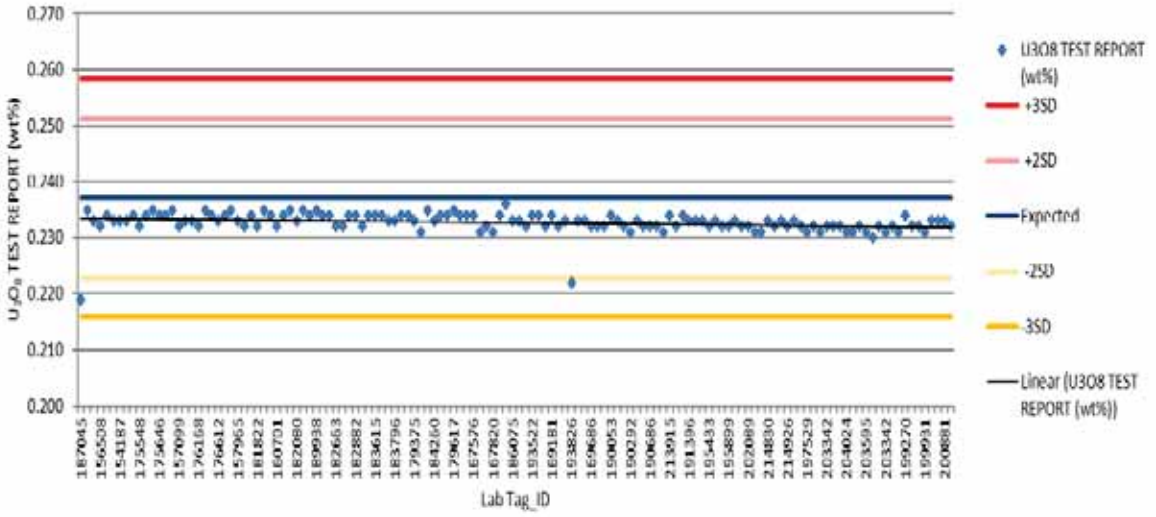


FIGURE 11-4 CRM CONTROL CHART – BL-5 (U_3O_8 HIGH GRADE STANDARD)

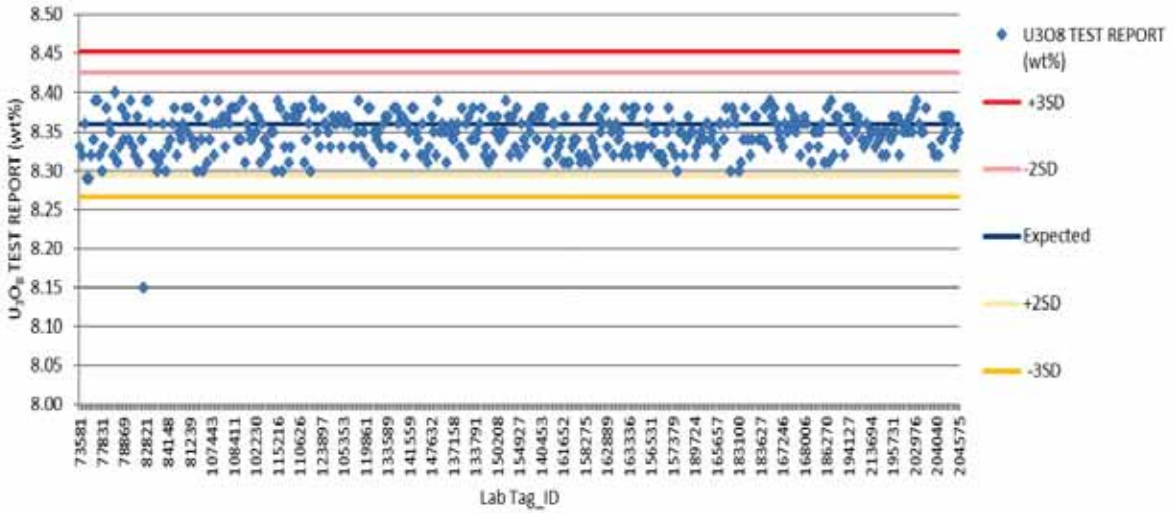


FIGURE 11-5 CRM CONTROL CHART – CUP-2 (U_3O_8 VERY HIGH GRADE STANDARD)

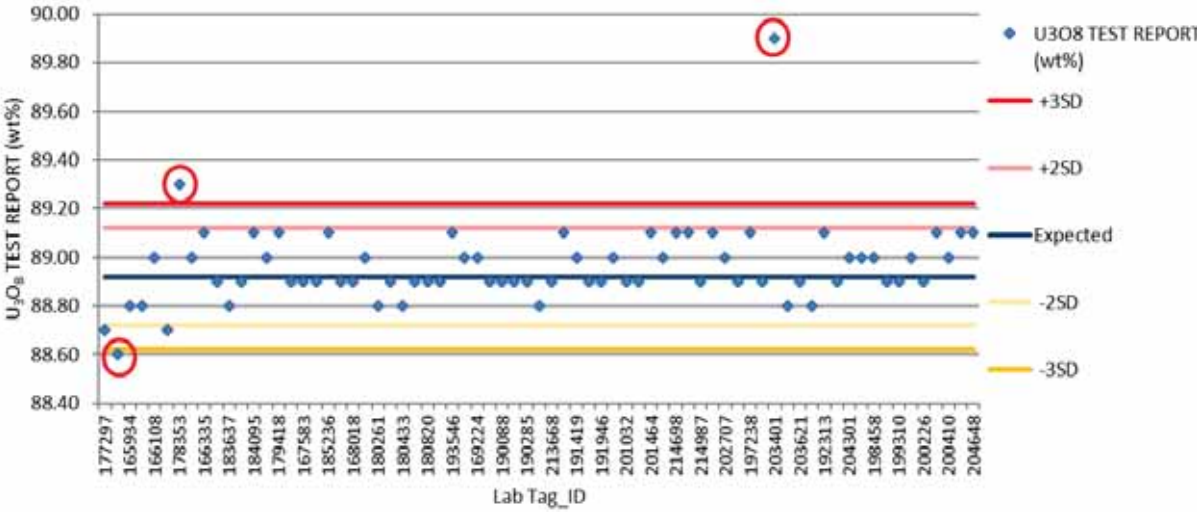
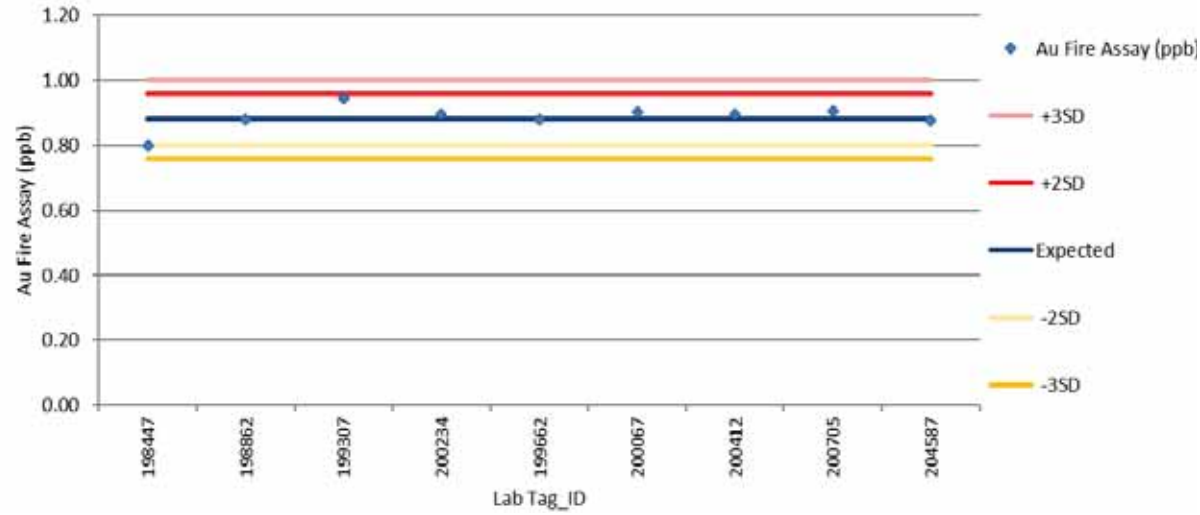


FIGURE 11-6 CRM CONTROL CHART – CH-4 (AU VERY HIGH GRADE STANDARD)



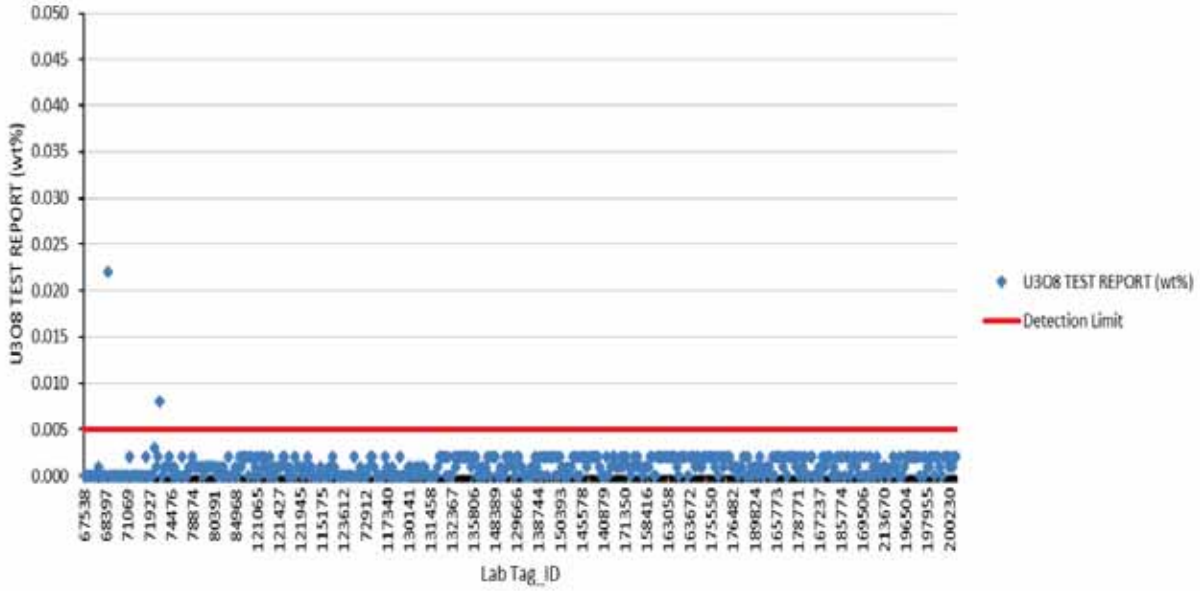
BLANKS

Blank material was sourced from the remaining half split core of previously analyzed samples that returned uranium concentrations below detection limits for the 2013 drill program and massive quartz veins intersected on the Property during the 2014 program. One blank sample

was inserted for each drill hole that intersects mineralization. Blank reference samples were not submitted for holes that did not intersect mineralization.

Details of the performance of blanks are provided in Figure 11-7 showing the results of 485 blank samples sorted by increasing sample analysis date. A failure criterion for blank samples is met when a sample returns greater than 0.005% U_3O_8, which is a concentration five times greater than the detection limit of the instrument (0.001% U_3O_8). Two sample failures occurred in 2013 with a maximum of 0.022% U_3O_8. Fission Uranium chose not to take corrective steps after reviewing the grades, failure rate, and other QA/QC results from these two batches.

FIGURE 11-7 BLANK MATERIAL CONTROL CHART



Note: Blank failure if > 5x detection limit (marked by red line)

DUPLICATE SAMPLES

Duplicate QC samples measure the precision of the sample preparation through to the analytical stage of chemical analysis. Four types of duplicate samples are submitted:

1. ***Field duplicates***: These are quarter core duplicates split in Fission Uranium's core facility. The field duplicate contains all levels of error: core splitting, sample size reduction, sub-sampling of the pulp, and the analytical error. One duplicate is to be inserted for every 20 regular samples. For mineralized drill holes, at least two field duplicate samples should be taken, one from the mineralized zone and one from unmineralized basement. In thicker mineralized zones (more than 20 m), a field duplicate should be taken every 20 samples. For each drill hole, the field duplicates should be retained and inserted into the batch at the end of the hole and assigned sample numbers following on from the last sample in the hole.

2. ***Preparation duplicates***: These are sample splits taken after the coarse crush but before pulverizing. A preparation duplicate should be inserted for each field duplicate submitted. The preparation duplicates are taken by the laboratory. To facilitate this, during sampling, an empty sample bag with a Fission Uranium sample tag is inserted into the batch after each field duplicate with instructions for the laboratory to prepare and insert a preparation duplicate of the previous sample.
3. ***Pulp duplicate***: This is a split of the pulp material that is weighed and analyzed separately. Similar to the preparation duplicate, the pulp duplicates are inserted for each field duplicate by inserting an empty bag with a Fission Uranium sample tag and instructions for the laboratory to prepare and insert a duplicate of the pulp from the previous sample.
4. ***Umpire pulp duplicates:*** *Umpire* pulp duplicates are submitted to a third-party laboratory to make an additional assessment of laboratory bias. Fission Uranium arranged the consignment of 250 preparation and 410 pulp duplicates from the 2015 summer through the 2018 summer drill programs to be analyzed at SGS Canada Inc. – Mineral Services (SGS) in Lakefield, Ontario. The sample preparation and analytical methods were similar to those at SRC.

Figures 11-8 to 11-10 plots results from the field, preparation, and pulp duplicate programs. Fission Uranium's protocols call for reject and pulp duplicates to be taken from the field duplicate; therefore, reject and pulp results are plotted against the field duplicate results in Figures 11-9 and 11-10. Results are as expected, with better repeatability for the pulps and preparation duplicates.

FIGURE 11-8 FIELD DUPLICATE CONTROL CHART (2016 TO 2018)

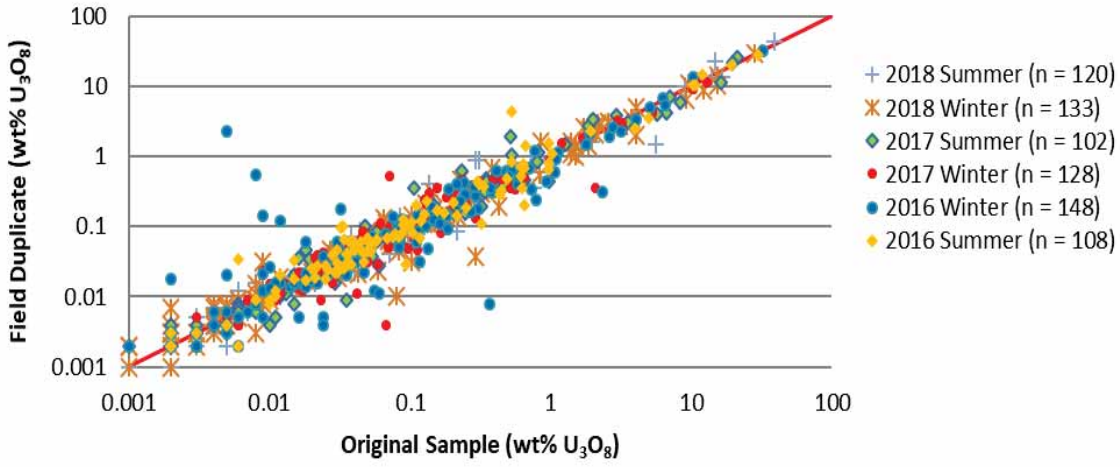


FIGURE 11-9 COARSE REJECT DUPLICATE RESULTS (2017 TO 2018)

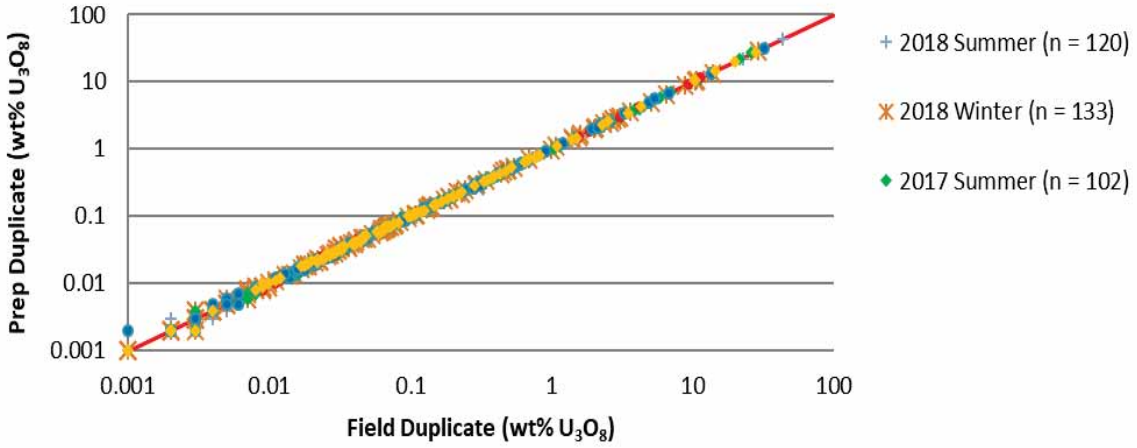
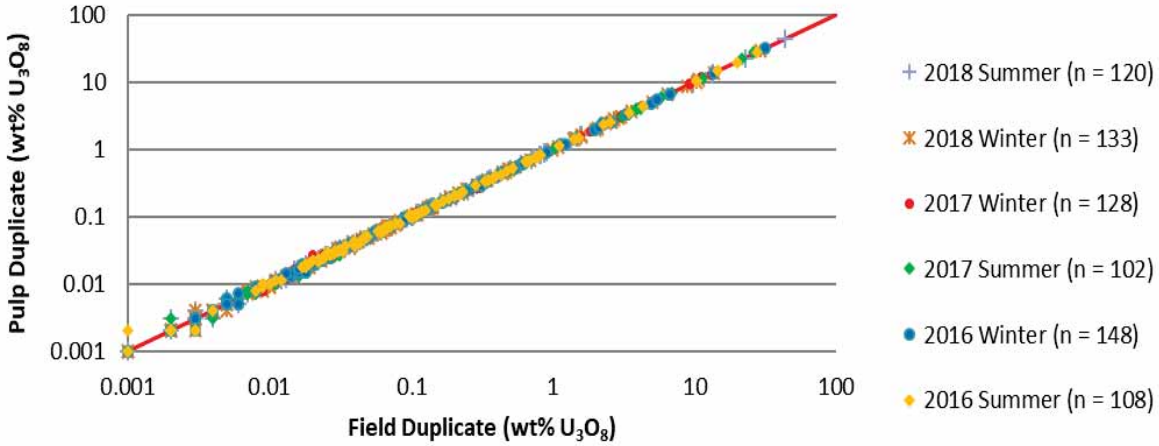


FIGURE 11-10 PULP DUPLICATE RESULTS (2016 TO 2018)



SRC INTERNAL QA/QC PROGRAM

Quality control was maintained by all instruments at SRC being calibrated with certified materials. Independent of Fission Uranium's QA/QC samples, standards were inserted into sample batches at regular intervals by SRC. Within each batch of 40 samples, one to two quality control samples were inserted. All quality control results must be within specified limits

otherwise corrective action was taken. If for any reason there was a failure in an analysis, the subgroup affected was reanalyzed.

Five U_3O_8 reference standards were used: BLA2, BL3, BL4A, BL5, and SRCUO2 which have known concentrations of 0.502% U_3O_8, 1.21% U_3O_8, 0.147% U_3O_8, 8.36% U_3O_8, and 1.58% U_3O_8, respectively. Four gold standards were also used by SRC for the Project: OXG83, OXL75, OXL78, and SJ10, which have gold concentrations of 1,002 ppb, 5,876 ppb, 5,876 ppb, and 2,643 ppb, respectively. With the exception of SRCUO2 (produced in-house at SRC), all reference materials are certified and provided by CANMET.

SRC has developed and implemented a laboratory management system which operates in accordance with ISO/IEC 17025:2005 (CAN-P-4E), General Requirements for the Competence of Mineral Testing and Calibration Laboratories. The laboratory also participates in a Certified Interlaboratory Testing Program (CCRMP/PTP-MAL) for gold using lead fusion fire assay with an AAS finish.

All processes performed at the laboratory are subject to a strict audit program, which is performed by approved trained professionals. SRC is independent of Fission Uranium.

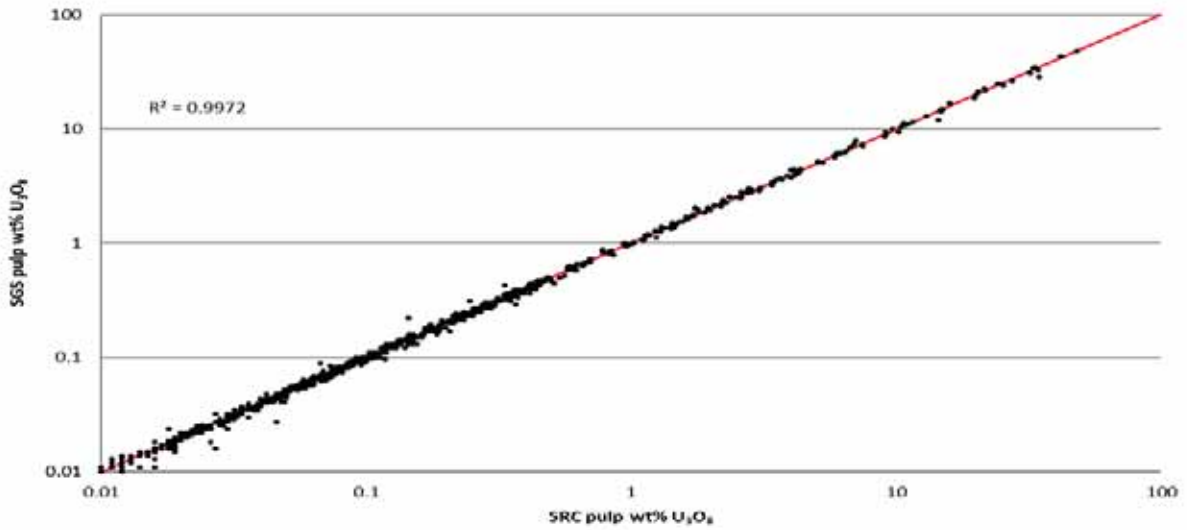
Based on the data validation and the results of the standard, blank, and duplicate analyses, RPA is of the opinion that the assay and bulk density databases are of sufficient quality for Mineral Resource estimation at the Triple R deposit.

SECONDARY LABORATORY CHECK

Since the fall of 2011, a total of 1,180 samples have been sent to SGS laboratory to measure the accuracy of the results from SRC. RPA reviewed the results and found high degrees of correlation and relative bias within acceptance limits (Figure 11-11).

The mean relative difference for all duplicate samples is 5.10%. One duplicate sample with an original result of 34.6% U_3O_8 from SRC returned 28.4% U_3O_8 from SGS. MSC suggests that this difference may be due to analytical error or slight differences in the analytical methodology combined with complications arising from the carbonaceous material during the digestion stage.

FIGURE 11-11 SRC VS. SGS DUPLICATE RESULTS



RPA is of the opinion that the secondary laboratory checks are of sufficient quality for Mineral Resource estimation at the Triple R deposit.

SAMPLE SECURITY AND CONFIDENTIALITY

Drill core was delivered directly to Fission Uranium's core handling facility located on the Property. After logging, splitting, and bagging, core samples for analysis were stored in a secured shipping container at the same facility. The samples were picked up on site by Marsh Expediting and transported by road to La Ronge before transhipment to SRC in Saskatoon. The shipping container was kept locked or under direct supervision of the Fission Uranium personnel. A sample transmittal form was prepared that identified each batch of samples.

SRC considers customer confidentially and security of utmost importance and takes appropriate steps to protect the integrity of sample processing at all stages from sample storage and handling to transmission of results. All electronic information is password protected and backed up on a daily basis. Electronic results are transmitted with additional security features. Access to SRC's premises is restricted by an electronic security system. The facilities at the main laboratory are regularly patrolled by security guards 24 hours a day.

Official results are provided as a series of Adobe PDF files. A Microsoft Excel spreadsheet file containing only the analytical results is also provided. These files are sent using a secured password protected compressed file.

In RPA's opinion, the sampling methods, chain of custody procedures, and analytical techniques are appropriate and meet acceptable industry standards, and results are appropriate to estimate Mineral Resources.

12 DATA VERIFICATION

RPA reviewed and verified the resource database including: a review of the QA/QC methods and results, verifying assay certificates against the database assay table, standard database validation tests, and three site visits including drill core review. No limitations were placed on RPA's data verification process. The review of the QA/QC program and results is presented in Section 11, Sample Preparation, Analyses and Security.

RPA considers the resource database to be reliable and appropriate to prepare a Mineral Resource estimate.

SITE VISIT AND CORE REVIEW

Mr. Mark B. Mathisen, CPG, visited the Property on August 6 to 8, 2018, during the summer drill programs in connection with the Triple R Mineral Resource estimate. During the visit, Mr. Mathisen visited barge-based drills and reviewed all core handling, logging, sampling, and storage procedures.

RPA examined core from several drill holes and compared observations with assay results and descriptive log records made by Fission Uranium geologists. As part of the review, RPA verified the occurrences of mineralization visually and by way of a handheld scintillometer. Holes reviewed included but were not limited to: PLS13-64, PLS13-75, PLS14-129, PLS14-183, and PLS14-186. There are no known outcrops of significance on the Property to visit.

DATABASE VALIDATION

RPA performed the following digital queries. No significant issues were identified.

- Header table: searched for incorrect or duplicate collar coordinates and duplicate hole IDs.
- Survey table: searched for duplicate entries, survey points past the specified maximum depth in the collar table, and abnormal dips and azimuths.
- Core recovery table: searched for core recoveries greater than 100% or less than 80%, overlapping intervals, missing collar data, negative lengths, and data points past the specified maximum depth in the collar table.

- Lithology: searched for duplicate entries, intervals past the specified maximum depth in the collar table, overlapping intervals, negative lengths, missing collar data, missing intervals, and incorrect logging codes.
- Geochemical and assay table: searched for duplicate entries, sample intervals past the specified maximum depth, negative lengths, overlapping intervals, sampling lengths exceeding tolerance levels, missing collar data, missing intervals, and duplicated sample IDs.

No significant issues were identified.

INDEPENDENT VERIFICATION OF ASSAY TABLE

For 2018, the geochemical table contained 5,733 records. RPA verified approximately 3,702 records representing 53% of the data for gold and uranium values against 52 different laboratory certificates. No discrepancies were found.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

INTRODUCTION

Fission Uranium contracted Melis Engineering Ltd. (Melis) to oversee and lead a metallurgical test work program for the Project.

SGS carried out the test work at the SGS laboratory located in Lakefield, Ontario. The test work included preparation and analysis of test composites, and tests of comminution, leaching, solid-liquid separation, SX of uranium, precipitation of uranium yellowcake products, tailings and effluent treatment, tailings physical and chemical characterization, and environmental testing of prepared tailings.

Note that previous metallurgical studies have referred to “Open Pit” samples and “Underground” samples, however, this is simply referring to what the expected head grades were in previous studies. The mineralogy of Patterson Lake is not distinguishable by mining method.

METALLURGICAL TEST WORK

Three purpose drilled holes were completed in the central part of the Triple R uranium deposit to generate core samples for the metallurgical test program.

The tests were undertaken on two composite samples:

- Underground (U/G): 0.65% U_3O_8
- Open Pit (O/P): 2.33% U_3O_8.

Twenty additional samples of localized deposit areas were also tested:

- Twelve lithographic samples
- Three annual composites
- One low grade sample
- Three lithographic gangue samples
- One overall gangue composite

Prior to the metallurgical testing, mineralogical studies were conducted by MSC. A set of forty-one individual assay reject samples were selected by MSC to provide spatial coverage of the PLS basement lithologies, uranium grades, and mineralogy as of December 2013. The forty-one samples were combined into five composite samples and a single master composite sample was made from the five composite samples. MSC performed X-ray diffraction (XRD) analyses, QEMSCAN, petrography by scanning electron microscope, electron probe micro analysis, and carbon and graphite analysis on each of the five composites as well as the master composite.

The three blended lithology composites and the overall gangue composite were tested for CEET Crusher Index (Ci), Semi Autogenous Grinding (SAG), Power Index (DPI), Bond ball mill Work Index (BWI_{BM}), and Abrasion Index (Ai).

Fifteen batch sulphuric acid leach tests were completed on composites U/G and O/P to define optimum leach conditions for the PLS mineralization. Variability leach tests were completed on the three annual composites and the low grade composite.

Liquid/solid separation thickening tests were completed on unwashed leach residue from the bulk leaches on Composites U/G and O/P. Rheology measurements were done on both unwashed and washed leach residues.

SX batch shake-out tests were completed to provide extraction isotherms for the pregnant leach solution from composites U/G and O/P.

Preliminary batch scrubbing tests were completed on loaded organic produced from the batch isotherm shake-out tests. The loaded organic was scrubbed with a pH 2.2 sulphuric acid solution followed by a water scrub.

Bulk scrubbing tests were completed on the loaded organic produced from the mini-SX circuit runs on the pregnant leach solution from the bulk leach tests on Composites U/G and O/P. The loaded organic was first scrubbed with a pH 2.2 sulphuric acid solution followed by a water scrub.

For each of the composite U/G and O/P, the pregnant strip liquor generated in the first stage of the acid strip bulk stripping of scrubbed loaded organic was submitted for preliminary molybdenum removal tests using activated carbon.

One gypsum removal test was carried out for each of the underground composite acid strip liquor and the open pit composite acid strip liquor.

Four uranium yellowcake precipitation tests were completed on the pregnant strip liquor from the molybdenum removal tests.

The neutralized tailings, one for the underground acid strip process and one for the open pit acid strip process, were used for thickening and (pressure) filtration tests, to be followed with environmental testing. Effluent treatment and tailings neutralization tests were completed for the composite U/G and the composite O/P based on using acid strip in SX.

Solid/liquid separation thickening tests were completed on unwashed leach residue from the bulk leaches on Composites O/P and U/G. Rheology measurements were done on both unwashed and washed leach residues.

TEST WORK RESULTS

MINERALOGY

The mineralogy testing indicated that the PLS mineralization is composed of varying quantities of quartz, chlorite, kaolinite, illite, and muscovite. Carbonate minerals, titanium oxides, feldspars, and pyrite are present in lesser amounts in all samples, and graphite was detected in some samples.

Uranium occurs as uraninite (UO_2)/uranophane {$Ca[(UO_2)_2(SiO_3OH)]_2.H_2O$}, with lesser coffinite [$U(SiO_4)_{1-x}(OH)_{4x}$], brannerite [$(U,Ca,Ce)(Ti,Fe)_2O_6$] and U-Pb minerals; fourmarierite ($PbU_4^{6+}O_{13}\cdot 4H_2O$), metaschoepite ($UO_3\cdot <2H_2O$), umohoite [$(UO_2)(MoO_4)\cdot 4H_2O$], and vandendriesscheite ($PbU_7O_{22}\cdot 12H_2O$). Other (U, Pb)-oxides are possibly present.

The grain size of the U-minerals (defined as the 50% passing value) varies from 33 µm in Composite 2 to 63 µm in Composite 5.

GRINDING

The samples tested were categorized as very soft to soft with respect to SAG milling hardness, and from soft to moderately soft in terms of ball milling. BWI_{BM} results for the four samples ranged from 10.3 kWh/t to 12.7 kWh/t.

LEACHING

Leach tests indicated that good uranium extraction was generally achieved within an eight hour residence time. Results from the variability leach tests were in line with the leach results of the Composite O/P.

SOLID-LIQUID SEPARATION

Solid liquid separation and rheology tests on the leach residue indicate a design Counter Current Decantation (CCD) thickener underflow density of 48% solids.

SOLVENT EXTRACTION

SX tests indicated the need for four stages for extraction, two stages for scrubbing, six stages for stripping, one stage for acid washing, and one stage for regeneration.

Strong acid stripping was found superior to ammonium sulphate stripping. Strong acid stripping was more efficient in uranium stripping, 99.6% to 100% in four stages versus 98% for ammonium sulphate stripping. Strong acid stripping transferred 5% of the molybdenum to the pregnant strip solution versus 15% for ammonium sulphate strip.

GYPSUM AND MOLYBDENUM REMOVAL

With a four hour retention time and terminal pH of 3.5, gypsum precipitation gave a washed gypsum cake assaying 0.05% to 0.075% uranium.

Run prior to gypsum precipitation, molybdenum removal by contact with activated carbon was poor, varying from 5.6% to 16.8%. Run after gypsum precipitation, molybdenum removal efficiency increased to 34% to 94%. Uranium losses in the molybdenum removal process were 0.1% to 0.2%.

String acid strip has been chosen for the Fission Uranium process. Molybdenum is not precipitated using strong acid strip and the process will not need a molybdenum removal step.

YELLOWCAKE PRECIPITATION

Based on yellowcake analyses, hydrogen peroxide precipitation yielded a 99.5% precipitation efficiency for the underground composite and 99.9% for the open pit composite. A slightly higher hydrogen peroxide dosage could have led to a more complete precipitation; the process design criteria will specify a hydrogen peroxide dosage of 0.25 kg/kg U_3O_8.

The uranium peroxide yellowcake from the strong acid strip process met all refinery specification without calcining. The ammonium diuranate yellowcake from the ammonium sulphate strip circuit is below the minimum value for uranium and contains elevated levels of sulphur, which would be mitigated in the calcining of yellowcake ahead of product packaging.

TAILINGS THICKENING

Tailings slurry thickening and rheology tests indicate a tailings thickener design underflow density of 43% solids.

EFFLUENT TREATMENT

The effluent treatment process for both open pit and underground consists of three consecutive stages of precipitation at pH 4.0, 7.0, and 10.0 respectively, with doses of lime (CaO), iron as ferric sulphate ($Fe_2(SO_4)_3$), and barium chloride ($BaCL_2$) at each stage.

The tailings neutralization process for both open pit and underground consists of three consecutive stages of neutralization at pH 4.5, 7.0, and 10.0 respectively, with doses of CaO, iron as $Fe_2(SO_4)_3$, and $BaCL_2$ in Stage 1, and lime alone in Stages 2 and 3.

The final treated effluent for both the open pit composite and the underground composite is low in deleterious elements, meeting metal mining effluent regulations.

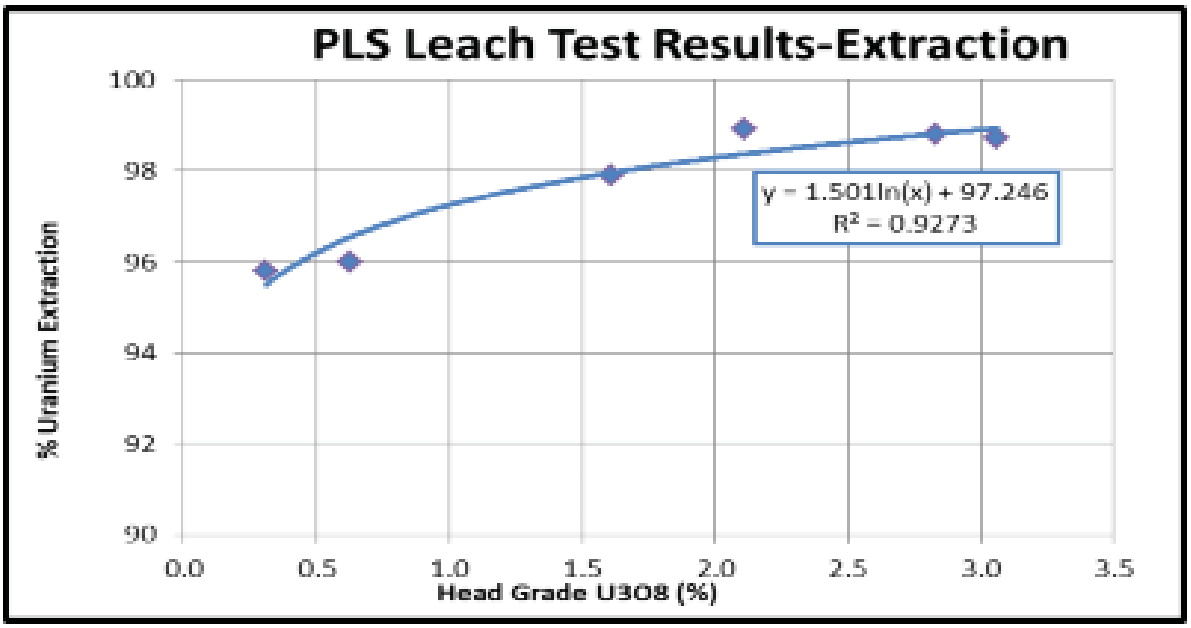
RECOVERY ESTIMATES

Based on results of the test work, and experience in Northern Saskatchewan uranium operations, overall net uranium recovery estimates were made by Melis. These estimates

were reviewed by Wood and verified as the recovery basis for the PFS. The graph of uranium recovery versus head grade is shown in Figure 13-1.

Projected net recoveries for open pit and underground head grades are 97.1% for 2.0% U_3O_8 head grade, and 94.9% for 0.5% U_3O_8 head grade.

FIGURE 13-1 LEACH TEST RESULTS VS. URANIUM HEAD GRADES



Source: Melis, 2018

METALLURGICAL VARIABILITY

In addition to the leach tests on Composites U/G and O/P, leach tests were conducted on four composite run-of-mine samples. The grade of the four composite samples ranged from 0.31% U_3O_8 to 2.84% U_3O_8. The Year 1, 2, and 3 composite samples had leaching extractions ranging from 97.9% to 98.9%. The LG composite had a leaching extraction of 95.8%.

DELETERIOUS ELEMENTS

The mineralogical test work performed by MSC did not identify the presence of any molybdenum bearing or arsenic bearing minerals. No other deleterious elements were identified in sufficient quantities to be a concern for the process.

COMMENTS

Metallurgical test work conducted is appropriate to the mineralization type and the PFS design. Wood considers the samples for the metallurgical test work to be representative of the various types of mineralization found in the deposit at the time the sampling was done.

A plot of overall uranium recovery versus uranium head grades was developed by Melis and verified by Wood to be the basis for the PFS design. There are no known deleterious elements in sufficient concentrations to affect marketing of the final yellowcake product.

14 MINERAL RESOURCE ESTIMATE

Table 14-1 summarizes Mineral Resources based on a $50/lb uranium price at a cut-off grade of 0.25% U_3O_8 and a potential underground scenario. Indicated Mineral Resources total 2.22 million tonnes at an average grade of 2.1% U_3O_8 for a total of 102.4 Mlb U_3O_8. Inferred Mineral Resources total 1.22 million tonnes at an average grade of 1.22% U_3O_8 for a total of 32.8 Mlb U_3O_8. Estimated grades are based on chemical assays only. Gold grades were also estimated and average 0.61 g/t for the Indicated Mineral Resources and 0.50 g/t for the Inferred Mineral Resources. Mineral Resources are inclusive of Mineral Reserves.

The cut-off date of the Mineral Resource database is October 23, 2018, which represents the date in which all assays were received from Fission Uranium's Summer 2018 drill program. No new drilling has been completed or estimation work carried out since the previous Mineral Resource estimate dated October 23, 2018 (RPA, 2019), however, the current estimate is based on an underground only scenario, compared to a combined open pit and underground scenario used previously, and hence a higher cut-off grade. The effective date of the Mineral Resource estimate is September 19, 2019. Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (CIM (2014) definitions) were used for Mineral Resource classification.

TABLE 14-1 MINERAL RESOURCE STATEMENT – SEPTEMBER 19, 2019
Fission Uranium Corp. – Patterson Lake South Property

Category	Tonnes	Metal Grade		Contained Metal	
	(000 t)	(% U_3O_8)	(g/t Au)	(Mlb U_3O_8)	(000 oz Au)
Indicated	2,216	2.10	0.61	102.4	43.1
Inferred	1,221	1.22	0.50	32.8	19.6

Notes:
1. CIM (2014) definitions were followed for Mineral Resources.
2. Mineral Resources are reported at a cut-off grade of 0.25% U_3O_8.
3. The cut-off grades are based on price of US$50/lb U_3O_8 and an exchange rate of C$1.00/US$0.75.
4. A minimum mining width of 1.0 m was used.
5. Mineral Resources are inclusive of Mineral Reserves.
6. Numbers may not add due to rounding.

RPA is not aware of any environmental, permitting, legal, title, taxation, socioeconomic, marketing, political, or other relevant factors that could materially affect the current Mineral Resource estimate.

RESOURCE DATABASE

Fission Uranium maintains a Property-wide drill hole database in Microsoft Access. Fission Uranium supplied RPA with a sub-set of data for the Triple R deposit only. The Triple R resource database dated October 23, 2018 includes drill hole collar locations (including dip and azimuth), assay, and lithology data from 629 drill holes totalling 196,788 m of drilling completed from 2012 through summer of 2018. The wireframe models representing the mineralized zones are intersected in 381 of 629 drill holes. A summary of records directly related to the Triple R resource model is provided in Table 14-2.

TABLE 14-2 DRILL HOLE DATABASE RECORD COUNT
Fission Uranium Corp. – Patterson Lake South Property

Table Name	Number of Records
Hole-ID	629
Survey	23,222
U_3O_8 Chemical Assays	139,387
Lithology	11,145
Density	15,981
Composites	51,432

Section 12, Data Verification, describes the verification steps made by RPA. In summary, no discrepancies were identified, and RPA is of the opinion that the Triple R drill hole database is valid and suitable to estimate Mineral Resources for the Triple R deposit.

GEOLOGICAL INTERPRETATION AND 3D SOLIDS

Basement hosted mineralization at the PLS Property occurs in a variety of styles, the most common of which appears to be fine grained disseminated and fracture filling uranium minerals strongly associated with hydrocarbon/carbonaceous matter within the graphitic pelitic gneiss. Uranium minerals, where visible, appear to be concordant with the regional foliation and dominant structural trends identified through oriented core and fence drilling (i.e., steeply dipping to the southeast).

The initial resource estimate prepared by RPA (RPA, 2015) was based only on mineralization contained within and around the R00E and R780E areas. Subsequent drilling programs conducted identified three additional zones of mineralization. Mineralization is now shown to occur at five locations on the PLS Property: 1) R780E, 2) R00E, 3) R1515W, 4) R840W, and

5) R1620E. The R780E zone hosts higher grade, thicker, and more continuous mineralization compared to other areas as defined by current drilling.

Geological interpretations supporting the estimate were generated by RPA and reviewed by Triple R personnel. Wireframe models of mineralized zones were used to constrain the block model grade interpolation process. RPA interpreted and constructed low grade wireframe models using a nominal cut-off grade of 0.05% U_3O_8 and a minimum core length of one metre. RPA considers the selection of 0.05% U_3O_8 to be appropriate for construction of mineralized wireframe outlines, as this value reflects the lowest cut-off grade that is expected to be applied for reporting of the Mineral Resources in an underground operating scenario and is consistent with other known deposits in the Athabasca Basin. Sample intervals with assay results less than the nominated cut-off grade were included within the mineralized wireframes if the core length was less than two metres or allowed for modelling of grade continuity. Wireframes of the High Grade (HG) domain were created using a grade intercept limit equal to or greater than one metre with a minimum grade of 5% U_3O_8, although lower grades were incorporated in places to maintain continuity and to meet a minimum thickness of one metre.

RPA built the wireframe models using 3D polylines on east looking vertical sections spaced 15 m apart. Infill polylines were added to accommodate for irregular geometries. Polylines were “snapped” to assay intervals along the drill hole traces such that the sectional interpretations “wobbled” in 3D space. Polylines were joined together in 3D using tie lines and the continuity was checked using a longitudinal section and level plans. Extension distance for the mineralized wireframes was half-way to the next hole, or approximately 25 m vertically and horizontally past the last drill intercept.

As discussed in Section 10, many holes were drilled vertically, which imposes challenges when interpreting steeply dipping mineralization. To the extent possible, RPA used information available from the angle holes to locate the hanging wall and footwall contacts of the mineralized zones and to interpret their true thickness. The sectional outlines of the mineralized zones based on angle holes were commonly extrapolated or interpolated to sections with vertical drilling only. This resulted in relatively regular outlines of the mineralized domains in plan view. RPA notes that most holes drilled since the previous resource estimate were angle holes. RPA recommends that this approach be continued.

The Triple R deposit as defined in the Mineral Resource estimate is comprised of several nearly vertical, stacked lenses across five mineralized zones that are generally oriented with an azimuth 66.2° northeast. The zones range from 60 m to 100 m wide with an overall strike length of 3.2 km starting at approximately 50 m from surface and extending to 300 m at depth. The deposit remains open in most directions.

The R00E zone is located at the western end and the much larger R780E zone. The R00E and R780E zones have an overall strike length of approximately 1.2 km, with the R00E measuring approximately 125 m in strike length and the R780E zones measuring approximately 900 m in strike length. A 225 m gap separates the R00E zone to the west and the R780E zone to the east.

The R780E zone is located beneath Patterson Lake, which is approximately six metres deep in the area of the deposit. The R00E and R780E zones are covered by approximately 50 m of overburden. The deposit extends from immediately beneath the overburden to a maximum depth of 330 m below the topographic surface.

A total of 82 wireframe models (domains) of the mineralization were constructed by RPA and used in the resource estimate (Table 14-3 and Figures 14-1 and 14-2). Of the 82 wireframes, 16 are high grade wireframes located within the low grade R780E_MZ wireframe, and two high grade wireframes are contained within the low grade R840W_001 wireframe. The Halo domain is located outside the interpreted wireframe models. Wireframe names were assigned to zones as identified by Fission Uranium disclosures.

TABLE 14-3 SUMMARY OF WIREFRAME MODELS
Fission Uranium Corp. – Patterson Lake South Property

Zone	Wireframe Name	Block Code	Wireframe Volume (m^3)
R780E_MZ	2018WF_-_MZ_100118_cut_v3.00t	101	1,179,972
R780E_MZ	2018WF_-_MZ_NE.00t	102	17,340
R780E_OTHER	2015WF_-_FW_1_1.00t	201	32,716
R780E_OTHER	2015WF_-_FW_2_2.00t	202	4,435
R780E_OTHER	2015WF_-_FW_3_2.00t	203	52,118
R780E_OTHER	2015WF_-_FW_4_1.00t	204	46,471
R780E_OTHER	2018WF_-_FW_5_2_060118.00t	205	39,887
R780E_OTHER	2018WF_-_FW_6_2_060118.00t	206	7,680
R780E_OTHER	2015WF_-_LZ_1_2.00t	301	11,769
R780E_OTHER	2015WF_-_LZ_2_1.00t	302	19,417

Zone	Wireframe Name	Block Code	Wireframe Volume (m^3)
R780E_OTHER	2015WF_-_LZ_3_2.00t	303	35,386
R780E_OTHER	2015WF_-_LZ_4_2.00t	304	6,260
R780E_OTHER	2018WF_-_LZ_5_092518.00t	305	66,084
R780E_OTHER	2018WF_-_LZ_6_092518.00t	306	20,459
R780E_OTHER	2015WF_-_LZ_7_2.00t	307	2,426
R780E_OTHER	2018WF_-_LZ_8.00t	308	7,471
R780E_OTHER	2018WF_-_EAST_1.00t	401	102,689
R780E_OTHER	2018WF_-_HW_1_1_092518.00t	501	65,788
R00E	2015WF_-_R000_1_1.00t	601	57,228
R00E	2015WF_-_R000_2_2.00t	602	4,003
HALO	2015WF_HALO_HALO_100118_cut.00t	901	NA
R780E_HG	2018WF_-_HG_001_100118_p1.00t	10111	2,187
R780E_HG	2018WF_-_HG_001_100118_p2.00t	10112	363
R780E_HG	2018WF_-_HG_001_100118_p3.00t	10113	5,527
R780E_HG	2018WF_-_HG_001_100118_p4.00t	10114	167
R780E_HG	2018WF_-_HG_001_100118_p5.00t	10115	307
R780E_HG	2018WF_-_HG_002_100118_p1.00t	10211	2,701
R780E_HG	2018WF_-_HG_002_100118_p2.00t	10212	12,397
R780E_HG	2018WF_-_HG_002_100118_p3.00t	10213	3,006
R780E_HG	2018WF_-_HG_002_100118_p4.00t	10214	1,987
R780E_HG	2018WF_-_HG_002_100118_p5.00t	10215	1,407
R780E_HG	2018WF_-_HG_003_100118_p1.00t	10311	2,152
R780E_HG	2018WF_-_HG_003_100118_p2.00t	10312	877
R780E_HG	2018WF_-_HG_004_100118.00t	1041	12,008
R780E_HG	2018WF_-_HG_006_092518.00t	1061	2,209
R780E_HG	2018WF_-_HG_007_092518_p1.00t	10711	18,961
R780E_HG	2018WF_-_HG_007_092518_p2.00t	10712	1,893
R840W	R840W__MSC_001-bends.00t	8400	17,249
R840W	R840W__MSC_001-1.00t	8401	165,905
R840W	R840W__MSC_002.00t	8402	1,433
R840W	R840W__MSC_003.00t	8403	3,717
R840W	R840W__MSC_004.00t	8404	1,017
R840W	R840W__MSC_005.00t	8405	2,108
R840W	R840W__MSC_006.00t	8406	3,190
R840W	R840W__MSC_007.00t	8407	3,505
R840W	R840W__MSC_008.00t	8408	5,069
R840W	R840W__MSC_009.00t	8409	5,252
R840W	R840W__MSC_010.00t	84010	799
R840W	R840W__MSC_011.00t	84011	973
R840W	R840W__MSC_012.00t	84012	3,170
R840W	R840W__MSC_013.00t	84013	1,065
R840W	R840W__MSC_014.00t	84014	1,687
R840W	R840W__MSC_015.00t	84015	265
R840W	R840W__MSC_016.00t	84016	792

Zone	Wireframe Name	Block Code	Wireframe Volume (m^3)
R840W	R840W__MSC_017.00t	84017	227
R840W	R840W__MSC_018.00t	84018	553
R840W	R840W__MSC_019.00t	84019	745
R840W	R840W__MSC_020.00t	84020	429
R840W	R840W__MSC_021.00t	84021	1,223
R840W	R840W__MSC_022.00t	84022	2,161
R840W	R840W__MSC_023.00t	84023	48
R840W	R840W__MSC_024.00t	84024	672
R840W	R840W__MSC_025.00t	84025	406
R840W	R840W__MSC_026.00t	84026	376
R840W	R840W__MSC_027.00t	84027	222
R840W	R840W__MSC_028.00t	84028	90
R840W	R840W_HG_MSC.00t	840100	3,934
R1515W	R1515W__MSC_001.00t	15151	49,595
R1515W	R1515W__MSC_002.00t	15152	34,502
R1515W	R1515W__MSC_003.00t	15153	26,516
R1515W	R1515W__MSC_004.00t	15154	22,163
R1515W	R1515W__MSC_005.00t	15155	13,848
R1515W	R1515W__MSC_006.00t	15156	10,477
R1515W	R1515W__MSC_007.00t	15157	3,082
R1515W	R1515W__MSC_008.00t	15158	4,712
R1515W	R1515W__MSC_009.00t	15159	1,170
R1620E	R1620E__MSC_001.00t	16201	21,364
R1620E	R1620E__MSC_002.00t	16202	32,334
R1620E	R1620E__MSC_003.00t	16203	7,893
R1620E	R1620E__MSC_004.00t	16204	3,271
R1620E	R1620E__MSC_005.00t	16205	1,308

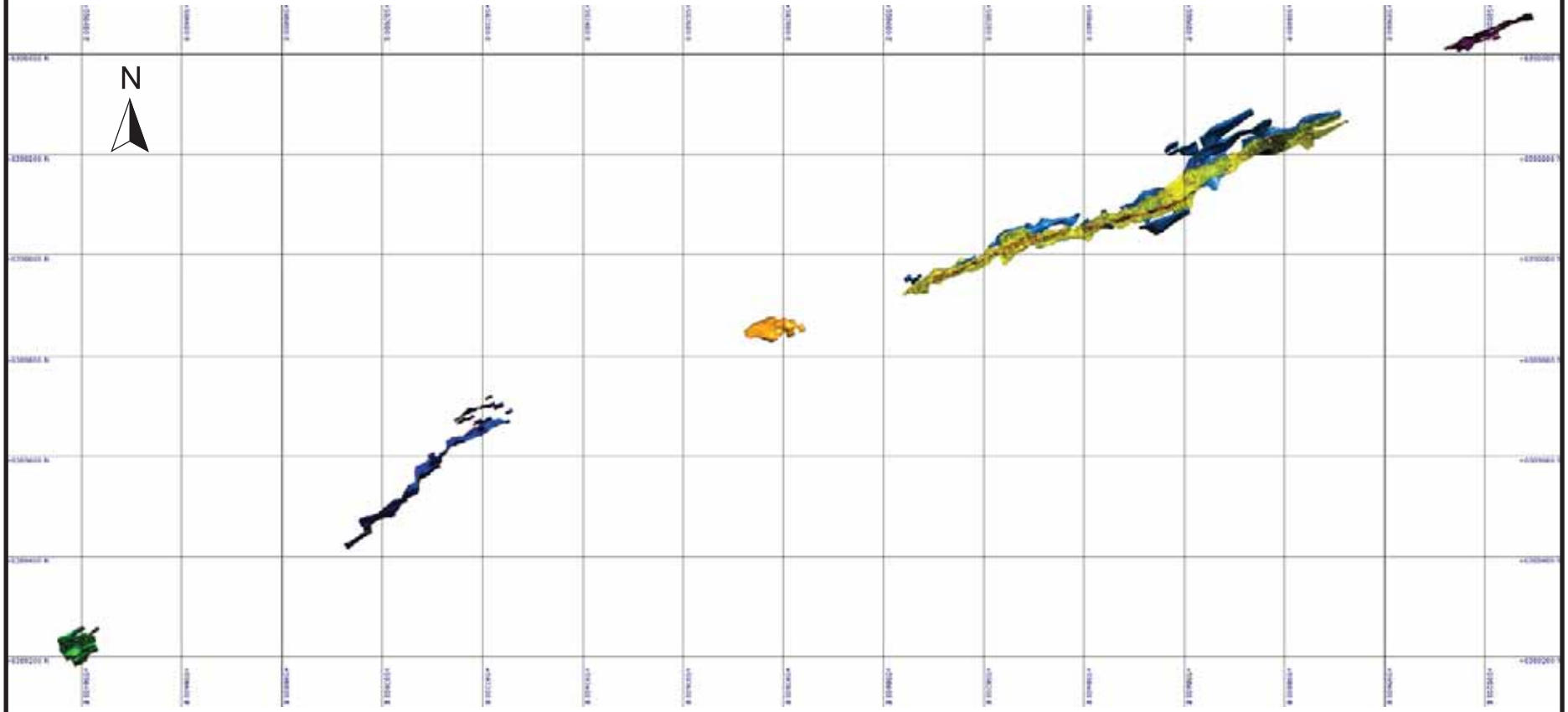


Figure 14-1

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Wireframe Solids
Plan View

November 2019

Source: RPA, 2019.

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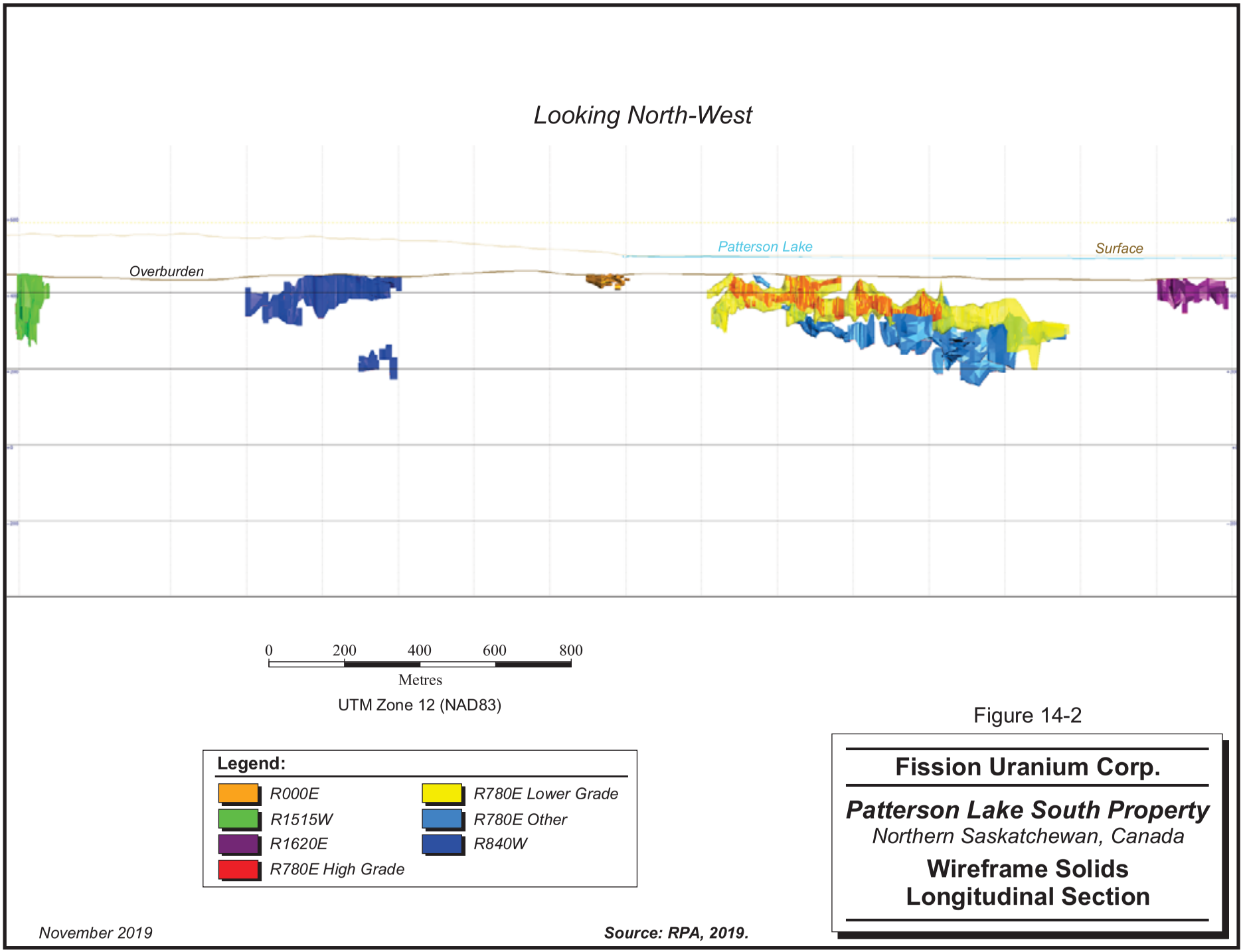


Figure 14-2

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Wireframe Solids
Longitudinal Section

November 2019

Source: RPA, 2019.

www.rpacan.com

The HG domain consists of 16 lenses within the R780E Main Zone (MZ), the largest continuous domain within the R780E area. The MZ makes up more than 80% of the contained pounds of U_3O_8 in the Mineral Resource. The MZ is elongated in the grid east-west direction and dip steeply to the south. The MZ measures approximately 740 m along strike. Both the down dip and true thickness of the MZ vary due to the irregular shape of the mineralization, however, in general, the down dip measurement ranges between 50 m and 80 m, and the true thickness is in most places between 20 m and 30 m but can be as little as two metres to a maximum of 45 m.

The MZ HG domain alone contains more than half the contained pounds of U_3O_8 classified as Indicated Mineral Resources. It was modelled as seven steeply dipping wireframe solids located within the R780E MZ. The high grade zones span over 500 m of strike length, measure from 10 m to 40 m down dip, and range from three metres to ten metres thick.

A number of other wireframe solids make up a smaller portion of the Mineral Resources. Most of the secondary domains are oriented similarly to the MZ. Some, including R00E, were modelled with a horizontal orientation. Additional drilling is recommended to better define the geometry of mineralization.

STATISTICAL ANALYSIS

Assay values located inside the wireframe models were tagged with domain identifiers and exported for statistical analysis. Results were used to help verify the modelling process. Basic statistics by domain are summarized in Table 14-4 and histograms of resource assays for each domain are illustrated in Figures 14-3 to 14-10.

TABLE 14-4 SUMMARY STATISTICS OF UNCAPPED % U_3O_8 ASSAYS
Fission Uranium Corp. – Patterson Lake South Property

Zone	Count	Min	Max	Mean	Variance	StDev	CV
R780E_MZ	18,804	0	45.7	0.592	3.74	1.935	3.27
R780E_HG	1,609	0	65.7	14.74	183.1	13.53	0.92
R780E_Other	4,862	0	44.9	0.722	6.71	2.59	3.59
HALO	74,879	0	33.6	0.032	0.14	0.374	11.64
R00E	937	0	48.8	1.778	24.29	4.929	2.77
R1620E	971	0	36.8	1.658	17.28	4.157	2.51
R840W	2,937	0	52.3	1.509	21.03	4.586	3.04
R1515W	1,801	0	30.9	0.938	5.5	2.346	2.5

FIGURE 14-3 HISTOGRAM OF RESOURCE ASSAYS IN R780E_MZ DOMAIN

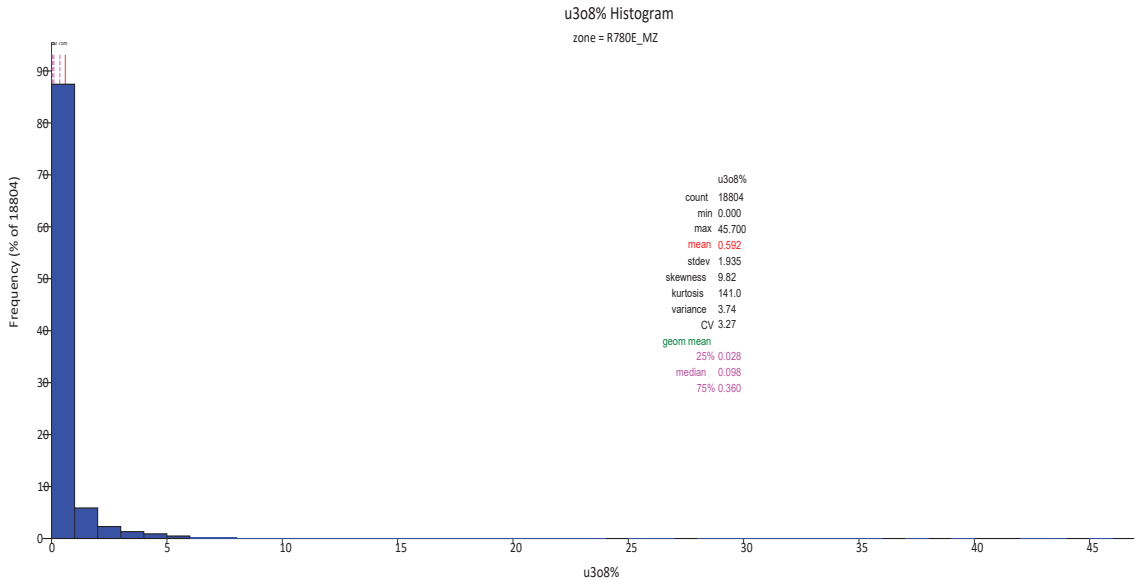


FIGURE 14-4 HISTOGRAM OF RESOURCE ASSAYS IN R780E_HG DOMAIN

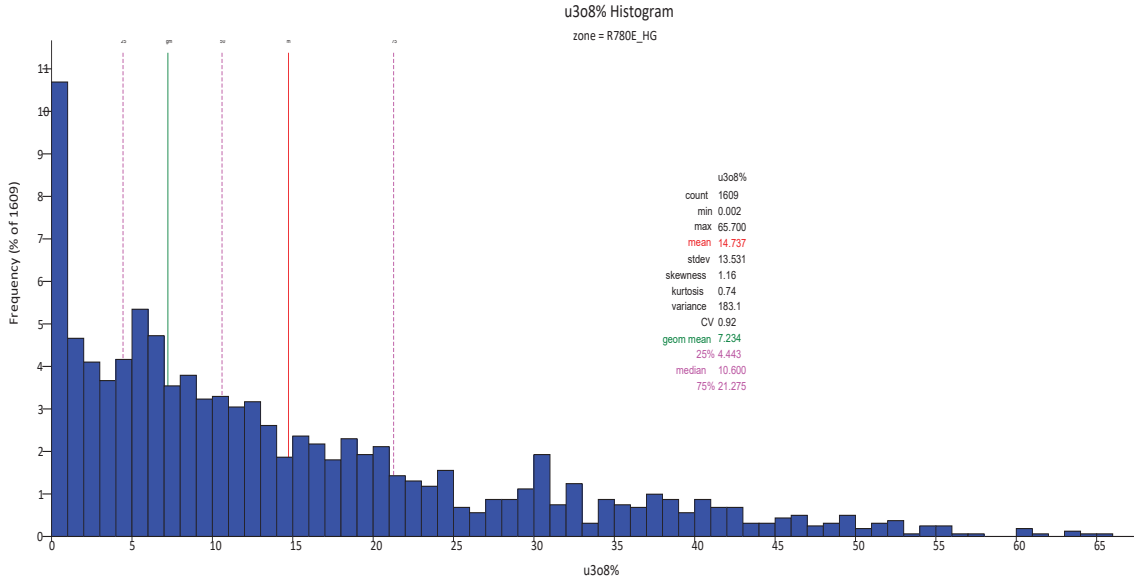


FIGURE 14-5 HISTOGRAM OF RESOURCE ASSAYS IN R780E_OTHER ZONE DOMAIN

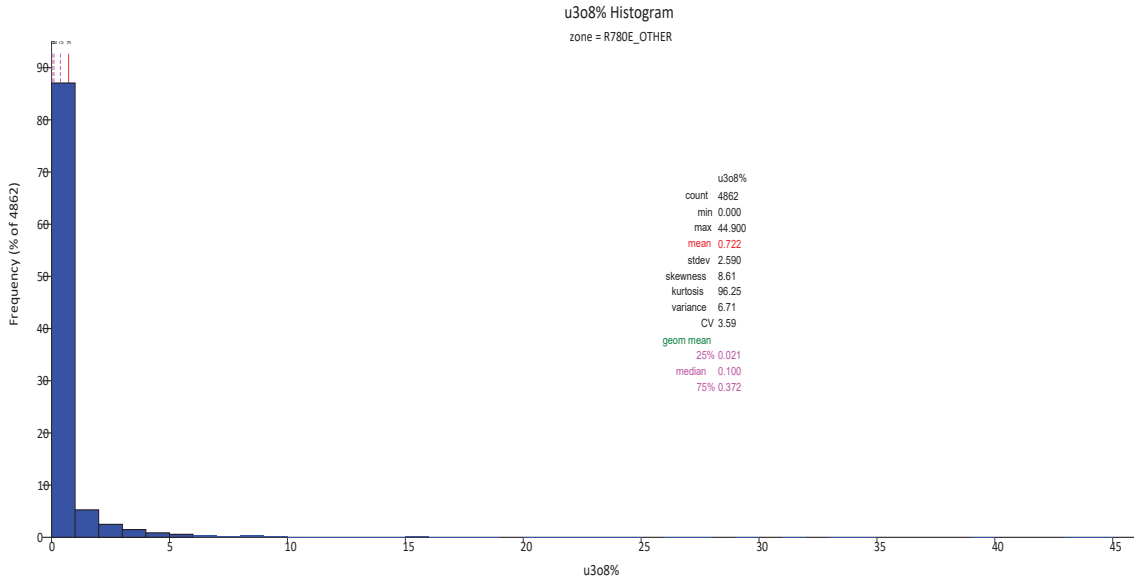


FIGURE 14-6 HISTOGRAM OF RESOURCE ASSAYS IN HALO ZONE DOMAIN

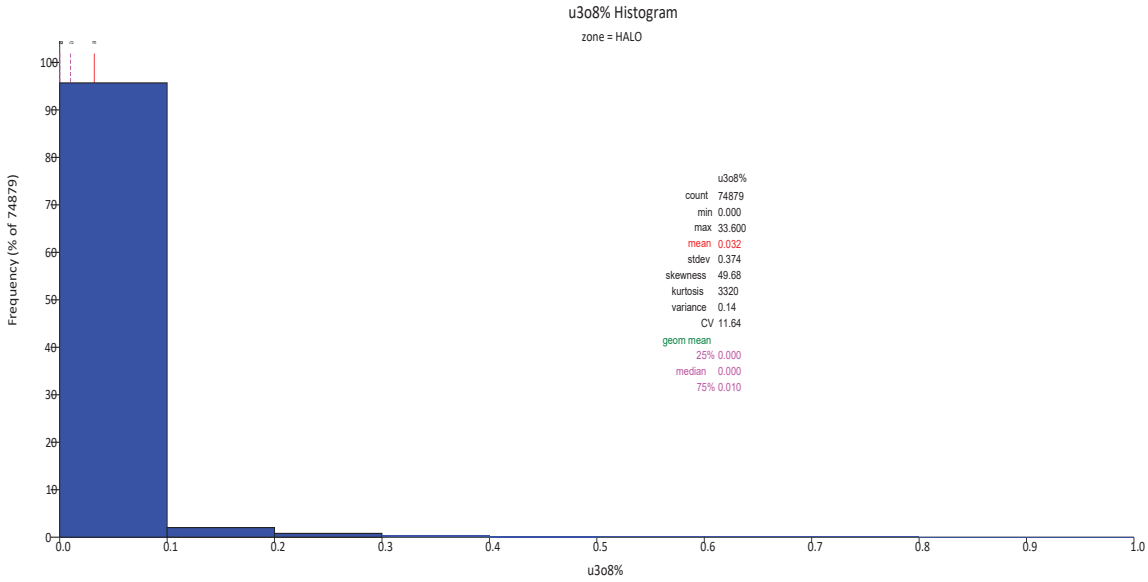


FIGURE 14-7 HISTOGRAM OF RESOURCE ASSAYS IN R00E ZONE DOMAIN

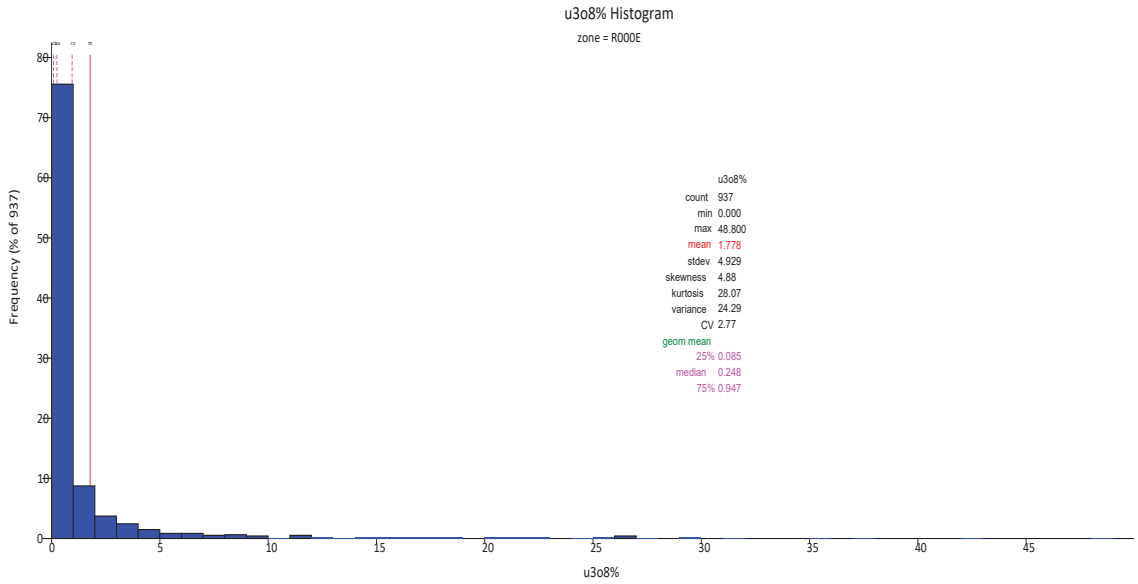


FIGURE 14-8 HISTOGRAM OF RESOURCE ASSAYS IN R1620E ZONE DOMAIN

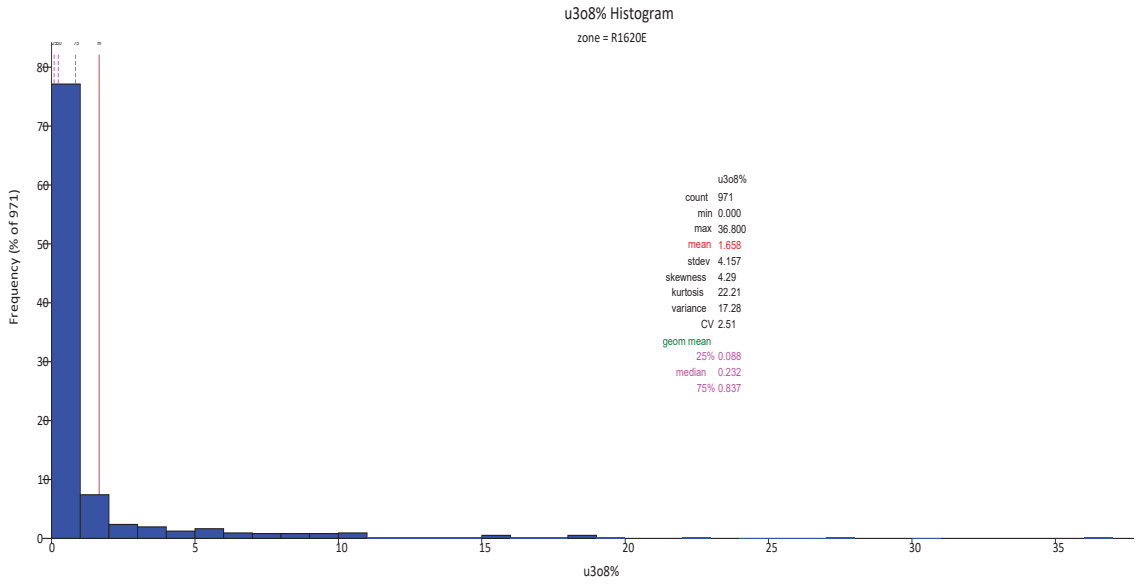


FIGURE 14-9 HISTOGRAM OF RESOURCE ASSAYS IN R840W ZONE DOMAIN

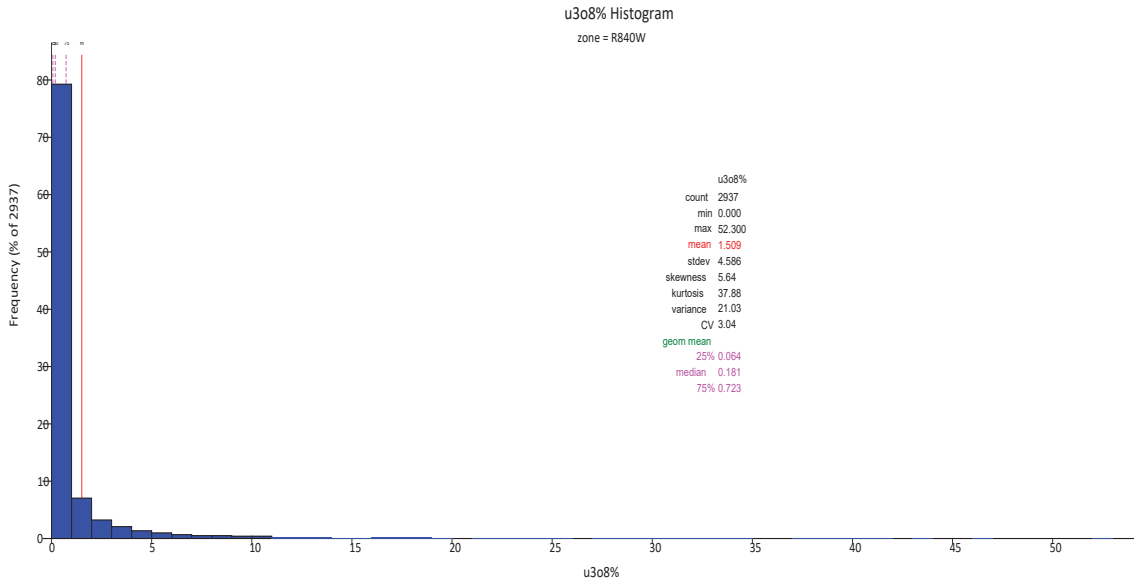
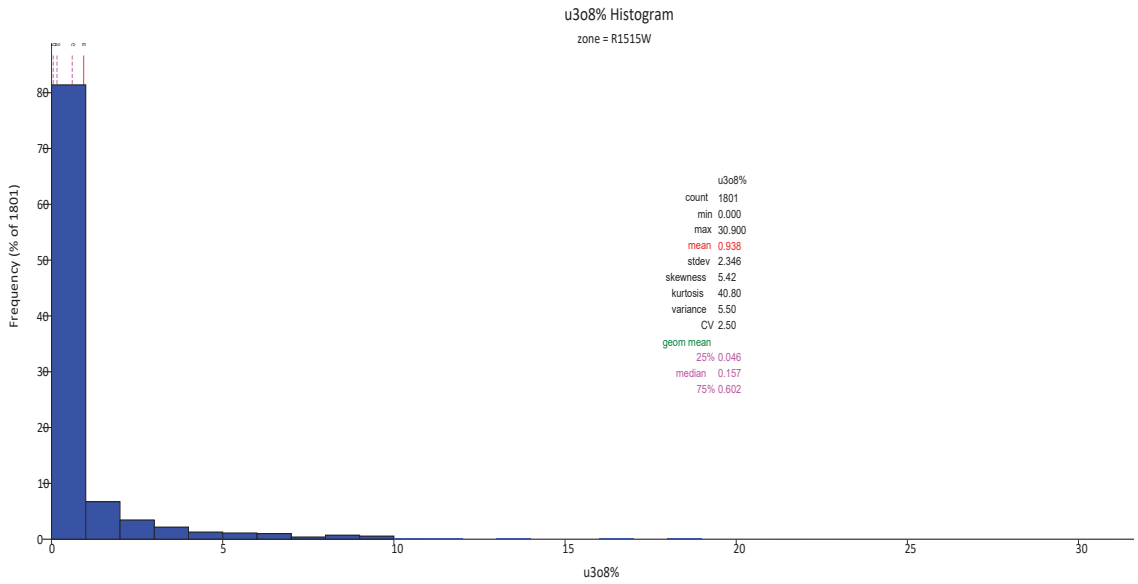


FIGURE 14-10 HISTOGRAM OF RESOURCE ASSAYS IN R1515W ZONE DOMAIN



CUTTING HIGH GRADE VALUES

Where the assay distribution is skewed positively or approaches log-normal, erratic high grade assay values can have a disproportionate effect on the average grade of a deposit. One

method of treating these outliers in order to reduce their influence on the average grade is to cut or cap them at a specific grade level.

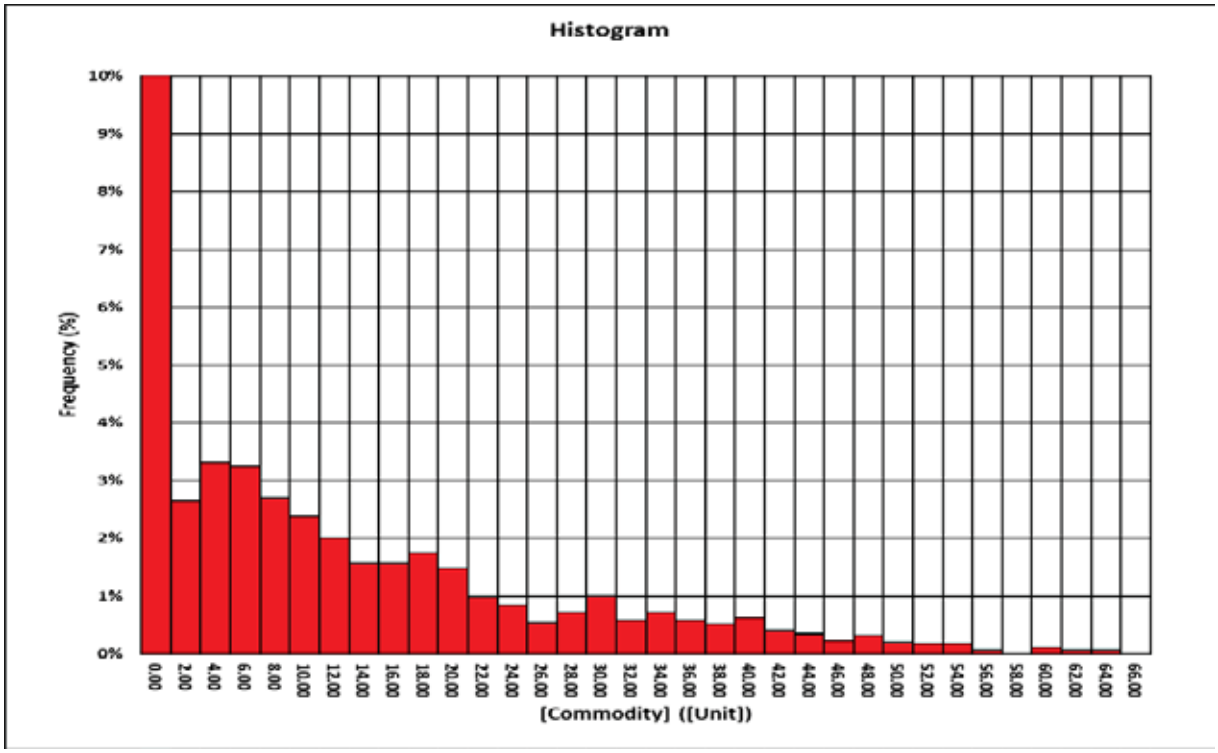
RPA is of the opinion that the influence of high grade uranium assays must be reduced or controlled and uses a number of industry best practice methods to achieve this goal, including capping of high grade values. Assessing the influence of outliers involves a number of statistical analytical methods to determine an appropriate capping value including preparation of frequency histograms, probability plots, decile analyses, and capping curves. Using these methodologies, RPA examined the selected capping values for each of the 84 mineralized domains and eight zones in the Triple R deposit.

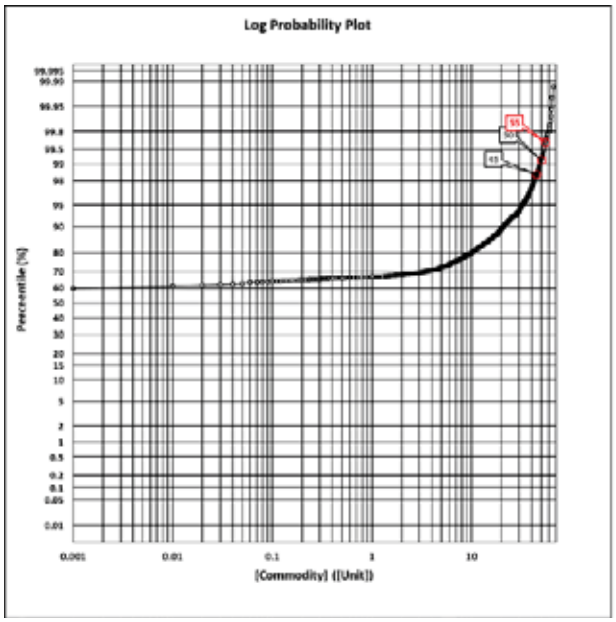
Review of the resource assay histograms within the wireframe domains and a visual inspection of high grade values on vertical sections suggest cutting high grade values to 7%, 10%, 20%, and 35% U_3O_8 in the low grade domains and 55% in the R780E_HG domain resulting in a total of 282 (0.27%) capped assay values (Table 14-5). Examples of the capping analysis are shown in Figures 14-11 and 14-12.

TABLE 14-5 CAPPING OF RESOURCE ASSAY VALUES BY ZONE
Fission Uranium Corp. – Patterson Lake South Property

Zone	Cap Levels ($\%U_3O_8$)	Number of Assays	Number Assays Capped	% of Assays Capped
R780E_MZ	10	18,804	132	0.70%
R780E_HG	55	1,609	14	0.87%
R780E_Other	20	4,862	23	0.47%
HALO	7	74,879	29	0.04%
R00E	10	937	44	4.70%
R1620E	20	971	10	1.03%
R840W	35	2,937	12	0.41%
R1515W	10	1,801	22	1.22%
Total		**106,800**	**286**	**0.27%**

FIGURE 14-11 HISTOGRAM OF RESOURCE ASSAYS IN R780E_HG DOMAIN





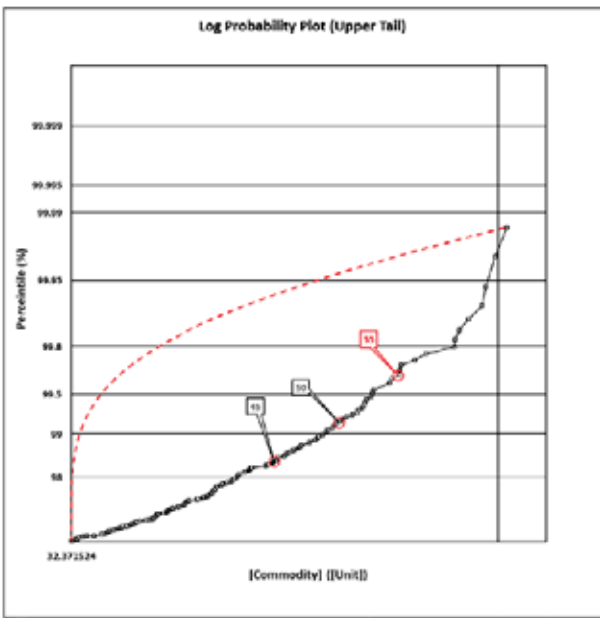
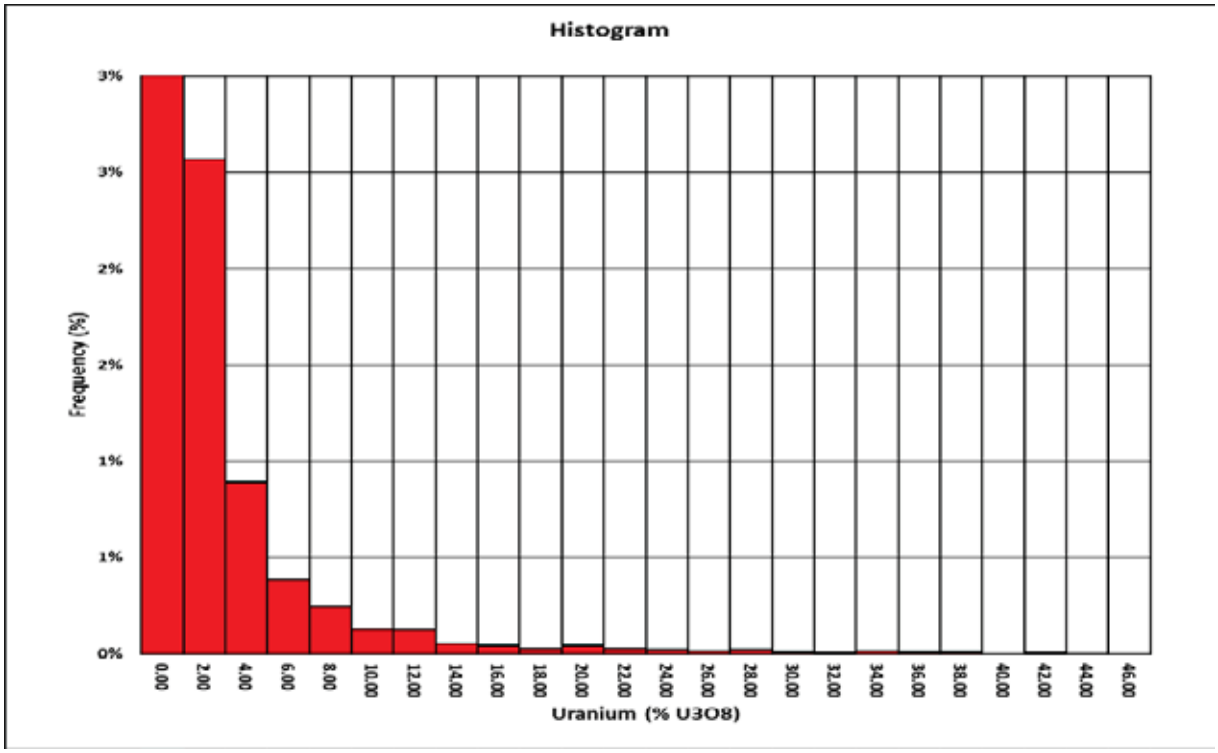
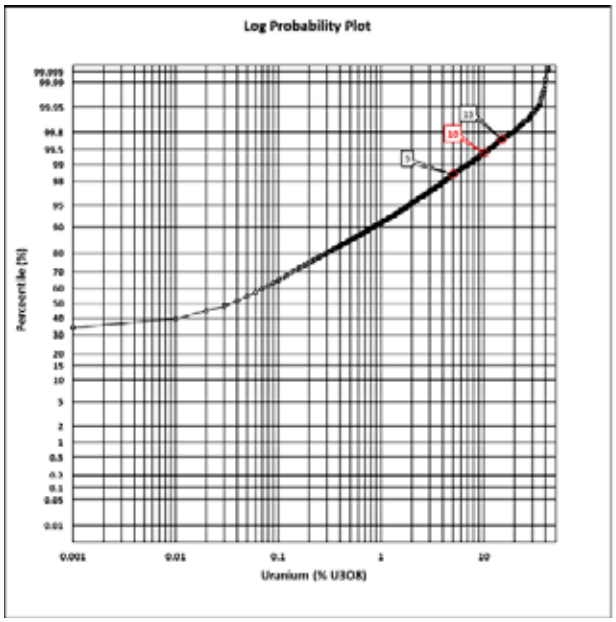
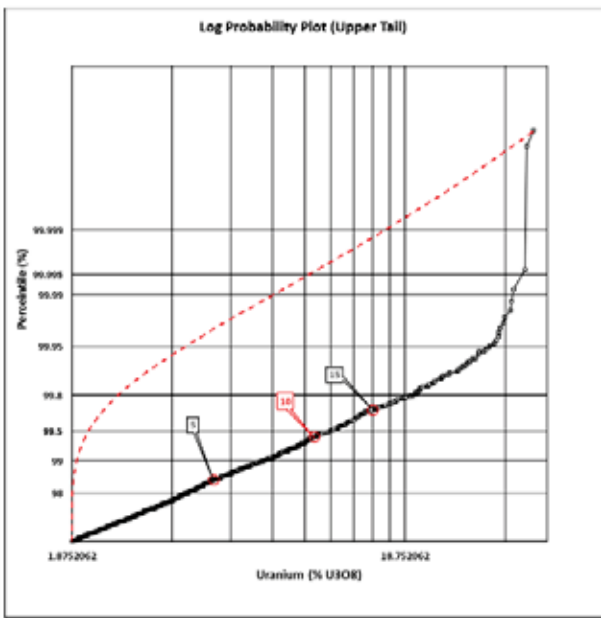


FIGURE 14-12 HISTOGRAM OF RESOURCE ASSAYS IN R780E_MZ DOMAIN







Capped assay statistics by zones are summarized in Table 14-6 and compared with uncapped assay statistics. For the R780E_MZ domain, by cutting 132 high values to 10% U_3O_8, the average grade was reduced from 0.59% U_3O_8 to 0.54% U_3O_8 and the coefficient of variation (CV) was reduced from 3.27 to 2.50. For the R780E_HG domain, by cutting 14 high values to

55% U_3O_8, the average grade was reduced from 14.74% U_3O_8 to 14.70% U_3O_8 and CV was reduced from 0.92 to 0.91

TABLE 14-6 SUMMARY STATISTICS OF UNCAPPED VS. CAPPED ASSAYS
Fission Uranium Corp. – Patterson Lake South Property

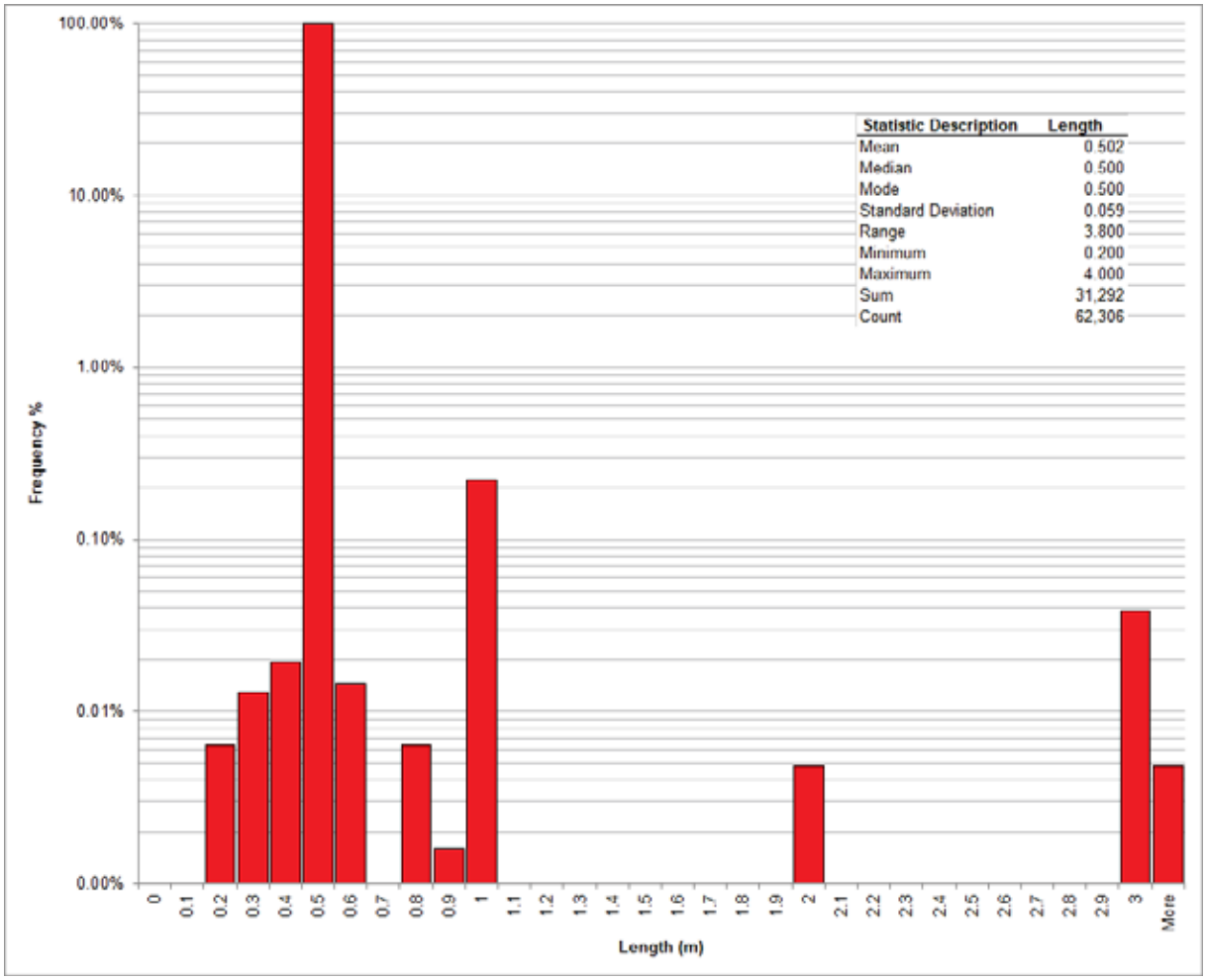
Zone	R780E_MZ		R780E_HG		R780E_Other		HALO	
Descriptive Statistics	Raw	Cap	Raw	Cap	Raw	Cap	Raw	Cap
Number of Samples	18,804	18,804	1,609	1,609	4,862	4,862	74,879	74,879
Min (%U_3O_8)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max (%U_3O_8)	45.70	10.00	65.70	55.00	44.90	20.00	33.60	7.00
Mean (%U_3O_8)	0.59	0.54	14.74	14.70	0.72	0.61	0.03	0.03
Variance	3.74	1.81	183.10	179.50	6.71	2.69	0.14	0.05
StDev (%U_3O_8)	1.94	1.34	13.53	13.40	2.59	1.64	0.37	0.22
CV	3.27	2.50	0.92	0.91	3.59	2.69	11.64	7.60
Number of Caps	0	132	0	14	0	23	0	29

Zone	R00E		R1620E		R840W		R1515W	
Descriptive Statistics	Raw	Cap	Raw	Cap	Raw	Cap	Raw	Cap
Number of Samples	937	937	971	971	2,937	2,937	1,801	1,801
Min (%U_3O_8)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max (%U_3O_8)	48.80	10.00	36.80	20.00	52.30	35.00	30.90	10.00
Mean (%U_3O_8)	1.78	1.25	1.66	1.58	1.51	1.43	0.94	0.85
Variance	24.29	5.99	17.28	13.37	21.03	16.98	5.50	3.14
StDev (%U_3O_8)	4.93	2.45	4.16	3.66	4.59	4.12	2.35	1.77
CV	2.77	1.96	2.51	2.32	3.04	2.88	2.50	2.09
Number of Caps	0	44	0	10	0	12	0	22

COMPOSITING

Composites were created from the capped assay values using hard boundaries from the wireframe models using the downhole compositing function of the Vulcan modelling software package. Sample lengths range from a few cm to 3.0 m within the wireframe models, with 99% of the samples taken at 0.5 m intervals (Figure 14-13). The composite lengths used during interpolation were chosen considering the predominant sampling length, the minimum mining width, style of mineralization, and continuity of grade. Given this distribution, and considering the width of the mineralization, RPA chose to composite to two metre lengths.

FIGURE 14-13 HISTOGRAM OF SAMPLING LENGTH



Assays within the wireframe domains were composited starting at the first mineralized wireframe boundary from the collar and resetting at each new wireframe boundary. Composites less than 0.53 m, located at the bottom of the mineralized intercept, were added to the previous interval. Table 14-7 shows the composite statistics by domain.

TABLE 14-7 DESCRIPTIVE STATISTICS OF COMPOSITE VALUES BY DOMAIN
Fission Uranium Corp. – Patterson Lake South Property

Zone	Count	Min	Max	Mean	Variance	StDev	CV
R780E_MZ	4,558	0.00	10.00	0.51	0.89	0.94	1.86
R780E_HG	383	0.06	53.18	15.11	116.80	10.81	0.72
R780E_Other	1,193	0.00	16.68	0.58	1.62	1.27	2.18
HALO	43,679	0.00	6.14	0.01	0.01	0.09	8.37
R00E	224	0.03	10.00	1.28	4.69	2.17	1.70
R1620E	223	0.00	18.73	1.64	10.12	3.18	1.94
R840W	718	0.00	34.80	1.40	14.34	3.79	2.70
R1515W	454	0	8.017	0.827	1.75	1.322	1.6

CONTINUITY ANALYSIS

RPA generated downhole and directional variograms using the two-metre composite U_3O_8 values located within the R780E_MZ mineralized wireframe including high grade mineralization. The downhole variogram suggests a relative nugget effect of less than 12% (Figure 14-14). Variograms were of poor to fair quality considering the number of composite data and not adequate to generate meaningful variograms to derive kriging parameters. Long range directional variograms were focused in the plane of mineralization, which most commonly strikes northeast and dips steeply to the southeast. To improve the variogram for the MZ, only composite values ranging from 0.10% U_3O_8 to 20% U_3O_8 were used (Figure 14-15). Most ranges were interpreted to be approximately 20 m to 30 m. These ranges were used to derive search ellipse dimensions for block interpolations.

RPA also visually reviewed and contoured the drill hole results to identify trends of high grade mineralization. Several shallow to moderately eastward plunging higher grade zones were identified and these were mostly modelled as part of the HG domain within the MZ.

FIGURE 14-14 DOWNHOLE VARIOGRAM

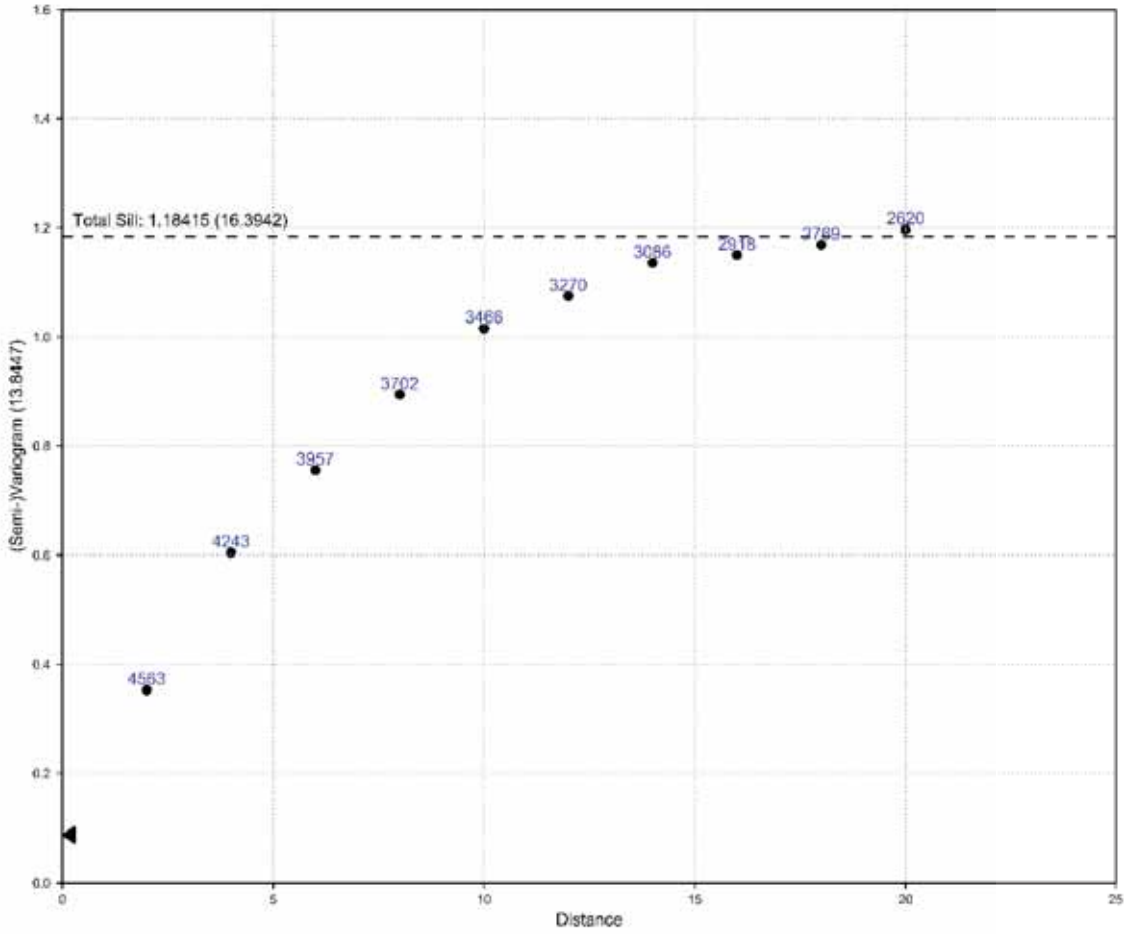
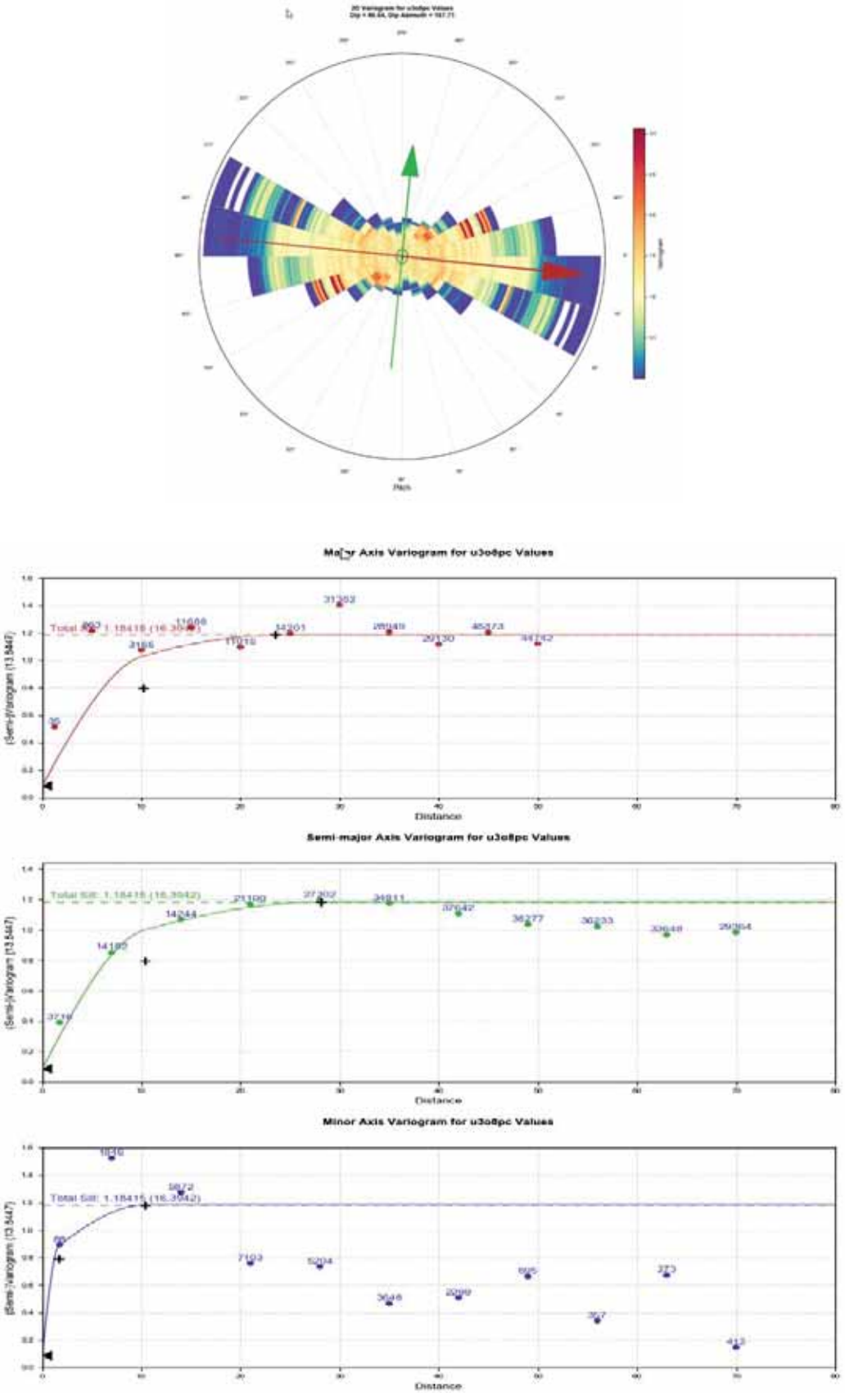


FIGURE 14-15 DIRECTIONAL VARIOGRAMS FOR R780E_MZ DEPOSIT



DENSITY

Bulk density estimates are used to convert volume to tonnage and, in some cases, can be used to weight block grade estimates. For example, high grade uranium deposits of the Athabasca Basin have bulk densities that commonly vary with grade due to the very high density of pitchblende/uraninite compared to host lithologies. Bulk density also varies with clay alteration and in situ rock porosity. When modelling high grade uranium deposits, it is common to estimate bulk density values throughout the deposit and to weight uranium grades by density, since small volumes of high grade material contain large quantities of uranium oxide.

RPA carried out correlation analyses of the bulk density measurements against uranium grades. Unlike most deposits in the Athabasca Basin, the high grade uranium mineralization at the Triple R deposit has relatively low density values. Uranium grade ranges of 20% U_3O_8 to 70% U_3O_8, within the Athabasca Basin, more commonly exhibit density values ranging from 3.0 t/m^3 to 6.0 t/m^3 correlated with grade. Triple R high grade mineralization is often associated with carbon which may account for the lower than expected density values. In general, the average density of mineralization commonly ranges from 2.25 t/m^3 to 2.41 t/m^3.

Since bulk density does not have a clear correlation with grade, RPA did not weight grades by density in the block interpolation. Block grade values and density values were estimated independently.

Block densities were estimated from the density measurements using inverse distance cubed (ID^3) and a similar search strategy as used for uranium grade. Hard boundaries were used between domains. The Triple R resource database includes more than 16,000 density measurements. Table 14-8 compares the average densities of the blocks within the mineralized zones to the average densities of measurements associated with grades greater than 0.1% U_3O_8.

TABLE 14-8 COMPARISON OF ESTIMATED BLOCK DENSITIES AND MEASURED CORE DENSITIES BY ZONE
Fission Uranium Corp. – Patterson Lake South Property

Zone	Blocks (t/m^3)	Measurements (t/m^3)
R780E_HG	2.41	2.35
R780E_MZ	2.33	2.35
R780E_OTHER	2.36	2.38
HALO	2.41	2.47
R00E	2.25	2.28
R1620E	2.34	2.36
R840W	2.29	2.26
R1515W	2.31	2.28

BLOCK MODEL

The Vulcan block model origin (lower-left corner at lowest elevation) is at UTM coordinates 596,304.8 mE, 6,388,726.0 mN and 0 m elevation and is made up of 737 columns, 380 rows, and 270 levels. Each block is one metre wide, two metres high, and five metres along strike. A regularized whole block approach was used whereby the block was assigned to the domain where its centroid was located. The models fully enclose the modelled resource wireframes and are oriented with an azimuth of 66.2°, dip of 0.0°, and a plunge of 0.0° so as to align with the overall strike of the mineralization within the given model area. A summary of the block model extents is provided in Table 14-9. A number of attributes were created to store such information as bulk density, estimated uranium grades, wireframe code, Mineral Resource classification, etc., for each block model area as listed in Table 14-10.

TABLE 14-9 BLOCK MODEL SET-UP
Fission Uranium Corp. – Patterson Lake South Property

Item	Value
Origin	
X minimum	596,304.8
Y minimum	6,388,726.0
Z minimum	0
Number of Blocks	
X	3,685
Y	760
Z	540
Block Size	
X	5
Y	1
Z	2
Number of Blocks	
X	737
Y	760
Z	270
Model Rotation	
Bearing	66.2
Plunge	0
Dip	0
Other	
Project Units	Metres
Coordinate System	NAD83 UTM Zone12N
Number of Blocks	151,232,400

Schematic

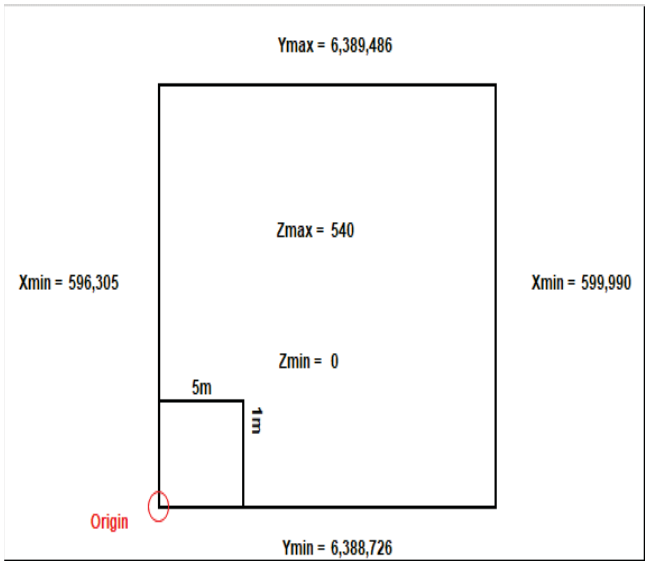


TABLE 14-10 TRIPLE R BLOCK MODEL PARAMETERS AND VARIABLES
Fission Uranium Corp. – Patterson Lake South Property

Variable	Default Value	Data Type	Description
au	-99	double	Au grade (g/t)
class	-99	integer	Classification
den	-99	double	Estimated measured density
den2	-99	double	Calculated polynomial density
est_flag_id	-99	integer	Estimation flag ID^3
est_flag_ok	-99	integer	Estimation flag OK
grade_id3	-99	double	%U_3O_8 ID^3
grade_ok	-99	double	%U_3O_8 grade OK
gxd	-99	double	grade_id3 x density
gxd_d	-99	double	Calculated (density (den2) weighted) %U_3O_8
gxd2	-99	double	%U_3O_8 * density (den2)
litho	unclass	name	Lithology

Variable	Default Value	Data Type	Description
nholes	-99	short	Number of holes
nn	-99	double	Nearest neighbour
nn_distance	-99	double	Distance to nearest neighbour
nsamp	-99	short	Number of samples
open_pit	-99	double	Open pit flag
ore	-99	integer	Mineralized domain (wireframe)
ug	-99	double	Underground flag
topo_flag	-99	double	Topo flag
overburden	-99	double	Overburden flag

INTERPOLATION PARAMETERS

Grade interpolations for U_3O_8 and gold were carried out using ID^3 in a single pass with a minimum of two to a maximum of seven composites per block estimate. The search ellipse orientation varied slightly by domain. Hard boundaries were used to limit the use of composites between domains. Most search ellipse dimensions were 50 m by 50 m by 10 m for a 5:5:1 anisotropic ratio. Since the low grade Halo domain is unconstrained, RPA limited the search ellipse to 10 m by 10 m by 5 m, which is equivalent to two blocks.

To reduce the influence of high grade composites, grades greater than a designated threshold level for the domains were restricted to a search ellipse dimension of 25 m by 25 m by 5 m (high yield restriction). The threshold grade levels were chosen from the basic statistics and from visual inspection of the apparent continuity of very high grades within each domain, which indicated the need to limit their influence to approximately half the distance of the main search. Interpolation parameters are listed in Table 14-11 for the Triple R Deposit Mineral Resource domains.

TABLE 14-11 BLOCK ESTIMATE SEARCH STRATEGY BY DOMAIN
Fission Uranium Corp. – Patterson Lake South Property

Block Code	Estimation Method	Cap (% U_3O_8)	Cap (g/t Au)	High Yield Threshold (% U_3O_8)	Bearing (°)	Plunge (°)	Dip (°)	Major (m)	Semi (m)	Minor (m)	Min Samp	Max Samp
101	ID^3	10	10	5	66.2	0	-90	50	50	10	2	7
102	ID^3	10	10	-	66.2	0	-80	50	50	10	2	7
201	ID^3	10	10	-	66.2	0	-70	50	50	10	2	7
202	ID^3	10	10	-	66.2	0	-70	50	50	10	2	7
203	ID^3	10	10	-	66.2	0	-70	50	50	10	2	7
204	ID^3	10	10	-	66.2	0	-70	50	50	10	2	7
205	ID^3	20	10	-	66.2	0	-70	50	50	10	2	7

Block Code	Estimation Method	Cap (% U_3O_8)	Cap (g/t Au)	High Yield Threshold (% U_3O_8)	Bearing (°)	Plunge (°)	Dip (°)	Major (m)	Semi (m)	Minor (m)	Min Samp	Max Samp
206	ID³	10	10	-	66.2	0	-70	50	50	10	2	7
301	ID³	10	10	-	66.2	0	-90	50	10	50	2	7
302	ID³	10	10	-	66.2	0	-70	50	10	50	2	7
303	ID³	7	10	-	66.2	0	-70	50	50	10	2	7
304	ID³	7	10	-	66.2	0	-70	50	50	10	2	7
305	ID³	10	10	-	66.2	0	-70	50	50	10	2	7
306	ID³	10	10	-	66.2	0	-70	50	50	10	2	7
307	ID³	10	10	-	66.2	0	-90	25	25	5	2	7
308	ID³	10	10	-	66.2	0	-70	50	50	10	2	7
401	ID³	10	10	-	66.2	0	-90	50	50	10	2	7
501	ID³	10	10	-	66.2	0	-70	50	50	10	2	7
601	ID³	10	10	-	66.2	0	-90	50	10	50	2	7
602	ID³	10	10	-	66.2	0	-90	50	10	50	2	7
901	ID³	7	5	-	66.2	0	-90	10	8	2	2	7
10111	ID³	55	15	20	66.2	0	-90	50	50	10	2	7
10112	ID³	55	15	20	66.2	0	-90	50	50	10	2	7
10113	ID³	55	15	20	66.2	0	-90	50	50	10	2	7
10114	ID³	55	15	20	66.2	0	-90	50	50	10	2	7
10115	ID³	55	15	20	66.2	0	-90	50	50	10	2	7
10211	ID³	55	15	20	66.2	0	-90	50	50	10	2	7
10212	ID³	55	15	20	66.2	0	-90	50	50	10	2	7
10213	ID³	55	15	20	66.2	0	-90	50	50	10	2	7
10214	ID³	55	15	20	66.2	0	-90	50	50	10	2	7
10215	ID³	55	15	20	66.2	0	-90	50	50	10	2	7
10311	ID³	55	15	20	66.2	0	-90	50	50	10	2	7
10312	ID³	55	15	20	66.2	0	-90	50	50	10	2	7
1041	ID³	55	15	20	66.2	0	-90	50	50	10	2	7
1061	ID³	55	15	20	66.2	0	-90	50	50	10	2	7
10711	ID³	55	15	20	66.2	0	-90	50	50	10	2	7
10712	ID³	-	-	20	66.2	0	-90	50	50	10	2	7
8400	ID³	20	10	-	25	0	-90	50	50	10	2	7
8401	ID³	15	10	10	66.2	0	-90	50	50	10	2	7
8402	ID³	20	10	-	66.2	0	-90	50	50	10	2	7
8403	ID³	20	10	-	66.2	0	-90	50	50	10	2	7
8404	ID³	20	10	-	66.2	0	-90	50	50	10	2	7
8405	ID³	20	10	-	66.2	0	-90	50	50	10	2	7
8406	ID³	7	10	-	66.2	0	-90	50	50	10	2	7
8407	ID³	20	10	-	66.2	0	-90	50	50	10	2	7
8408	ID³	20	10	-	66.2	0	-90	50	50	10	2	7
8409	ID³	15	10	-	66.2	0	-90	50	50	10	2	7
84010	ID³	20	10	-	66.2	0	-90	50	50	10	2	7
84011	ID³	20	10	-	66.2	0	-90	50	50	10	2	7
84012	ID³	20	10	-	66.2	0	-90	50	50	10	2	7
84013	ID³	20	10	-	66.2	0	-90	50	50	10	2	7

Block Code	Estimation Method	Cap (% U_3O_8)	Cap (g/t Au)	High Yield Threshold (% U_3O_8)	Bearing (°)	Plunge (°)	Dip (°)	Major (m)	Semi (m)	Minor (m)	Min Samp	Max Samp
84014	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
84015	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
84016	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
84017	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
84018	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
84019	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
84020	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
84021	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
84022	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
84023	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
84024	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
84025	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
84026	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
84027	ID^3	7	10	-	66.2	0	-90	50	50	10	1	7
84028	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
840100	ID^3	35	10	-	66.2	0	-90	50	50	10	2	7
15151	ID^3	10	10	-	66.2	0	-90	50	50	10	2	7
15152	ID^3	10	10	-	66.2	0	-90	50	50	10	2	7
15153	ID^3	10	10	-	66.2	0	-90	50	50	10	2	7
15154	ID^3	10	10	-	66.2	0	-90	50	50	10	2	7
15155	ID^3	7	10	-	66.2	0	-90	50	50	10	2	7
15156	ID^3	10	10	-	66.2	0	-90	50	50	10	2	7
15157	ID^3	10	10	-	66.2	0	-90	50	50	10	2	7
15158	ID^3	10	10	-	66.2	0	-90	50	50	10	2	7
15159	ID^3	10	10	-	66.2	0	-90	50	50	10	2	7
16201	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
16202	ID^3	20	10	10	66.2	0	-90	50	50	10	2	7
16203	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
16204	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7
16205	ID^3	20	10	-	66.2	0	-90	50	50	10	2	7

BLOCK MODEL VALIDATION

RPA validated the block model using the following methods:

- Swath plots of composite grades versus ordinary kriging (OK), ID^3, and nearest neighbour (NN) grades in the X, Y, and Z (Figures 14-16 to 14-18)
- Volumetric comparison of blocks versus wireframes
- Visual Inspection of block versus composite grades on plan, vertical, and long section
- Parallel secondary estimation using ID^3
- Statistical comparison of block grades with assay and composite grades

RPA found grade continuity to be reasonable and confirmed that the block grades were reasonably consistent with local drill hole composite grades.

FIGURE 14-16 EAST-WEST (X) SWATH PLOT OF R780E_MZ DEPOSIT

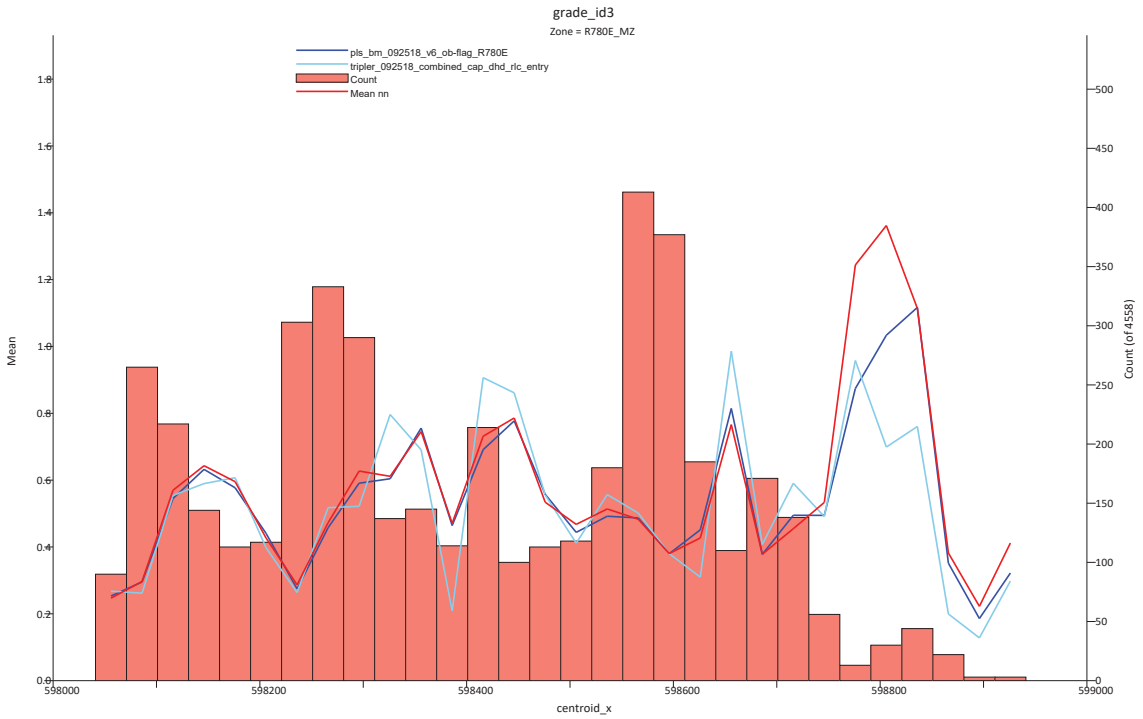


FIGURE 14-17 NORTH-SOUTH (Y) SWATH PLOT OF R780E_MZ DEPOSIT

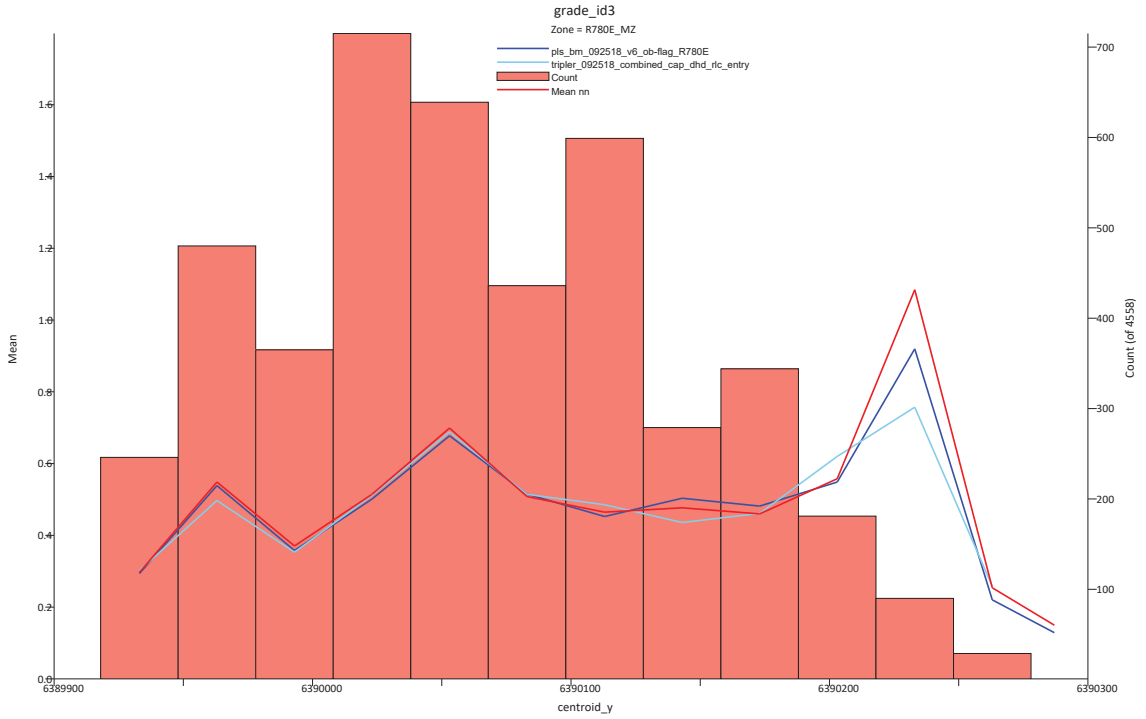
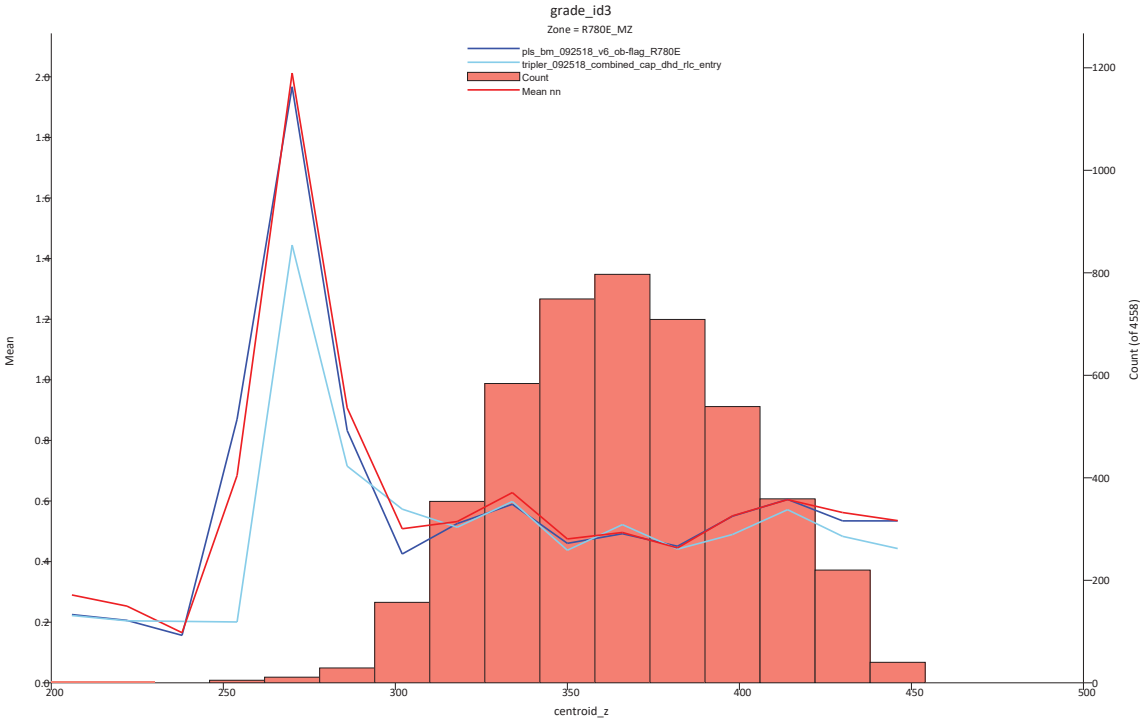


FIGURE 14-18 VERTICAL (Z) SWATH PLOT OF R780E_MZ DEPOSIT



VOLUME COMPARISON

The comparison of wireframe volumes to block volumes at a zero grade cut-off shows good agreement (Table 14-12).

TABLE 14-12 VOLUME COMPARISON
Fission Uranium Corp. – Patterson Lake South Property

Zone	Wireframe Volume (m^3)	Block Model Volume (m^3)	% Difference
R780E_HG	68,148	67,870	-0.41%
R780E_MZ	1,197,311	1,196,580	-0.06%
R780E_OTHER	521,057	522,470	0.27%
HALO	244,517,192	243,434,960	-0.44%
R00E	61,231	60,700	-0.87%
R1620E	66,169	66,070	-0.15%
R840W	228,279	228,280	0.00%
R1515W	166,064	169,490	2.06%
Total	**246,825,451**	**245,746,420**	**-0.44%**

VISUAL COMPARISON

Block grades were visually compared with drill hole composites on cross-sections, longitudinal sections, and plan views. The block grades and composite grades correlate very well visually within the Triple R deposit (Figures 14-19 through 14-22).

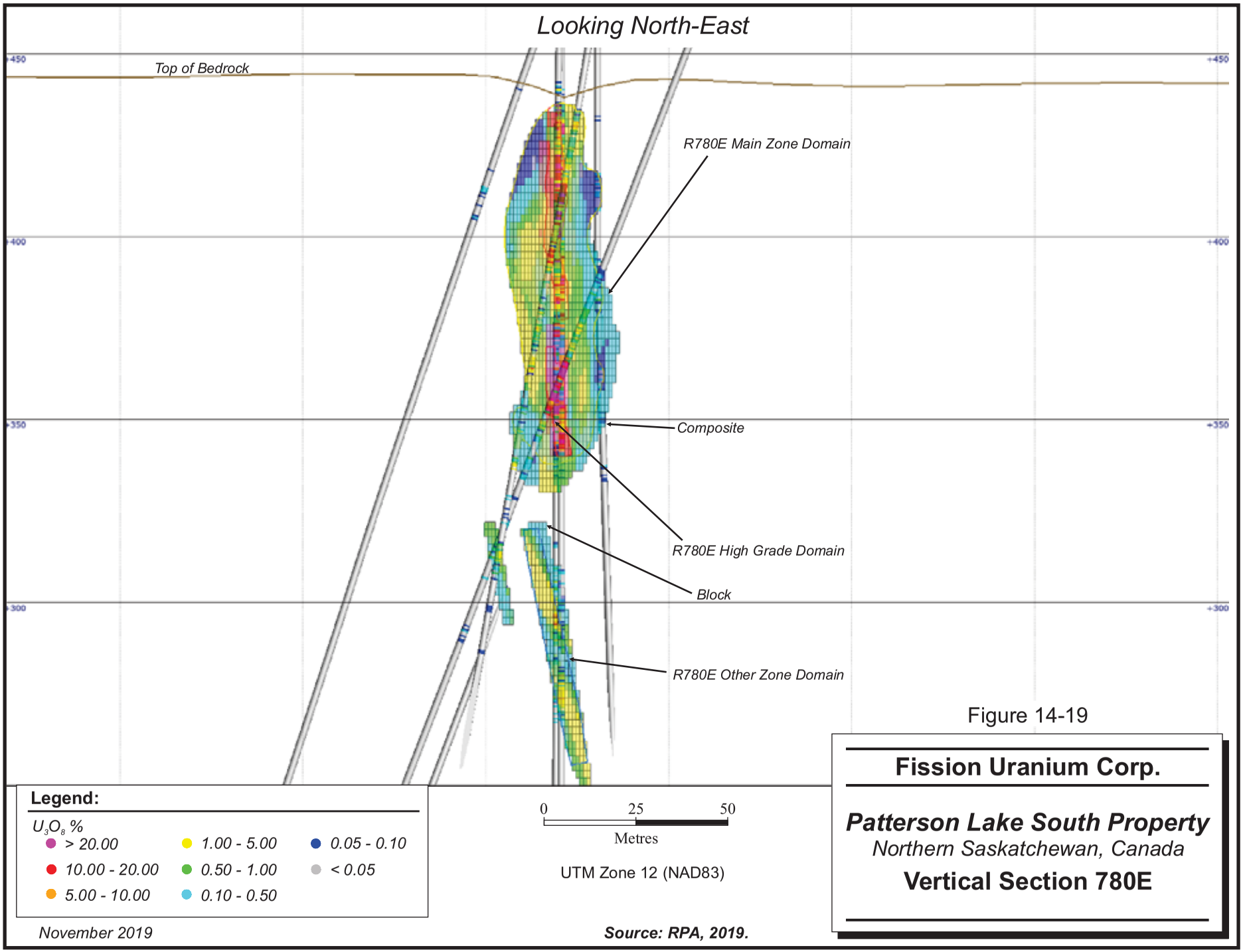


Figure 14-19

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Vertical Section 780E

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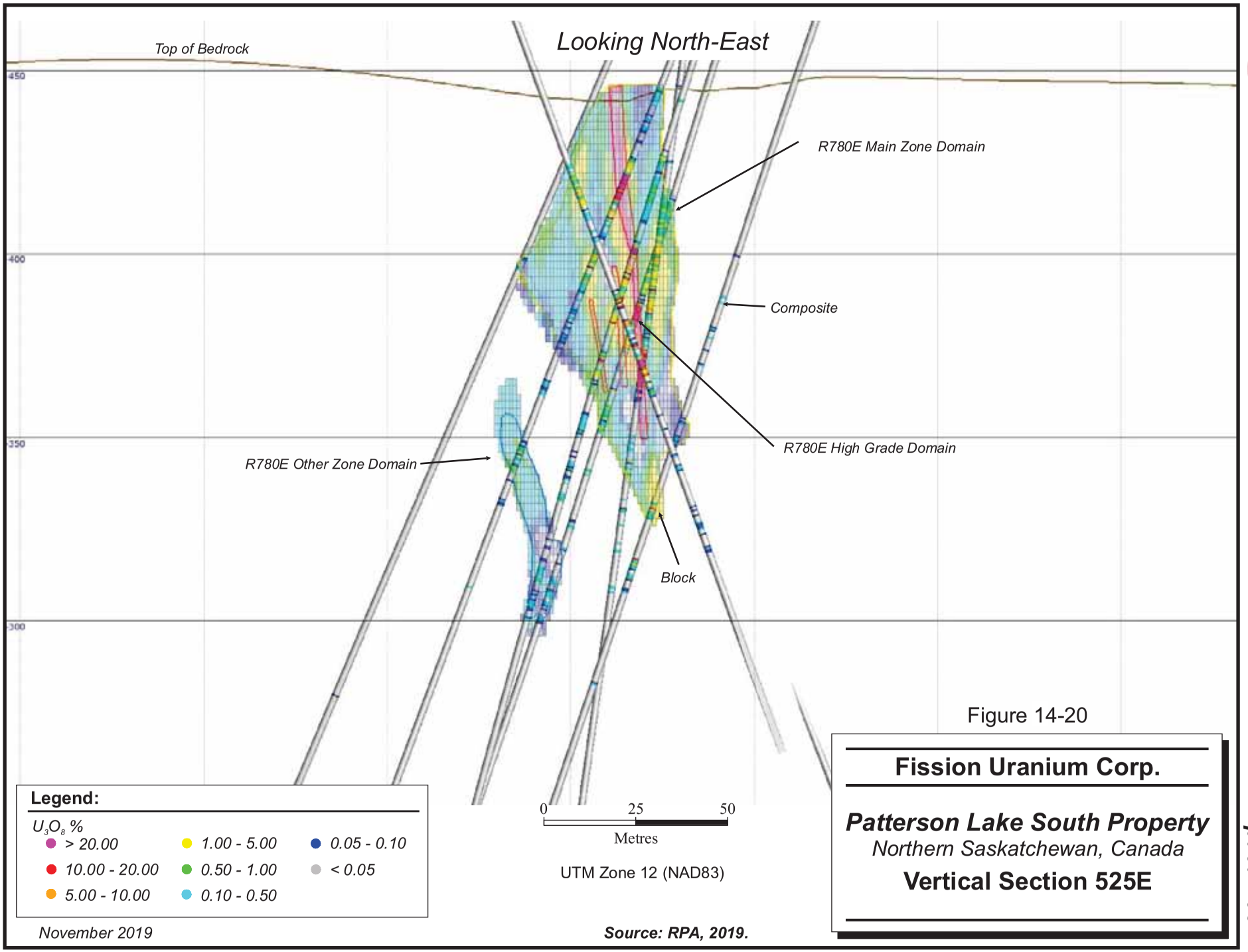

Figure 14-20

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Vertical Section 525E

November 2019

Source: RPA, 2019.

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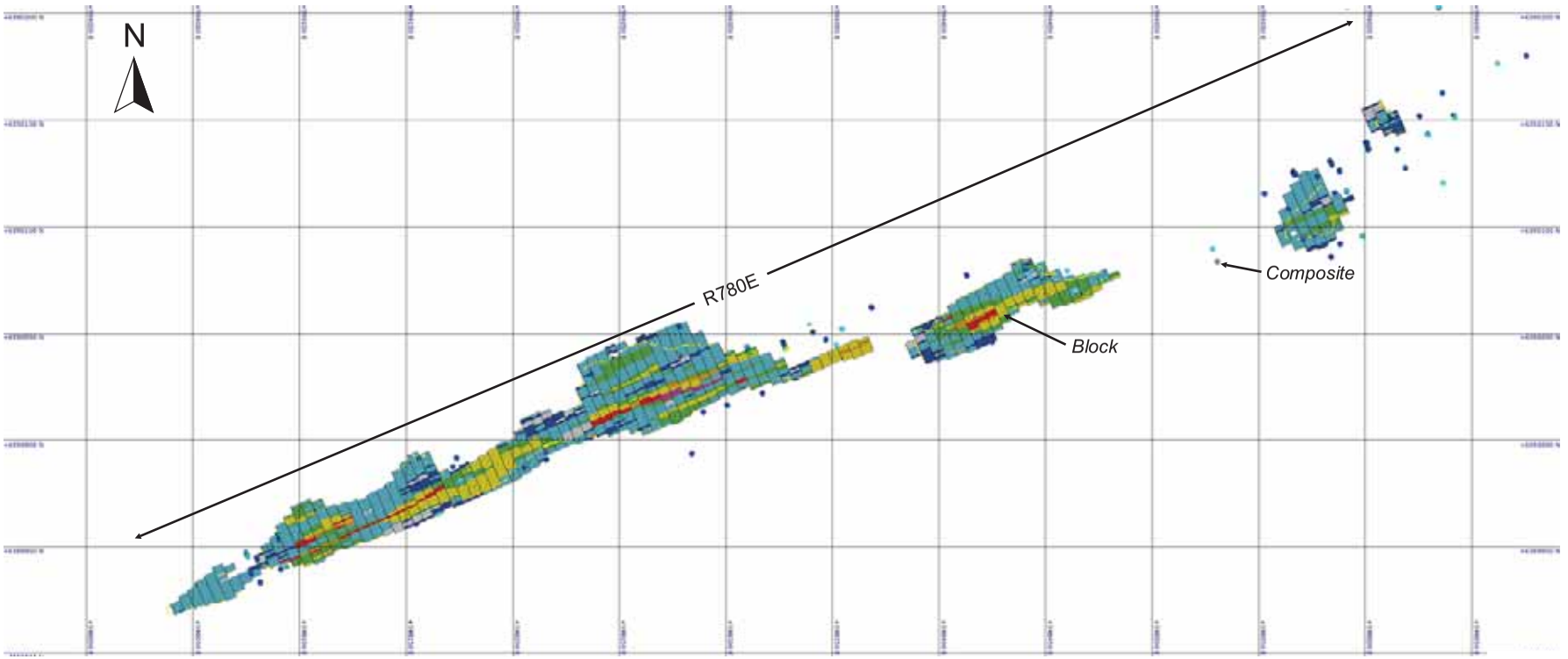


Legend: U_3O_8 %

- > 20.00
- 10.00 - 20.00
- 5.00 - 10.00
- 1.00 - 5.00
- 0.50 - 1.00
- 0.10 - 0.50
- 0.05 - 0.10
- < 0.05

0 50 100 150 200

Metres

UTM Zone 12 (NAD83)

Figure 14-21

Fission Uranium Corp.

Patterson Lake South Property

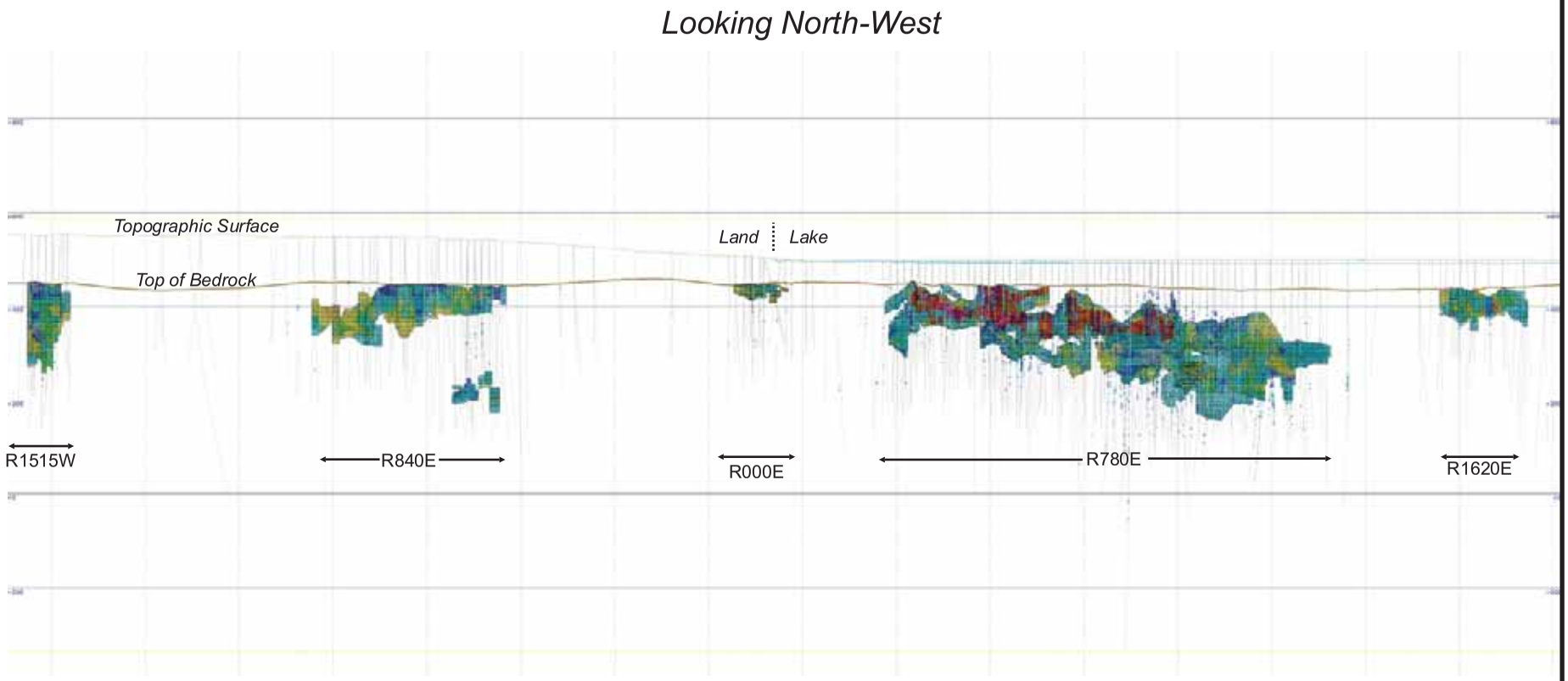
Northern Saskatchewan, Canada

Level Plan 400Z

November 2019

Source: RPA, 2019.

www.rpacan.com



Legend: U_3O_8 %

- *> 20.00*
- *10.00 - 20.00*
- *5.00 - 10.00*
- *1.00 - 5.00*
- *0.50 - 1.00*
- *0.10 - 0.50*
- *0.05 - 0.10*
- *< 0.05*

0 200 400 600 800

Metres

UTM Zone 12 (NAD83)

Figure 14-22

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Longitudinal Section

November 2019

Source: RPA, 2019.

STATISTICAL COMPARISON

Statistics of the block grades are compared with statistics of composite grades in Table 14-13 for all blocks and composites within the Triple R deposit zones.

TABLE 14-13 STATISTICS OF BLOCK GRADES VS. COMPOSITE GRADES
Fission Uranium Corp. – Patterson Lake South Property

Zone	R780E_MZ		R780E_HG		R780E_Other	
Descriptive Statistics	Comp	Block	Comp	Block	Comp	Block
Number of Samples	4,558	119,706	383	6,798	1,193	52,237
Min (% U_3O_8)	0.000	0.000	0.059	0.123	0.000	0.000
Max (% U_3O_8)	10.00	8.78	53.18	52.41	16.68	11.26
Mean (% U_3O_8)	0.51	0.52	15.11	16.49	0.58	0.55
Variance	0.89	0.36	116.80	64.08	1.62	0.53
StDev (% U_3O_8)	0.94	0.60	10.81	8.01	1.27	0.73
CV	1.86	1.14	0.72	0.49	2.18	1.33

Zone	R00E		R1620E		R840W		R1515W	
Descriptive Statistics	Comp	Block	Comp	Block	Comp	Block	Comp	Block
Number of Samples	224	6,102	223	6,617	718	22,467	454	20,206
Min (% U_3O_8)	0.025	0.038	0.000	0.000	0.000	0.000	0.000	0.000
Max (% U_3O_8)	10.00	9.29	18.73	15.47	34.80	28.50	8.02	6.95
Mean (% U_3O_8)	1.28	1.35	1.64	1.95	1.40	1.16	0.83	0.81
Variance	4.69	3.30	10.12	8.26	14.34	3.86	1.75	0.67
StDev (% U_3O_8)	2.17	1.82	3.18	2.87	3.79	1.97	1.32	0.82
CV	1.70	1.35	1.94	1.47	2.70	1.69	1.60	1.01

MINERAL RESOURCE REPORTING CRITERIA

To fulfill the NI 43-101 requirement of “reasonable prospects for eventual economic extraction”, RPA estimated an underground mining cut-off grade using assumptions based on historical and known operating costs for mines operating in the Athabasca Basin, as well as previous studies completed.

Mineral Resources are reported at an underground cut-off grade of 0.25% U_3O_8. The cut-off grade is based on a long term price of US$50/lb U_3O_8 and PFS cost estimates.

The assumptions on estimated operating costs used to calculate the cut-off grade are summarized in Section 21.

CLASSIFICATION

Definitions for resource categories used in this report are consistent with those defined by CIM (2014) and adopted by NI 43-101. In the CIM classification, a Mineral Resource is defined as "a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction". Mineral Resources are classified into Measured, Indicated, and Inferred categories. A Mineral Reserve is defined as the "economically mineable part of a Measured and/or Indicated Mineral Resource" demonstrated by studies at Pre-Feasibility or Feasibility level as appropriate. Mineral Reserves are classified into Proven and Probable categories.

Mineral Resources were classified as Indicated or Inferred based on drill hole spacing and the apparent continuity of mineralization (Figure 14-23). Most of the MZ domain was classified as Indicated owing to the closely spaced drilling throughout the length of the zone. In these areas of Indicated Mineral Resources, drill hole sections are spaced 15 m apart along strike, vertical holes are spaced approximately 10 m along each section, number of holes greater than or equal to two, and distance to nearest neighbour less than 20 m. Angle holes are spaced from 15 m to 45 m apart, averaging 30 m, along the strike direction. Three of the eight high grade lenses were classified entirely as Indicated. Almost the entire R00E Zone was classified as Indicated. All material outside the wireframes, within the low grade Halo domain, was classified as Inferred (not shown).

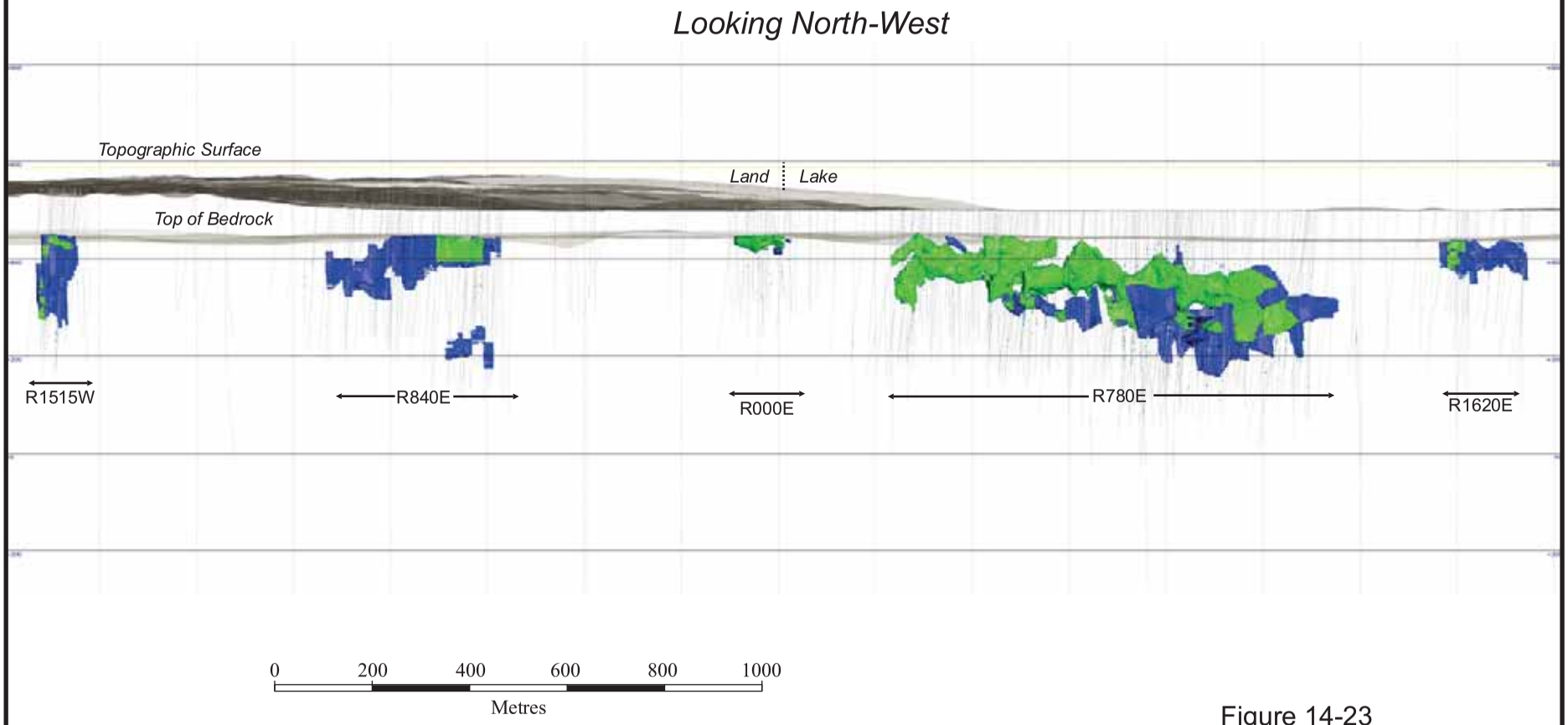


Figure 14-23

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

3D View of the Mineral Resource Classification

November 2019

Source: RPA, 2019.

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MINERAL RESOURCE REPORTING

At cut-off grades of 0.25% U_3O_8 for resources potentially mineable by underground methods, Indicated Mineral Resources total 2.22 million tonnes at an average grade of 2.1% U_3O_8 for a total of 102.4 Mlb U_3O_8. Inferred Mineral Resources total 1.22 million tonnes at an average grade of 1.22% U_3O_8 for a total of 32.8 Mlb U_3O_8. Estimated grades are based on chemical assays only. Gold grades were also estimated and average 0.61 g/t for the Indicated Mineral Resources and 0.50 g/t for the Inferred Mineral Resources.

The zones are those areas traditionally referred to by Fission Uranium in press releases and on its website and are generally defined by differences in location with respect to local grid easting. The R780E_HG domain consists of several lenses within the R780E_MZ and, when combined, the two zones account for approximately 63% of the total resources at Triple R. Table 14-14 reports Mineral Resources summarized by zone.

TABLE 14-14 MINERAL RESOURCE STATEMENT BY ZONE – SEPTEMBER 19, 2019
Fission Uranium Corp. – Patterson Lake South Property

Category	Zone	Tonnes	Metal Grade		Contained Metal	
		(000 t)	(% U_3O_8)	(g/t Au)	(Mlb U_3O_8)	(000 oz Au)
Indicated	R780E					
	R780E_HG	163	16.88	2.61	60.6	13.7
	R780E_MZ	1,554	0.81	0.46	27.6	22.9
	R780E_OTHER	205	0.93	0.61	4.2	4.0
	R780E Subtotal	1,922	2.18	0.66	92.4	40.6
	R000E	97	1.50	0.15	3.2	0.5
	R1620E	42	1.99	0.19	1.8	0.3
	R840W	88	1.68	0.32	3.3	0.9
	R1515W	66	1.13	0.39	1.6	0.8
Indicated Total		**2,216**	**2.10**	**0.61**	**102.4**	**43.1**
Inferred	R780E					
	R780E_HG	0.4	11.74	4.39	0.1	0.1
	R780E_MZ	45	0.97	0.74	1.0	1.1
	R780E_OTHER	504	0.81	0.54	9.0	8.8
	R780E Subtotal	549	0.83	0.56	10.1	9.9
	HALO	98	0.57	0.37	1.2	1.2
	R000E	8	3.95	0.81	0.7	0.2
	R1620E	59	3.55	0.48	4.6	0.9
	R840W	280	1.86	0.49	11.5	4.4

Category	Zone	Tonnes (000 t)	Metal Grade (% U_3O_8)	(g/t Au)	Contained Metal (Mlb U_3O_8)	(000 oz Au)
	R1515W	227	0.94	0.41	4.7	3.0
Inferred Total		**1,221**	**1.22**	**0.50**	**32.8**	**19.6**

Notes:
1. CIM (2014) definitions were followed for Mineral Resources.
2. Mineral Resources are reported at a cut-off grade of 0.25% U_3O_8
3. The cut-off grades are based on price of US$50/lb U_3O_8 and an exchange rate of US$0.75/C$1.00.
4. A minimum mining width of 1.0 m was used.
5. Mineral Resources are inclusive of Mineral Reserves.
6. Numbers may not add due to rounding.

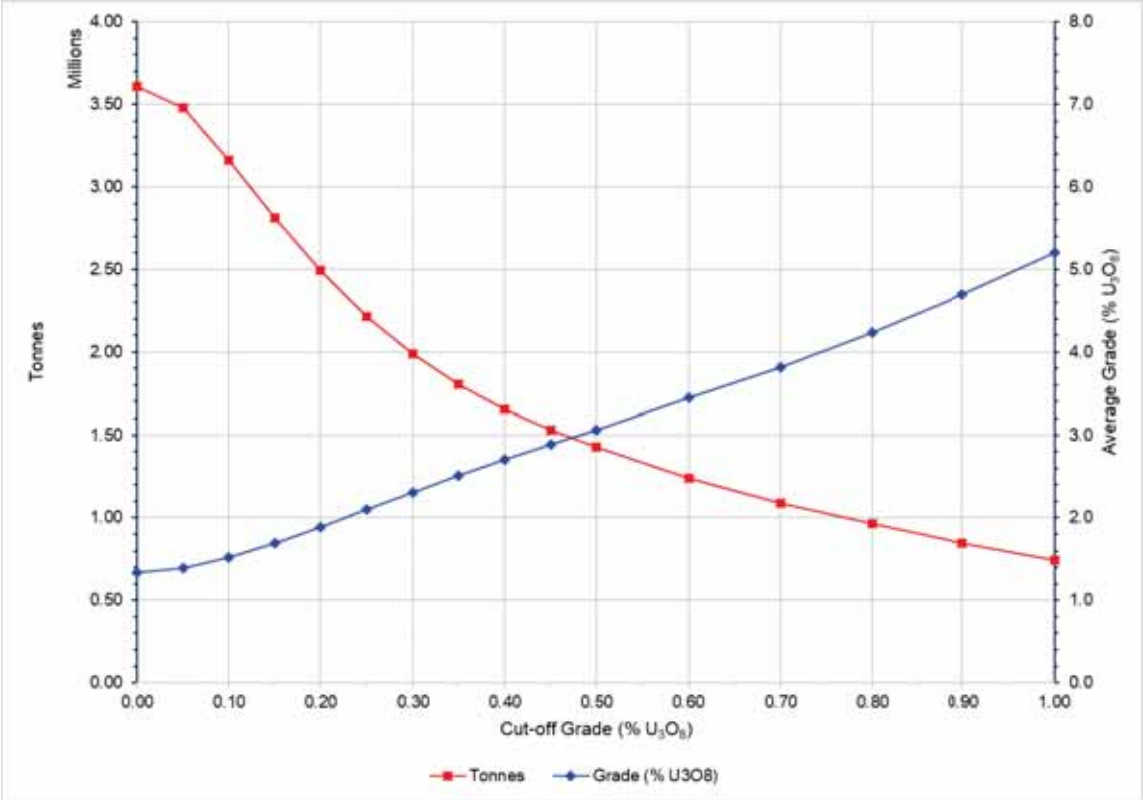
GRADE TONNAGE SENSITIVITY

Tables 14-15 and Figure 14-24 show the sensitivity of the Triple R block model to various cut-off grades. RPA notes that, although there is some sensitivity of average grade and tonnes to cut-off grade (COG), the contained metal is less sensitive.

TABLE 14-15 GRADE TONNAGE SENSITIVITY INDICATED MINERAL RESOURCE
Fission Uranium Corp. – Patterson Lake South Property

COG	Tonnes (000 t)	Metal Grade (% U_3O_8)	(g/t Au)	Contained Metal (Mlb U_3O_8)	(000 oz Au)
0.05	3,477	1.39	0.42	106.45	47.3
0.1	3,164	1.52	0.46	105.93	46.7
0.15	2,812	1.69	0.50	104.96	45.7
0.2	2,494	1.89	0.55	103.74	44.4
0.25	2,216	2.10	0.61	102.36	43.1
0.3	1,989	2.30	0.65	100.99	41.8
0.35	1,802	2.51	0.70	99.66	40.5
0.4	1,652	2.70	0.74	98.42	39.4
0.45	1,529	2.89	0.78	97.27	38.4
0.5	1,425	3.06	0.82	96.18	37.5
0.6	1,238	3.44	0.89	93.92	35.5
0.7	1,091	3.82	0.96	91.83	33.8
0.8	962	4.23	1.04	89.68	32.0
0.9	845	4.70	1.12	87.50	30.3
1	746	5.20	1.20	85.42	28.8

FIGURE 14-24 INDICATED MINERAL RESOURCE TONNES AND GRADE AT VARIOUS CUT-OFF GRADES



COMPARISON TO PREVIOUS ESTIMATE

The current PFS contemplates an underground only mining scenario, while the previous resource estimates were based on a hybrid mine approach consisting of both open pit and underground techniques reported in May 2019 (RPA, 2019). Table 14-16 compares the September 19, 2019 Mineral Resource estimate with the October 23, 2018 estimate. Due to an increase in the cut-off grade from 0.15% U_3O_8 to 0.25% U_3O_8 as a result of converting open pit resources to underground resources, Indicated Mineral Resources have decreased by 1.4%, or approximately 1.4 Mlb of U_3O_8, with a grade increase from 1.85% U_3O_8 to 2.10% U_3O_8. Inferred Mineral Resources remain relatively unchanged with a decrease of 0.2%, or approximately 72,000 pounds of U_3O_8, with a small increase in grade from 1.20% U_3O_8 to 1.22% U_3O_8.

TABLE 14-16 COMPARISON TO PREVIOUS RESOURCE ESTIMATE
Fission Uranium Corp. – Patterson Lake South Property

Estimate	Tonnes	Metal Grade		Contained Metal	
	(000 t)	(% U_3O_8)	(g/t Au)	(Mlb U_3O_8)	(000 oz Au)
September 19, 2109 Estimate					
Indicated	2,216.0	2.10	0.61	102.36	43.1
Inferred	1,221.0	1.22	0.50	32.81	19.6
October 23, 2018 Estimate					
Indicated	2,540.4	1.85	0.54	103.77	44.4
Inferred	1,238.4	1.20	0.49	32.89	19.6
Difference					
Indicated	-324.4	0.24	0.06	-1.41	-1.3
Inferred	-17.4	0.01	0.01	-0.072	0
Percent Difference					
Indicated	-12.8%	13.1%	11.3%	-1.4%	-2.9%
Inferred	-1.4%	1.2%	1.2%	-0.2%	0.0%

15 MINERAL RESERVE ESTIMATE

SUMMARY

Mineral Reserves for Triple R are based on the Mineral Resources as of September 19, 2019 and include detailed mine designs and modifying factors such as external dilution and mining extraction factors. Table 15-1 summarizes the Mineral Reserves.

TABLE 15-1 MINERAL RESERVE STATEMENT – SEPTEMBER 19, 2019
Fission Uranium Corp. – Patterson Lake South Property

Category	Tonnes (000 t)	Grade (% U_3O_8)	Contained Metal (Mlb U_3O_8)
Probable			
R00E Zone	15	2.03	0.7
R780E Zone	2,283	1.60	80.7
Total Probable	**2,299**	**1.61**	**81.4**

Notes:
1. CIM (2014) definitions were followed for Mineral Reserves.
2. Mineral Reserves are estimated using an average long term uranium price of US$50/lb U_3O_8, and an exchange rate of C$1.00/US$0.75.
3. Underground Mineral Reserves were estimated by creating stope shapes using a stope optimizing tool. The stope optimizer was run using a cut-off grade of 0.25% U_3O_8, with a minimum mining width of 3.0 m (including hanging wall and footwall dilution), on 20 m vertical stope heights.
4. A mining extraction factor of 95% was applied to the underground stopes, while underground development assumed a 100% mining extraction factor.
5. The density varies according to the block model. Waste density was estimated to be 2.42 t/m^3.
6. By-product credits were not included in the estimation of Mineral Reserves.
7. Numbers may not add due to rounding.

Mineral Resource to Mineral Reserve conversion was moderate within the R780E and R00E zones, with mining losses (part of the "modifying factors" that differentiate Mineral Reserves from Mineral Resources) consisting of:

- Sterilization of material in the vicinity of the bedrock contact
- Underground resource blocks not included in designed stopes due to grade or lack of continuity with other mineral blocks

Mineral Reserves are contained within the R780E and R00E zones. PLS's other three zones (R1515W, R840W, and R1620E) were not considered for inclusion as Mineral Reserves.

RPA is not aware of any mining, metallurgical, infrastructure, permitting, or other relevant factors that could materially affect the Mineral Reserve estimate.

DILUTION AND EXTRACTION

Based on the Mineral Resource and cut-off grade calculation, an iterative approach to Mineral Reserve planning was utilized. Underground stope shapes were generated using Deswik Stope Optimizer (DSO). The key inputs used to create stope shapes included a 20 m vertical height, minimum mining width of 3.0 m (which includes 0.5 m of dilution on both the hanging wall and footwall), and a 0.25% U_3O_8 cut-off grade. Dilution applied to the underground stope shapes included the following:

- For transverse stopes, end wall dilution of 0.5 m is applied to each stope shape, for a total of 1.0 m.
- Sidewall dilution (including backfill dilution) has been included for secondary transverse stopes at a rate of 5%.
- For longitudinal stopes, hanging wall and foot wall dilution of 0.5 m is applied to each stope shape, for a total of 1.0 m.
- For both longitudinal and transverse stopes, the grade of the dilution was based on what was contained in the block model.
- Secondary transverse stopes had a dilution of 5% added to them.

The resultant net dilution applied to the underground stopes is 22%. RPA recommends that a detailed dilution study be conducted as part of future studies.

The mining extraction factors were 95% for underground stopes, and 100% for underground development. Post-blast ore scanning and sorting for underground mining represents a potential upside to head grade control and improvement and has not been included in this PFS.

CUT-OFF GRADE

The cut-off grade calculations for underground mining were estimated using benchmarking data, previous studies completed on PLS, as well as other inputs that have been derived specifically for this stage of the Project (such as process recovery). After completion of the cash flow model, the initial cut-off grades were validated to ensure that they aligned with the initial assumptions. The cut-off grade calculation is presented in Table 15-2.

TABLE 15-2 CUT-OFF GRADE ESTIMATE
Fission Uranium Corp. – Patterson Lake South Property

Parameter	Units	Underground	Notes
Annual Mine and Mill Production	000 t	350	
Daily Throughput	tpd	1,000	
Uranium Grade	% U_3O_8	0.50%	
Uranium Recovery	%	94.9%	
Recovered Uranium	Mlb	3.66	
Uranium Price	US$/lb	50.00	
Exchange Rate	C$/US$	0.75	
Uranium Price (Canadian)	C$/lb U_3O_8	66.67	
SK Revenue Royalty Payments	%	7.25%	
Net Uranium Price Realized	C$/lb U_3O_8	61.83	
Revenue			
Net Smelter Return	C$ 000	226,392	1
Value per Tonne	C$/t ore	647	
Value per % U_3O_8	**C$/% U_3O_8**	**1,294**	
Operating Costs			
Unit Underground Mining	C$/t proc	180.00	2
Unit Processing	C$/t proc	110.00	2
Unit G & A	C$/t proc	86.00	2
Mining	C$ 000	63,000	
Processing	C$ 000	38,500	
G & A	C$ 000	30,000	
Total Operating Costs	**C$ 000**	**131,500**	
Sustaining Capital Unit Costs	C$/t proc	28	2
Mining Incremental @ 60%	C$/t proc	108	3
Variable Processing @ 50%	C$/t proc	55	4
Cut-Off Grades			
Operating Costs and Sustaining Capital	% U_3O_8	0.31%	5
Operating Costs	% U_3O_8	0.29%	6
Incremental (Var. Mining, Proc., G&A)	% U_3O_8	0.23%	7
Pit/Portal Discard (Proc., G&A)	% U_3O_8	0.15%	8
Var. Processing	% U_3O_8	0.04%	9

Notes:
1. Assumes that the buyer pays for transportation to refinery, and the uranium is 100% payable, and there are no penalties.
2. Cost assumptions based on comparable projects, and previous studies.
3. Incremental mining costs assume that 40% of mining costs are fixed annually, and 60% are variable based on tonnage.
4. Variable processing costs assume that 50% of total processing costs are fixed annually, and 50% are variable based on tonnage.

5. This cut-off grade considers the metal needed to cover total operating costs and sustaining capital costs.
6. This cut-off grade considers the metal needed to cover total operating costs, however, excludes the cost of sustaining capital development.
7. This cut-off grade considers the metal needed to cover variable mining, processing, and general and administration (G&A) costs.
8. Surface cut-off grade (often referred to as the Pit or Portal Discard) considers that the material has already been mined and brought to surface, and the metal content must be enough to cover processing and G&A.
9. This cut-off grade is only applicable when there is excess capacity in the process plant, and fixed processing costs and G&A costs are already incurred.

Metal prices used for Mineral Reserves are based on consensus, long term forecasts from banks, financial institutions, and other sources.

SUMMARY OF MATERIAL CLASSIFICATION

The limit for what is considered benign waste, from a regulatory perspective, is 0.03% U_3O_8. Table 15-3 summarizes how the quantities of ore, waste, and special waste rock were derived.

TABLE 15-3 SUMMARY OF ORE AND WASTE CLASSIFICATION
Fission Uranium Corp. – Patterson Lake South Property

Resource Block Grade	Category	Underground Shape	
		Within Stopes (grade measured per stope)	Within Development (grade measured per round)
< 0.03%	Waste	Blended into diluted stope grade, and sent to appropriate stockpile	Sent to Waste Pile, not processed
0.03% to 0.15%	Special Waste	Blended into diluted stope grade, and sent to appropriate stockpile	Sent to Special Waste Pile, not processed
0.15% to 0.25%	Low Grade (LG) Ore	Blended into diluted stope grade, and sent to appropriate stockpile	Sent to LG Stockpile for processing at the end of the LOM
0.25% to 4.00%	Medium Grade (MG) Ore	Blended into diluted stope grade, and sent to appropriate stockpile	Sent to MG Stockpile for processing
> 4.00%	High Grade (HG) Ore	Blended into diluted stope grade, and sent to appropriate stockpile	Sent to HG Stockpile for processing

16 MINING METHODS

CONTEXT

The Project hosts the Triple R deposit, a structurally controlled northeast-southwest trending sub-vertical high grade uranium deposit. The deposit is overlain by 50 m to 100 m of sandy overburden, with the high grade mineralization located near the bedrock-overburden contact. The deposit extends beneath Patterson Lake, and will require extensive ground control improvements to effectively isolate the deposit from the lake as shown in Figure 16-1.

Previous studies on the Project have focused on a combination of open pit and underground mining using ring dykes, slurry wall, dewatering, and overburden removal to access the deposit. This PFS focuses exclusively on underground mining methods and attempts to minimize the disturbance of Patterson Lake. Irrespective of the mining method, the following factors must be considered in determining the optimum extraction method:

- Regulatory and permitting considerations
- Environmental footprint and impact on biological and aquatic wildlife
- Radiological considerations, and impacts of radiation exposure to site personnel
- Safety implications with respect to water inflow and geotechnical considerations
- Overall extraction factor of the orebody with respect to crown pillar considerations
- Extraction factor of specific high grade ore pods, with respect to worker safety
- Review of constructability and project complexity for each of the options
- Empirical trade-off of capital and operating costs for each of the selected options

The previous PFS that evaluated an open pit and underground mine (referred to as the Hybrid PFS) was completed in April 2019. Based on feedback received by Fission Uranium and other stakeholders, an underground only concept was evaluated at a PFS level. The resulting study shows the deposit being accessed by a decline through the overburden, accompanied by two ventilation raises that provide dedicated ventilation services to the mine workings.

MINING METHOD OVERVIEW

The mining method for the underground will be longhole retreat mining in both transverse and longitudinal methods, and some localized drift and fill mining based on current block model

information. The mining will progress from the bottom levels to the top, and from the southwest to northeast. Mining is planned at nominally 1,000 tpd ore.

The mine will be accessed using a decline originating to the west of the R00E deposit. The decline will include a box cut into the overburden, and a portal face collared in the overburden. The first stage of the decline will be developed through overburden for approximately 405 m, using the New Austrian Tunneling Method (NATM – a method commonly used in soft ground), also known as Sequential Excavation Method (SEM), or Sprayed Concrete Liner (SCL). Following this, the decline will transition through weak bedrock for an additional 133 m, until reaching the competent bedrock.

The ventilation system will be a push-pull system with one fresh air raise (FAR) and one exhaust air raise (EAR). The ventilation system also includes a fresh air drift and internal fresh air raises that distributes the air to all of the mine workings, and an exhaust air drift and internal exhaust raises that collect the exhaust air and discharge it out of the mine. The ventilation in the underground workings will be used once in the ore production areas and could possibly be reused from waste headings. Push-pull ventilation systems have been used extensively in uranium mines in the Athabasca Basin.

A key component of the underground design is the concept of using artificial ground freezing to extract some of the crown pillar – the mineralized material that approaches the overburden layer. This will be done using horizontal directional drilling from the shore of Patterson Lake and then pumping a refrigerated brine solution through the drill holes to effectively freeze the ground in the areas of stopes.

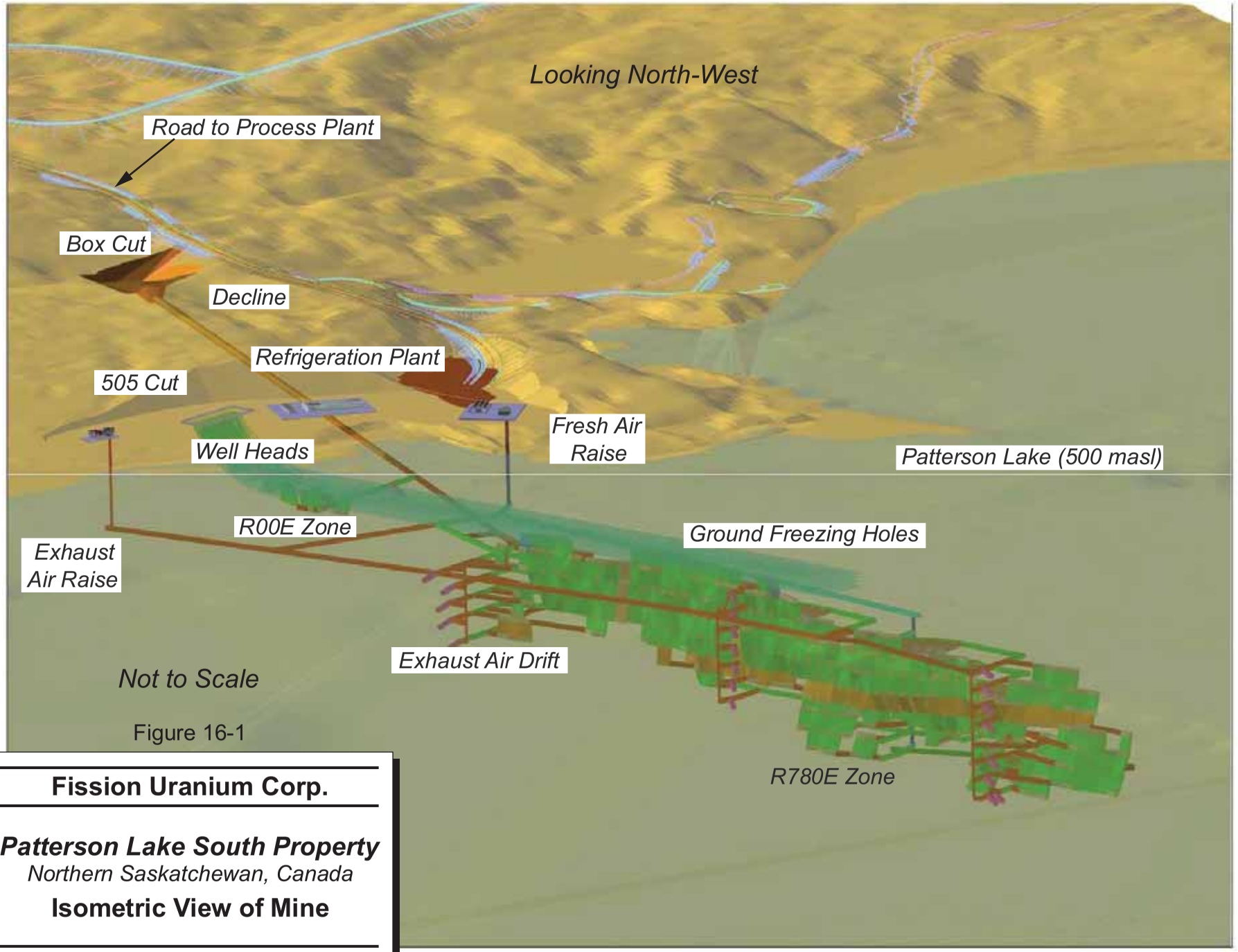


Figure 16-1

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Isometric View of Mine

November 2019

Source: RPA, 2019.

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GEOTECHNICAL ANALYSIS AND DESIGN

The majority of previous geotechnical design work was oriented toward the open pit and underground hybrid option, and most of the previous data is still relevant for the underground mining concept. Geotechnical analysis is summarized into: surface design, mine access design (decline and shafts), underground mine design, and crown pillar recovery. Geotechnical analysis and design were carried out by BGC and other groups. The geotechnical analysis section is generally extracted from BGC (2018f). BGC has since completed further underground and open pit geotechnical design that supports the assumptions made in the development of the PFS mine plan.

MINE SURFACE DESIGN

OVERVIEW

This applies to the area on the shore of Patterson Lake referred to as the "505 Cut" and Box Cut. The "505 Cut" refers to an area that is leveled to 505 masl, where the ventilation raises will be collared, as well as the ground freezing infrastructure will be placed. The Box Cut includes a "Forward Staging Area" that is a flat excavation at 510 masl, approximately 40 m wide by 40 m length, and the portal collar. Both areas require the excavation of overburden.

HYDROGEOLOGIC ASSUMPTIONS FOR DESIGN

For both the 505 Cut and Box Cut, it was assumed that the excavation occurs in overburden that is above the water table. Further work is recommended to define the water table in the areas of 505 Cut and Box Cut. The fully depressurized design assumption should be considered preliminary pending confirmation at the next level of study.

SLOPES IN SOIL

The results of the PFS geotechnical site investigations supports the assumptions made during the 2015 PEA for the open pit slope designs in soil. Additional work was carried out in 2018 to understand the extent of the Mannville Group, which has the potential to detrimentally affect the open pit slopes stability (BGC, 2018d). The existing dataset supports the interpretation that the mudstone unit pinches out outside (southwest) of the proposed pit walls. Therefore, no additional work has been completed for the open pit slope designs in soil, and the designs presented in BGC (2015), which assume a design static factor of safety (FoS) of 1.5, are considered by BGC to be suitable for the current level of study:

- 26° overall slope

- 20 m high benches
- 30° bench face angle
- 8 m bench width.

Minimal ground support is planned for the 505 Cut and Box Cut excavations. Slope face angles can be refined during the initial stages of excavation based on field work and conducting test pit exercises.

MINE ACCESS DESIGN

PORTAL

The portal is situated within the Box Cut. The face of the portal is perpendicular to the gradient of the decline, while the sidewalls "fade away" from the face slope to the slope of the Box Cut. The portal face and sidewalls require extensive ground support to ensure stability throughout the LOM. A series of soil nails, spilings, mesh, and shotcrete is all planned to ensure the stability of the portal face in advance of excavation. The ground support will be installed in 1.5 m vertical lifts. Drainage is planned so that precipitation is directed away from the slopes of the Box Cut and portal. An unfolded section of the portal ground improvements is shown in Figure 16-2. For the mining sequence refer to the excavation and ground support description provided for Figure 16-10.

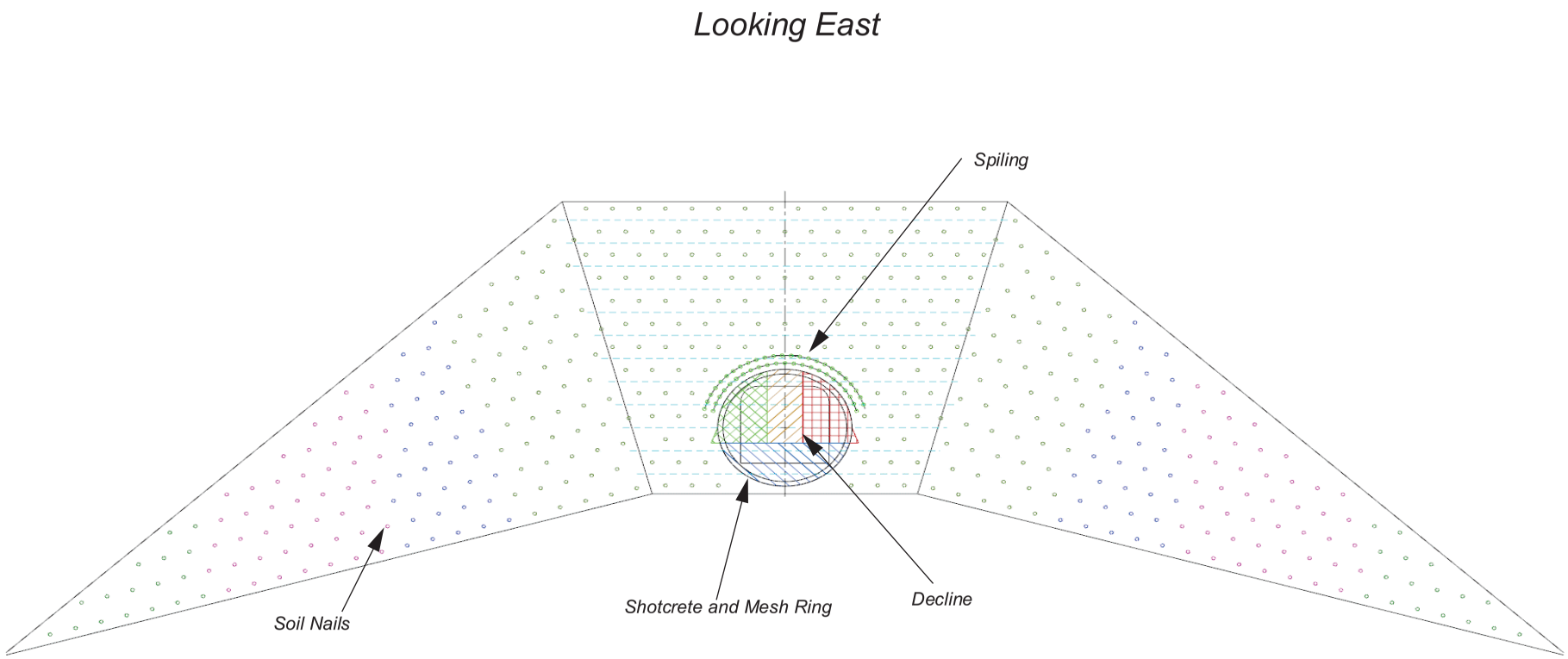

Figure 16-2

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Schematic of the Unfolded View of the Portal

Coloured Ring Quadrants Indicate Excavation Sequence Described in Text

Refer to Figure 16-10 for Decline Profiles

November 2019

Source: RPA, 2019.

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DECLINE

The area around the decline will be dewatered prior to excavation. The decline will be developed on an east-west alignment at a gradient of -15%. The first component of the decline is through overburden, followed by development through transition bedrock, and development through competent bedrock. To develop through overburden, a tunneling method known as the NATM will be utilized. A plan view and geological long section of the decline are shown in Figure 16-3, and Figure 16-4, respectively.

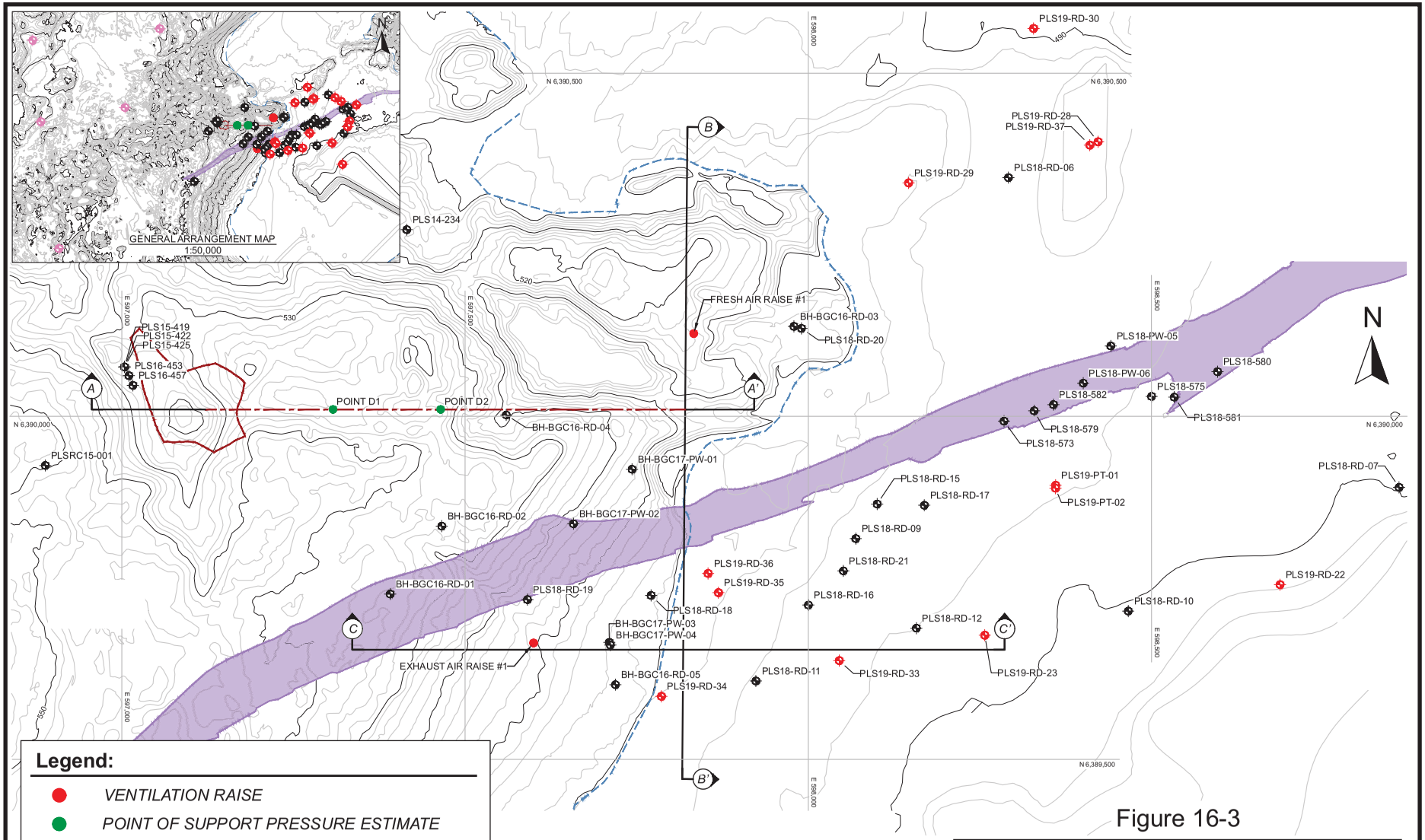
A summary of the decline development is shown in Table 16-1.

TABLE 16-1 SUMMARY OF DECLINE DEVELOPMENT
Fission Uranium Corp. – Patterson Lake South Property

Decline Phase	Starting Elevation (masl)	Ending Elevation (masl)	Vertical Distance (m)	Lateral Development (m)	Gradient (%)	Finished Dimensions (m)	Ground Support
Overburden	510	450	60	405	-15	7.0 m DIA	Sequential Excavation
Transition	450	430	20	133	-15	Irregular	Variable
Hard Rock	430	380	50	337	-15	5.0 m W x 5.0 m H	Standard
Total			**130**	**875**			

VENTILATION SHAFTS

Both shafts will traverse through overburden into bedrock. To excavate through the overburden, a ground freezing program is required, to a depth of 75 m for both the fresh air and exhaust shafts. Both shafts will be lined with 300 mm high-strength concrete. Geological cross sections of the ventilation shafts are shown in Figure 16-5 and Figure 16-6.



Legend:

- *VENTILATION RAISE*
- *POINT OF SUPPORT PRESSURE ESTIMATE*
- *DRILL HOLE (2019)*
- *PRE-FEASIBILITY STUDY DRILL HOLE*
- *TAILINGS MANAGEMENT FACILITY DRILL HOLE*
- *EXTENT OF BATHYMETRY*
- *BOX CUT*
- *DECLINE CENTRELINE*
- *SHEAR CORRIDOR OUTLINE*

0 100 200 300 400 500
Metres

Cross Sections A-A', B-B', and C-C' are shown in Figures 16-4 to 16-6

Figure 16-3

Fission Uranium Corp.

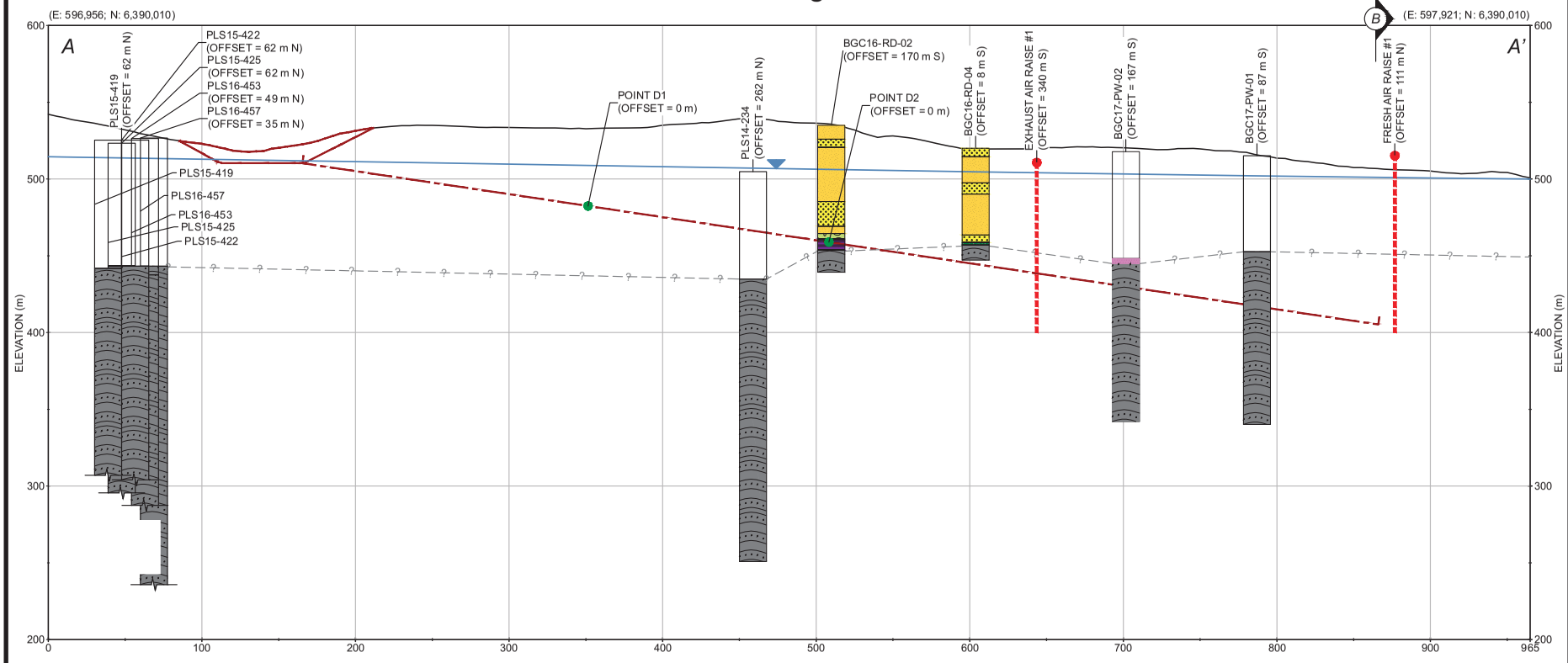
Patterson Lake South Property

Northern Saskatchewan, Canada

Plan View of Decline with A-A', B-B', and C-C' Cross Sections

November 2019

Source: BCG, 2019.



0 50 100 150 200 250
Metres

Legend:

- *POINT OF SUPPORT PRESSURE ESTIMATE*
- *VENTILATION RAISE*
- *BOX CUT*
- *DECLINE CENTRELINE*
- *PRE-MINING PIEZOMETRIC SURFACE*
- *INFERRED BEDROCK CONTACT*

INTREPRETED DRILL HOLE GEOLOGY

- *FINE TO COARSE SAND (GLACIOFLUVIAL 2)*
- *FINE TO MEDIUM SAND (GLACIOFLUVIAL 1)*
- *NO DATA - ASSUMED OVERBURDEN*
- *FINE TO COARSE SAND AND GRAVEL, SOME SILT (UPPER TILL)*
- *SILT AND SAND (LODGEMENT TILL)*
- *CONTACT RAPIDS FORMATION (SANDSTONE)*
- *MANNVILLE FORMATION (CRETACEOUS) (MUDSTONE)*
- *BASEMENT BEDROCK (GNEISS)*

Figure 16-4

Fission Uranium Corp.

Patterson Lake South Property

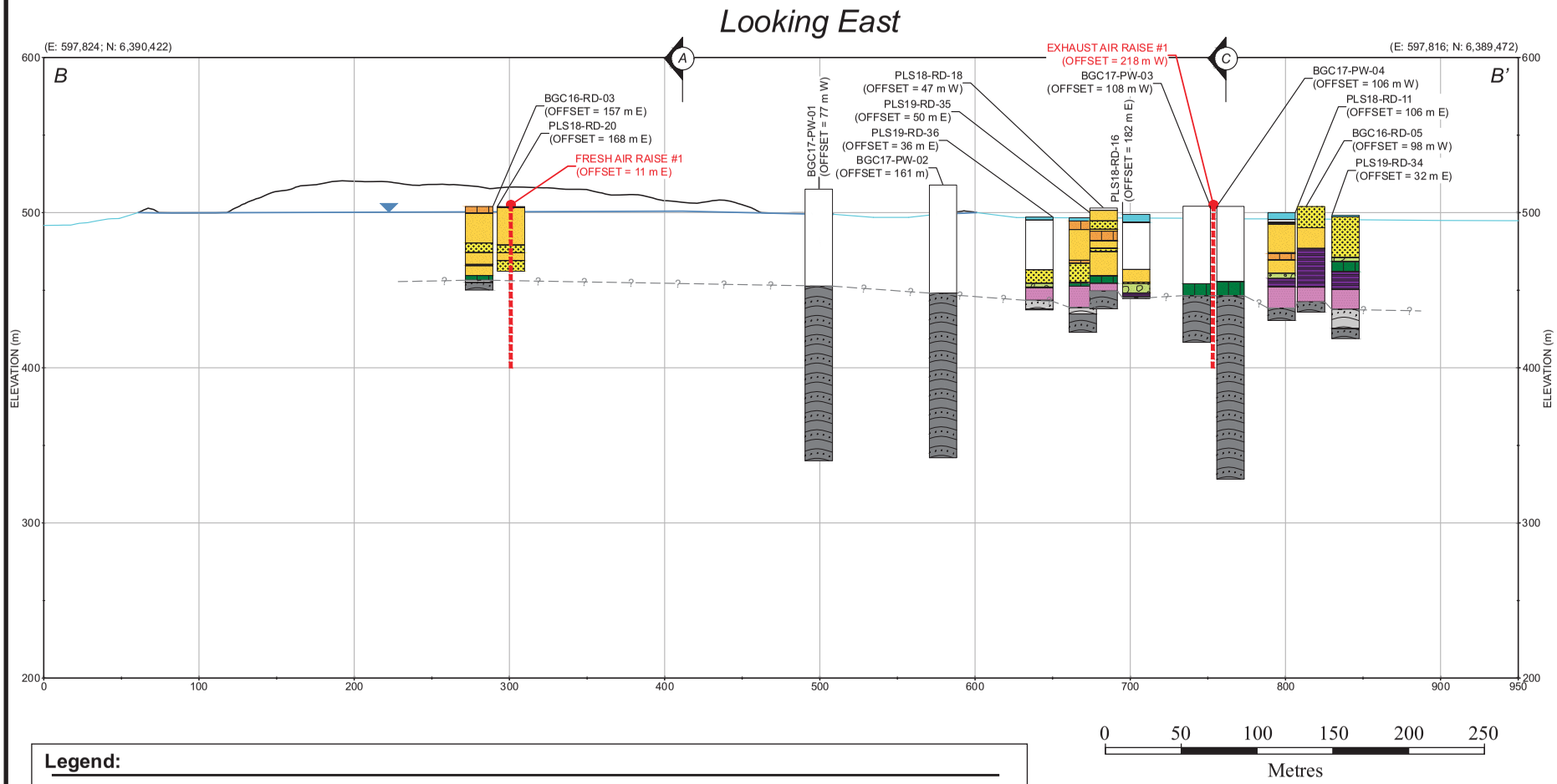
Northern Saskatchewan, Canada

A-A' Long Section of Decline

November 2019

Source: BCG, 2019.

www.rpacan.com



Legend:

- VENTILATION RAISE
- PRE-MINING PIEZOMETRIC SURFACE
- PATTERSON LAKE
- INFERRED BEDROCK CONTACT

INTERPRETED DRILL HOLE GEOLOGY

- NO DATA - ASSUMED OVERBURDEN
- FINE TO COARSE SAND (GLACIOFLUVIAL 2)
- FINE TO MEDIUM SAND (GLACIOFLUVIAL 1)
- SILT AND FINE SAND (GLACIOFLUVIAL TO GLACIOLACUSTRINE)
- SILT, SOME CLAY, SOME FINE SAND (GLACIOLACUSTRINE)
- FINE TO COARSE SAND AND GRAVEL, SOME SILT (UPPER TILL)
- SILT AND SAND (LODGEMENT TILL)
- MANNVILLE FORMATION (CRETACEOUS) (MUDSTONE)
- CONTACT RAPIDS FORMATION (SANDSTONE)
- WEATHERED GNEISS
- BASEMENT BEDROCK (GNEISS)
- PATTERSON LAKE

November 2019

Source: BCG, 2019.

Figure 16-5

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

B-B' Geological Cross Section of Fresh Air Raise

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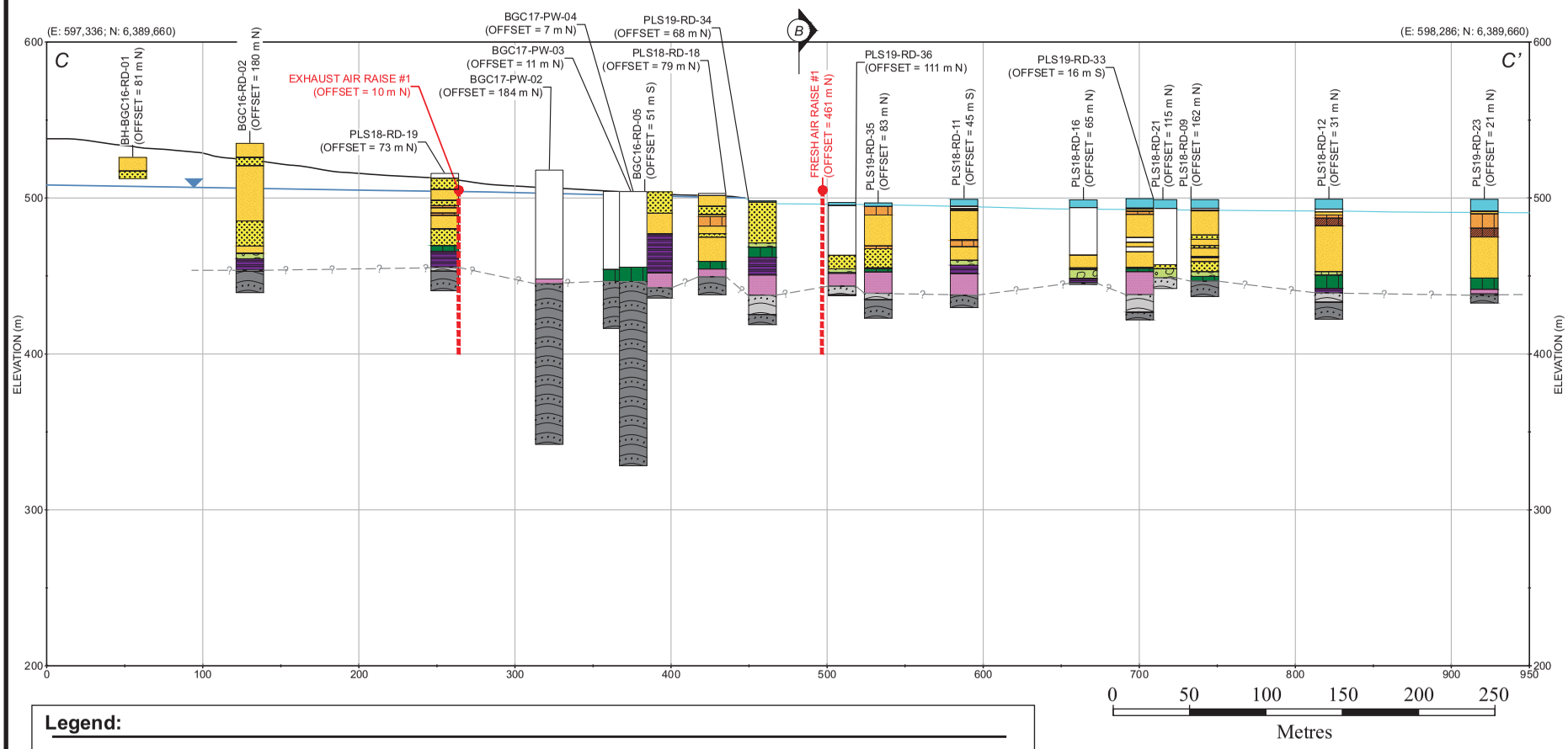

Legend:

- VENTILATION RAISE
- PRE-MINING PIEZOMETRIC SURFACE
- PATTERSON LAKE
- INFERRED BEDROCK CONTACT

INTERPRETED DRILL HOLE GEOLOGY

- NO DATA - ASSUMED OVERBURDEN
- FINE TO COARSE SAND (GLACIOFLUVIAL 2)
- FINE TO MEDIUM SAND (GLACIOFLUVIAL 1)
- SILT AND FINE SAND (GLACIOFLUVIAL TO GLACIOLACUSTRINE)
- SILT, SOME CLAY, SOME FINE SAND (GLACIOLACUSTRINE)
- FINE TO COARSE SAND AND GRAVEL, SOME SILT (UPPER TILL)
- SILT AND SAND (LODGEMENT TILL)
- MANNVILLE FORMATION (CRETACEOUS) (MUDSTONE)
- CONTACT RAPIDS FORMATION (SANDSTONE)
- WEATHERED GNEISS
- BASEMENT BEDROCK (GNEISS)
- PATTERSON LAKE

November 2019

Source: BCG, 2019.

Figure 16-6

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

C-C' Geological Cross Section of Exhaust Air Raise

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UNDERGROUND MINE

UNDERGROUND DESIGN CRITERIA

BGC has used a combination of empirical and analytical assessments to develop underground excavation design recommendations for the R780E/R00E underground mine. The maximum unsupported and supported stope dimensions, ground support designs, crown pillar designs, and backfill strength recommendations were estimated by BGC for use in the PFS mine design and the development of a LOM plan.

Table 16-2 summarizes the design acceptance criteria for the geotechnical assessments for the underground mine design. The stope stability, ground support, and backfill FoS acceptance criteria are based on industry standard practice with the following assumptions:

- Material shear strengths are assumed to be reasonable based on the information available.
- The geotechnical data set is sufficient to develop an understanding of the potential failure mechanisms.
- Underground excavations will be managed during operations using observational techniques and instrumentation where necessary.
- Workers are not permitted to work under unsupported ground.
- Stopes will be mined in a primary-secondary sequence and must be backfilled as soon as practicable within the mining cycle.
- Downstream environmental sensitivities are present related to the potential for radioactive contamination.

TABLE 16-2 UNDERGROUND EXCAVATION AND OPEN PIT SLOPE DESIGN ACCEPTANCE CRITERIA
Fission Uranium Corp. – Patterson Lake South Property

Mine Component	Analysis	Acceptance Criteria Value
Underground	Ground support designs	FoS = 1.3
Underground	Stope designs (unsupported)	Boundary of “stable” and “transition” zones on Stability Graph
Underground	Stope designs (supported)	Centrally located within the “some confidence cable bolt design zone” on Stability Graph
Underground	Backfill strength	Industry precedence and FoS = 1.3 against wedge instability in vertical exposure of backfill
Underground	Crown pillar	FoS = 1.5 (rock mass failure) FoS = 2.0 (shear abutment failure)

STOPE STABILITY ANALYSIS

Preliminary recommendations for stope dimensions and ground support to assist with the development of stoping design criteria have been developed using the empirical "Stability Graph" method (Hutchinson and Diederichs 1996, and Nickson et al., 1992 after Potvin, 1988). The method is used to estimate acceptable mining dimensions for the proposed stope back and walls using the hydraulic radii (HR (area/perimeter)) and modified stability number (N') calculated as follows:

$$N' = Q' \; x \; A \; x \; B \; x \; C$$

Where:

Q' is the modified rock mass classification parameter

A is a measure of the ratio of intact rock strength to induced stress

B is a measure of the relative orientation of dominant structure with respect to the excavation surface

C is a measure of the influence of gravity on the stability of the face being considered.

The results of the N' and HR for the assessed stope surface are plotted on the stability curve to estimate the achievable unsupported and supported stope dimensions.

The 2015 PEA mine plan was reviewed to determine the average stope orientation for the transverse and longitudinal stopes. The base case designs have been estimated using the mean values for Q' and intact strength. The "A" parameter has been calculated using the design UCS for each geotechnical unit, with an in-situ stress field as discussed in Chapter 2 (BGC, 2018). The "B" parameter has been calculated based on a representative value selected from all design discontinuity sets in the domain. The "C" parameter has been calculated based on the orientation of the design discontinuity sets, which indicates sliding failure mechanisms will govern stability in the walls, and that gravity fall will govern stability in the back.

Table 16-3 summarizes the stope stability analysis inputs and results for transverse and longitudinal stopes. The base case design for the PFS mine plan is for unsupported stope walls and backs; therefore, the maximum recommended unsupported transverse stope dimensions are 30 m strike length, 10 m span, and 35 m stope height, and the maximum recommended unsupported longitudinal stope dimensions are 30 m strike length, 10 m span, and 35 m stope height. For the "supported" design cases presented in Table 16-3, stope

hanging walls are assumed to be supported with 15 m long 5/8" double strand fully grouted cable bolts installed from the stope undercut and overcut at a staggered spacing of 1.5 m by 1.5 m. The stope stability assessments and resultant recommended stope dimensions require that backfill is as tight as practically possible to the stope walls and back. Due to backfill shrinkage, the secondary stopes in the uppermost overcuts in each mining block should be assumed to have spans equal to twice the stope width. Additional ground support may be required to prevent unravelling.

TABLE 16-3 STOPE STABILITY ANALYSIS
Fission Uranium Corp. – Patterson Lake South Property

Mining Orientation	Stope Surface	Wall Orientation[1]		Q'	A	B	C	N'	Maximum Unsupported HR	Maximum Supported HR
		Dip Direction (°)	Dip (°)							
Transverse	Hanging wall	318	86	15	0.70	0.4	3.0	13.0	6.0	10.7
	Side Wall	228	90	11	0.45	0.4	4.0	8.1	5.1	9.8
	Back	0	0	11	0.45	0.2	2.0	2.0	3.2	7.4
Longitudinal	Hanging wall	314	89	15	0.70	0.4	3.0	13.0	6.0	10.7
	End Wall	224	90	11	0.45	0.4	5.0	10.1	5.6	10.1
	Back	0	0	11	0.45	0.2	2.0	2.0	3.2	7.4

Notes:
1. The orientation of the stope walls is based on the average orientation measured from the PEA-level underground mine design received from RPA on October 10, 2017.

BACKFILL STRENGTH RECOMMENDATION

BGC assumes mined-out stopes will be backfilled with a cemented rock fill (CRF) and uncemented rock fill (URF) combination based on the 2015 PEA.

Backfill of 1,000 kPa 28 day strength is required in the primary and secondary stopes, where the primary backfill design criteria are for vertical exposure stability within the open stope. This recommendation is based on the Mitchell method (Mitchell et al., 1982) for stability of an exposure of unsupported cemented backfill, for an assumed double high stope (2 x 35 m). The design strength is based on a design FoS > 2, to allow for operational inefficiencies, CRF quality control, and the lack of ability to test in-situ CRF. This recommendation is not applicable to the design of backfill for stopes immediately above the sill pillars, where personnel work

under engineered fill during sill pillar recovery. Backfill strength requirements are increased in the area of the crown pillar.

GROUND SUPPORT

Ground support is designed for primary (waste) and secondary (production cross cut) headings stability. As a protective measure against radioactive radiations, shotcrete will be used in all secondary drifts. The assumed excavation dimensions are based on the 2015 PEA mine plan, and remain valid for the underground only PFS:

- Primary headings (Waste and ore drifts): 5 m x 5 m
- Intersections: 6.5 m effective span

It has been assumed for efficiency that intersection ground support types will be the same type, but not necessarily the same length, as the primary heading ground support, with the addition of cable bolts as required to provide long support to any wedges.

The structural stability of the proposed excavations was analyzed using an empirical design chart after Grimstad and Barton (1993) and Unwedge© (Rocscience 2018) to develop minimum ground support recommendations. Discontinuity set orientations and strengths as discussed in Chapter 4 and Chapter 5 (BGC 2018), respectively, were used in the analysis. Discontinuity cohesion was assumed to be zero. Primary headings were assumed to be excavated in the footwall, and secondary headings were assumed to be excavated in the MIN domain.

Barton's empirical design chart was used to review the required ground support in consideration of given excavation geometries. Although the design chart indicates that most of the rock would be adequately supported using spot bolting, standard practice in Canadian hard rock mines is to have a minimal patterned ground support standard. As such, kinematic ground support analyses (Unwedge) were conducted for primary headings (main access ramp, main level access, and intersections) in the footwall, and secondary headings in the MIN structural domain.

Table 16-4 summarizes the ground support design inputs, and Table 16-5 provides the ground support recommendations.

TABLE 16-4 GROUND SUPPORT DESIGN PROPERTIES
Fission Uranium Corp. – Patterson Lake South Property

Type	Property	Unit	Source
Splits sets (SS33)	Tensile Capacity	8.5 tonnes	Brady et al., 2006
	Bond Strength (weak ground)	0.25 to 1.2 tonnes per 0.3 m	Brady et al., 2006
Fully Grouted #7 Rebar	Tensile Capacity	0.232 MN	DSI, 2012
	Plate Capacity (6” x 6”)	5.6 MN	DSI, 2012
	Bond Strength	0.59 MN / m	Brady et al., 2006
	Bond Length	80%	N/A
Cable bolts, 5/8”, single strand	Yield Strength	21.6 tonnes	Brady et al., 2006
	Bond Strength	300 kN/m	Hutchinson and Diederichs, 1996
Welded Mesh, 4 x 4 inch, 6 gauge	Bag strength	3.3 tonnes	Brady et al., 2006

Notes:
1. Cable bolt bond strength assumes rock elastic modulus of 30 GPa and grout water:cement ratio of 0.4.

TABLE 16-5 GROUND SUPPORT DESIGN RECOMMENDATIONS
Fission Uranium Corp. – Patterson Lake South Property

Opening Type	Cross-section	Ground Support Type	Length (m)	Spacing (m)	Additional Notes
Main access development (ramp, primary development drifts)	5 m x 5 m	Welded wire mesh	N/A	N/A	In back and walls
		Grouted #7 Rebar	2.4	1.2	In back and shoulders
		Splits Sets (SS33)	2.4	1.2	In lower walls
Secondary development (ventilation access and production cross cut development)	4 m x 4 m	Welded wire mesh	N/A	N/A	In back and walls
		Grouted #7 Rebar	1.8	1.2	In back and shoulders
		Splits Sets (SS33)	1.8	1.0	In lower walls
		Shotcrete	N/A	N/A	For radiological protection of workers
Ventilation raises	3 m diameter	Welded wire mesh	N/A	N/A	Primarily in hanging wall of raise
		Grouted #7 Rebar	1	0.8 x 0.8	

Opening Type	Cross-section	Ground Support Type	Length (m)	Spacing (m)	Additional Notes
Intersections	6.5 m effective span [5]	Welded wire mesh	N/A	N/A	In back and walls
		Grouted #7 Rebar	2.4	1.2	In back and walls
		Cable bolts	5	2.5 x 2.5	Single strand, bulged

Notes:
1. Design FoS of 1.3.
2. Wall bolts must extend to within 0.5 m of sill (floor).
3. Surface support should be installed when excavation intersects relatively poorer ground, faults, more persistent joints or narrower joint spacing, soft joint walls, groundwater seepage, or “dead” sounding material.
4. Estimates provided for cost estimating purposes only.
5. Narrower bolt spacing will be required if overbreak results in effective spans greater than the design assumption.

The bolt types used in these designs are consistent with the bolt types assumed during the 2015 PEA. Operational efficiency may be improved by using a single bolt type. The split sets in the walls could be replaced by grouted #7 rebar, if the same bolt length and bolt spacing is used.

All possible combinations of discontinuity design sets were analyzed to assess the adequacy of prescribed ground support to prevent wedge failures. Joints were assigned persistence equal to the width of the drift opening, and faults were assumed to have infinite persistence. Wedges that weigh less than three tonnes and/or have an apex height greater than one opening dimension (one drift height) above the back were filtered from further analyses. It was assumed these wedges posed low risks to the design as they would either be retained by surface support (shotcrete or galvanized welded wire mesh) or would be “clamped” and unlikely to fail. An FoS of 1.3 against kinematic failure has been used to guide the design recommendations.

Due to adverse orientation of some of the discontinuity sets in the rock mass, there will remain some residual risk for rock fall despite the installation of the ground support summarized in this report. The risk for that rock fall increases where the discontinuities are persistent (greater than half of the cross cut span) and closely spaced (less than half of the cross cut span). The existing geotechnical database is insufficient to predict where these more persistent and/or closely spaced discontinuities may occur, therefore thorough geotechnical inspections and routine scaling of the workings throughout the development cycle should be carried out to help mitigate the residual risk.

CROWN PILLAR CONSIDERATIONS

The deposit extends under Patterson Lake, and approaches the contact between water-saturated overburden and bedrock. Consequently, careful consideration must be placed in evaluating the feasibility of extracting this mineralization. RPA and BGC evaluated a variety of different ground improvement methods to allow for the partial recovery of the crown pillar. Two methods were explored in greater detail: jet grouting from a peninsula built into Patterson Lake over top of the deposit, and ground freezing either from shore, from underground drifts, or from a similar peninsula as the jet grouting option. A key consideration of the underground only PFS was to minimize the disturbance to Patterson Lake, and therefore the peninsula option was eliminated. Ground freezing using horizontal directional drilling emerged as the preferred option due to the following:

- Ground freezing has been used extensively in the Athabasca Basin to isolate uranium deposits from poor ground conditions
- Ground freezing could be installed remotely, prior to any development occurring in the area of the crown pillar
- Freeze plant infrastructure can be placed on surface, adjacent to the collars of the freeze holes

Based on this, BGC (geotechnical), Newmans Geotechnique (ground freezing), and Artisan Consulting Services (horizontal directional drilling) proposed a solution that allows for recovering a portion of the crown pillar stopes, while sterilizing approximately 15 m of the uppermost deposit. BGC provided a shape file to RPA and Newmans to show the extent of the freezing that needs to occur. The ground freeze includes holes in the overburden and bedrock. To achieve the crown pillar recovery, Newmans recommends 57 drill holes spaced between 6 m and 7 m centre-to-centre, depending on whether it is drilled in overburden or bedrock. The holes are cased and include a high density polyethylene (HDPE) pipe inside each hole. Refrigerated brine is then circulated through the holes, to achieve an overall frozen mass of ground with a temperature of at least -10C. Based on modelling, this is expected to take 24 months.

A cross section of the ground freezing area and freezing model is shown in Figure 16-7, and Figure 16-8, respectively.

Looking North-East

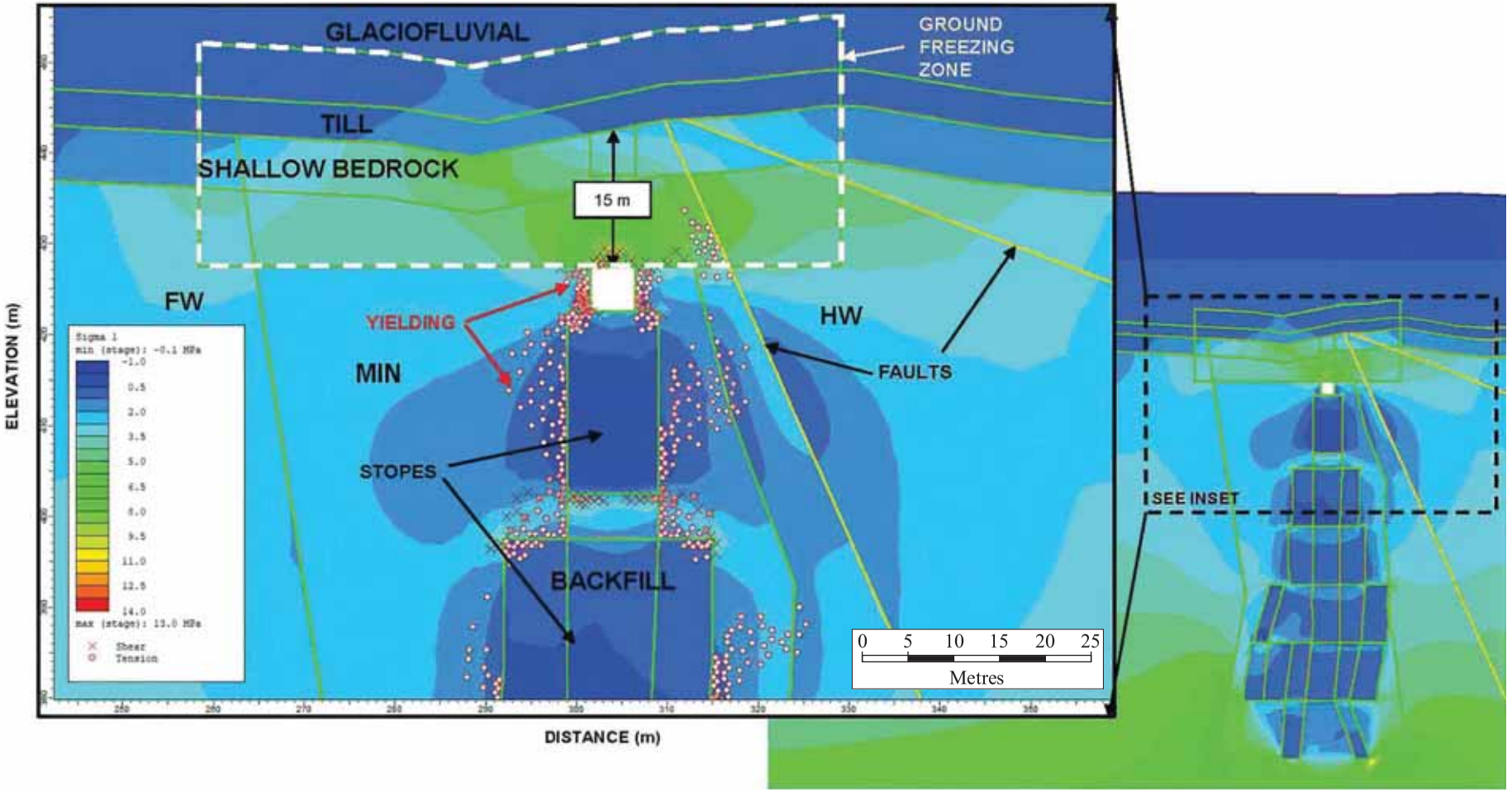

Figure 16-7

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Cross Section of Crown Pillar Area

Note: Crown Pillar is 15 metres Thick, 5 metres Span

November 2019

Source: BCG, 2019.

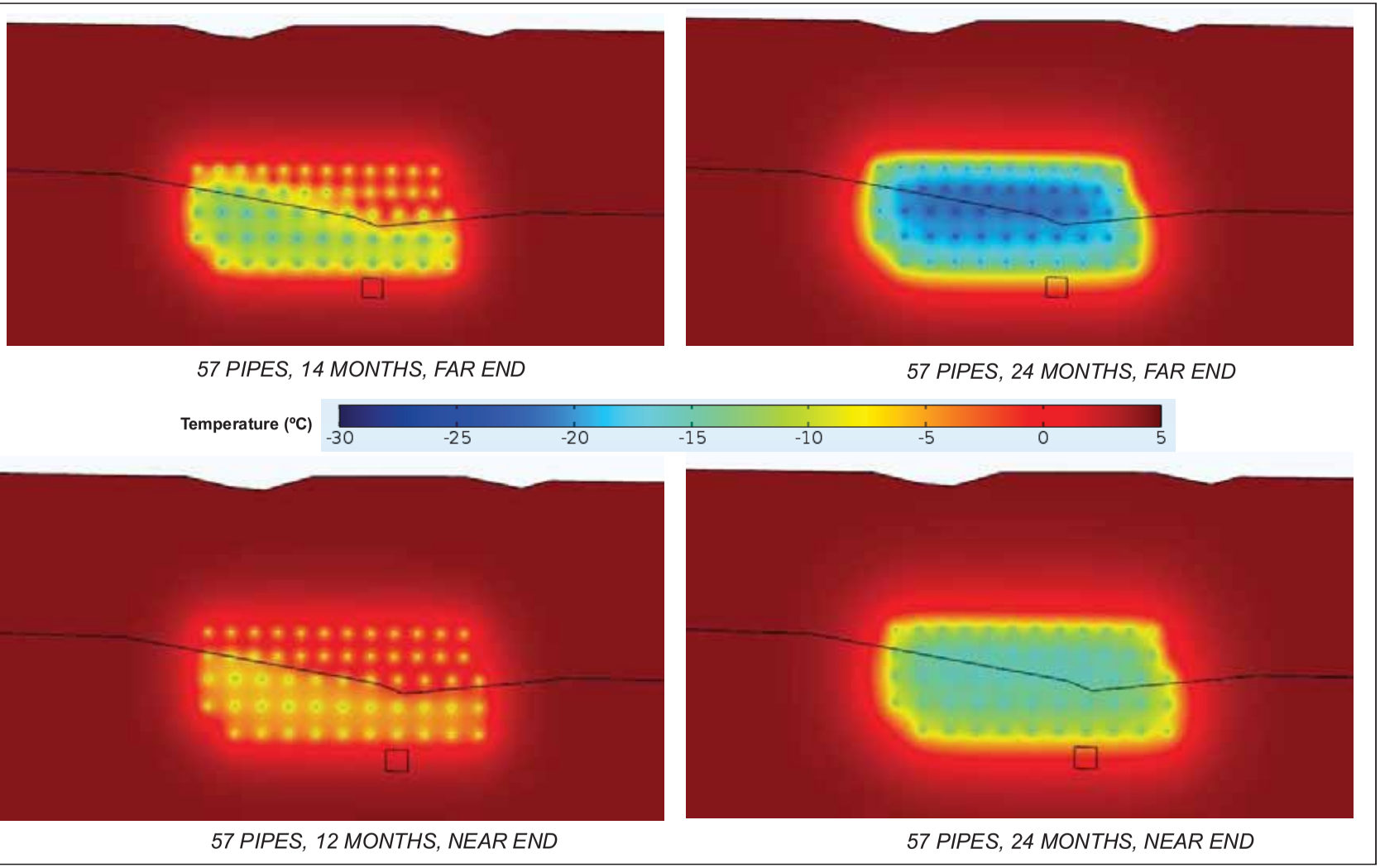

Figure 16-8

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Sample Cross Sections of Ground Freezing Area

Note: The pipes are on a 7x7 m grid in basement, 6x6m grid in till

November 2019

Source: Newmans Geotechnique, 2019.

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HYDROGEOLOGY

Previous hydrogeology studies at the Project have focused on the concept of a hybrid open pit and underground mine, and consequently some of the previously completed work is no longer relevant to the underground only concept. The following section discusses previous work as it relates to the hybrid concept.

In August 2016, seven groundwater monitoring wells were installed at the Project to support the assessment of baseline hydrogeology conditions within the soil. Five of these wells were installed on land, and two were installed in Patterson Lake. The 2016 hydrogeological field program is described in BGC (2018a).

Four geotechnical holes were drilled and instrumented with vibrating wire piezometers (VWPs), (two per borehole) as part of a geotechnical program that ran concurrently with the 2016 hydrogeological program. Monitoring wells were installed at the bottom of three of these boreholes. Prior to the installation of monitoring equipment, six packer tests and two falling head tests were completed in the geotechnical boreholes to obtain estimates of hydraulic conductivity near the soil-sedimentary bedrock contact. The 2016 geotechnical field program is described in more detail in BGC (2018b).

In August 2017, a hydrogeological field program was undertaken during which the monitoring wells installed in 2016 were developed, hydraulically tested, and sampled (BGC, November 10, 2017). Additionally, four geotechnical drill holes were completed in bedrock. Ten packer tests were completed in these boreholes to obtain estimates of bedrock hydraulic conductivity. Three of the boreholes were instrumented with a nest of three VWPs (i.e., nine VWPs total). The 2017 geotechnical site investigation program is outlined in a separate report (BGC, November 10, 2017). The packer test results formed the basis of the groundwater inflow model.

The hydrogeological work was used by BGC to develop a 3D numerical groundwater flow model to estimate groundwater inflows to the open pit and underground workings, and to support open pit assessments for the Project PFS. The numerical model development was limited to the requirements of the PFS-level design, and simulates groundwater flow for existing conditions, and operational phases of the mine.

The numerical model was developed using MODFLOW-USG, with local sub-layer and spatial refinement around the proposed open pit and cutoff wall alignment. The model grid was separated into seven hydrostratigraphic units, based on the site conceptual hydrogeological model. The model was calibrated to 43 hydraulic head targets, assumed to represent average annual conditions, which resulted in a normalized root mean square error (NRMS) of 7.1%. The relatively good match to field observations indicates the numerical model provides a reasonable representation at the project scale.

Transient predictive simulations were performed using the calibrated groundwater flow model, modified using the PFS open pit shells and underground stope designs. The goal of the simulations was to quantify groundwater inflows, which were separated into four components:

1. seepage through the cutoff wall;
2. dewatering the surficial sediments and shallow bedrock within the bounds of the cutoff wall;
3. flow to the open pit through bedrock; and
4. flow to the underground workings.

To simulate the progression of the open pit and underground workings, the model was divided into eight annual stress periods. Transitory increases in predicted groundwater flow corresponded to periods when a new pit shell was introduced within the model.

Total predicted inflow to the mine was up to 10,360 m^3/day. The groundwater seepage through the cutoff wall was predicted to range from approximately 740 m^3/day in Mine Year 1, to approximately 3,190 m^3/day in Mine Year 7. Dewatering rates for the surficial sediments and shallow bedrock were predicted to range from approximately 0 m^3/day in Mine Years 6 and 7, to approximately 7,780 m^3/day, in Mine Year 2. The rate of groundwater inflow into the open pit through the bedrock was predicted to range from approximately 120 m^3/day in Mine Year 1, to approximately 1,550 m^3/day in Mine Year3. At the end of mining, inflows to the pit through bedrock were predicted to be approximately 270 m^3/day. The model predicted groundwater inflow rates to the underground workings to range from approximately 670 m^3/day in Mine Year 6, to approximately 570 m^3/day in Mine Year 7.

A sensitivity analysis indicated that seepage through the cutoff wall is most sensitive to the hydraulic conductivity of the upper aquifer and the cutoff wall itself. Inflows through the

bedrock to the open pit and underground workings are most sensitive to the hydraulic conductivity of the basement bedrock aquifer.

The groundwater flow model developed and documented as part of this project met the objectives outlined in the scope of work and is appropriate for the support of a PFS. The results of the modelling presented within this report provide a range of likely bulk groundwater inflow rates to the mine.

In RPA's opinion, the expected inflows into the underground mine would not exceed that which was modeled for the hybrid option. Further hydrogeological modeling is required that is focused on the underground only mining concept.

GEOTECHNICAL UNCERTAINTIES AND RELATED RECOMMENDATIONS FOR FURTHER WORK

This section summarizes BGC's perception of the data gaps and geotechnical uncertainties associated with the open pit and underground rock mechanics assessment presented in this report. Associated recommendations to address remaining gaps in information, increase the reliability of the underground designs, and evaluate mitigation options for risks identified in this study are also presented.

CROWN PILLAR DESIGN AND RECOVERY

The design for the crown pillar is at a PFS level and requires further detailed modeling to bring it to a FS level of study.

POREWATER PRESSURES IN THE MINE

There is currently uncertainty regarding the predicted pore pressures during development of the underground workings, due to a large scale pumping test only being completed in one area of the previously planned open pit, and related 3D hydrogeological model has only been completed for the hybrid concept, and not the underground only concept.

STRUCTURAL GEOLOGICAL MODEL

The structural geologic model remains poorly defined at this stage of study, therefore there is uncertainty regarding the location, orientation, and geotechnical characteristics of large scale structure (faults) across the project area. Because large scale structure has the potential to affect the stability of the underground crown pillar, stopes, ramp, and footwall development,

BGC has generated their own model based on historic maps and a review of geotechnical drill hole data that is currently available. The reliability of the rock mechanics assessments could be improved if further geological modelling work could define the location, orientation, and geotechnical characteristics of major geologic structures.

UNDERGROUND MINE INFRASTRUCTURE

The location of underground mine infrastructure (crushers, conveyors, shops, etc.) had not been defined at the time of this assessment. The proposed underground infrastructure could be at risk if even relatively small movements are experienced in the walls, back or sill of the excavations. Back or wall instability could directly impact the infrastructure. Instability or deformation in the vicinity of the excavation may require ongoing maintenance, which would increase service delays for the infrastructure.

The risk to the underground infrastructure can be managed by engineering design and mine operations:

- Designing adequate ground support for the excavations.
- Maintaining adequate barrier pillars between the excavations and production openings.
- Maintaining adequate barrier pillars between the excavations and major structures (fault zones), if possible.
- Operating a suitable ground deformation monitoring system to provide early warning of instabilities that could affect the infrastructure.
- Including a contingency in the estimated maintenance costs for the infrastructure to account for adjustments to the system in response to deformations.

GEOTECHNICAL UNITS, STRUCTURAL DOMAINS, AND DISCONTINUITY STRENGTHS

Optimization of the proposed mine plan, including open pit slope angles, crown pillar thickness, and stope dimensions, would be possible with additional refinement of the geotechnical units, structural domains, and design discontinuity sets. The current dataset is insufficient in volume to allow further delineation of additional units and domains, which may allow more aggressive designs in areas of higher rock mass quality or higher shear strengths.

Six to eight geotechnical drill holes should be completed to collect data for the FS level assessment of the Project. These drill holes should be used to confirm the geological interpretations and the geotechnical parameters of the rock mass. The drilling program should include packer testing above, below, and across/within faults or geologic contacts. Areas requiring additional geotechnical information include the underground workings, the portal

location, and the decline alignment. The drill holes should be oriented to minimize blind zones in the combined structural data set and should target inferred large scale structures based on work presented in this report.

Additional laboratory testing including UCS, BTS, triaxial, and direct shear testing should be completed. Particular attention should be paid to direct shear testing, triaxial testing, and BTS testing, to help develop a better understanding of the discontinuity shear strengths and estimates of the Hoek-Brown constant parameter m_i.

INTERSECTION OF EXPLORATION DIAMOND DRILL HOLES

The mine plan should account for costs associated with open drill holes, particularly those collared on Patterson Lake. Prior to excavation, the surveyed downhole path of all drill holes should be plotted on driving layouts to anticipate drill hole intersections, and necessary contingency devices such as packers or stem pipes should be available.

RADIATION PROTECTION

When considering the design of the mine, radiological protection of site personnel is paramount. In the context of uranium mining, radiation exposure comes from gamma rays, alpha particles, beta particles, radon gas, and the decay of radon gas into what is known as radon progeny. The primary concern from a radiation protection point of view relates to exposure from gamma radiation and radon progeny. Gamma radiation affects both underground and open pit mining, while radon progeny is generally only a concern in underground mining. The Canadian Nuclear Safety Commission (CNSC) sets out rigorous standards for the amount of radiation exposure that a worker can receive over a set time interval (typically a five year window). It is then up to the company to establish yearly, quarterly, monthly, weekly, and daily radiation exposure limits that a worker is permitted to receive.

The four tenets used to minimize radiation exposure are time, distance, shielding, and ventilation.

- **Time**: minimize the time that a worker needs to spend in an area of radioactivity
- **Distance**: maximize the distance that a worker needs to be in relation to a radioactive area
- **Shielding**: maximize the shielding that protects a worker from the source of radioactivity

- **Ventilation**: plan an effective ventilation system that consistently removes air-borne contaminants such as radon progeny and gas

The approach to mine design taken by RPA was to isolate the deposit into distinct high grade and low grade zones. In consultation with radiological advisors at Arcadis who worked on previous studies on the Project, a mine design was generated that ensures radiological exposure to personnel is well within regulatory limits.

In the underground mine plan, the tenets of time, distance, shielding, and ventilation have all been considered. The ventilation system is planned in a manner that utilizes "single-pass ventilation", where fresh air brought through raises is used only once in a mineralized heading before it is discharged to the exhaust system. Ventilation from waste headings may be re-used provided that it meets accepted standards for air quality. Shielding will be incorporated into both the mine mobile equipment, and ground support practices used at the mine. Furthermore, the mine design has been carried out to minimize the time – and maximize the distance – a worker is in the vicinity of radiation bearing mineralization.

MINE DESIGN

SURFACE ACTIVITIES

505 CUT

The 505 Cut is planned to include the fresh air raise, exhaust air raise, propane farm, and heater house for the fresh air intake, refrigeration plant, well heads for the freeze holes, and electrical substation. The 505 Cut is accessed by a road from the process plant. All infrastructure on the 505 Cut is offset from the shore of Patterson Lake by a minimum of 100 m.

BOX CUT

The Box Cut is accessed by a road from the process plant and includes an area known as the "Forward Staging Area" which will serve as the launching point for the underground portal and decline. The Forward Staging Area is a level area approximately 40 m by 40 m and is intended to house some parking for mobile equipment, temporary ventilation infrastructure, and other mine services required for decline development. A larger mine laydown area is located several hundred metres away from the Box Cut. The second aspect of the Box Cut is the portal area, which includes extensive ground support requirements to ensure the long term stability of the decline. A plan view of the 505 Cut and Box Cut is shown in Figure 16-9.

OVERBURDEN STORAGE FACILITY

Approximately 1.0 million cubic metres (Mm^3) of overburden is expected to be produced from excavation of the 505 Cut, Box Cut, and development through overburden. A portion of the mined-out overburden will be used for filling in low spots to achieve required drainage. The remainder of the overburden will be hauled and stored in an appropriate location. The storage area was chosen to be as close as possible to the mine to minimize haul time while not impeding the possibility of future exploration. The overburden storage has been designed to hold 2.1 Mm^3 of material, which includes a swell factor, and an allowance for future expansion.

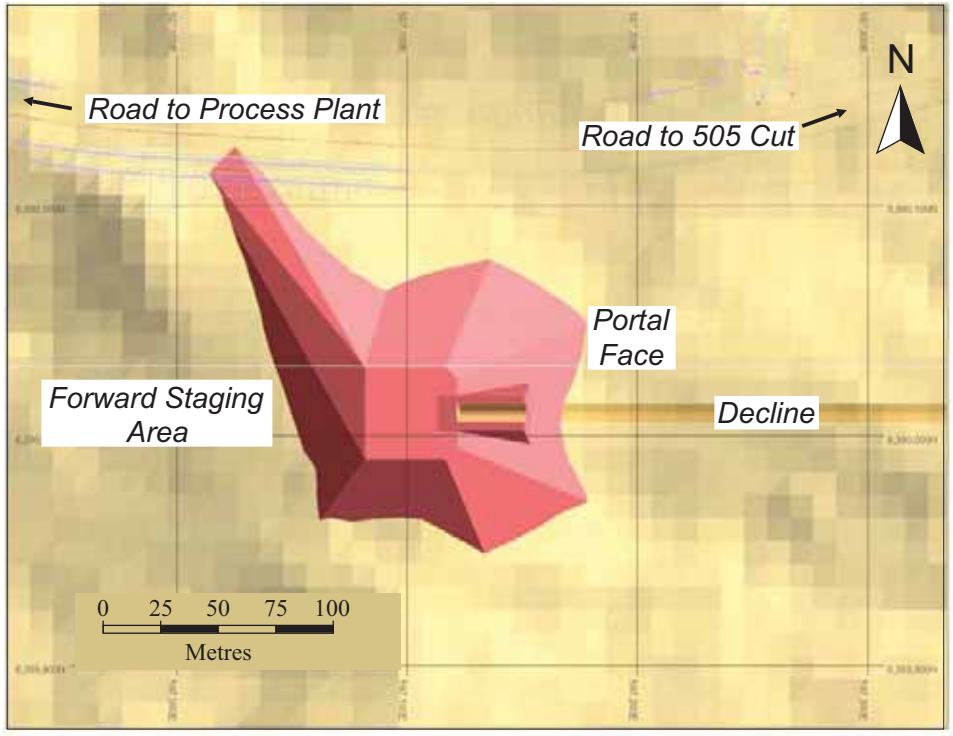
Wood and BGC recommend building the overburden storage at a slope of 5.5:1 to ensure ground and slope stability. Since the overburden material is not acid generating, contact water is not required to be contained and treated. The storage area will be cleared of vegetation and overburden will be placed directly on surface. Water runoff from the storage area could pick up suspended solids and will need to be treated prior to being discharged into Patterson Lake. Two collection ditches will be constructed to capture, and transport runoff water to two collection ponds where suspended solids will be allowed to settle before the water is discharged to the lake.

WASTE ROCK STORAGE FACILITY

The excavation of the mine is anticipated to produce 1.2 Mt of waste rock. All waste rock material will be hauled to a waste rock dump. Similar to the overburden storage, the waste rock dump will be located close to the mine and outside of future exploration zones. The waste rock dumps will be built at a slope of 4:1. The capacity of the waste rock storage pile is 2.0 Mt, which includes a swell factor, and an allowance for future expansion. Waste rock will be utilized in the production of backfill.

It is assumed that some of the waste rock material could contain low grade mineralization or could be potentially acid generating (PAG). The mineralized material will be separated from non-mineralized material and directed to a separate “special waste” rock dump. The special waste area will be dual lined with HDPE and incorporate a leak detection system between layers. Surface runoff from the mineralized waste rock will be collected and treated prior to discharge. The special waste rock dump will be built such that positive drainage to a final low point is achieved and will be able to withstand a 24 hour probable maximum precipitation (PMP) storm event. A single 200 mm inner diameter pipe will pump runoff from the collection pond to the effluent treatment plant.

The non-mineralized waste rock that is non-acid generating will be stockpiled on existing grade, without lining or containment.



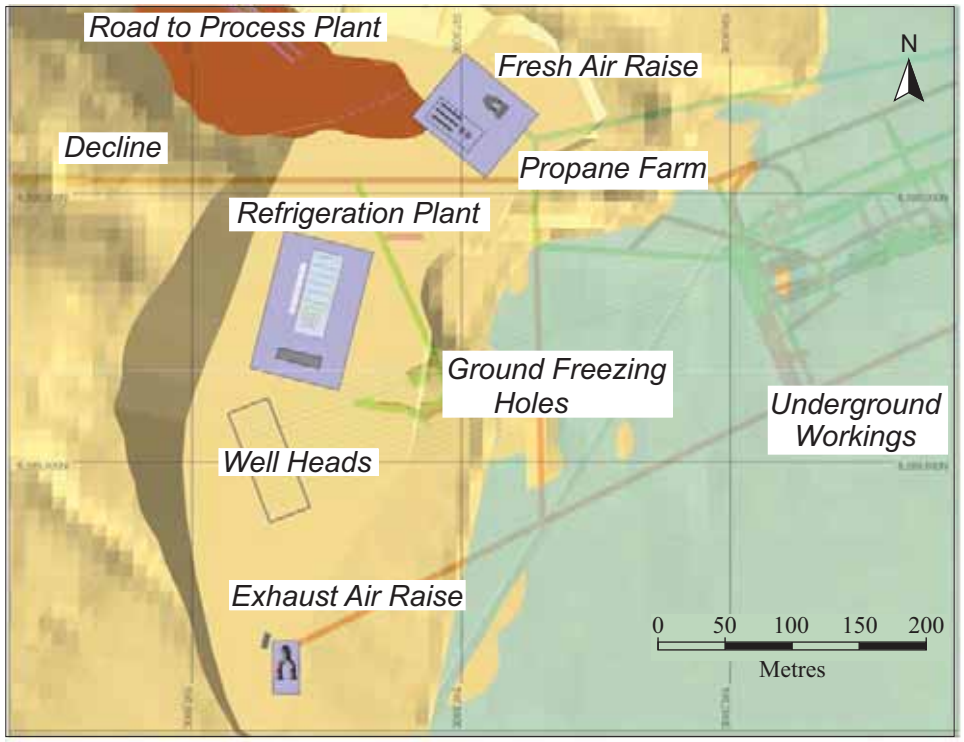


Figure 16-9

Fission Uranium Corp.

Patterson Lake South Property
Northern Saskatchewan, Canada
505 Cut and Box Cut Plan View

November 2019 ***Source: RPA, 2019.***

UNDERGROUND

DECLINE ACCESS

The decline access starts at the Box Cut, and proceeds using the NATM method of excavation, assuming a 7.0 m finished diameter. Upon reaching the transition bedrock, the decline will change to an irregular shape, followed by a 5.0 m wide by 5.0 m high decline through bedrock. The profiles of the three stages are shown in Figure 16-10.

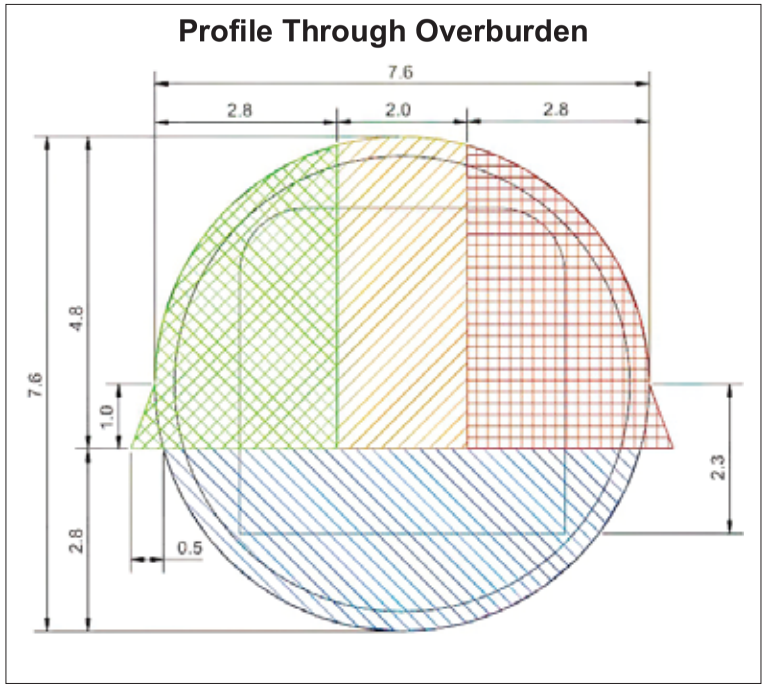
For the profile through overburden the sequence is to excavate 0.5 m in the upper left quadrant (green) and apply 75 mm of shotcrete on open ground including the face, followed by screening of the wall only using short “nails” secured into the shotcrete. U bars that stick out beyond the next 225 mm of shotcrete will then be installed to the screen. The same procedure will be followed in the upper right quadrant (red), followed by the central panel (yellow).

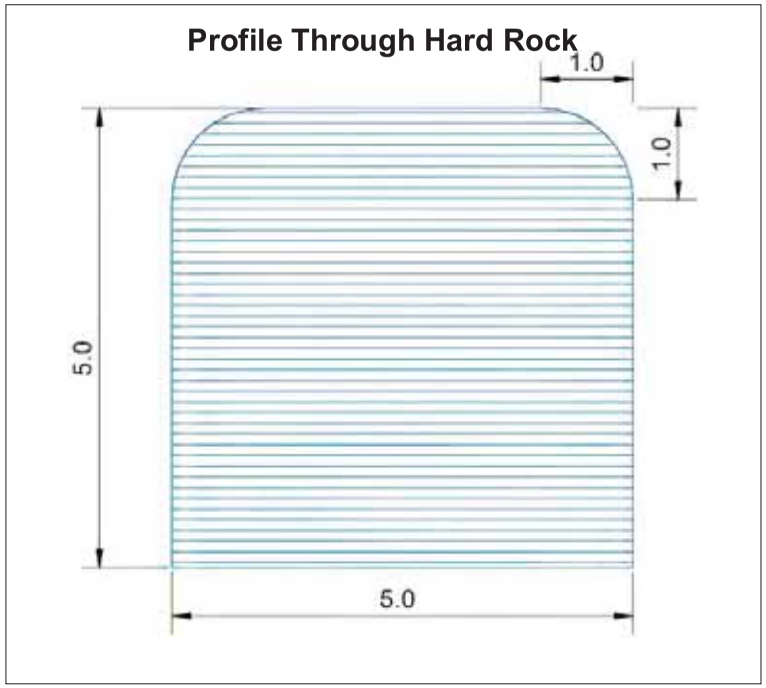
The three steps will be repeated to make one metre of advance in the upper decline. A total of 225 mm of shotcrete would then be applied along with mesh. This sequence will be repeated on the upper half of the drill profile up to ten metres in advance of silling the bench. Following bench silling, 300 mm of shotcrete will be applied on the sill and lower walls. These procedures will be followed for the entire 405 m of development in overburden.

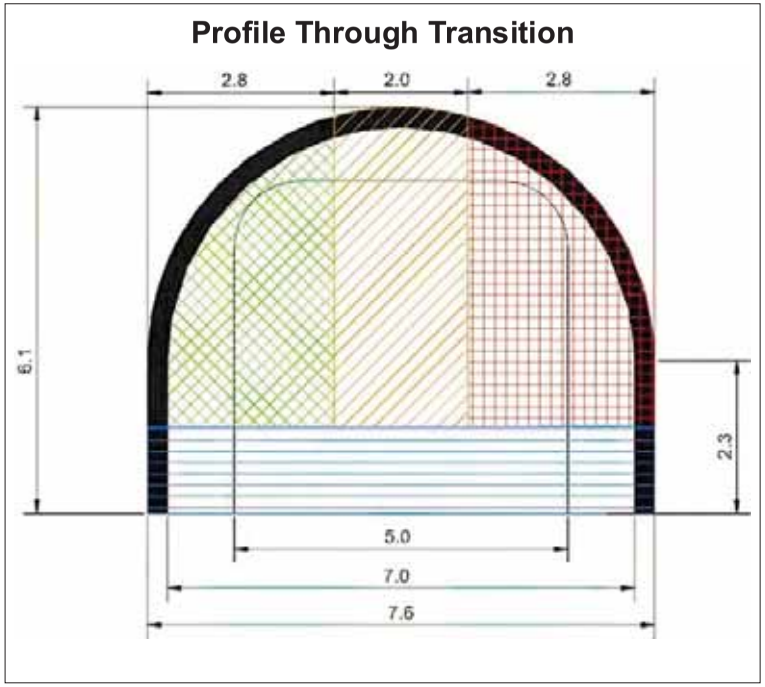
The sequence will transition after competent bedrock (blue) is encountered in the sill. The transition length is 135 m. The bedrock depth will eventually consume the whole face.

For the profile through hard rock standard drill and blast excavation methods will be utilized.

An overview of the mine is shown in Figures 16-11 to 16-13.







Note: Figure Dimensions are in Metres
Decline is Excavated East to West

Coloured Ring Quadrants Indicate Excavation Sequence Described in Text

Figure 16-10

Fission Uranium Corp.

Patterson Lake South Property
Northern Saskatchewan, Canada

Decline Profiles

November 2019

Source: RPA, 2019.

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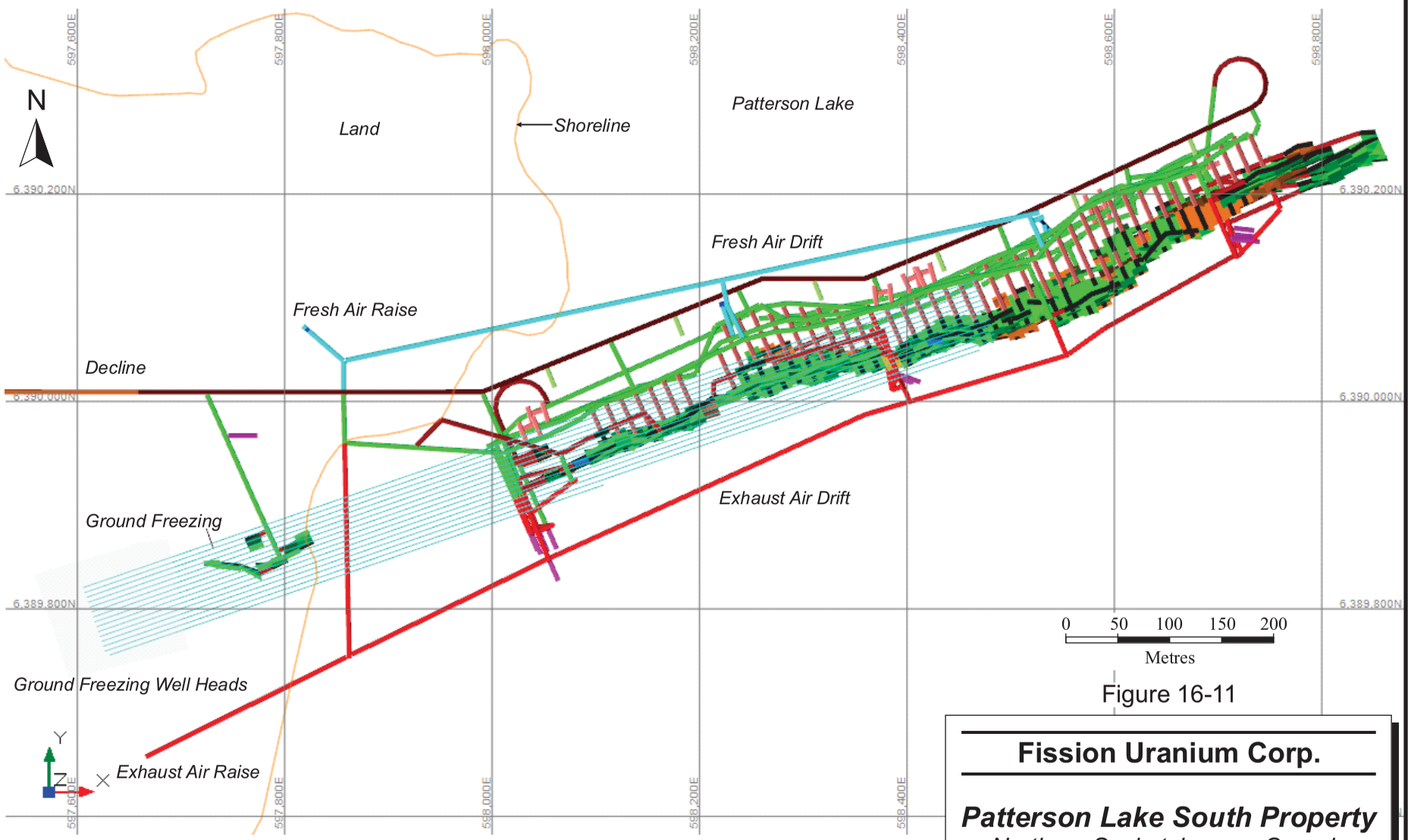

Figure 16-11

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Mine Plan View

November 2019

Source: RPA, 2019.

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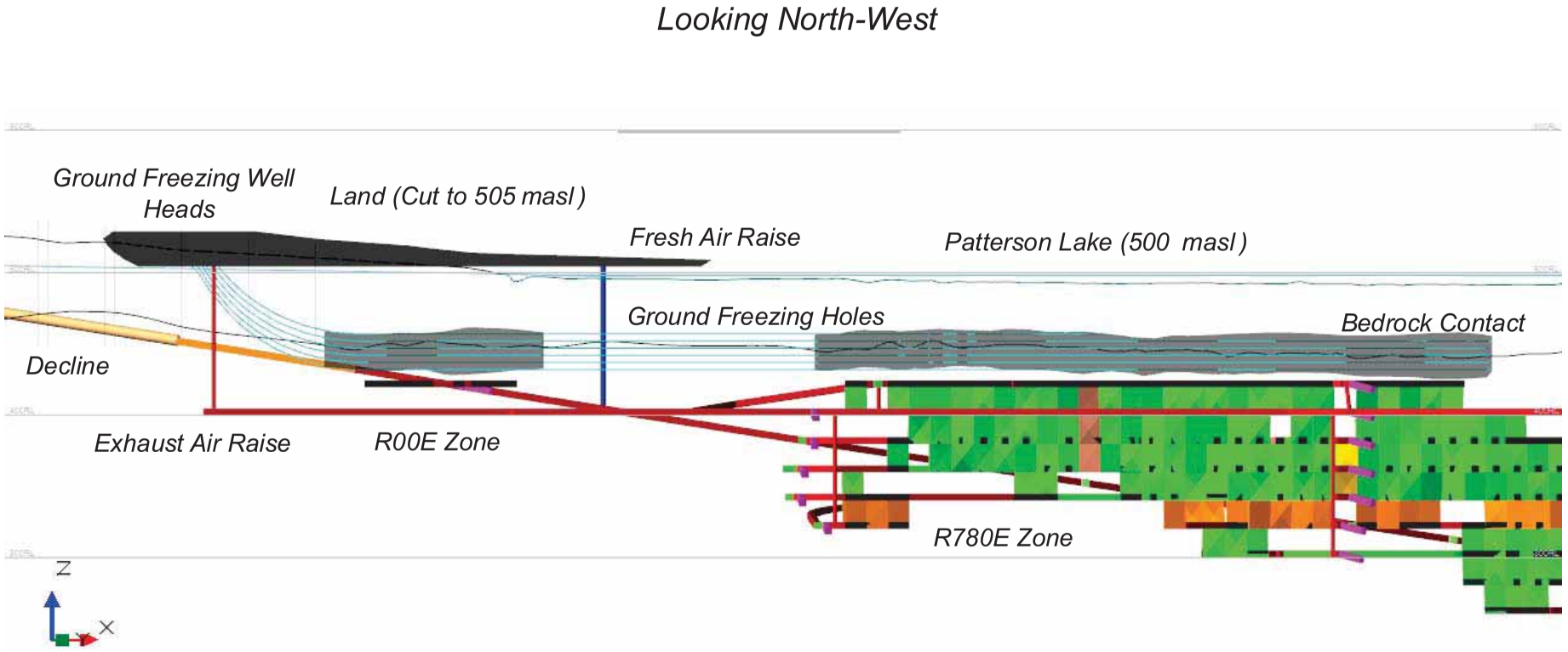

Figure 16-12

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Mine Longitudinal Section View

November 2019

Source: RPA, 2019.

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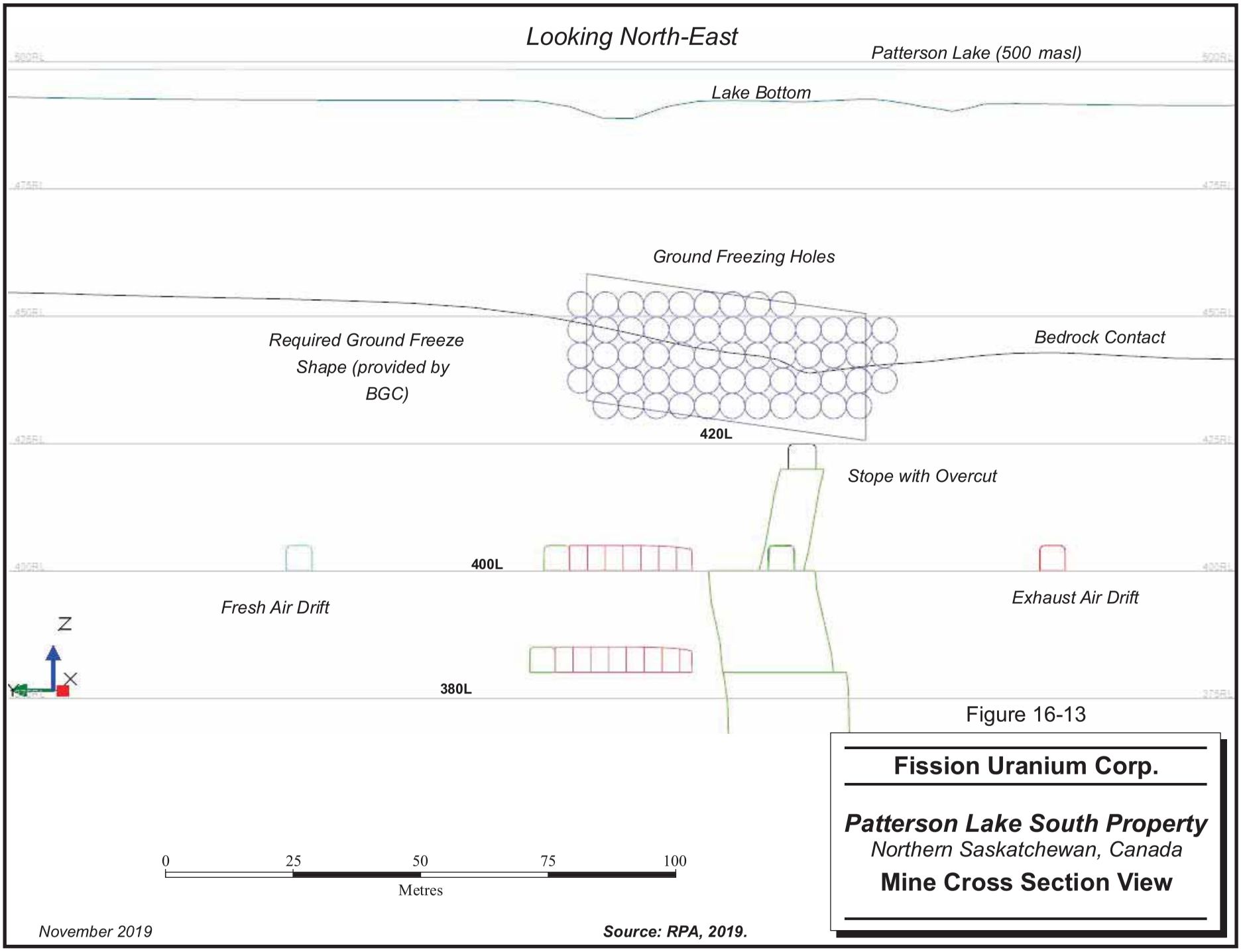

Figure 16-13

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Mine Cross Section View

November 2019

Source: RPA, 2019.

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STOPE AND DEVELOPMENT DESIGN

Underground mining will be carried out using transverse and longitudinal longhole retreat mining. Transverse mining makes up the majority of the mining on the west and middle areas of the orebody as shown in Figure 16-14. Longitudinal mining is done in the east end of the orebody where there are multiple narrow lenses. The development sizes are listed in Table 16-6.

TABLE 16-6 UNDERGROUND DESIGN CRITERIA
Fission Uranium Corp. – Patterson Lake South Property

Parameter	Unit	Width	Height	Arch
Ramp	(m)	5	5	1
Level Access / Haulage	(m)	5	5	1
Vent Access	(m)	5	5	1
Cross Cut (ore dev.)	(m)	5	5	1
Vent Raise Fresh Air – Round	(m)	4		
Vent Raise Exhaust Air – Round	(m)	3		

Underground stopes are planned on 20 m sub-levels. Stope lengths are 15 m in strike and have variable widths. The dimensions used in the design are within BGC's recommended geotechnical parameters. Stopes were designed using DSO. The parameters used to create the stopes are shown in Table 16-7.

TABLE 16-7 DSO DESIGN CRITERIA
Fission Uranium Corp. – Patterson Lake South Property

Parameter	Units	Value
Height	(m)	20
Strike Length	(m)	15
Minimum Mining Width	(m)	2
HW and FW Dilution	(m)	0.5
Effective Width	(m)	3.0
Maximum Mining Width	(m)	100
Cut-Off Value	(%U_3O_8)	0.25
Allowable Dilution	%	65

Cut-off grades for stope design were established using preliminary cost estimates for mining, processing, and G&A. The underground mining cut-off grade, on a break-even basis, is approximately 0.25% U_3O_8. Specialized factors were applied for stopes within the area of the crown pillar.

The development mining cycle in ore includes the following items:

- Development drilling.
- Blasting.
- Mucking.
- Mechanical scaling.
- Shotcrete – used for immediate support and shielding.
- Bolting and screening.

The production mining cycle includes the following items:

- Cable bolting – Action takes place as soon as a drift is completed. Item is done for the entire stoping area.
- Production Drilling/Blasting – Action takes place after cable bolting. Item is done for the entire stoping area.
- Mucking.
- Backfill, and cure time.

Mucking of the adjacent stope does not take place until backfilling is completed.

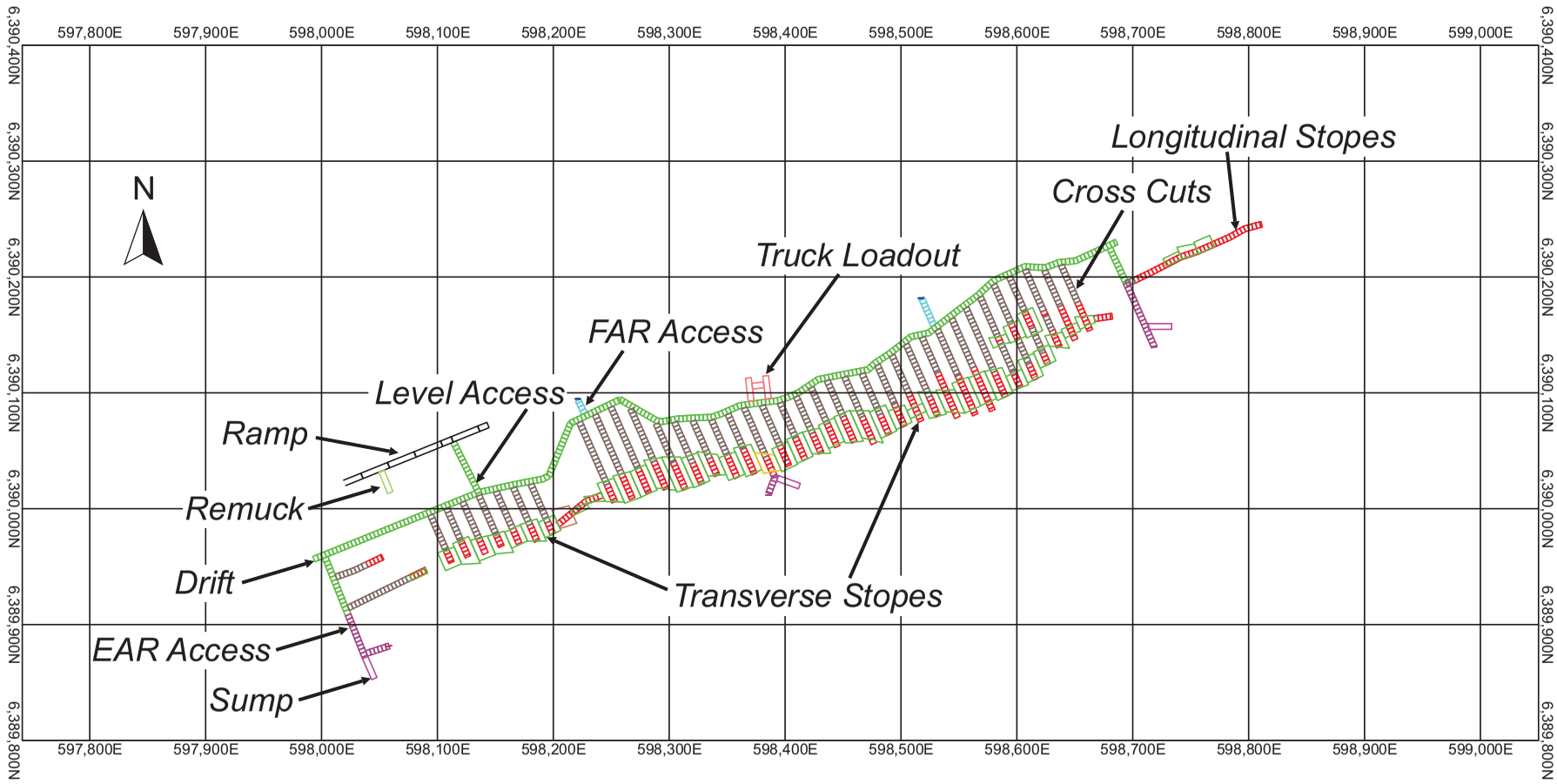
Ventilation raises will either be drop raises or alimak raises between levels. Shafts from surface will be sunk for the fresh air and exhaust air raises. The finished diameters of both shafts are 5.0 m. The ventilation system for the mine is a push pull system with multiple internal fresh air and exhaust air raises, as shown in Figure 16-15. The total ventilation required is 180 m^3/s to meet the schedule and vehicle requirements. The exhaust fans will expel 130 m^3/s of exhaust air through the vent raises, while the remaining 50 m^3/s of air will exhaust through the portal. Although modeling shows only 180 m^3/s of air is required, the mine plan and cost model assumed 600 kcfm (283 m^3/s) has been to include allowances for losses and leakage. The air exhausting the portal will comprise uncontaminated air that does not go through production areas. The FAR will contain a ladder system for secondary means of egress. The ventilation is designed to be a single pass use through an ore heading. Once the air has been contaminated in an ore heading it goes immediately to exhaust. The ventilation system is designed to allow multiple levels to be open in the mine in various stages of production.

ARTIFICIAL GROUND FREEZING AND CROWN PILLAR RECOVERY

Artificial ground freezing will consist of five separate lines of drill holes, collared on surface, and drilled using horizontal directional drilling technology. A summary of the holes is shown in Table 16-8.

TABLE 16-8 SUMMARY OF GROUND FREEZING DIRECTIONAL DRILLING
Fission Uranium Corp. – Patterson Lake South Property

Line	Number of Holes (ea)	Drill Metres (m)	Hole Spacing (m)	Rock Type	Collar Elevation (masl)	Toe Elevation (masl)	Net Vertical Metres (m)
Line 1	9	8,249	7	WGN	505	431.5	73.5
Line 2	11	9,554	7	WGN	505	438.5	66.5
Line 3	11	9,420	7	WGN	505	445.5	59.5
Line 4	13	10,688	6	OB	505	451.5	53.5
Line 5	13	9,306	6	OB	505	457.5	47.5
Total	**57**	**47,217**					



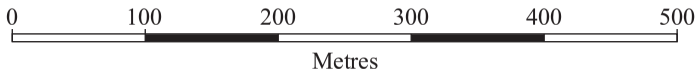


Figure 16-14

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Typical Underground Level Plan

November 2019

Source: RPA, 2019.

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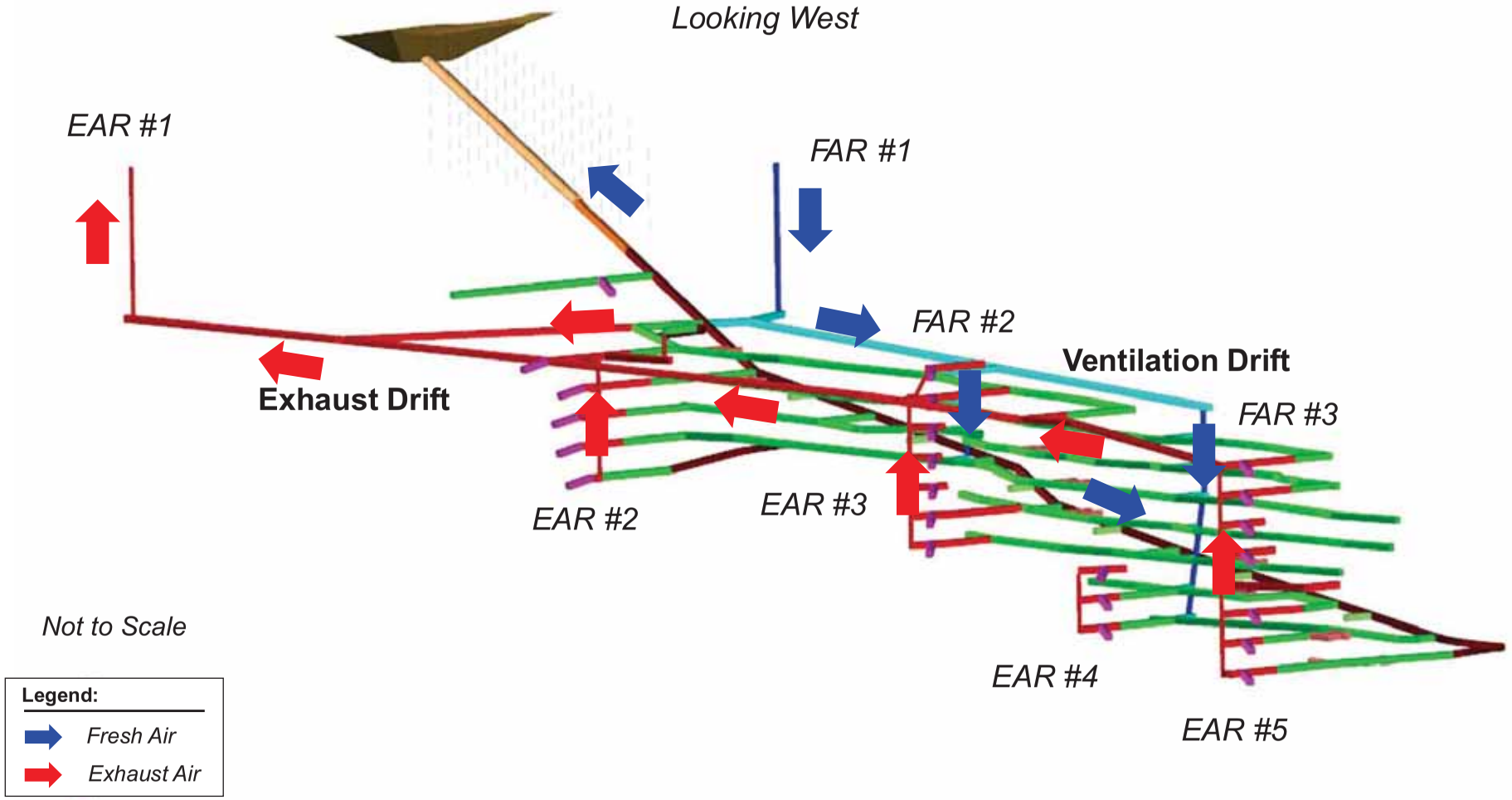

Figure 16-15

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Ventilation System Schematic and Model

November 2019

Source: RPA, 2019.

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MINE EQUIPMENT

A mine contractor will develop the portal and decline through overburden and transition material, as this requires specialized tunneling equipment. Upon completion of this, an owner-supplied mining equipment fleet will complete all remaining development throughout the mine life. Required mining equipment is listed in Table 16-9.

TABLE 16-9 MINE EQUIPMENT
Fission Uranium Corp. – Patterson Lake South Property

Description	Quantity
2 Boom Jumbo Epiroc Boomer M2	3
Rock Bolter Epiroc Boltec M	2
ST14 LHD Epiroc ST14	5
Haul Truck Epiroc MT 431B	5
Production Drill Epiroc Simba E7C	2
Easer L-Mobile Raise Boring Machine Epiroc	1
Cable Bolt Drill Epiroc Cabletec M	1
Ammonium Nitrate Fuel Oil (ANFO) Loader Truck Charmec MF 605	1
Lube Truck Utimec MF 400	1
Flat Deck Truck w. Crane Utimec LF 130	2
Transmixer Utimec LF 600	3
Shotcrete Sprayer Spraymec MF 050 D	2
Personnel Carrier Utimec MF 164 PER	3
Scissor Lift Utilift MF 540	3
Small Vehicle (Rad. Tech., etc.) RTV-X1100C	10
Grader	1
Mobile Rock Breaker and Scaler Scamec 2000	1
Casette Truck MF 100 Multimec	1
HiMec Basket Truck MF 905 Himec	2

UNDERGROUND MINE INFRASTRUCTURE

SHOTCRETE PLANT

All ore headings, stopes, and areas with poor ground conditions will require shotcrete. A wet shotcrete system is planned to be installed on surface. The shotcrete will be transported to working areas where it will be applied with mechanized shotcrete sprayers.

BACKFILL

Backfill of mined-out stopes will be completed using a CRF and URF combination. CRF will be produced using a combination of cement slurry, and either waste rock or sand available on site. The cement slurry will be delivered to the underground via slick line, and then hauled to its final destination. RPA recommends that backfilling options be studied in greater detail in future studies.

VENTILATION

As discussed in the mine design section, ventilation will be established using a fresh air raise and exhaust air raise and portal. Air will down-cast through the fresh air raise, and up-cast through both the portal and exhaust raise.

DEWATERING

An extensive dewatering system is planned for both the underground mine and the entire mine. As discussed in the hydrogeology section, a pumping system is planned to handle water inflow into the mine. All water entering the mine will be pumped to the process plant where it will be treated prior to being released to the environment. A recycling system will be used to supply water for any mine equipment usage, provided that it is of suitable quality.

MAINTENANCE

An underground service bay will be established for minor repairs and maintenance. All major equipment maintenance will be completed at the mine maintenance shop on surface.

POWER

An underground mine electrical station will be established that is fed from the primary power plant on surface. Branching off from the underground main station, a series of electrical substations will be established as required.

COMMUNICATIONS

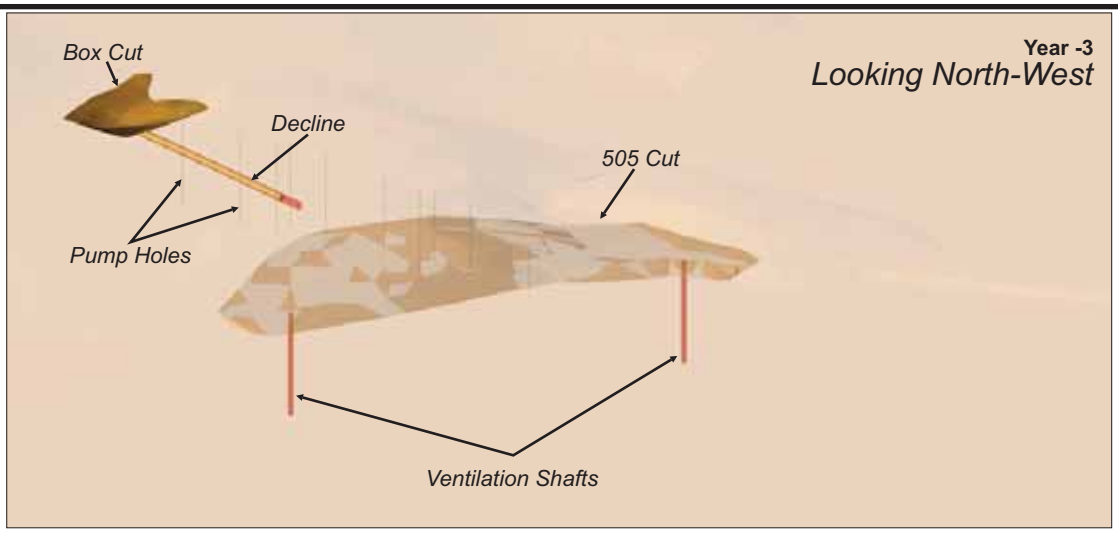
A fibre-optic communications system is planned for the underground mine. The fibre-optic system has the capacity to handle data for equipment tracking, radiation monitoring, ventilation monitoring, and video monitoring.

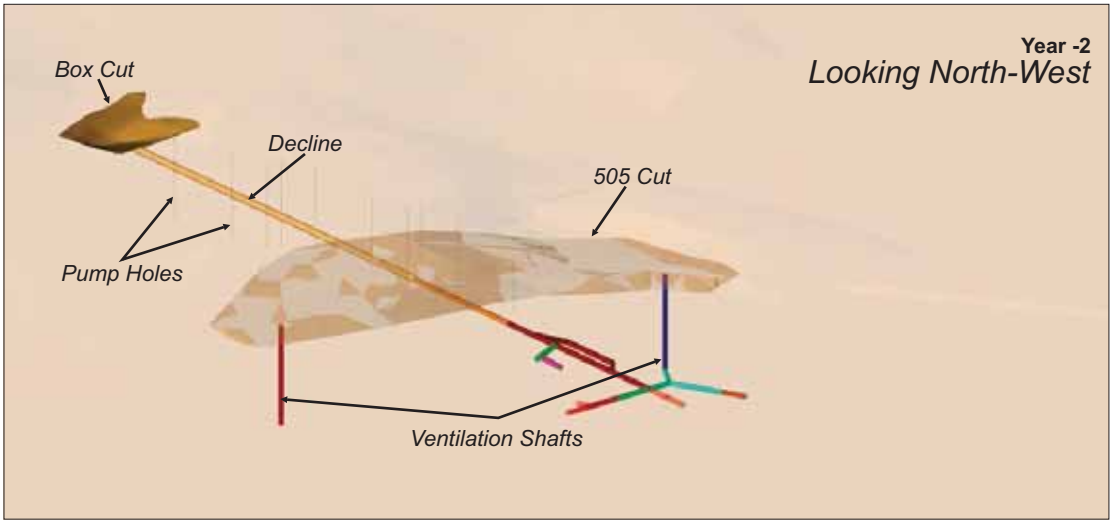
LIFE OF MINE PLAN

CONSTRUCTION SCHEDULE

A three year pre-production period is envisaged for the Project. The critical path for completing construction revolves around completing the decline through overburden, establishing the ventilation system, and developing in the ore. In Year -3, the box cut, and portal will be collared, along with starting development in the overburden. An area referred to as the “505 Cut” will also be completed. Year -2 will see the continuation of the decline, along with two ventilation raises. Year -3 will include underground development in hard rock, and development in ore drifts in advance of steady-state production.

The construction sequence is shown in Figure 16-16.





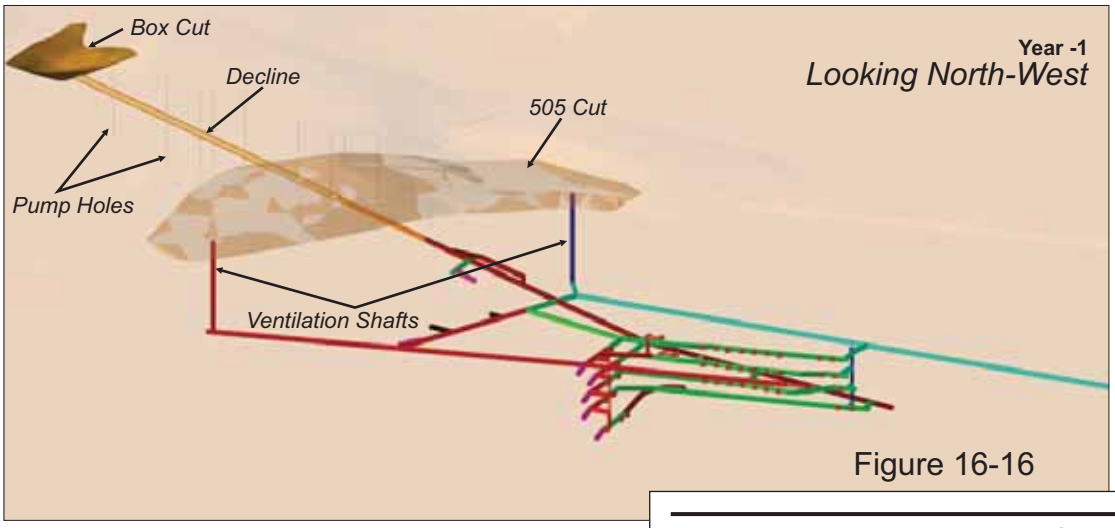


Figure 16-16

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Construction Sequence

Not to Scale

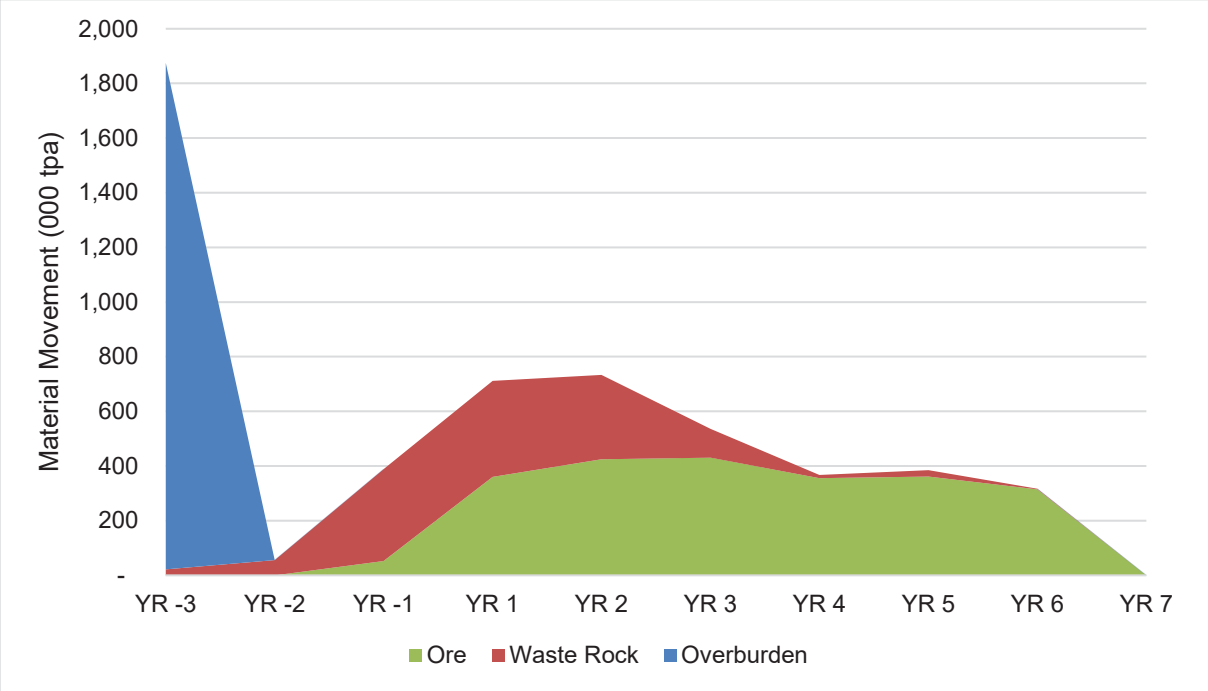
November 2019

Source: RPA, 2019.

OPERATIONS

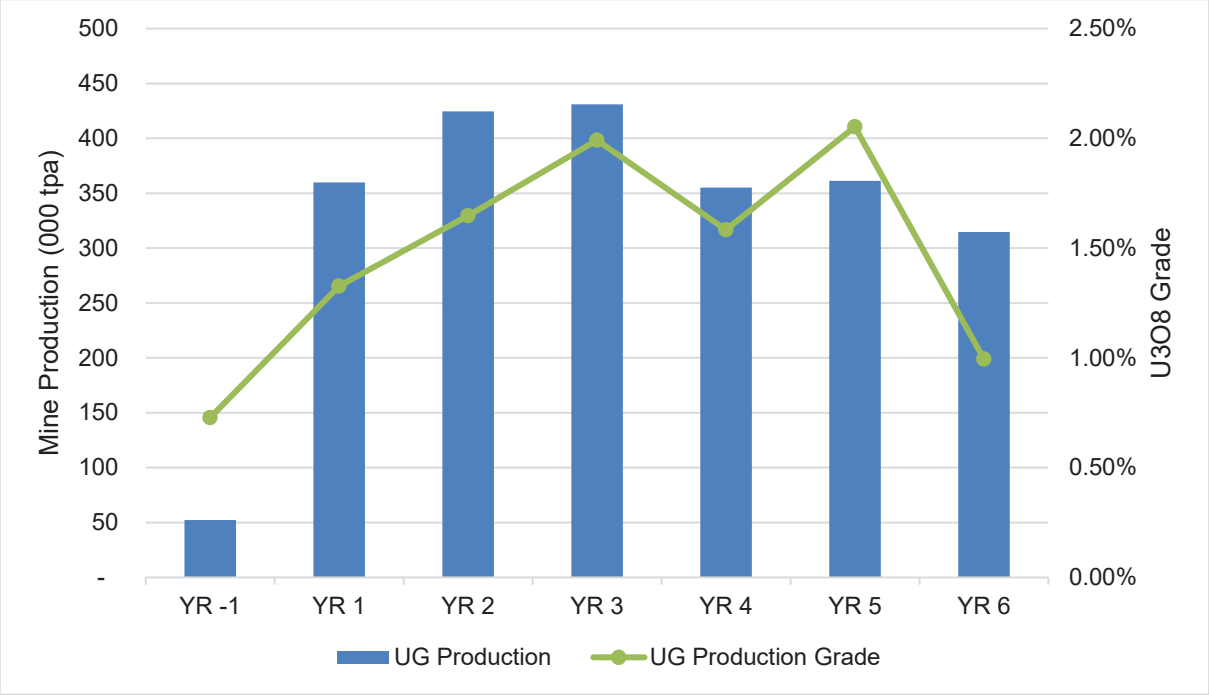
RPA has envisaged a LOM plan where ore is mined beginning in pre-production Year -1 and continuing over six years of operations. The large amount of overburden moved in Year -3 refers to the 505 Cut and Box Cut, as shown in Figure 16-17.

FIGURE 16-17 OVERALL MATERIAL MOVEMENT



The LOM production schedule is shown in Figure 16-18.

FIGURE 16-18 LIFE OF MINE PRODUCTION SCHEDULE



Three separate stockpiles will be constructed at the Project, to allow for optimum process blending. The process schedule and recovered uranium schedule are shown in Figures 16-19 and 16-20, respectively.

FIGURE 16-19 LIFE OF MINE PROCESS SCHEDULE

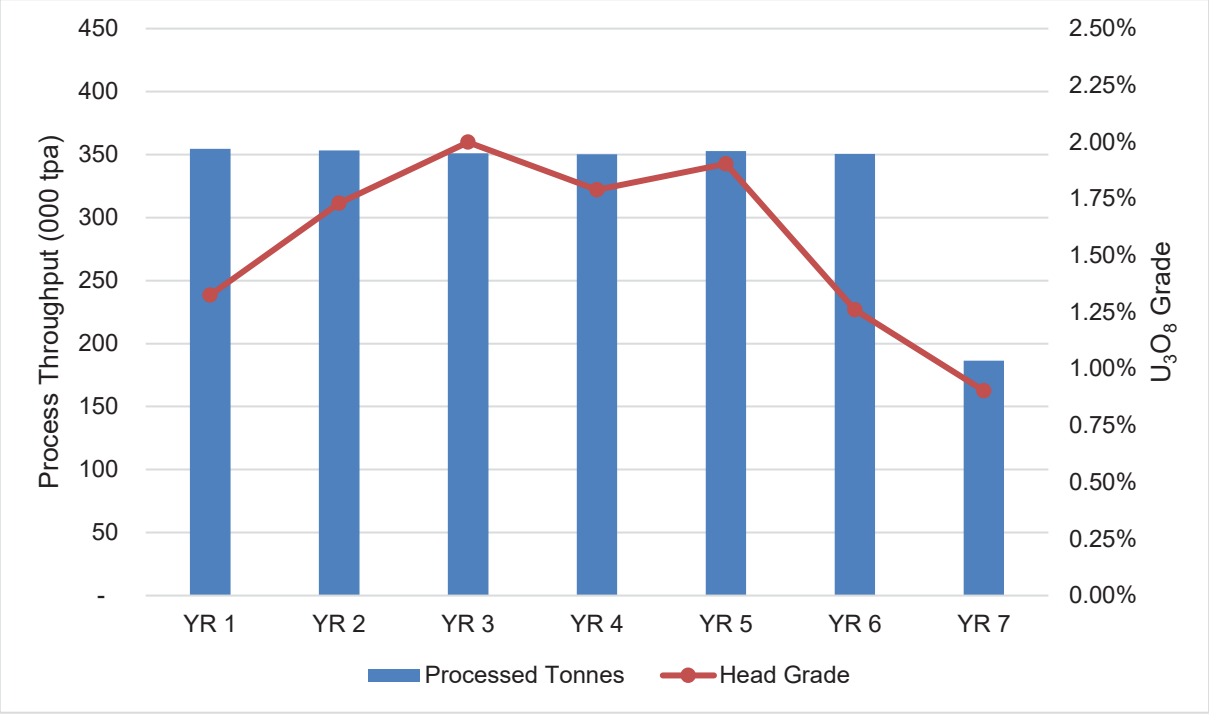
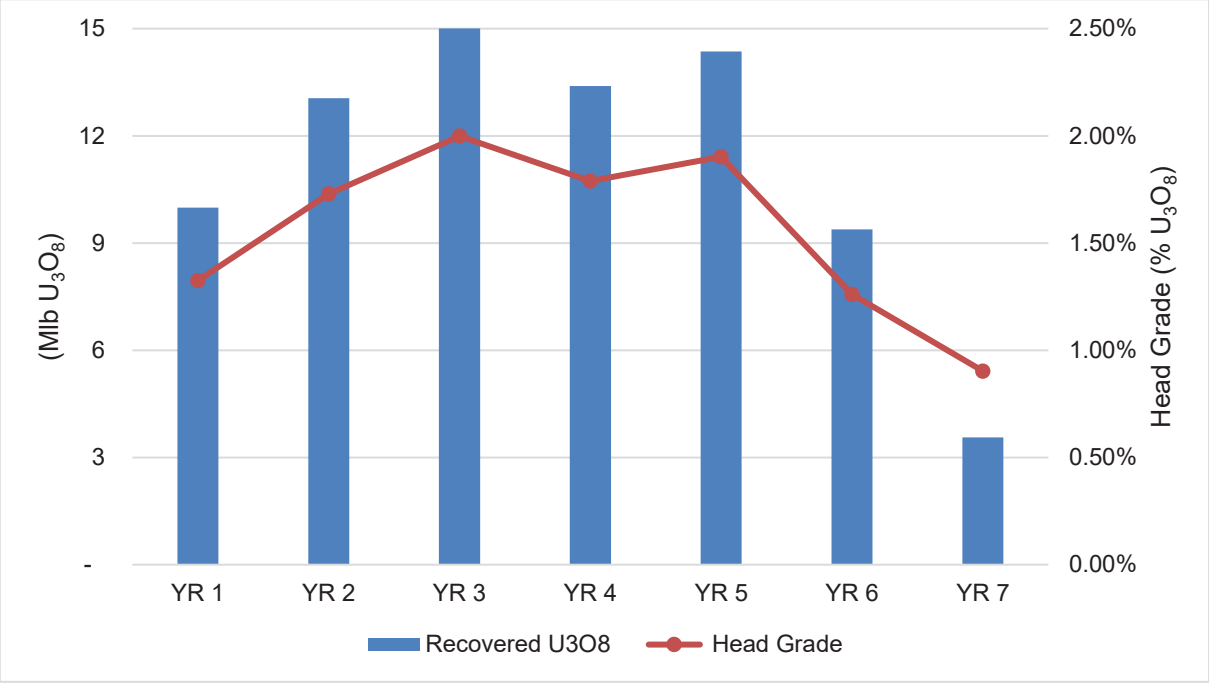


FIGURE 16-20 RECOVERED URANIUM SCHEDULE



The mine and processing plans are summarized in Tables 16-10 and 16-11, respectively.

Table 16-10 Mine Schedule
Fission Uranium Corp. – Patterson Lake South Property

	Units	Total	YR -3	YR -2	YR -1	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6
Underground Mining											
UG Production	000 t	2,299	0	0	52	360	425	431	355	361	315
UG Production Grade	%	1.61%	0.00%	0.00%	0.73%	1.33%	1.65%	1.99%	1.58%	2.05%	0.99%
Contained Pounds	Mlb U_3O_8	81.36	0.00	0.00	0.84	10.53	15.43	18.93	12.39	16.35	6.90
Overburden	000 t	1,853	1,853	-	-	-	-	-	-	-	-
Waste Rock	000 t	1,219	22	56	337	352	309	105	13	24	3
Total Moved	**000 t**	**5,372**	**1,875**	**56**	**389**	**712**	**733**	**536**	**368**	**385**	**317**
Operating Development	m	15,102	-	-	1,551	3,204	5,366	3,685	364	862	70
Capital Development	m	12,554	190	886	5,028	4,145	2,236	69	-	-	-
Total Horizontal Development	**m**	**27,656**	**190**	**886**	**6,580**	**7,348**	**7,602**	**3,754**	**364**	**862**	**70**
Vertical Development	m	790	68	142	172	237	171	-	-	-	-

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Table 16-11 Processing Schedule
Fission Uranium Corp. – Patterson Lake South Property

Processing	Units	Total	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6	YR 7
Tonnes	000 t	2,299	355	353	351	350	353	350	186
Grade	%	1.61%	1.32%	1.73%	2.00%	1.79%	1.90%	1.26%	0.90%
Contained Pounds	Mlb U_3O_8	81.36	10.35	13.47	15.47	13.82	14.80	9.74	3.71
Process Recovery	%	96.80%	96.50%	96.90%	97.10%	96.90%	97.00%	96.40%	95.90%
Recovered Uranium	Mlb U_3O_8	78.75	9.99	13.05	15.02	13.39	14.36	9.38	3.56

17 RECOVERY METHODS

INTRODUCTION

Wood completed design and costing for the process plant and related infrastructure facilities for the PFS. Wood has design, construct, and commissioning experience on a multitude of uranium process plants both within the Athabasca Basin and globally.

The process flowsheet selected for the Project is based on unit processes commonly used effectively in uranium process plants in northern Saskatchewan, while utilizing some new innovations in some of these unit process designs to optimize plant performance.

While the Triple R deposit contains gold values that may be recoverable, a high level economic analysis by RPA has shown this to have limited impact on overall project profitability at current market conditions and gold recovery was thus excluded from this design. Should market forces change in the future, gold recoveries could be reasonably easily engineered into the existing design and constructed without harming throughput or recovery from the uranium process plant.

The conceptual mill design will have a nominal feed rate of 350,000 tpa, operate 350 days per year, and be able to produce nominally 15.0 Mlb per year of U_3O_8. The mill design will have an estimated recovery ranging from 95% to 97% and is designed in a manner that can accommodate fluctuations in ore grade that are expected when mining moves from higher grades to lower grades, or vice versa.

Note that previous metallurgical studies have referred to “Open Pit” samples and “Underground” samples, however this is simply referring to what the expected head grades were in previous studies. The mineralogy of Patterson Lake is not distinguishable by mining method.

The unit processes for uranium recovery are:

- Grinding
- Acid leaching using hydrogen peroxide as oxidant
- CCD and clarification

- SX using strong acid stripping
- Gypsum precipitation
- Yellowcake precipitation
- Yellowcake calcining and packaging
- Tailings neutralization
- Effluent treatment with monitoring ponds to confirm quality of effluent discharge

PROCESS FLOWSHEET

A zero-based design approach was taken in the mill process design. The design aims to achieve the required throughput with the minimum redundancy, installed equipment, and design allowances. Health, safety, and environmental aspects however are not compromised. There are only two instances where circuit design capacity is planned to be more than nominal. Grinding capacity has been increased by 20% more than nominal to allow for higher maintenance requirements than the rest of the circuit. The effluent treatment plant has also been designed for more than the nominal flow rate due to the possibility of having periods of excess water from the mines and weather-related surges.

Process design has been directed by the metallurgical test program results as well as knowledge from literature, and Wood's experience with existing successful process methods.

The proposed process flow diagram is included as Figure 17-1. Table 17-1 shows the production design requirements used to develop the process flows and mass balance for the processing plant.

TABLE 17-1 PRODUCTION DESIGN REQUIREMENTS
Fission Uranium Corp. – Patterson Lake South Property

Production Criteria	Units	Quantity
Ore feed rate (annual)	tpa	350,000
Ore feed rate (daily)	t/op day	1,000
Ore feed grade, Open Pit (High)	% U_3O_8	2.0
Ore feed grade, Underground (Low)	% U_3O_8	0.5
Plant uranium recovery, Open Pit	%	97.1
Plant uranium recovery, Underground	%	94.9
Production rate, Open Pit	Mlb U_3O_8/year	14.98
Production rate, Underground	Mlb U_3O_8/year	3.66
Operating time	hrs/year	7560
Availability	%	90

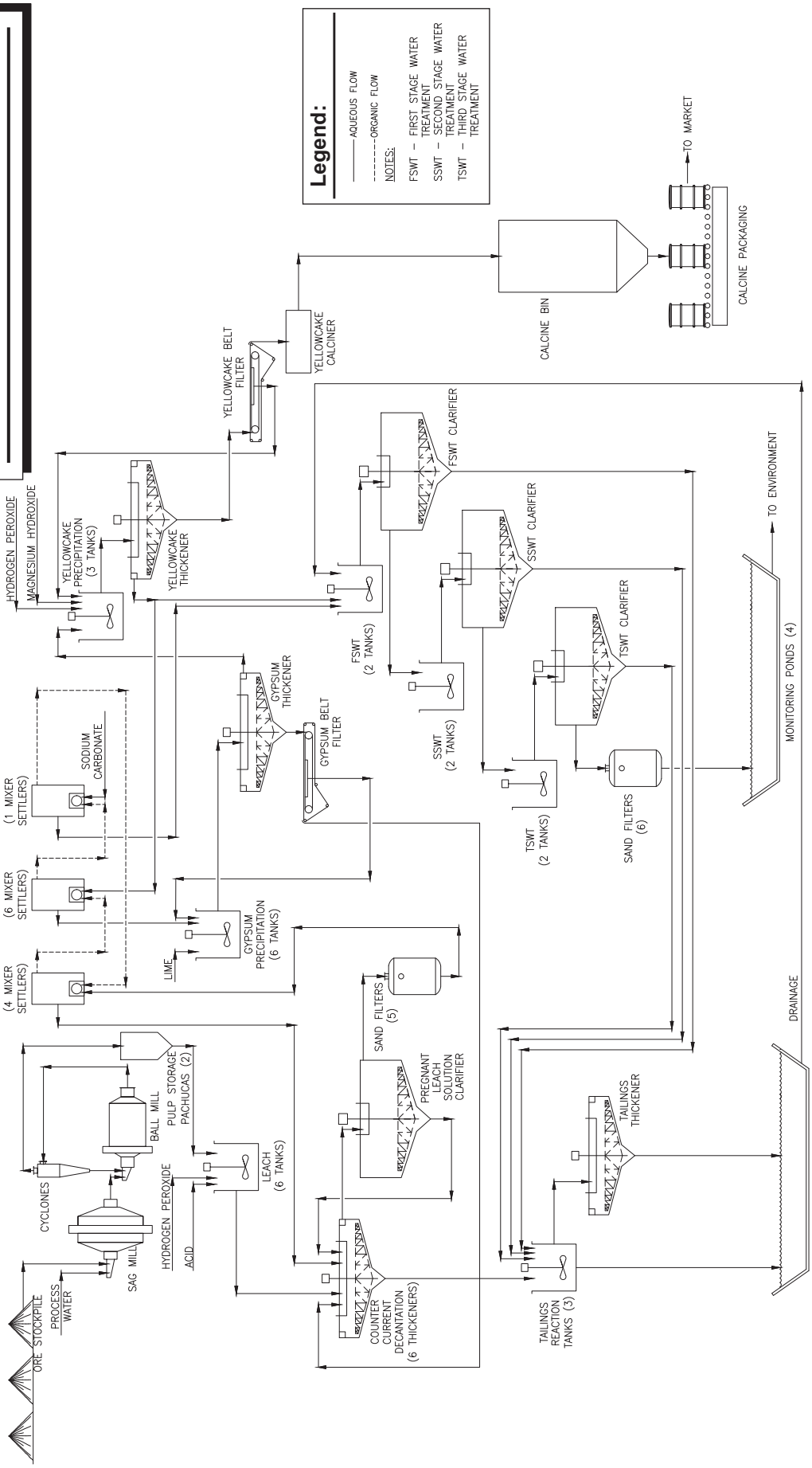
Figure 17-1

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Process Flowsheet



Source: Wood, 2019.

November 2019

PLANT DESIGN

ORE SORTING AND STORAGE

Ore will be loaded into a haul truck in the underground mine. The truck will drive through a radiometric scanner to confirm ore grade and the delivery location of the ore on the ore pad adjacent to the process plant. Different ore grades and types can be stored in different piles.

GRINDING

A loader operator will deliver ore to the grizzly hopper. Traffic in the ore storage and reclaim area will be restricted to minimize ore contamination in the site area. A variable speed ore feed conveyor delivers ore from the hopper into the SAG mill at a prescribed rate that will be close to the ground ore feed rate to be fed to leaching. The ore will be weighed on the belt as well as given a gamma radiation scan to check uranium content.

Process water will be added into the SAG mill feed along with the ore to provide the target % solids content in the mill. SAG mill discharge reports by gravity to feed the ball mill. The ball mill will also be fed recycled oversize particles from a classification cyclone that will be situated above the ball mill. Process water can be added to the ball mill feed to maintain the target % solids composition of slurries in the circuit. Ball mill discharge reports to a pump box that pumps the ore slurry to the classification cyclone/cyclones. The overflow stream of the cyclone is designed to have the target particle size (P_{80} 150 µm) as well as the target 50% solids composition for leaching. It will be pumped to twin pulp storage pachucas.

The twin pulp storage pachucas are air agitated and provide surge capacity between the grinding circuit and the leaching circuit and a degree of ore blending.

The grinding circuit has tonnage capacity greater than that required for leach feed. This allows the grinding circuit to fill the pulp storage pachucas. When full, the grinding circuit can be shut down to provide short periods (up to 12 hours) of grinding circuit maintenance without disruption of ore slurry feed to leaching.

LEACHING

The first leach tank will be fed by a variable speed centrifugal pump to feed the prescribed solids rate to the leaching circuit. The feed solids tonnage combined with the measured grade of the solids gives the target uranium flow rate into the mill. It will be important to have the

correct uranium flow rate because, if the flow rate is too high, uranium recovery in leaching will be decreased. If too little uranium is fed, the production rate will be low.

The leaching circuit will be comprised of six mechanically agitated tanks that are connected in series. The flow between tanks will be by gravity. The discharge of each tank will be from a baffled upcomer to ensure minimal solids short circuiting in each tank. The tanks in total provide the target eight hour residence time to oxidize and dissolve the uranium from the ore.

The tanks are heated with steam spargers to the prescribed 50°C leach temperature. Most of the sulphuric acid required will be fed into the first two to three tanks. This is also the case with the sodium chlorate oxidant that will be fed to the leaching tanks. Sulphuric acid will be added to maintain the target minimum 10 g/L to 15 g/L acid content in the final leaching tank discharge. Sodium chlorate will be added to maintain the target 475 meV to 500 meV oxidation reduction potential (ORP).

If low iron ore is being leached, ferric sulphate will be available to provide supplemental ferric iron. Iron in solution is required to provide oxidation of U+4 to U+6. U+6 is soluble in the acidic solution while U+4 is not.

It is expected that 98.3% of uranium in ore will dissolve in the leaching circuit.

COUNTER CURRENT DECANTATION

A variable speed pump will be used to pump slurry from leach tank 6 (the last tank of the leaching train) into a relatively small mix tank. Overflow solution from CCD 2 will report by gravity into this mix tank as well. The mixed slurry will be pumped to the center well feed of CCD 1 along with a flocculant flow (flocculant enhances settling). The overflow of CCD 1 (pregnant aqueous solution) will report to a pumpbox and will be pumped to feed a pin bed clarifier. Underflow from CCD 1 will be removed by a variable speed pump that will be controlled by the density of the underflow stream as well as the solids load level in the thickener. Underflow will be pumped to a small mix tank where it will be mixed with the gravity overflow of CCD 3. This mixed solution will be pumped to the feed well of CCD 2 where it will be treated with flocculant. In a similar manner, the CCD underflows will be pumped to feed the next CCD, i.e., CCD 3 to feed CCD 4 until underflow of CCD 6 (the final CCD in the train). CCD 6 underflow will be pumped to the tailing reaction tank #1.

Wash water will be fed into the feed mix tank of CCD 6. The wash water is made up of:

- First priority – a portion of SX raffinate flow (in order to recycle as much acid as possible and to minimize fresh water consumption)
- Second priority – acidized process water

The acid content of the slurry solution passing through the CCD circuit must be maintained to ensure that dissolved uranium is not precipitated in the CCD circuit. Enough wash water will be introduced into CCD 6 mix tank to meet the target uranium concentration in the pregnant aqueous solution that will overflow from CCD 1.

The overflow of CCD 6 flows by gravity to the mix tank feeding CCD thickener #5. The solutions pass from one thickener to the next counter to the direction of the solids slurry. That is, the wash solution passes from CCD 6 to CCD 1, while the solids slurry passes from CCD 1 to CCD 6. Hence, the term counter current decantation has been given to this solids washing process.

Circuit performance is determined by a combination of the concentration of dissolved uranium in the feed solution from leaching, the amount of wash water added to CCD 6 feed, and the underflow slurry densities in the CCD thickeners. Greater than 45% solids are expected in CCD underflows. It is estimated that 99.5% of dissolved uranium will be washed out of the leached residue solids when using a train of six CCD thickeners.

PREGNANT SOLUTION CLARIFICATION AND STORAGE

The overflow from CCD 1 feeds a reactor clarifier that removes turbidity (that is, fine solids) from the pregnant aqueous solution. The feed to the reactor clarifier will be treated with a small quantity of flocculant to aid settling and clarification.

The overflow of the reactor clarifier flows by gravity to the pregnant solution clarifier pump box. From there the solution will be pumped downwards through the set of five pregnant leach solution sand filters. The filtrate flows to the clarified pregnant leach solution tank.

SOLVENT EXTRACTION

The organic in the SX circuit will be made up of three components:

- A tertiary amine that selectively forms a bond with uranyl sulphate. Enough amine will be added into the solution to hold the design g/L U_3O_8 (usually about 6% to 12% amine reagent by volume).
- Isodecanol that will be introduced into the solution to enhance the separation of aqueous and organic after mixing ceases. Isodecanol is typically added to about half the volumetric concentration of the amine
- A kerosene-type organic as the main carrier solvent.

The design criteria for the organic solvent are 6% amine; 6% isodecanol and 88% kerosene. There will be four extraction mixer settler units. Clarified pregnant aqueous solution will be pumped from the clarified pregnant leach solution tank into the extraction mixer #1, in which it is mixed with organic solution from extraction settler #2. As the organic and the aqueous phases are intimately mixed, the tertiary amine in the organic phase holds onto the uranyl sulphate and removes it (extracts it) from the aqueous phase. After mixing, the mixer discharges the solutions into a settler unit, in which the solution separates into a lower density organic floating on top of the higher density aqueous. A portion of the organic in each extraction settler will be returned to its mixer. This organic recirculation is done to control the volume ratios of organic and aqueous in the mixer; in this case the ratio is 1.5/1 organic/aqueous.

The aqueous that has settled out in extraction settler # 1 will be fed to extraction mixer #2 where it will be met with a counter currently moving organic flow from extraction settler #3. In this counter current flow, pregnant aqueous will be fed into extraction mixer #1 and discharges as barren raffinate from extraction settler #4. Conversely, barren organic will be fed into extraction mixer #4 and discharges from extraction settler #1 as loaded organic (high uranium content organic).

Barren raffinate from extraction settler #4 will be pumped to the raffinate tank. Periodically, the organic that accumulates on the raffinate tank surface, will be skimmed off to return to the extraction circuit. Much of the raffinate reports to the CCD 6 mix tank where it will be recycled as CCD wash. As much of the raffinate as possible will be recycled to capture the acid that is contained in the raffinate. Recycling of raffinate will however increase the circulating load of contaminant elements. This build up of contaminant levels results in the need to bleed some

of the raffinate to the effluent treatment circuit. The raffinate tank can hold about two hours of raffinate generation.

Loaded organic at this point will be expected to contain 99.9% of the uranium that has been fed to SX in the pregnant aqueous solution. The organic will be washed in two scrub mixer settlers with a small flow of acidic water that will be flowing counter current to the organic. The acid solution washes some elements like arsenic from the loaded organic. As well, it washes any small "bubbles" of aqueous that may have escaped extraction settler #1 with the loaded organic. In both acid scrub mixer settlers, aqueous will be recirculated to obtain the target organic to aqueous ratio in the mixers. Scrubbed loaded organic has a high concentration of uranium and much lower concentrations of contaminating elements. Some elements such as molybdenum can, however, go with the uranium into the loaded organic flow to an extent.

There will be six strip mixer settlers. In stripping, barren aqueous strip solution will be used to strip uranium off the organic. The stripping solution will be a strong acid solution that contains 400 g/L sulphuric acid. Scrubbed loaded organic feeds the strip mixer #1 in which it will be mixed with aqueous stripping solution from strip settler #2. The mixed solution separates in strip settler #1. Much of the aqueous in strip settler #1 will be recirculated back to the strip mixer #1 to maintain the target organic to aqueous ratio in the mixer. The remainder of the loaded strip solution will be pumped to the loaded strip after settler which allows the remainder of the organic in the loaded strip solution to separate out. From the strip after settler the loaded strip solution will be pumped to the pregnant strip tank. The pregnant strip tank can hold about four hours of pregnant strip as it is generated. The loaded strip will be very concentrated in uranium at approximately 150 g/L U_3O_8.

Organic from strip settler #1 feeds the strip mixer #2 where it will be mixed with aqueous from strip settler #3. Once again this will be a counter current arrangement with the uranium reporting to strip settler #1 aqueous discharge as loaded strip solution, and the barren stripped organic discharging from strip settler #6. The barren strip solution will be fed into the strip mixer #6 and moves counter currently to strip settler #1.

The barren organic exiting stripping can contain droplets of aqueous that contain strong acid solution. The SX acid wash mixer settler washes the organic with water and recovers the acid that might otherwise be lost. The wash aqueous will be pumped to the strong acid strip solution

make up tank where more acid will be added to the aqueous before it will be used to strip the loaded organic.

Most of the washed organic reports to the barren organic tank. A portion however reports to the mixer of the regeneration mixer settler. A dilute solution of sodium carbonate will be used to keep the aqueous in the regeneration mixer settler at a pH of approximately 9. The regeneration process strips the barren organic of elements such as molybdenum that otherwise could recirculate with the organic and build up in concentration to reduce the organic loading capacity for uranium. The proportion of organic reporting to regeneration will be as low as possible to obtain low contamination concentration levels in the circulating organic. If there is uranium in the barren organic sent to the regeneration unit (from incomplete strip performance), much of it is lost to the spent regeneration solution. Spent regeneration solution reports to the effluent treatment circuit. It is expected that the stripping of the loaded organic into the loaded strip will be 99.6% efficient (U lost to the regeneration stream is about 0.4%).

GYPSUM PRECIPITATION AND WASHING

Lime will be added to increase the pH of the loaded strip solution to reduce the acid concentration in the strip solution in preparation for precipitating uranium. Loaded strip solution will be pumped from the pregnant strip tank into the first reactor tank of a train of six tanks. The flow reports from one tank to the other by gravity. Lime slurry will be added to each tank to very gradually bring pH up in small steps to a final target value of 3.5. As lime is added, it will react with the acid in the loaded strip solution to precipitate gypsum. Gradual addition into high agitation insures that precipitation happens as slowly as possible so as not to trap uranium in the gypsum particles as they are being precipitated. Precipitation removes sulphate to low levels that are required in the uranium precipitation step. The total residence time in the gypsum precipitation circuit will be six hours.

The slurry from the gypsum precipitation process will be pumped to the feed well of the gypsum clarifier. Flocculant will be added to the feed well to assist settling of the gypsum solids in the clarifier. The gypsum clarifier overflow stream flows by gravity into yellowcake precipitation tank #1. The gypsum clarifier underflow will be pumped to the gypsum belt filter. Gypsum belt filter filtrate will be pumped to gypsum precipitation tank #1. The gypsum filter cake from the gypsum belt filter will be reslurried with dilute acid and the resulting slurry will be pumped to CCD thickener #2 to recover any uranium trapped in the filter cake.

YELLOWCAKE PRECIPITATION AND WASHING

Purified loaded strip from the gypsum clarifier overflow reports to yellowcake precipitation tank #1. In this tank, hydrogen peroxide will be added to precipitate uranium as uranyl peroxide (yellowcake). The hydrogen peroxide will be dispersed into a well agitated slurry to minimize very fast localized precipitation. As the reaction progresses, the pH begins to drop. A slurry of magnesia will be added to maintain the pH at 3.0 to 3.5. Yellowcake precipitation tank #1 flows by gravity to yellowcake precipitation tank #2, where the uranium precipitation reaction will be completed, and time is given for the precipitate particles to grow. Total residence time in the precipitation tanks will be four hours.

Yellowcake precipitation tank #2 overflows into yellowcake wash tank #1 where the slurry will be mixed with the belt filter filtrate, the scrub solution from the yellowcake calciner off gas scrubber, and the backwash from the barren strip sand filters. Yellowcake wash tank #1 discharge will be pumped to the wash thickener feed well, where it will be treated with flocculant to assist good settling in the thickener. It is important to have good solids settling performance in the wash thickener to ensure that yellowcake solids do not escape with the barren strip to feed the effluent treatment system and result in uranium recovery loss. Yellowcake wash thickener underflow will be pumped to the belt filter. Yellowcake belt filter cake will be washed with fresh water and will be then conveyed to the yellowcake calciner. Yellowcake belt filter filtrate will be pumped to yellowcake wash tank #1.

Barren strip solution will be removed from the circuit as overflow from the wash thickener. This overflow stream will be pumped through the barren strip sand filters to recover any yellowcake solids in the barren strip solution. Sand filter backwash reports to yellowcake wash tank #1. Sand filter filtrate reports to the barren strip tank. The barren strip tank can contain about four hours of barren strip solution flow. Barren strip solution will be pumped to the SX strip solution make-up tank, or to the yellowcake calciner off-gas scrubber, or to effluent treatment.

YELLOWCAKE CALCINING AND PACKAGING

Yellowcake from the belt filter will be fed to the yellowcake calciner by screw conveyor. The calciner will be an externally heated natural gas rotary type. The combustion gas flow that heats the dryer drum does not contact the uranium inside the rotating drum. The combustion gas discharges through a stack. A small ventilating air stream passes through the calciner to ensure that no gasses given off by the drying and calcining operations build up in the calciner.

Upon exiting the calciner, the ventilation flow passes through a scrubber to remove any particulates. The liquid discharge of the scrubber reports to the yellowcake wash tank #1. After scrubbing, the ventilation gasses discharge via a stack to the environment.

In the calciner, the damp uranyl peroxide will be dried, molecular water of crystallization will be driven off, and uranium peroxide will be calcined to produce a U_3O_8 product. The calciner design temperature will be 840°C with a solids residence time of one hour. During calcining a small amount of volatile contaminants, e.g. fluorine, are also driven out of the calcine and exit in the ventilation gas flow.

The calciner discharge screw conveyor will be designed to cool the calcine to about 200°C before discharging it to the calcine bin. This bin can hold approximately one day's maximum production. The bin and product transfer points are kept under a slight vacuum to prevent any uncontrolled dust emissions. The fan that draws the vacuum, discharges to the atmosphere through a small baghouse.

The calcine bin will feed a packaging system that loads the calcine into 210 L steel drums. While calcine is being fed to the drum, the system will be sealed to prevent any dust from contaminating the area. The drums are sampled manually before lids are fit and seal rings applied. The drums are then washed thoroughly and dried. After being weighed, an ID label will be attached that includes the drum tare and total weight as well as the net weight of the product contained. Normal net weight of a drum will be about 400 kg. Typically, there will be about 100 drums packaged per mill operating day. Some empty drums are stored in the packaging area. There will be also room in the packaging area for temporary storage of at least two days of production or about 200 drums. Drum lots will be loaded into truck vans and will be transported to the prescribed delivery point.

TAILINGS NEUTRALIZATION

CCD 6 underflow slurry and first stage water treatment (FSWT) clarifier underflow slurry will be fed to tailings reaction tank #1. Lime (to neutralize acid), and ferric sulphate and barium chloride (to precipitate dissolved radium) will be added to tailings reaction tank #1. Tailings reaction tank #2 receives the second stage water treatment (SSWT) clarifier underflow slurry. The only reagent that will be added to tailings reaction tank #2 will be lime slurry. Tailings reaction tank #3 will receive the third stage water treatment (TSWT) clarifier underflow slurry. The only reagent added to tailings reaction tank #3 will be lime slurry. Neutralized tailings

slurry overflows from tailings reaction tank #3 into the feed well of the tailings thickener. The tailings thickener underflow slurry will be pumped to the tailings management facility (TMF). Tailings thickener overflow goes to either FSWT reactor tank #1 or to the process water tank.

EFFLUENT TREATMENT

Feed solution will report to the first of two FSWT reactor tanks. Much of the mill effluent will be acidic and even when combined with slightly basic mine effluents, the pH will normally be lower than the target operating pH of 4.5. Lime slurry will be added to the reactor tanks to maintain the pH at 4.5. Sulphuric acid reacts with the lime and a resulting gypsum precipitate will be formed. Some metals will begin to precipitate with the hydroxide that will be added by the lime.

The raffinate fed to FSWT reactor tank #1 will normally have significant levels of ferric iron. If raffinate is not flowing or is in low supply, ferric sulphate can be added to ensure an adequate ratio of ferric iron to arsenic and molybdenum (approximately 4:1). Much of the arsenic, molybdenum, and selenium will be precipitated in the FSWT tank. These elements can co-precipitate with other precipitates or be adsorbed onto surfaces of precipitated iron compounds such as ferrihydrite and ferric and manganese hydroxides.

Generally, there will be a sufficiently high ORP in the FSWT to keep arsenic in the arsenate form. This will make arsenic precipitation more efficient. Sometimes however it will be beneficial to inject air into the reactors to provide oxygen to the system to ensure elements are not reduced. Air will be injected into the agitator blade area, which will also help to remove any radon from the effluents and ensure that all generated CO_2 is stripped and removed before the pH is increased in SSWT. If present, CO_2 can make uranium more soluble in a higher pH solution.

Some barium chloride will be added in the FSWT reactor tanks. Barium will react with the sulphate that is plentiful in FSWT to form a barium sulfate precipitate. The radium in the effluents will act similarly to barium and much of the radium will be co-precipitated in FSWT.

The two reactor tanks will have a total residence time of one hour at design flow and two hours at nominal flow. All the reagents can be added into both the first and second reactor tanks as required.

Elements precipitated in the FSWT reactor tanks will feed as a dilute slurry into the FSWT clarifier. The clarifier will settle the precipitates and will provide a low suspended solids overflow stream that will flow to the SSWT reactors.

In the two SSWT reactor tanks, more lime will be added to increase the pH to 7. As the pH is increased, metals will be precipitated. More ferric sulphate as well as barium chloride will be added to precipitate more of the oxyanions, including radium. If more sulphate is required, or pH needs to be decreased, sulphuric acid will be available.

All reagents can be added in either of the two SSWT reactor tanks. As with the FSWT, the design residence time in the reactors will be a minimum of one hour. At the nominal flow rate residence time will be two hours. Precipitated solids are settled in the SSWT clarifier, from which the underflow slurry will be pumped to tailings reactor tank #2. The SSWT clarifier overflow will flow by gravity into TSWT reactor tank #1. In the TSWT stage the entire suite of reagents for SSWT is available. The pH will be raised to 10 in the TSWT reactor tanks. The underflow of the TSWT clarifier will be pumped to tailings reactor tank #3. The TSWT clarifier overflow will flow by gravity into the pH adjustment tank, where sulphuric acid will be added to bring the pH down to 6.5.

Water from the pH adjustment tank will be passed through the treated effluent sand filters. The filtered water may go to the process water tank for use in the mining and milling operations. Use of this recycled water reduces the amount of fresh water that will be used and therefore the amount of effluent discharged into the environment. The filtered water may also be pumped into one of the three monitoring ponds.

FEED AND EFFLUENT MONITORING PONDS

The mine sump pumps will discharge to a surface feed settling pond. The pond can contain four to five days of normal mine water discharge. As water is retained in the pond, suspended solids settle. Water that runs off potentially contaminated site areas such as the ore storage pads and from potentially contaminating uses such as dry and laundry, and maintenance shops, discharges to the feed settling pond.

Water will be pumped from the feed settling pond into the process water tank. Excess water will be pumped from the feed settling pond to FSWT. The flow of water to FSWT will be maintained at a prescribed flow rate.

Effluent monitoring ponds will allow storage of treated effluent until water parameters are assayed and confirmed to meet discharge criteria. As a pond receives water from the pH adjustment tank, the flow will be sampled. Once a monitoring pond is full, the composite sample that represents the full pond will be taken to the on-site laboratory and all the parameters of concern are assayed. If all the assays are in the required ranges, approval is given allowing the pond to be discharged to the environment. As the pond is discharged to the environment, another composite sample will be taken that will represent the discharge to the environment. The assays of this discharge composite sample will be reported as required to the control agencies. If assays are not as required in the pond fill composite, the pond contents are pumped back to the feed settling pond for reprocessing in the effluent treatment plant. At nominal fill rates a monitoring pond will hold about 18 hours of treated effluent.

URANIUM RECOVERY

Based on results of the test work, and experience in Northern Saskatchewan uranium operations, overall net uranium recovery estimates were made by Melis Engineering. These estimates were reviewed by Wood and verified as the basis for the PFS. Table 17-2 summarizes these estimates. The graph of uranium recovery versus head grade is shown in Figure 17-2.

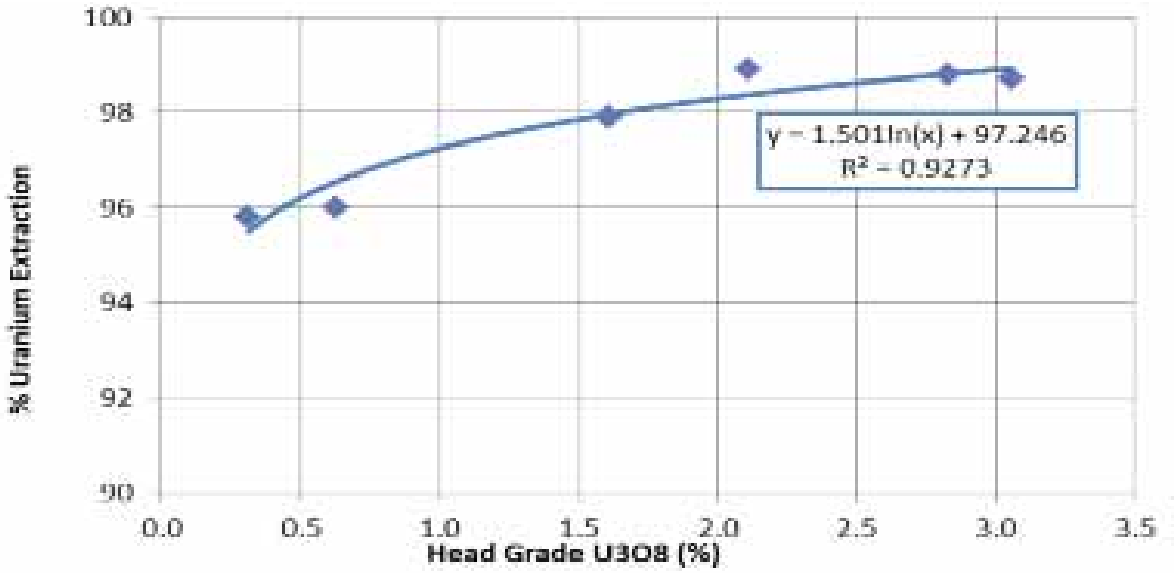
Projected net recoveries for Open Pit (higher grade) and Underground (lower grade) head grades are 97.1% for 2.0% U_3O_8 head grade, and 94.9% for 0.5% U_3O_8 head grade.

TABLE 17-2 OVERALL URANIUM RECOVERY ESTIMATE
Fission Uranium Corp. – Patterson Lake South Property

Composite	Feed (% U_3O_8)	Extraction1 (%)	Other Losses (%)			Net Recovery (%)
			Soluble	SX	Other	
O/P	2.83	98.8	0.5	0.4	0.3	97.6
U/G	0.63	96.0	0.5	0.4	0.4	94.7
YR1	3.06	98.7	0.5	0.4	0.3	97.5
YR3	2.11	98.9	0.5	0.4	0.3	97.7
YR6	1.61	97.9	0.5	0.4	0.3	96.7
LG	0.31	95.8	0.5	0.4	0.4	94.5
Average of the Year 1 to Year 6 and Open Pit Composites						97.4
Average of the Underground and Low Grade Composites						94.6
Projected Recoveries for Open Pit and Underground Head Grades						
Projected Net Recovery for 2.0% U_3O_8 Head Grade[2]						97.1
Projected Net Recovery for 0.5% U_3O_8 Head Grade[2]						94.9

Notes:
1. Extraction values from leach test results
2. Calculated using overall uranium extraction extrapolated from Figure 17-2
3. Table prepared by Melis Engineering, 2018

FIGURE 17-2 LEACH TEST RESULTS VS. URANIUM HEAD GRADES



Source: Melis Engineering, 2018

ENERGY, WATER, AND PROCESS MATERIALS REQUIREMENTS

WATER

Water consumption was estimated for all the different mill processes and totals at approximately 130.4 m^3/hr. Opportunities to recycle water to the mill and reduce fresh water consumption were identified, totaling approximately 51.2 m^3/hr.

REAGENTS

Reagents will include:

- Sulphur
- Sulphuric acid (94% H_2SO_4)
- Unslaked lime (CaO)
- Sodium Chlorate ($NaClO_3$)
- Hydrogen peroxide (H_2O_2)
- Flocculant
- Kerosene
- Tertiary amine
- Isodecanol
- Sodium carbonate (Na_2CO_3)
- Magnesia (MgO)
- Ferric sulphate ($Fe_2(SO_4)_3$).

ENERGY

Energy requirements for the Project are discussed in Section 18. The process plant is estimated to require 5 MW.

COMMENTS

The proposed process flowsheet is conventional for the uranium industry and will use conventional equipment.

The test work performed and knowledge of similar deposits in the Athabasca Basin supports the recovery assumptions and the amenability of the PLS mineralization to the proposed processing methods.

18 PROJECT INFRASTRUCTURE

INTRODUCTION

The Project is located adjacent to Patterson Lake, approximately 550 km north-northwest of the city of Prince Albert and approximately 150 km north of the community of La Loche, Saskatchewan. The Property is accessible by vehicle along all-weather Highway 955 which bisects the Property in a north-south direction. The site will be operated as a remote, fly-In/fly-out (FIFO) operation.

The key infrastructure contemplated for the Project includes:

- Underground mine with access from a Box Cut and Portal (see Section 16)
- Mine infrastructure including material handling systems, ventilation, dewatering, maintenance facilities
- Artificial ground freezing system for partial recovery of the crown pillar mineralization
- Site support infrastructure for the mine, including explosive magazine, liquid natural gas (LNG) storage facilities, LNG power plant, and electrical and communications facilities
- Process plant and associated analytical laboratory
- TMF (see Section 20)
- Surface waste rock storage facility for benign waste rock, non-benign waste rock (either mineralized or otherwise harmful to the environment), and benign overburden
- Permanent and construction accommodation camps
- Mine support buildings, including maintenance, warehouse, and security buildings
- Water management facilities, including storm water runoff pond and six process ponds
- Airstrip

The layout of the planned surface infrastructure is provided in Figure 18-1.

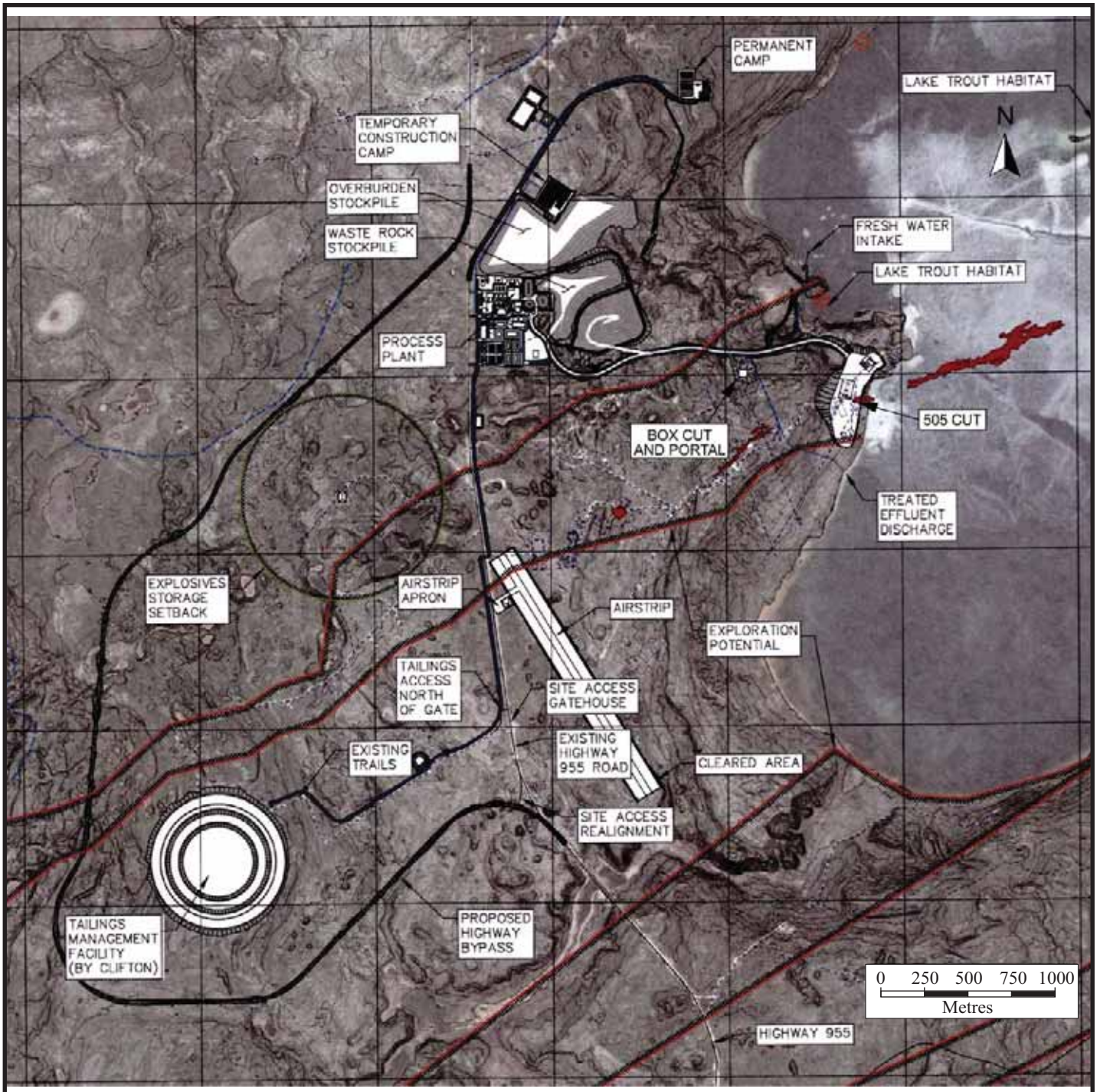


Figure 18-1

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Proposed Surface Infrastructure Layout Plan

November 2019

Source: Wood, 2019.

ROADS AND LOGISTICS

The PLS Property has the benefit of having an existing, well-maintained public road that runs through the Project. This existing gravel surfaced road is under the jurisdiction of Saskatchewan Ministry of Highways and Infrastructure (SMHI) and identified as Hwy 955. However, due to the required placement of the TMF, a detour of the existing highway around the project is required. The requirement for a highway bypass is a result of project traffic between the TMF and the main process facilities. The TMF is located on the opposite side of the existing highway from the process facilities. The project requires free flowing traffic between the two areas, and public traffic cannot cross with such project vehicles due to environmental and safety restrictions.

The existing highway road that is within the PLS property will be used as the primary on-site access. The proposed highway detour that circumvents the TMF will be 8.7 km long and 8 m wide on surface.

Regular traffic roads will have a six metre wide traffic surface (three metre per lane) with one metre wide shoulders totaling eight metre wide top graveled surface. Due to the heavy haul traffic between the open pit excavation and the waste and overburden stockpiles, the road between the mill site and the open pit is designed to have two 7.7 m wide travel lanes and one metre shoulders, resulting in a total road surface width of 17.4 m.

STOCKPILES

OVERBURDEN STORAGE FACILITIES

Approximately 1.0 Mm^3 of overburden is expected to be produced from excavation of the 505 Cut, Box Cut, and development through overburden. A portion of the mined-out overburden will be used for filling in low spots to achieve required drainage. The remainder of the overburden will be hauled and stored in an appropriate location. The storage area was chosen to be as close as possible to the mine to minimize haul time while not impeding the possibility of future exploration. The overburden storage has been designed to hold 2.1 Mm^3 of material, which includes a swell factor, and an allowance for future expansion.

Wood and BGC recommend building the overburden storage at a slope of 5.5:1 to ensure ground and slope stability. Since the overburden material is not acid generating, contact water

is not required to be contained and treated. The storage area will be cleared of vegetation and overburden will be placed directly on surface. Water runoff from the storage area could pick up suspended solids and will need to be treated before being discharged into Patterson Lake. Two collection ditches will be constructed to capture, and transport runoff water to two collection ponds where suspended solids will be allowed to settle before the water is discharged to the lake.

The proposed location of the overburden stockpile is shown in Figure 18-2.

WASTE ROCK STORAGE FACILITIES

The excavation of the mine is anticipated to produce 1.2 Mt of waste rock. All waste rock material will be hauled to a waste rock dump. Similar to the overburden storage, the waste rock dump will be located close to the mine and outside of future exploration zones. The waste rock dumps will be built at a slope of 4:1. The capacity of the waste rock storage pile is 2.0 Mt, which includes a swell factor, and an allowance for future expansion. Waste rock will be utilized in the production of backfill.

It is assumed that some of the waste rock material could contain low grade mineralization or could be PAG. The mineralized material will be separated from non-mineralized material and directed to a separate “special waste” rock dump. The special waste area will be dual lined with HDPE and incorporate a leak detection system between layers. Surface runoff from the mineralized waste rock will be collected and treated prior to discharge. The special waste rock dump will be built such that positive drainage to a final low point is achieved and will be able to withstand a 24 hour PMP storm event. A single 200 mm inner diameter pipe will pump runoff from the collection pond to the effluent treatment plant.

The non-mineralized waste rock that is non-acid generating will be stockpiled on existing grade, without lining or containment.

Figure 18-2 shows the layout of the waste rock stockpile.

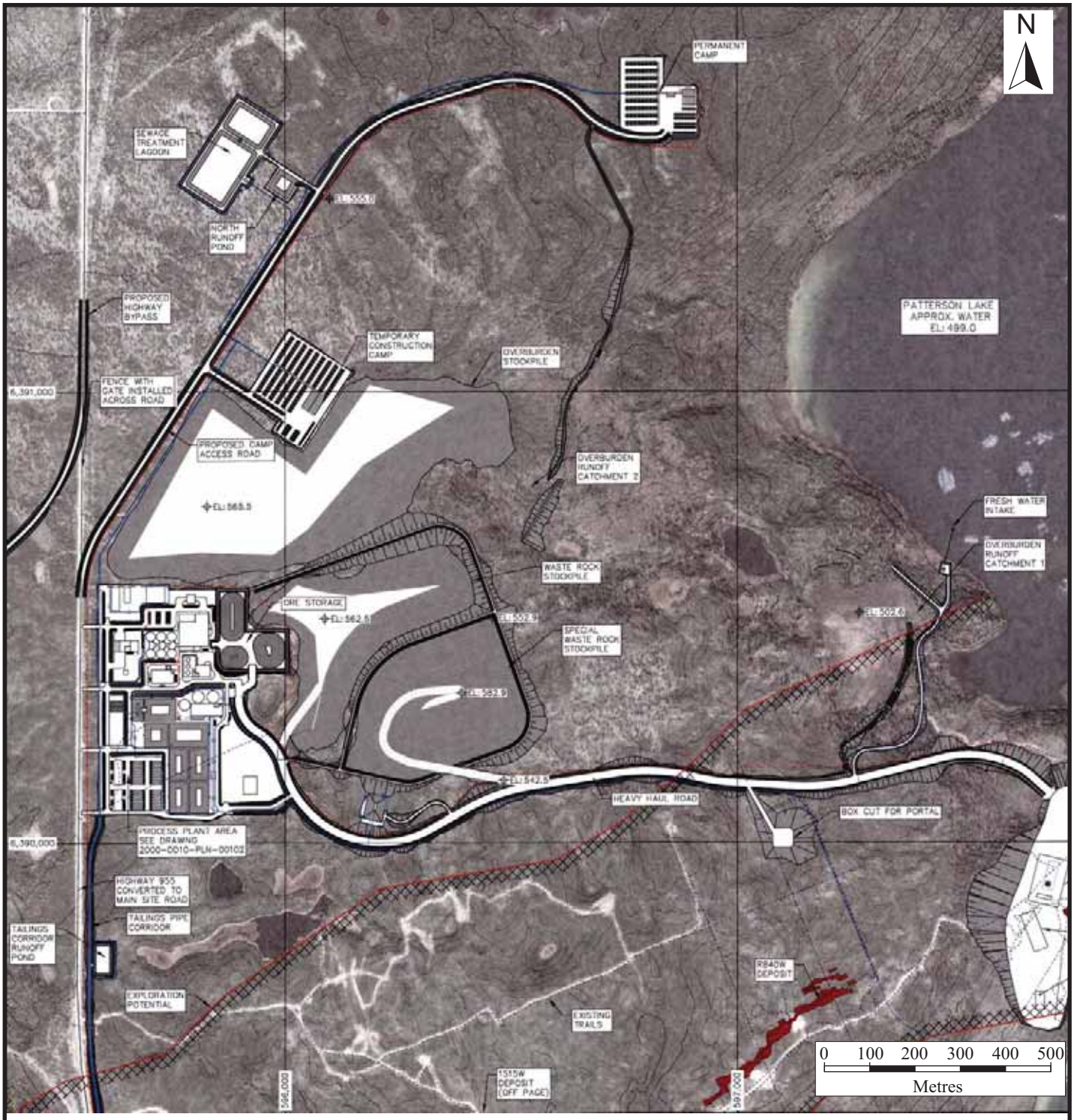


Figure 18-2

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Overburden and Waste Rock Storage Facility Layout Plan

November 2019

Source: Wood, 2019.

TAILINGS MANAGEMENT FACILITY

The TMF is discussed in Section 20.

WATER MANAGEMENT

Water management is discussed in Section 20.

BUILT INFRASTRUCTURE

ADMINISTRATION, CONTROL ROOM, LABORATORIES, AND DRY

The administration building will be a two-story building located at the northwest corner of the Process plant, and will include:

- Offices and cubicles for operations staff
- Safety and first aid facilities
- Change rooms, lockers, showers, and laundry for the plant and open pit/underground workers
- Metallurgical laboratory for analyzing effluent, ore, and product samples

It is anticipated that there will be office and cubical space for approximately 25 people in the administration building. There will also be two meeting rooms, a kitchen, and a lunchroom for staff to use. The female and male dry areas are sized for 30 and 120 workers respectively based on other similar underground uranium projects. The overall administration complex is projected to cover 36 m x 18 m and will be separated from the mill complex by a firewall.

MAINTENANCE AND WAREHOUSING BUILDING

The Project's maintenance and warehouse storage will be housed by a building located to the west of the mill process plant. The maintenance shop occupies the majority of the 24 m × 54 m building. It will provide space to rebuild and repair process equipment, as well as fabricate items to support the operations of the site. Two drive-through maintenance bays will be located on the west end of the building, one with a wash bay. A 10 t capacity overhead crane spans both bays and part of the maintenance shop. Allowances were made to equip the shop appropriately with items such as welders, band saws, and other small tools. This building will also house additional office space and lunchroom facilities for warehouse and maintenance personnel.

The warehouse portion of the building is stocked with supplies and equipment that are required for the ongoing operation and maintenance of the plant and mobile equipment. The warehouse has a truck receiving platform with a dock leveler for receiving parts and supplies from various sized trucks. There is also an overhead door suitable for forklift and truck deliveries. A 7.5 t capacity overhead crane is utilized in the warehouse for on/off loading of trucks.

MAINTENANCE SHOP

The Project's mobile equipment maintenance shop will be housed by a building located near the process plant. The truck maintenance shop will be a 24 m x 54 m building. It will provide space to repair and rebuild all mobile equipment required to operate the site. The shop will have three bays, two drive-through maintenance bays and one wash bay. A 50 t capacity overhead crane will span the two maintenance bays. This building will have storage space, office, a washroom, and a lunchroom.

SITE SECURITY

The site gatehouse will be a 4 m x 20 m modular building and will include washroom facilities and water storage for security personnel. Gate arms will be used to control site access.

FIRE PROTECTION

A standard deep buried interconnected firewater loop will be installed and will encircle the process plant, the maintenance/warehouse building, and the effluent treatment plant. Fire is an inherent risk in SX plants that must be managed. The SX plant will have its own specially designed fire suppression system.

FUELS

Liquefied propane gas (LPG) will be used in several areas of the Project, including in the process plant, and for heating air as it enters the underground mine. Due to the distance between the process plant and underground ventilation system, multiple LPG storage facilities are envisaged. LPG will be delivered to the site via specialized trucks, which is consistent with existing uranium mines in northern Saskatchewan.

In addition to LPG, the site will require diesel for several applications. Areas needing diesel include the site general equipment, surface mobile mine equipment, and underground mine equipment.

AIRSTRIP

An airstrip will be constructed at the Project and will function as the primary mechanism for moving personnel to and from the work site. The airstrip will be sized to match regional commuter propeller planes, and will also include a small airport terminal, fuel station, light system, and appropriate navigation equipment.

CAMP AND ACCOMMODATION

The permanent camp is assumed to host 270 rooms in nine dormitories. The camp administration office and boot room will form the entrance to the camp. Additional facilities will include laundries, recreation room, and camp kitchen and dining area.

The construction camp will be located in proximity to the permanent camp in order to minimize infrastructure such as piping. It is planned to accommodate approximately 400 persons in fifteen dormitories.

POWER AND ELECTRICAL

The Project is located in a region of northwest Saskatchewan with road access, however, the area is devoid of other infrastructure. There is a 14.4 kV single phase power line approximately 100 km from the site; however, it is of insufficient capacity for the Project's scope. The nearest sub-station to the site with sufficient capacity for the Project is approximately 200 km away. Due to the high capital costs associated with running a power line to site, the UG PFS design includes an on-site power plant.

The power requirement for site is estimated to be 8.7 MW and increase to 16.1 MW before reducing again to 11.1 MW, as a result of operating the refrigeration plants (Table 18-1).

TABLE 18-1 POWER REQUIREMENTS ESTIMATE
Fission Uranium Corp. – Patterson Lake South Property

Description	Power Consumption (MW)
Mine	3.0 to 10.3
Process	5.2
G&A	0.6
Total	**8.7 to 16.1**

In order to meet the site power requirement, the site will require a maximum of ten, two MW generators (20 MW of installed capacity). The mine load varies due to the operation of the refrigeration plants at peak capacity in Year 2 and Year 3, followed by intermittent operation of the freeze plants for the remainder of the mine life. The plant will be fueled by LNG which will be trucked to site.

WATER SUPPLY

Water from Patterson Lake will be pumped to a storage tank in the effluent treatment plant. From there the water will be pumped to the administration building for the workers dry and laboratory and for fresh water to the process plant.

A separate water intake will be located north of the raw water intake and will supply water for the permanent and temporary construction camps for washrooms and laundries. Potable water will be trucked to site. It is recommended that a trade-off study be carried out to determine the optimal strategy for supplying potable water at site.

EXPLOSIVES

An explosives storage area is planned for the Project and will be located in an area that is a suitable distance away from other buildings and offices. The explosives storage facility will consist of two buildings – one for ANFO and primers, and the other for blasting caps, and also a mixing station.

COMMENTS

Infrastructure considerations are sufficient to support the proposed mine plan.

19 MARKET STUDIES AND CONTRACTS

MARKET OVERVIEW

The principal commodity of the Project is U_3O_8, commonly known as yellowcake. The primary end-use for yellowcake is in the manufacturing of fuel bundles which are used in nuclear power plants that produce electricity. Yellowcake is sold between producers and end-users and is sold both under long term contracts, and the spot market.

MARKET DEMAND

The demand for yellowcake is directly correlated with the global demand for nuclear energy, which is in turn driven by the demand for electricity. It is estimated that global consumption for electricity has grown from 5,000 TWh in 1980, to 25,000 TWh in 2017. Expected consumption is expected to grow by 58% to 40,000 TWh by 2040 (Cameco 2019 Q1 Investor Presentation). In 2017, an estimated 2,500 TWh (or approximately 10% of the total electricity demand) was provided by nuclear power plants. Demand for nuclear fuel is expected to increase, with an estimated 51 new reactors currently under construction.

MARKET SUPPLY

The supply of yellowcake can come from two sources: primary (uranium mines), and secondary sources. The primary uranium market is relatively concentrated, with a handful of companies, countries, and projects accounting for the majority of primary uranium supply. In 2017, five companies accounted for approximately 65% of global uranium production.

The top ten uranium mines, by production, are shown in Table 19-1.

TABLE 19-1 PRIMARY URANIUM MARKET SUPPLY
Fission Uranium Corp. – Patterson Lake South Property

Position	Project	Location	Mining Method	2017 Production (Mlb U_3O_8)	Percent of Total
1	Cigar Lake	Canada	UG	18.0	12%
2	McArthur River	Canada	UG	16.1	10%
3	Katco	Kazakhstan	ISR	9.1	6%
4	Central Mining District	Uzbekistan	ISR	6.2	4%
5	Olympic Dam	Australia	UG	6.2	4%
6	Karatau	Kazakhstan	ISR	6.1	4%
7	Mynkuduk	Kazakhstan	ISR	5.5	4%
8	Somair	Niger	OP	5.5	4%
9	Inkai	Kazakhstan	ISR	5.5	4%
10	South Inkai	Kazakhstan	ISR	5.2	3%
-	Remaining			70.1	46%
	Total			153.6	100%

Notes:
1. ISR stands for In-Situ Recovery, UG stands for Underground, and OP stands for Open Pit.
2. Uranium from Olympic Dam is recovered as a by-product.
3. McArthur River is currently on care and maintenance.

MARKET PRICES

In the past ten years, spot uranium prices have been trading at between US$18/lb U_3O_8 to US$65/lb U_3O_8, as shown in Figure 19-1.

FIGURE 19-1 TEN YEAR HISTORIC SPOT URANIUM PRICE

Source: NYMEX, Monthly Weighted Average

Several events have impacted the current spot price, significantly the Fukushima-Daiichi nuclear accident in March 2011. A large scale earthquake and tsunami disabled the power supply and cooling of three reactors, causing radioactive material to be released into the environment. In September 2013, Japan shut down their entire fleet of nuclear reactors pending a safety review. The first reactor was restarted in August 2015, and as of March 2019, a total of nine reactors (out of a total of 35 operable reactors) were operating again. The extended closure of Japan's nuclear power plants has caused a supply glut, as utility companies were no longer consuming uranium, and selling what they had already purchased back into the spot market.

With the restart of the Japanese nuclear fleet, coupled with new reactor construction in emerging economies, and uncertainty around some supply sources, consensus forecasts show a long term uranium price ranging from US$30/lb U_3O_8 to US$55/lb U_3O_8. Based on long term forecasts, RPA has used US$50/lb U_3O_8 as the basis for the cash flow model.

20 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

SUMMARY

In support of the PFS, a review of the licensing, permitting and environmental aspects of the Project, including bio-physical, social, and governance, was completed through a literature search, examination of the appropriate Acts and Regulations, review of the PFS design of the project, discussions with Fission Uranium and the PFS team, examination of selected documents, and a site visit.

The preliminary baseline work has described typical northern Saskatchewan terrain of the Athabasca Basin region, and it has not identified anything that should significantly delay a project if proper planning and mitigations are incorporated into the Project design. Such mitigations would include, but are not be limited to, habitat compensation for any fish habitat disturbed by the Project, possibly terrestrial habitat compensation for woodland caribou habitat, and sufficient consultation with local First Nations and communities. The primary environmental goal will be the protection of Patterson Lake and the downstream water quality in the Clearwater River system as this will likely be the focus of any concerns under the underground mining only scenario.

Overall, the Project appears to be following applicable regulations governing exploration, drilling, and land use, and Fission Uranium staff and contractors are aware of their duties with respect to environmental and radiation protection. Early in the exploration program, there were some issues related to excess clearing of trails and nearby water bodies, however, Fission Uranium has worked to repair and reclaim these areas. Operations are neat and orderly, with the level of clearing and disturbance now commensurate with similar projects in northern Saskatchewan. The Project is frequently visited by Saskatchewan Conservation officers to ensure compliance.

A high level, preliminary environmental risk assessment (PERA) was conducted to assess potential interactions of the Project with the environment. Under the underground mining only scenario, the main area of concern is development and operation of the TMF. The mitigations

proposed for the TMF, appear protective of the environment in the long term post decommissioning.

The TMF will use the proven sub-aqueous deposition and pervious surround methodologies, and it will require enough work to demonstrate that the proposed hybrid facility (partially excavated and partially above ground) will be protective. The hybrid TMF design is optimized to the existing geological and hydrogeological conditions and avoids widespread dewatering during operation, although it does require a slight draw on the local groundwater to eliminate contaminant flux. The potential for impacts on Patterson Lake will be much less in the underground mining scenario and are largely related to protecting the water quality. This will need to be demonstrated in the environmental impact assessment (EIA).

Most of the identified environmental risks are the same as existing uranium operations, which, in the modern era, have demonstrated to have minimal impact on the local and regional environments. Regardless, for all aspects of the Project, a detailed environmental risk assessment (ERA) will be required to ensure that all reasonable mitigations are in included in the EIA and the Project design.

To date, the environmental baseline has been sufficient for the local environment to be included in an EIA, however, the far field, downstream of Patterson Lake area, requires additional work ahead of an EIA and to support pathways modelling. This additional baseline work is underway and will be largely completed in 2019 with some work required in the winter of 2019/20. Canada North Environmental Services Limited (CanNorth) has reviewed the baseline program against what is necessary to support the pathways modelling required to support an EIA and CNSC licensing, and any identified gaps are being addressed in the current work.

The level of environmental review was commensurate with a PFS and was not an exhaustive examination of all documentation and did not include modelling or a compliance audit. The interpretation relies on the authors more than 35 years of experience with Saskatchewan uranium projects and familiarity with mining and the federal and provincial requirements that accrue to such projects. The Project is at a stage where, with proper planning, areas of concern can be addressed in a timely fashion within an orderly project approvals process.

Some of the items required to support an EIA, particularly consultation, need to be undertaken in a manner that does not materially affect the Project timing. This will require ongoing consultation with the CNSC and the Saskatchewan Government to ascertain the level of First Nations, Métis, and stakeholder consultation expected. Fission Uranium's level of governance continues to be adequate for the level of work on site, however, it will require significant improvement to support the policy-driven management systems required to support a uranium project and its safety and control areas.

Clifton recommends that Fission Uranium:

1. Continue the engagement and consultation process, expanding it to reflect the changes in the Project scale, mining options and progress in the environmental approvals process;
2. Complete an assessment to ensure all appropriate information is being collected to support the environmental modelling required for the EIA and CNSC licensing.
3. Finish the downstream bio-physical work to complete the information required for the EIA (currently ongoing);
4. Continue bio-physical monitoring at a maintenance level to maintain the currency of the existing environmental database.
5. Continue to explore options to reduce the footprint of the TMF.
6. Explore shared services options with other companies operating in the area (e.g. environmental data sharing, infrastructure, etc.).
7. Continue to participate in the woodland caribou discussions for SK1 and SK2W.
8. Ensure that future work on site is of sufficient detail (feasibility level at a minimum) to support the EIA and CNSC licensing process.
9. Develop a suitable governance structure (policies and committees) for the Fission Uranium board in anticipation of the policy-driven requirements for managing a uranium mine.

INTRODUCTION

The PLS area represents a new mining region with several discoveries in the area with the potential to be developed, and as such the Triple R deposit will garner additional scrutiny as one of the first new projects on the west side of the province since the now decommissioned Cluff Lake mine. The potential impacts from a uranium project in northern Saskatchewan are well known, and with regulatory oversight from both the federal and provincial governments, the actual performance of modern uranium mines has been very good. Environmental protection will continue be a key focus for project success.

This section is based upon an examination of available literature and reports available either online or supplied by Fission Uranium (either directly or through its contractors); discussions with Fission Uranium management and personnel; discussions with contractors and regulators; and, a site visit. While some documentation was reviewed, it was not an audit or an exhaustive assessment of compliance. The focus was on items that might be material to the PFS and, or with potential to impact the progress of the Project as it moves towards production.

A PERA was conducted for the PLS Property and was designed to incorporate a level of detail consistent with the pre-feasibility stage of the project. It examines what is projected regarding site facilities, areas of physical disturbance, effluent releases, emissions to the environment, and makes an estimate of the potential impacts after mitigation. While the project is conceptual, preferred options are presented and included in the PFS, and these preferred options are highlighted in the PERA.

SITE SETTING

The following describes the main components of the Project as they may be affected by the proposed project design. The PERA is not an exhaustive examination of potential environmental interactions but is designed to focus on those with the most potential for significant impacts. Combined with the current preferred development options, the following are some of the key factors to be considered in the PERA discussion:

Geology

- Thick sequence of glacial overburden that will make some development difficult and allows a pathway for migrating fluids.
- Location of the main ore body directly under Patterson Lake.
- Handling of waste rock and the determination of its acid generating or leaching potential.

Hydrology

- Patterson Lake is the first lake downstream of Broach Lake, which is the headwaters of the Clearwater River system
    - Preston Lake Wildlife Refuge (permanent, legislated), approximately 40 km downstream. Preston Lake Wildlife Refuge consists of an island located in Preston Lake at 57° 24’ N, 109° 11’ W from The Wildlife Management Zones and Special Areas Boundaries Regulations, 1990;

  - Clearwater River's Heritage River designation;
  - Clearwater Provincial Wilderness Park (48 km SSE, longer by river), per The Parks Act;
  - Drains into Alberta and joins the Athabasca River at Fort McMurray approximately 300 km downstream.
- Relatively flat area to west of Patterson Lake with drainage to Alberta a potential concern
  - Maintain project within one watershed (Clearwater R.)
  - Marguerite River Wildland immediately along the AB/SK border in AB (38 km due west). This is where water would drain to if discharged into the Alberta watershed.
- Protection of water quality will be paramount

Hydrogeology

- Groundwater movement, especially from the TMF
- Quantity and quality of groundwater

Ecological

- Main terrestrial species of concern is caribou
- Main aquatic species of concern is lake trout
- Potential conflicts with rare and endangered plants

Social

- First Nations and Métis use of the area
- Patterson Lake's use for fishing, including commercial, subsistence and recreational
- Trapping, and traditional resource harvesting in the area
- Consultation and engagement
- Impact communities (e.g., all communities on the west side to Beauval, etc.)

Governance

- Board supported policies for Safety, Environmental, Social and Governance.

BASELINE PROGRAM

Modern EAs require significant environmental and social baseline data to predict potential impacts through an ERA supported by pathways modelling and analytics, and the design of

appropriate mitigations. Since the start of their exploration program, Fission Uranium has contracted CanNorth to undertake environmental baseline work, which has included programs since 2013. The work programs have continued to the present and additional work is proposed for 2019/20. The majority of the work completed to date has focussed on the near field environment, and this near field work is sufficient for use in an EIA. As the Project advanced, it was recognized that additional baseline work was required to fully support an EIA particularly in regard to the downstream environment along the Clearwater River system and in the reference areas; this work is being completed in 2019. Overall, the work to date is sufficient to support the PFS and the submission of a Technical Description/Project Description document to initiate the EIA process.

Baseline work has included hydrology, water quality, aquatic and terrestrial environments, groundwater, air quality, and heritage resources. In addition, CanNorth has also completed a site condition and reclamation report in support of local reclamation initiatives by Fission Uranium.

Hydrologic monitoring stations were established at the inflow and outflow to Patterson Lake, and the 1:100 year high and low flows are predicted to be 2.93 m^3/s to 0.09 m^3/s, respectively. Lake water quality is excellent with Contaminants of Concern (COC) at or below detection levels, and ongoing monitoring has seen no change in water quality. The lake supports a healthy fish population and substrates suitable for spawning (e.g. rock and gravel) are available, although whitefish have been found to utilize the entire shoreline of the lake.

Table 20-1 provides a list of rare and endangered species that have been identified by CanNorth as having potential to be found on the Project area.

TABLE 20-1 RARE AND ENDANGERED SPECIES WITHIN THE PROJECT AREA
Fission Uranium Corp. – Patterson Lake South Property

Scientific Name	Common Name	COSEWIC	SARA Status
Chordeiles minor	Common Nighthawk	Special Concern	Threatened
Euphagus carolinus	Rusty Blackbird	Special Concern	Special Concern
Contopus cooperi	Olive-sided Flycatcher	Special Concern	Threatened
Rangifer tarandus caribou	Woodland Caribou	Threatened	Threatened
Myotis lucifugus	Little Brown Myotis	Endangered	Endangered
Myotis septentrionalis	Northern Myotis	Endangered	Endangered
Hirundo rustica	Barn Swallow	Threatened	-

While terrestrial work has indicated that there was one Saskatchewan listed rare plant and some bird nesting areas that may require special consideration, such as seasonally limiting activity during the nesting season. There does not appear to be any issues that would require material or unusual mitigations. There is nothing identified that would conflict with currently proposed activities, however, this will be re-examined in depth in the EIA and, if necessary, a mitigation strategy proposed. Bat studies are underway and if endangered bats are present, then a mitigation strategy will be devised, such as the use of bat boxes.

The fisheries work indicated a robust fishery in Patterson Lake. For the underground only option, there are no facilities projected to be close to the shore except for a freshwater intake, a discharge area, and a dock. These facilities can easily be designed to meet current regulations in order to prevent impacts to fish or fish habitat.

The Saskatchewan Ministry of Environment (MOE) has been working on Range Planning for woodland caribou in Saskatchewan since Environment Canada issued their "*Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal population, in Canada – 2012"* (the Recovery Strategy). In its report, in response to a finding that caribou are threatened in Canada, Environment Canada assessed populations in each province and set a minimum undisturbed habitat limit of 65% in order to allow caribou herds to remain stable or grow. Provinces are expected to meet this commitment.

Saskatchewan was divided into two major ranges: SK1, the Boreal Shield, which covers most of northern Saskatchewan including the Athabasca Basin areas; and SK2, the Boreal Plain region that covers, for the most part, the commercial timber region of the province. The province further divided SK2 region into three sub areas for management: western, central,

and eastern. The Project area lies in the very northwestern corner of the SK2 west zone very close to the border with SK1, and given the local setting, it could easily be argued that the Project lies in SK1 given the shield-like terrain and sparse development.

Currently, the province has a draft plan in place for SK2 Central, and they expect it to be completed in 2019, with SK2 West following late in 2019 and SK2 East (and possibly SK1) in 2020. The province is working to comply with Environment Canada's recovery strategy in order to prevent Environment Canada from taking over the management. Saskatchewan understands the need to balance economic activity with caribou protection and is contemplating entering into a Section 11 Agreement under the Species at Risk Act, which allows the province to enter into a conservation agreement with Environment Canada to benefit a species at risk or enhance its survival in the wild. The agreement must describe conservation measures consistent with the Species at Risk Act and may include measures to protect critical habitat. It is not clear at this time what affect that would have, if any, on developing a Caribou Management Plan (CMP) for the Project.

Fission Uranium has been an active participant in provincial consultations related to the Recovery Strategy, especially related to the SK2 West area. For the EIA, a CMP will be required that discusses the mechanisms for mitigating potential impacts to caribou. The plan will have to discuss, in descending preference, how the company's activities will avoid or minimize impacts to caribou habitat and, if the impacts cannot be avoided or suitably minimized, propose offsetting compensation. Currently, disturbances are calculated on the actual area plus a 500 m buffer, and the disturbance will be deemed to last 40 years or more (the time to regrow vegetation in the area). For instance, for a temporary road, the area affected will be the length of the road plus the 500 m buffer, so a ten kilometre temporary road would have a footprint of at least ten square kilometres. The 40 year countdown to becoming caribou habitat would not begin until the road has been decommissioned, reclaimed, and the revegetation is self-sustaining.

While the mandatory need for a CMP is not in place yet, it will be soon, and Fission Uranium will require CMPs for exploration work as well. Since Saskatchewan has indicated it will not use caribou or the habitat rating to stop development (at least not in the near term), the level of development in an area and the type of caribou habitat will have a large bearing on the level of mitigation and, or compensation. In the Patterson Lake area, there is a conflict between the provincially assigned level of caribou habitat (Tier 1, or best habitat), the existing level of

disturbance (completely disturbed by fire), and the apparent ongoing use of the area by caribou despite the activity and fire disturbance (from Alberta collar data, local observations, and recent surveys). There is also considerable controversy about the inclusion of fire and lakes in the definition of disturbed habitat. If monitoring can demonstrate that there is a stable level of caribou in the area, this would meet the goals of the Recovery Strategy and allow the disturbance necessary to support development. It has been suggested by Fission Uranium that the Patterson Lake area, despite being in SK2 West, has more in common with the SK1 range: boreal shield range, which is; sandy, Athabasca Basin-type terrain, with little development locally, and the main modifier on the land is fire. As a result, it may be that in developing the CMP for the area there may be different expectations for mitigation or compensation. Fission Uranium would have to make the case based upon the baseline work and population studies, both of which are ongoing.

In earlier heritage resource work on the property, one site that should be avoided was identified, or if avoidance is not possible, a formal archaeological excavation will be required prior to any disturbance. The scope of the heritage resources work will be reviewed during the next project phase to determine whether it is enough for inclusion in an EIA, or if additional work is required.

For an EIA, development of source terms and pathways modelling will be required to assess likely operational performance. The baseline program is currently being assessed for its compatibility with this modelling, and any gaps will be addressed. Local geotechnical and hydrogeological data is being developed by consultants working on the PFS. This work will be further supported by the Feasibility Study (FS) level work required to support an EIA. The focus is on the performance of mining works, the mill area, discharges to the environment, and the TMF.

CONSULTATION, ENGAGEMENT, AND SOCIO-ECONOMICS

Modern EIAs have been focusing more on the social aspects of development with both the federal and provincial regulators having extensive guidance on Indigenous and stakeholder consultation and engagement. Within this framework, companies are required to discuss socio-economic considerations such as sex and gender (e.g. the federal Gender Based Analysis Plus), training and job opportunities, commercial opportunities, burden on existing infrastructure and organizations, etc. In addition, the CNSC provides guidance on consultation in REGDOC 3.2.1 *Public Information and Disclosure*, and REGDOC 3.2.2 *Aboriginal*

Engagement and the Indigenous Services Canada *Aboriginal Consultation and Accommodation – Updated Guidelines for Federal Officials to Fulfill the Duty to Consult – March 2011.* The province of Saskatchewan also has their *First Nation and Métis Consultation Policy Framework 2010*, which is used as the guidance document for all projects.

For both levels of government, most of the Duty to Consult, consultation, and engagement activities are delegated to the proponent. Specifically, the proponent is expected to develop relationships with potentially impacted communities, determine the potential level of impact, especially with respect to traditional rights and activities, and develop the proposed accommodation or compensation. The latter can take the form of Impact Benefit Agreements or similar agreements that outline the relationship between a project and the affected communities.

Members of the Fission Uranium team have a long association with La Loche through their exploration activities that go back over 30 years. Further, the current Chief of the Clearwater River Dene Nation (CRDN), Teddy Clark, has been a special advisor to Fission Uranium's board since 2013, providing insight and guidance.

Fission Uranium has also worked to provide employment and business opportunities to local communities. Fission Uranium has provided direct employment during exploration programs for local workers and contractors, including technicians, camp staff, carpenters, drillers and driller's helpers, drivers, and lumber suppliers. In addition, Fission Uranium conducts business with Big Bear Camps, which provides food, lodging, some construction and maintenance services, and security, all of which employ and engage local people. While it is not always possible, Fission Uranium does request its contractors employ as many local people as possible when completing work on the Project.

Since November 2011, Fission Uranium has met periodically with local stakeholders, primarily the community of La Loche and the CRDN. Through 2014, most of the meetings related to mineral exploration, especially working on the lake, and drilling off barges. In one meeting Fission Uranium described their exploration plans including drilling from barges, risk mitigation, and the commencement of environmental baseline studies. The discussion also included the importance of Patterson Lake to Descharme Lake and La Loche communities, as well as concerns over Fission Uranium's proposal to use the south access road. Based upon this

input, Fission Uranium used the north access road so there would be less impact on local peoples using the lake.

Unfortunately, the records for 2015 have been misplaced and are currently unavailable, however, since 2016, Fission Uranium has been working to meet annually with La Loche, CRDN, local trappers, Buffalo Narrows, Patuanak (English River First Nation), Meadow Lake Tribal Council, Métis locals, and other groups. The primary objectives of these meetings have been to discuss the Project status, answer questions, and listen to concerns. Recent meetings have included discussions on the proposed mining and the PFS that was underway at the time. Meetings are documented through minutes, attendee lists, and outcomes, if any.

Recent meetings with the CRDN have been on how to formally grow the relationship with the Project and maximize the benefits to both sides. It was agreed that this was in everyone's best interests and that discussions should become more frequent and focused on what is achievable at each stage of activity with an eye on the long term goals: maximizing benefits to First Nation, Métis, and local communities.

Fission Uranium has also been involved in local community support activities including:

- Supporting Grade 4 class trips to visit Edmonton in 2016 and 2018;
- A site tour for area community members in February 2018;
- Payment of the minor hockey fees in the La Loche area in 2017 and 2018; and
- Donations to a variety of causes including the food bank and Christmas hampers.

Fission Uranium is open to considering other proposals for sponsorship in the La Loche area. To date in 2019, Fission Uranium has sponsored:

- La Loche July 1st celebrations;
- La Loche Métis Local #39 National Aboriginal Day celebrations;
- Buffalo Narrows Summerfest; and
- La Loche's Sports and Culture and Recreation Yannessa Days.

Fission Uranium sponsors the Mining Rocks Earth Science Program providing First Nations youths with the opportunity to learn about the practical applications of earth science, as well as the diverse career opportunities within the mining industry. Fission Uranium also supports First Nation's magazines through advertising and sponsorship.

For this stage of the Project, the level of consultation and engagement is adequate, however, will need to increase to adjust to the changing expectations of stakeholders and the regulators. Fission Uranium be required to talk with both levels of government to ensure sufficient consultation is being conducted to satisfy the EIA and licensing processes . With respect to the Project itself, Fission Uranium appears to be engaging the relevant communities and groups, although government may expand the consultation cohort based upon their own records of traditional use.

With the likelihood of other developments in the area, there is also the potential to share services with one of the other developments, should they proceed. Such services could include: a camp and camp catering, an airstrip, shared power generation facilities, shared medical, ambulance and evacuation facilities, road maintenance, and environmental monitoring. Shared services would benefit both the environment and provide opportunities for local businesses and provide operational saving for participating operations. Unfortunately, initial overtures to share baseline work did not prove successful, and it is Fission Uranium's hope that there will be regional sharing of data and monitoring responsibilities in the future.

The EIA will require both a detailed discussion of consultation activities, in addition to details on how stakeholder concerns have been addressed. Further, the EIA will require the examination of potential socio-economic impacts from the Project. Currently, Fission Uranium is engaging adequately in the community and should take care to continue to as the Project evolves. Recent discussions with the CRDN are a good first step in this area, however, Fission Uranium will also have to include more discussions with the west side communities.

PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT

The following list of activities is a summary of the main activities on which the PERA was based on:

- Mining Options
    - Underground Only Option – minor works in Patterson Lake
        - Development (e.g. the decline)
        - Operation
        - Decommissioning
        - Ore haul – separation of clean and contaminated materials
- Mill construction and operation;

- Ancillary Services
  - FIFO operations;
  - Camp on site
  - Fuel storage and power generation
- TMF modelled on Orano's JEB, a previous open pit, now used as a TMF;
  - With tailings deposited using subaqueous deposition
  - Underdrain to support dewatering and tailings densification
  - Pervious surround
  - Capping at decommissioning
  - Long term performance
- Ore and waste stockpiles; and
- Decommissioning and reclamation.

RECEPTORS

Clifton has identified the following receptors:

1. Lodge on Forrest Lake;
2. Patterson Lake;
   a. Fish/fishermen/consumers
   b. Traditional and recreational users
   c. Drinking water/consumers
   d. Flow/erosion potential
   e. Carrying capacity of lake, especially lake trout
3. Employees and site workers (Fission Uranium, NexGen Energy Ltd. (NexGen), Purepoint, others)
4. General public;
5. Terrestrial receptors;
6. Aquatic receptors, including downstream (i.e. Clearwater River drainage);
7. Air quality; and
8. Radiation protection.

The following tables (Tables 20-2 to Table 20-6) provide the details of the PERA for the proposed project. This is based upon the PFS description of the Project and will require more detail for both the FS and the EIA.

TABLE 20-2 PROJECT PERA SUMMARY TABLE – TERRAIN AND HABITAT DISTURBANCE
Fission Uranium Corp. – Patterson Lake South Property

Disturbance	Description	Mitigations	Discussion
Ground clearing	Clearing for all facilities including: • Roads • Re-alignment of HWY 955 • Mill pad • Waste/ore stockpiles • Camp • Shore for dyke construction/mine access • Airstrip • TMF • Aggregate quarries	Minimization of clearing Reclamation of unused areas Keeping facilities as compact as possible	Remains a major impact to the areas cleared but can be remediated at decommissioning. The goal is to minimize the amount of area disturbed. Provide a Caribou protection plan. Minimize impact on natural drainage
TMF	TMF will be required. Will produce a large amount of excavated material.	Preferred method is hybrid design to use water table properly. Design: sub-aqueous deposition with pervious surround and underdrain system. Immediate reclamation of berms and waste excavation piles. Diversion of fresh water around TMF	TMF designed to minimize footprint, minimize flux to environment, ease of decommissioning. Long term stability. Sub-aqueous design eliminates radioactive dust and radon. Will require a TMF Management Program and design assessment per current standards (e.g. MAC Tailings Guidance)
TMF Operation	Should be few impacts from TMF operation as long sub-aqueous development with underdrain	Should be little impact. May need some dust control for vehicles. Collected water from underdrain for treatment and disposal. Secondary containment for pipeline leakage.	If sub-aqueous system works as designed, little impact during operations and after decommissioning. Will require a TMF Management Program and design assessment per current standards (e.g. MAC Tailings Guidance)
Mine ramp/foreshore excavation	A decline will be developed to ramp through the overburden and access the ore body below the overburden.	Proper location of excavated material in dry stable area with erosion and sediment control. Material should be clean and not require water collection. Immediate stabilization and reclamation of cut slopes and embankments to minimize erosion and sediment transport	Use of NATM to reduce water inflow in the overburden. Collection and treatment of used water during development.

Disturbance	Description	Mitigations	Discussion
Roadways/including a relocated Hwy 955	Relocation of the highway to prevent traffic accidents and incidental cross contamination. Includes on-site roadways.	The relocation is the mitigation. On site, roadways will have designated clean and dirty roads, and there will be scheduled monitoring for contamination.	Hwy 955 will be designed to move to the west around the TMF. Discuss with MHI will be required. Maintain MHI design standards for relocated roadway. TMF location will be optimized in the FS to minimize the amount of road relocation.
Mining: Underground	Underground option with no impact to Patterson Lake, including any ventilation or access raises (all of these are on shore). Decline access and initially, two vent raises	Handling of waste rock, mine water, ventilation, radiation protection, access, and egress.	Design for single pass air where workers will be present, segregate clean and dirty waste based on ARD potential, mine water collected, degassed for radon, sent to mill for treatment
Ore Stockpile(s) (ARD, leaching potential, potential contamination of soil, water, and groundwater)	Ore storage or blending pads	Bermed, double lined storage pads. Cover with clean waste to prevent dusting. All drainage to runoff collection ponds	Water collected and treated. Ensure not upwind of living facilities to protect from dust or radon emanations
Waste Rock: Clean (No ARD or leaching potential)	Clean overburden and waste rock. Main issues are sedimentation from stockpiles.	Clean waste with erosion controls and sedimentation barriers. All drainage to runoff to collection ponds or drain into sandy terrain, not directly to surface water.	Clean materials available for other uses and reclamation
Waste Rock: Mineralized (ARD, leaching potential, potential contamination of soil, water, and groundwater)	Low grade/sub-ore and contaminated waste stockpiles radon	All drainage to runoff collection ponds. Lined pads and monitoring for contaminated water to protect groundwater. Contaminated water to mill for treatment.	Ensure not upwind of living facilities to protect from dust or radon emanations
Mill/Mill terrace	Disturbance, runoff, Dust and gaseous emissions	Collect runoff water for treatment, keep pad areas clean, site as compact as possible, Wildlife Management	Careful consideration to the clean and dirty parts and keeping them separate.
Ancillary facilities, including camp, offices, shops, clean laydowns, etc.	Disturbance, contaminated and non-contaminated wastes, potable water, sewage, Recycling materials	Recycling, proper design of water and sewage facilities. Training. Domestic waste handling Hazardous waste handling	Many recycling programs mandated by law in SK, such as electronics, tires, cardboard/paper, plastics, refundable containers, oil/oil filters, etc.

TABLE 20-3 PROJECT PERA SUMMARY TABLE – WATER, CONTAMINATED AND UNCONTAMINATED
Fission Uranium Corp. – Patterson Lake South Property

Disturbance	Description	Mitigations	Discussion
Runoff	Mill terrace, contaminated stockpiles, mine	Collection, to mill for treatment and eventual discharge. Maximize diversion of fresh water from project infrastructure. Full containment of plant island	Given the sandy nature of the terrain, all areas requiring water to be collected will require some form of treatment to allow for water flow and collection.
Mine water	U/G mine, and ramps	Collection, to mill for treatment and eventual discharge	Dewatering wells and additional grouting may be required to minimize flows during operation.
Tailings decant	From the underdrain system. Includes some local groundwater to keep the regional flow towards the TMF.	Collection, to mill for treatment and eventual discharge. Security of tailings solution pipelines.	Use of the underdrain will ensure no release of contaminants until the desired tailings density is achieved during decommissioning. May require running the treatment system for a number of years after production stops.
Sewage	Collect and treat from various locales. Final process to be decided.	Collection, to mill for treatment and eventual discharge, separate sewage TP or septic field.	Final sewage treatment methods have not yet been chosen.
Treated effluent	Discharged to Patterson Lake and the Clearwater River system	Final estimates of quantity and quality will be needed for the EIA.	Must meet licensed objectives, but preferable SSWQO in order to keep downstream impacts to a minimum. This is especially important as there is likely to be another mine discharging to the same system.
Potable water	Collected, treated, stored with reserves for fire	Need inlet and WT facilities prior to distribution.	Inlet upstream from discharge point(s)
Fuels	Diesel Gasoline Lubricants Propane LNG	Licensed with MOE EPB (SK Code) HMWS Regs. WMIS	Properly designed and licensed facilities with trained personnel will minimize any risk to the environment. Emergency Response Plan (ERP).
Reagents	Various, to be identified	HMWS Regs. WMIS Site security	Proper storage, likely within the mill terrace area.
Yellowcake	Produced, drummed, shipped	CNSC licensing TDG Regs. Site security	Proper storage and tracking Compliant with Additional Protocols ERP
Explosives	Handling and use of explosives is required for mining, and possibly quarrying.	Following federal regulations, properly trained personnel, separate magazines depending on the type of explosive used.	Properly handled, explosives are safe. Security will be required to prevent theft or misuse. ERP

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TABLE 20-4 PROJECT PERA SUMMARY TABLE – SITE EMISSIONS
Fission Uranium Corp. – Patterson Lake South Property

Disturbance	Description	Mitigations	Discussion
Mine air exhaust	Diesel exhaust, radon, radon progeny, dust	Dilution by having enough fresh air flow, dust control, AQ monitoring,	Modelling in the EIA will provide more information
Mine air conditioning	GHGs, probably propane	Minimize use to the extent practicable	May or may not be required.
Generators	Diesel or LNG, diesel exhaust emissions, GHG	While LNG is the cleaner option (virtually no particulate matter, NOx, or Sox) there are practical issues that may not favour this option	Chance of spill with diesel fuel
Mill	Various emission sources	Protection against dust – need capture and baghouse with filters	Emission sources will be determined and modelling in EIA.
Vehicles	Exhaust – GHG calculation	Utilize current emissions control standards, maintain equipment well	Look at electric where possible
TMF	Subaqueous, so emissions should be low	Water cover eliminates dusting, promotes settling, and minimizes radon emanation	Releases and long term impacts to be defined in EIA by pathway modelling
Ore and special waste stockpiles	Radon, radon progeny, dust, runoff	Proper design and monitoring	Ensure not upwind from camp or offices.

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TABLE 20-5 PROJECT PERA SUMMARY TABLE – DECOMMISSIONING
Fission Uranium Corp. – Patterson Lake South Property

Disturbance	Description	Mitigations	Discussion
Underground	Contaminant flow to surface receptors, interaction with GW,	Plug openings, allow to flood, monitor, grout/shotcrete/backfill to limit water movement.	Will need rigorous modelling to show limited movement of GW after closure
Surface facilities	Decontaminate as much as possible, tear down, recycle to max. extent possible	Dispose of materials that cannot be decontaminated in TMF, remove, or cover concrete pads, clean up any contaminant spills,	Per CNSC guidelines for contaminant removal. Mill WTP will be needed until the TMF underdrain is decommissioned.
Roads	Remove, scarify, revegetate once no longer needed.	Survey for contamination prior to decommissioning, remove contaminated soils to TMF for disposal.	
TMF	Will need a cover design and implementation plan to encourage ongoing dewatering and settling.	Likely scenario is an initial cap/cover designed to weight the tailings to encourage dewatering and compaction. Once target density is achieved, redo cap/cover in final form, seal off the underdrain, and revegetate. Monitor.	Timing would have to be modelled. Mill water treatment facility will be required until tailings meet density target.

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TABLE 20-6 PROJECT PERA SUMMARY TABLE – COMMUNITY AND SOCIO-ECONOMICS
Fission Uranium Corp. – Patterson Lake South Property

Disturbance	Description	Mitigations	Discussion
Consultation and engagement	Consultation and engagement with First Nations, Métis and communities	Must fulsomely engage with the communities, writ large Establish relationships with all the potential Impact Communities related to the project. Document all activities and participants	It is essential that this be done for the success of the project.
Roads	Increased traffic on northern roads and through towns such as Buffalo Narrows and La Loche, and north on Hwy 955. Are bridges adequate over Clearwater River?	Work with local authorities and MHI to minimize safety risks in communities. Work with MHI to improve Hwy 955 and upgrade bridges if necessary.	Project will need a traffic analysis for the increase of traffic in NW Saskatchewan. The road relocation around site will also be addressed.
Employment	A new mining operation will bring jobs and opportunities for local employment.	Start now to work with communities to ensure there is a trained workforce available.	For safety reasons, mines in northern Saskatchewan now require Grade 12 education at a minimum. Given the long approvals process, expectations need to be realistic with respect to availability of employment and timing. Experience elsewhere in SK indicates businesses work best when they are not solely reliant on the mine(s) for their survival given the cyclical nature of mining (witness the current Cameco shutdowns)
Business opportunities	A new mine will bring opportunities for business to supply goods and services.	Work with local communities and entrepreneurs to develop businesses.	
Community	Potential impacts on communities range from demand on health care and social services, policing, etc.	Monitor and work with local authorities and communities. Increased employment likely to be an improvement in community health. Continue with engagement and sponsorship activities.	Target communities are La Loche as the nearest community followed by the west-side communities (Métis communities, Buffalo Narrows, Ile-a-la Crosse, Beauval, etc.).

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ENVIRONMENTAL RISK

The Project is characteristic of modern uranium mines, and for the most part the mitigations are well known and well tested. In proposing to build the mine to at least current standards for uranium mines in Saskatchewan, the environment will be reasonably protected, and overall impacts minimized. The main impacts are potential losses of habitat, impacts to aquatic and terrestrial habitat and biota, and impacts to local users. At the PFS level of detail, the current design appears to apply proper mitigations, however, this cannot be fully tested until the EIA stage when a detailed environmental risk assessment will be completed.

With the consideration of the underground only mining option, the proposed project has one feature that that will require great care in design, construction, and operation: the TMF.

The TMF design is a hybrid model that considers the site-specific geotechnical and hydrogeological conditions while utilizing the best features of modern uranium TMFs such as. engineered tails transported as a slurry in a pipeline, managed tailings emplacement, sub-aqueous deposition, a pervious surround, and an underdrain system to accelerate densification. The water cover will eliminate ice lens development during winter, as well as prevent dusting of radioactive material and the emanation of radon. The constant pumping on the underdrain is designed to prevent contaminant flux from the TMF to the surrounding environment during operations. The hybrid TMF design was chosen with due consideration to the shallow groundwater table which, while making construction difficult, allows for the underdrain to be situated within it. Excavation below the water table is required to allow the underdrain system to function and provide secure containment during operations. A short period of local dewatering is required to construct the underdrain. Consideration was also given to the fact that there is a general desire from the public and regulators not to have a fully above ground TMF (such as the Key Lake above ground TMF).

As decommissioning progresses, the tailings will consolidate, and when they have achieved their target density, the underdrain system can be decommissioned. Once milling is complete, the underdrain system will be used to dewater the tailings and capping material will be placed onto the tails to develop the initial cover and densify the tailings. Once the target density is achieved, the tailings will be a dense plug that will be relatively impenetrable to the local groundwater flow and recharge (i.e. the tailings plug will be the path of most resistance to water). Thus, neither the cap nor the pervious surround needs to keep water away from the tailings plug as water will simply flow around it. Further, an engineered cover is proposed to

minimize infiltration from precipitation and runoff while keeping the tailings saturated to prevent intrusion of oxygen that might promote development of acid drainage from the tailings. While detailed modelling will be required to demonstrate this concept fully in the EIA, the principles outlined are being successfully used at Key Lake, McClean Lake and Rabbit Lake, and represent the current state of the art in northern Saskatchewan. As such, the design, construction, operation and decommissioning of the TMF will be protective of the regional ground and surface water, and when reclaimed, it will have restored wildlife habitat on the reclaimed surface.

At the PFS level, this is a preliminary examination of the potential impacts from the Project and commensurate with the level of design and knowledge. Successful environmental protection will require considerably more work to develop a pathways model for the proposed project that details the predicted environmental inputs, the potential receptors, and any potential impacts. This information will then be fed back to the design team to allow for optimization of mitigation strategies. All of this will be dealt with in the EA and licencing/permitting process.

From the current assessment, there will be some locally significant impacts that, with proper design, will be reversed at decommissioning and reclamation. The underground only mining scenario goes a long way to minimizing the impacts to Patterson Lake as it eliminates the need for for a ring dyke, slurry wall, dewatering, and overburden removal that was included in the Hybrid mining PFS.

Underground Only Mining Option

The implementation of the underground only mining option, while subject to its own challenges, if properly done executed will not leave a lasting presence after decommissioning. The development of the decline from the foreshore through the overburden to access the ore body will require careful construction. The area within the decline development will require temporary dewatering while the development progresses through the overburden. The excavation method is known as the NATM, which together with other localized ground support, will allow for a safe decline development. Once in place, the decline will be largely protected from water inflow, or the movement of water from the decline.

To avoid radon buildup, two vent raises are proposed, one for fresh air and one for exhaust air with the mine design to allow for single pass air wherever personnel will be present. The

exhaust air will require monitoring for radon and particulates. Artificial ground freezing will be used underground to provide ground support. This has been used in uranium mines elsewhere in the Athabasca Basin with great success. The revised mining method results in a significant reduction of approximately 90% of total mine related earth movement when compared to the Hybrid PFS methodology (5.4 Mt in the U/G PFS versus 51.2 Mt in the Hybrid PFS), a 58% reduction to the total disturbed area, and no direct impacts to habitat in Patterson Lake.

Overall, the main concerns regarding underground mining and the environment will be the amount of water that needs to be handled, treated, and discharged to the environment. Further work is required to understand the site water balance.

REGULATORY

PROVINCIAL ENVIRONMENTAL ASSESSMENT AND PERMITTING PROCESS

Mineral tenure is issued by the Saskatchewan Ministry of Energy and Resources (SKER) and grants mineral rights subject to conditions such as the completion of certain levels and types of assessment activities. As the Project is located on Crown Land, surface access is controlled through permits from the MOE during mineral exploration. Should the Project meet all the requirements for permitting, construction, and operations, a surface lease would be granted to allow these activities to occur. Surface leases are coordinated through the Ministry of Government Relations, Northern Engagement Branch, and the Lands Branch of the MOE, and includes input from other government agencies where appropriate. While negotiations can start early, a precondition of the issuance of a surface lease is the successful outcome of the provincial EA process.

In Saskatchewan, the EA and licensing process are separate and sequential, as the EA process must be completed prior to the issuance of specific licenses and permits. The first step in the EA process is to submit a Technical Proposal (formerly the Project Proposal) to the Environmental Assessment Branch (EAB) for Environmental Assessment Screening to determine whether the project requires a full EA or can proceed to licensing. The document prepared for guidance from the EAB is largely derived from PFS level information combined with publicly available information on the mining area and any available results from fieldwork. To the best of the proponent's ability, the document outlines the full scope of the project from construction through decommissioning along with a discussion of potential impacts and

mitigations. The Saskatchewan EAB Technical Proposal Guidelines indicate that a Technical Proposal should include, at a minimum:

- Executive Summary;
- Project Description;
- Description of the Environment;
- Potential Impacts and Mitigations;
- Monitoring;
- Decommissioning and Reclamation;
- Stakeholder Engagement; and,
- First Nations and Métis, Duty to Consult.

While it can be safely assumed that the Project will be deemed a development per the Environmental Assessment Act (EAA), the submission of a Technical Description has several advantages, including starting the regulatory process and allowing development of guidance. If a major issue is noted by the government, there is ample time at this stage to adjust project planning prior to the detailed design and EA.

The EA process in Saskatchewan is an inter-ministry program assigned to the Minister of Environment and led by the EAB. The EAA requires that environmental impact statements (EIS) are prepared and circulated for review by other branches within MOE, other Saskatchewan ministries and agencies as necessary, and this is done through the Saskatchewan Environmental Assessment Review Panel (SEARP). This also includes, as a courtesy, forwarding the Technical Proposal to the Canadian Impact Assessment Agency (CIAA) and the CNSC. EAB then compiles comments received from the reviewers with its own review and renders a decision as to whether the project requires an EA or can proceed to licensing. In order to require an EA, a project must be deemed to be a development by the Commissioner EA utilizing the criteria in Section 2(d) of the EAA. All uranium mining projects meet the criteria and are therefore deemed developments. Once a project is deemed a development the proponent will receive a formal Ministerial Determination that the Project is a development and an EA is required, with rationale. In addition to the Determination Letter, there is also a public notice about the proposed project.

The proponent is then required to produce a draft Terms of Reference (ToR) for the project (formerly the Project Specific Guidelines) that includes all the items in the EAB guidelines for the preparation of the ToR and any project specific items. The EAB, and sometimes the

SEARP, provide input to the ToR in order to ensure their ministry's or agency's interests are being met, and that all the normal requirements of an EA are included. The ToR is then posted to the MOE's website. It is then the proponent's responsibility to prepare the EA and undertake all consultations and studies required to produce the document. In general, the EA is derived by comparing the consultation and environmental baseline information with a feasibility level description of the proposed project. Once the document is submitted, the EAB reviews the draft EIA for completeness. If complete, the EIS will be reviewed by the EAB and the SEARP. If during the review there are any significant information gaps, the document will be returned to the proponent to address. This will continue until such time as there are no significant data gaps.

Given the changes to the federal impact assessment (IA) process, it is likely the provincial EIA will be the stand-in for the federal IA. As such, the province would work closely with the lead federal agency involved in the Project, the CNSC, to ensure that the EIA will cover all the federal requirements where they differ from the provincial ones. It is incumbent on Fission Uranium to develop a ToR for the Project that fully contemplates the federal requirements as this will greatly speed up the licensing process.

Once the EAB and the SEARP are finished their reviews, the EAB will compile the comments and produces the Technical Review Comments document. This document and the final EIS are placed in public review for a 30 to 60 days. When all the comments are in, EAB will produce an EA decision document for the Minister. While there are three outcomes possible, the likely outcome for a project that gets to this stage is approval of the EA with conditions. With approval of the EA, the surface lease can be completed and signed.

Once the EA is approved and the surface lease is in place, subject to the conditions, the proponent can proceed with licensing through the MOE Environmental Protection Branch, which largely provides a one window approach for licensing on behalf of other branches and Ministries. For efficiency, the work to provide the level of engineering required to support licensing, and to develop a surface lease is usually done concurrent to the EA process to minimize any time lags. It should be noted that the Minister has the right to initiate a public hearing into the project at any time should there be grounds for doing so. Such grounds could include significant public concern or the inability to fully mitigate the project, thereby putting human health or the environment at potential risk. The best method for avoiding a public hearing is conduct complete and fulsome public consultations with all stakeholders, First

Nations and Métis, and to fully address all potential impacts with the appropriate mitigations in the EIS.

OTHER PROVINCIAL PERMITS AND PERMISSIONS

Other agencies that will require licences and permits, including, but not limited to:

- Saskatchewan Labour (occupational health and safety, mining safety/Mining Act);
- Saskatchewan Highways and Infrastructure (MHI) (highway access and relocation);
- Saskatchewan Health (camp, hygiene, water, and sewage treatment);
- Saskatchewan Water Security Agency (water supplies, treated water discharge, sewage);
- Government Relations (surface lease, monitoring, social impact requirements); and
- Ministry of Economy (mineral tenure, royalties).

Most Ministries will indicate their interest and the need for any permits in the Technical Proposal and EA review stages through the SEARP and those comments will come forward in the technical review comments produced by the EAB. Overall, a number of permissions, of one form or another, are required to complete a project, but are rarely material to the schedule or budget if organized properly.

FEDERAL ENVIRONMENTAL ASSESSMENT PROCESS

Bill C-69 established the CIAA, which replaces the Canadian Environmental Assessment Agency (CEAA). The CIAA is charged with undertaking IA for designated projects. Projects are designated if they appear in the *Physical Activities Regulations* or if they are designated by the Minister.

While the *Physical Activities Regulations* has done a better job of identifying projects with potentially large environmental risks the biggest change with respect to uranium mining is the inclusion of uranium mining and milling with other mining projects. As such, a uranium mine or mill is not a designated project per the regulations if the mine or mill has a capacity of less than 2,500 tpd. Previously under CEAA, any uranium mine or mill was a designated activity regardless of the scale of production. With a capacity of much less than 2,500 tpd (approximately 1,000 tpd) the Project will not trigger a review under CIAA. There is always a remote possibility that the Minister could make the project a designated project, however, the likely outcome is that the federal government (likely the CNSC as the primary licensing agency) will rely on and participate in the provincial EIA process.

While a federal IA is not likely required, the main federal licensing agency for the project, the CNSC, will require the federal EA criteria to be met in order to meet their requirements and to be able to proceed with licensing. There is no process in place yet but based upon what has occurred in the past and recent discussions with the CNSC and Saskatchewan MOE, the CNSC would be able to rely on the provincial EIA process if the additional federal requirements are included and the CNSC could be a reviewer and adviser. This has worked in the past and neither agency saw an issue with this methodology moving forward, even in the absence of a valid working agreement. This 'substitution' would allow the CNSC Commission to approve the EIA outcome and then proceed to licensing.

To initiate the licensing process, the CNSC recommends a pre-application consultation in order to understand the project and provide guidance on their IA and licensing processes, and consultation. This early consultation with the CNSC allows them to initiate their planning for consultation with First Nation, Métis, and other stakeholders about the project and its licensing. The CNSC provides guidance on Aboriginal consultation (*Codification of Practice: CNSC Commitment to Aboriginal Consultation*) and the need for early engagement (*Early Aboriginal Engagement: A Guide for Proponents of Major Resource Projects*) as well as required public information programs (*G-217, Licensee Public Information Programs*).

While the option of sequentially doing the EA and the licensing is available to the proponent, the CNSC suggests doing these two distinct processes in parallel to save time. Effectively, while the provincial EIA process is proceeding, the licensing proceeds in parallel. With the approval of the EA required before the Commission Tribunal can approve the licensing, the CNSC will have to wait for the provincial process to be completed. As in Saskatchewan, a successful EA decision is required prior to a decision on the licensing packages. When making the initial application for a license, the proponent must provide the information required by the CNSC in the following regulations:

- Cost Recovery Fees Regulations (2003);
- General Nuclear Safety and Control Regulations;
- Radiation Protection regulations;
- Packaging and Transport of Nuclear Substances Regulations; and
- Nuclear Substances and Radiation Devices Regulations.

The application must be accompanied by the required initial fee per the cost recovery regulations ($25,000 for a facility) and a Project Description prepared according to the Major

Projects Management Office (MPMO) guidance (Guide to Preparing a Project Description for a Major Resource Project). While this guidance may change in the absence of the MPMO and the introduction of new CIAA regulations and guidance, it is currently applicable. The Technical Description developed for the province will likely suffice for the start of the CNSC licensing process if its scope includes a consideration of the CNSC's requirements. The CNSC generally grants licenses for the four distinct stages of a project in sequence. Those licensing stages are:

- Site preparation and construction;
- Operation;
- Decommissioning;
- Abandonment.

While these stages are usually separate and sequential, there is the potential for overlapping licenses within a licensing stage if the work needs to be done in phases, or to accommodate project conditions in a single licensing action. All depending upon the proponent's ability to provide the rationale and the detailed information required for each licensing package.

Proponents will be required to develop management systems complete with policies, systems/programs, procedures, and monitoring (plan, do act, check type-system) to support the license applications. To protect human health and the environment, the CNSC focusses on several Safety and Control Areas in their assessment of projects:

- Management
    - Management systems
    - Human performance management
    - Operational performance
- Facilities and Equipment
    - Physical design
    - Safety analysis
    - Fitness for service
- Core Controls and Processes
    - Radiation Protection
    - Human health and safety
    - Environmental Protection
    - Emergency management and fire protection
    - Waste management

  - Security
- Safeguards and Non-proliferation
- Packaging and Transport

These safety and control areas need to be addressed and scaled as necessary within each license application. For instance, for radiation protection, a radiation protection program that includes all aspects of managing the radiation hazard on site including policies, responsibilities, training, equipment, monitoring, reporting, corrective action, etc., in a management system format. The scale of the radiation protection program may vary for construction compared to operations. CNSC Safety and Control Management Areas are described with respect to a year of performance reporting at:

http://www.nuclearsafety.gc.ca/pubs_catalogue/uploads/CNSC-Report-Performance-Canadian-uranium-Fuel-Cycle-Processing-Facilities-2012-eng.pdf

In February of 2018, the federal government tabled two bills related to the federal EA process that would have some bearing on the approvals of new projects. These were Bill C-68, which contains amendments to the Fisheries Act; and Bill C-69, which includes the new Impact Assessment Act, and amendments to the Navigation Protection Act. Both bills received Royal Assent on June 21, 2019 and came into force on August 28, 2019. With the underground option, these changes are not likely to have any material impact on the Project.

WATER MANAGEMENT

For the UG PFS design, water management infrastructure has been designed to maximize diversion of surface runoff water from the general site footprint or any disturbed area where it can potentially become contaminated. Water that interacts with the contaminated waste rock piles will be captured and controlled, while clean waste rock will be deposited such that any runoff does not create sedimentation issues but allows the water to infiltrate into the overburden.

The surface water runoff pond is designed to hold runoff from the immediate plant-site and mine island footprint following a 24 hour 1:100 year storm event. The pond will have dual HDPE liners to provide dual containment and will include a leak detection system between the two liners.

The storage areas for mineralized ore and mineralized/special waste rock are similarly planned to be dual contained with HDPE liners and will be able to store volumes of water associated with a PMP storm event. These areas will also contain separate leak detection pipe under-drain systems. The clean waste rock stockpile and the undisturbed area uphill from the site will be intercepted by a diversion ditch and will collect in runoff retention areas located to the east and west of the site. The east collection area will consist of a constructed pond with one HDPE liner layer. The west collection area will be an unlined area that will be able to hold very large volumes of runoff water.

Six water treatment storage ponds are planned, and will include four monitoring ponds for treated effluent, one contingency pond, and one settling pond. Each monitoring pond and the contingency pond is sized for 5,000 m^3 of capacity and will maintain one metre of freeboard as contingency for a PMP event. The settling pond will have a capacity of 10,200 m^3 with one metre freeboard. About 1,100 m^3 of the feed settling pond capacity is reserved for a 1:100 year 24 hour storm event which comes from rain runoff collected from selected areas.

All treatment and storage ponds will be double lined with a HDPE liner and will have 300 mm of sand between both layers with a leak detection system. All other water conveyance and containment structures have been designed to accommodate a 24 hour 100 year storm event as well as the anticipated volumes of water generated under routine and non-routine operating conditions.

TAILINGS MANAGEMENT FACILITY

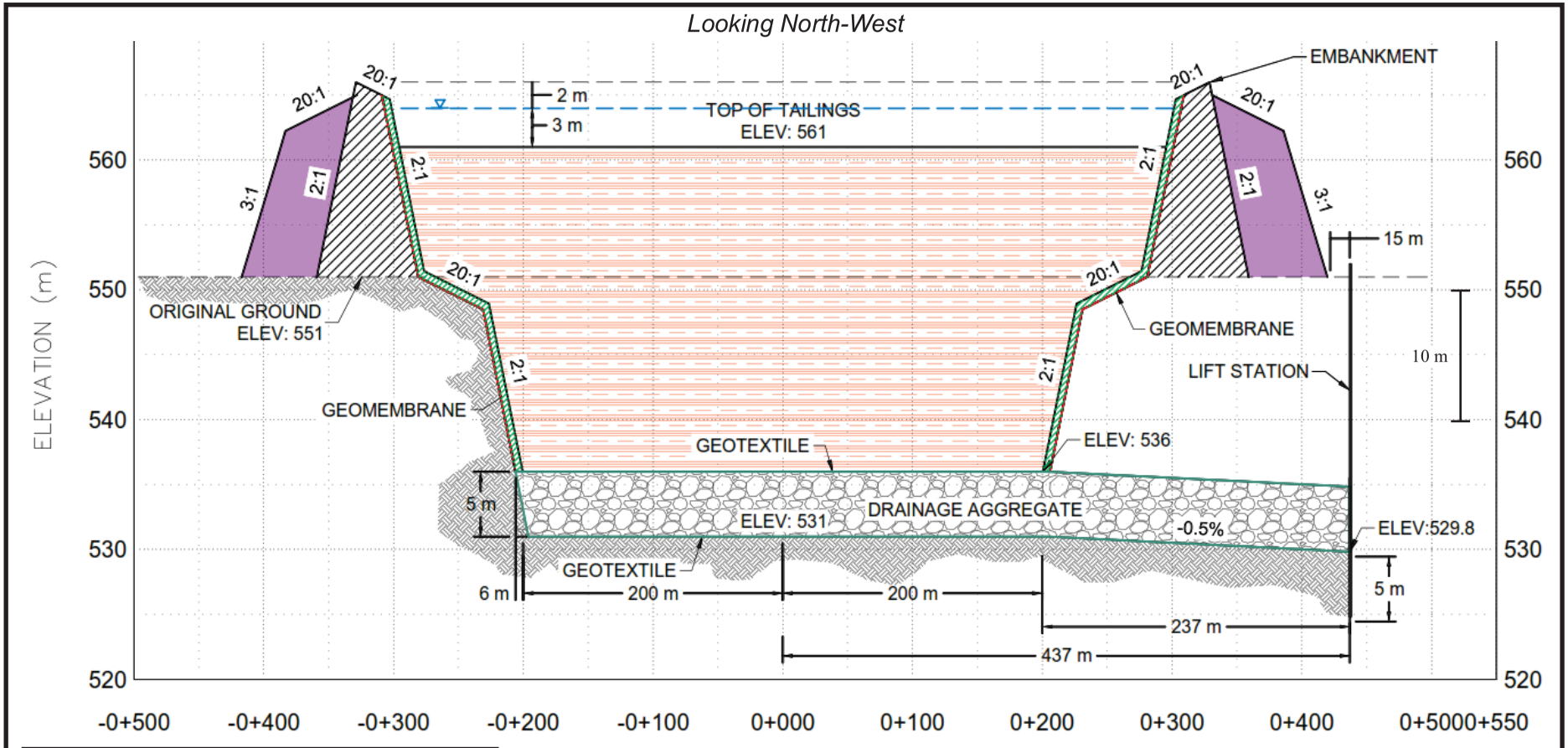
The TMF will incorporate a pervious surround design to create a consolidated low hydraulic conductivity mass of tailings for decommissioning and enhanced long term performance. This design is based on similar concepts successfully being used at other operating uranium mines in the Athabasca Basin. The pervious surround allows groundwater and TMF releases to be directed to an underdrain, pumped to surface, and returned to the water treatment facility for treatment and release. A schematic of the proposed TMF is shown in Figure 20-1.

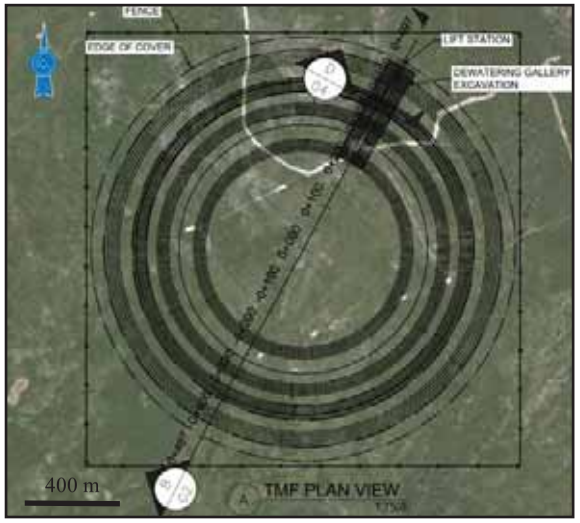
Decommissioning will leave a low hydraulic conductivity tailings mass that will divert groundwater flow around the tailings (i.e. a mass that is the path of most resistance to water). An engineered cover will maintain a saturated tailings mass to limit the potential development of acid rock drainage. The water flowing around the tailings causes the primary solute release

mechanism to be diffusion. The diffusive process is very slow, limiting release to the environment, and even then, concentrations will be very low. The preliminary modelling indicates that the proposed TMF design will be protective of the groundwater and the Clearwater River system for the long term.

Due to the constraints on the design placed on it by the local geology and hydrology, the TMF utilizes both below grade and above grade storage. Below grade excavation will extend to below the water table, providing hydrodynamic containment during operation of the facility. The above grade will also incorporate a pervious surround.

Dewatering infrastructure for the TMF includes an underdrain, dewatering drift and lift station. The lift station will be placed outside the TMF footprint so the well can be used for any future expansions. The location of the lift station was set to be as close to the mill as possible to reduce complexity of the pipeline in the TMF area.





TMF CROSS SECTION B
H 1:5000
V 1:500
01

0 50 100 150 200 250
Metres

Figure 20-1

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

TMF Design Shematic

November 2019 ***Source: Clifton Associates Ltd., 2019.***

The impacts to Patterson Lake are predicted to be minimal. At 10,000 years the loadings to the lake were estimated at 0.8% of the source mass. With the current data and analysis, the TMF should not create any meaningful impact to Patterson Lake or the Clearwater River.

Data used for the PFS analysis was taken from BGC field investigations and previous work completed near the proposed TMF facilities, and from a Clifton field investigation on the proposed TMF locations. The Clifton work indicated that the primary TMF location is acceptable, however, additional work is required to bring the geotechnical and hydrogeological information to a level necessary to complete the detailed modelling required to support the EIA and CNSC licensing. During the next round of studies on the TMF, the location will be optimized and moved as close to the mill as possible while still retaining protection of Patterson Lake. Any movement towards the mill will have the added benefit of minimizing the relocation of Highway 955.

Field work will provide necessary data for refined IAs. Further work by others will strengthen understanding of local geology, stratigraphy, and groundwater regime. All additional information will be incorporated into pathways models to assess long term performance and potential impacts.

DECOMMISSIONING

As part of the regulatory process, Fission Uranium will be required to develop a Preliminary Decommissioning Plan (PDP) for inclusion in the EIA that details the steps that will be taken to decommission project facilities and reclaim the land at the end of project life. As part of licensing the PDP is fleshed out and a cost estimate for implementation is prepared, the Preliminary Decommissioning Cost (PDC). The company will then be required to provide some form of surety or bond to cover the cost of carrying out the decommissioning plan. The surety is designed to cover the unlikely situation where the proponent is unable to complete the decommissioning and reclamation and the government has to step in to complete the work in a decommission tomorrow scenario. While salvage of some materials is likely, these cannot be considered in the PDC. The plan and costs are periodically reviewed and updated and can be scaled to reflect the current state of the site. In this scenario, progressive decommissioning is encouraged as it lowers close-out liabilities and often reduces the cost of disturbed-land lease fees.

For a uranium mining and milling project, the first step is to conduct systematic surveys to determine the extent of contamination, if any. Contamination may be chemical or radiological. Areas that can be decontaminated will be cleaned and re-surveyed to ensure that the clean-up criteria have been met. Equipment that cannot be reasonably decontaminated are disposed of on site, likely within the TMF, or at an approved off-site disposal facility.

The tailings area will require time after mine operations cease to allow for consolidation of the tailings under the loading of the cap. During this period, the underdrain will continue to operate to handle the pore water being squeezed from the tailings as they densify. This water will have to be treated prior to release, requiring some components of the mill to remain. Once the tailings have reached their target density, the underdrain would be disconnected and sealed, the tailings cover finalized, and all infrastructure removed. The tailings cover will be vegetated and maintained until it is stable and self-supporting. According to the CNSC, most TMFs will likely contain less than 10^{15} Bq of activity and therefore do not need to be licensed as Class 1 nuclear facilities. This will have to be assessed on an ongoing basis during operation. Regardless, a CNSC license will be required for the foreseeable future with periodic monitoring and repair supported by a bond or fund of some sort to support this activity.

For the underground only mining option decommissioning the underground mining areas will require some care to ensure that any residual contamination is effectively isolated from the environment and that Patterson Lake will not be affected

Under the provincial government policies, reclaimed land can be returned to the province under The Reclaimed Industrial Sites Act and The Reclaimed Industrial Sites Regulations which establish an Institutional Control Program. This program is implemented once a site has been deemed to be reclaimed in a self-sustaining manner and all operations are complete. The property can then be transferred back to the province for monitoring and maintenance. For this to happen, the proponent pays a calculated sum into the monitoring and maintenance, and the unforeseen events funds for maintenance and monitoring in perpetuity. In the unlikely event that the site does not behave as predicted, the government can seek redress from the proponent if the costs exceed the funds available. The tailings pond would likely be excluded from this program and remain under a CNSC license and the proponent's responsibility.

GOVERNANCE

Fission Uranium is governed by a board of directors with most of the operational aspects of the company under the Chief Operating Officer. While the board has some general policies related to the environment and social engagement, these will need to be expanded upon in order to support the policy driven management systems required to meet the CNSC's Safety and Control requirements, and to meet corporate due diligence requirements. The current policy structure is acceptable for this stage of the Project. Policies developed to support occupational health and safety, environmental performance and radiation protection will need to be developed and the board will need to have a committee or committees to oversee these policies and their implementation. That implementation would include the management systems predicated on the ISO style plan, do, check, act methodology.

DISCUSSION

The preliminary baseline work has described typical northern Saskatchewan terrain of the Athabasca Basin region, and it has not identified anything that should significantly delay a project if proper planning and mitigations are incorporated into the Project design. Such mitigations would include, but are not be limited to, habitat compensation for any fish habitat disturbed by the Project, possibly terrestrial habitat compensation for woodland caribou habitat, and sufficient consultation with local First Nations and communities. The primary environmental goal will be the protection of Patterson Lake and the downstream water quality in the Clearwater River system as this will likely be the focus of any concerns under the underground mining only scenario.

Overall, the Project appears to be following applicable regulations governing exploration, drilling and land use, and Fission Uranium staff and contractors are aware of their duties with respect to environmental and radiation protection. Early in the exploration program, there were some issues related to excess clearing of trails and near water bodies, but Fission Uranium has worked to repair those areas and reclaim them. The operations are neat and orderly, and the level of clearing and disturbance is commensurate with similar projects in northern Saskatchewan. The Project is visited frequently by Saskatchewan Conservation Officers to ensure compliance.

A high level, PERA was done to look at potential interactions of the project with the environment. Under the underground mining only scenario, the main area of concern is development and operation of the TMF. The mitigations proposed for the TMF, appear protective of the environment in the long term post decommissioning.

The TMF will use the proven sub-aqueous deposition and pervious surround methodologies, and it will require enough work to demonstrate that the proposed hybrid facility (partially excavated and partially above ground) will be protective. The hybrid TMF design is optimized to the existing geological and hydrogeological conditions and avoids widespread dewatering during operation, although it does require a slight draw on the local groundwater to eliminate contaminant flux. The potential for impacts on Patterson Lake will be much less in the underground mining scenario and are largely related to protecting the water quality. This will need to be demonstrated in the EIA.

Most of the identified environmental risks are like those for existing uranium operations, which, in the modern era, have been demonstrated to have minimal impact on the local and regional environments. Regardless, for all aspects of the project, a detailed ERA will be required to ensure that nothing is missed and that all reasonable mitigations are in included in the EIA and the Project design.

To date, the environmental baseline has been adequate within the local environment to include in an EIA, however, the far field (downstream of Patterson Lake area) requires additional work ahead of the EIA and to support pathways modelling. This additional baseline work is underway and will be largely completed in 2019 with some work required in the winter 2019/20. CanNorth has reviewed the baseline program against what is necessary to support the pathways modelling required to support an EIA and CNSC licensing, and any identified gaps are being addressed in the current work.

The level of environmental review was commensurate with a PFS and was not an exhaustive examination of all documentation and it did not include modelling or a compliance audit. The interpretation relies on the authors more than 35 years of experience with Saskatchewan uranium projects and familiarity with mining and the federal and provincial requirements that accrue to such projects. The Project is at a stage where, with proper planning, areas of concern can be addressed in a timely fashion within an orderly project approvals process.

Some of the items required to support an EIA, particularly consultation, need to be undertaken in a manner that does not materially affect Project timing. This will require ongoing consultation with the CNSC and the Saskatchewan Government to ascertain the level of First Nations, Métis, and stakeholder consultation they expect. Fission Uranium's level of governance continues to be adequate for the level of work on site, but it will require significant improvement to support the policy-driven management systems required to support a uranium project and its safety and control areas.

Clifton recommends that Fission Uranium:

- Continue the engagement and consultation process, expanding it to reflect the changes in project scale, mining options and progress in the environmental approvals process;
- Ongoing assessment to ensure all appropriate information is being collected to support the environmental modelling required for the EIA and CNSC licensing;
- Finish the downstream bio-physical work to complete the information required for the EIA (currently ongoing);
- Continue bio-physical monitoring at a maintenance level to maintain the currency of the existing environmental baseline data;
- Continue to explore options to reduce the footprint of project, such as optimizing the location of the TMF;
- Explore shared services options with other companies operating in the area (e.g. environmental data sharing, infrastructure, etc.);
- Continue to participate in the woodland caribou discussions for SK1 and SK2W;
- Ensure that future work on site is of sufficient detail (feasibility level at a minimum) to support the EIA and CNSC licensing process; and,
- Develop a suitable governance structure (policies and committees) for the Fission Uranium board in anticipation of the policy-driven requirements for managing a uranium mine.

21 CAPITAL AND OPERATING COSTS

CAPITAL COSTS

Capital costs have been estimated for the Project based on comparable projects (Table 21-1), first principles, subscription based cost services, budgetary quotes from vendors and contractors, and information within RPA's project database. In RPA's opinion, the capital cost estimate is consistent with an Association for the Advancement of Cost Engineering (AACE) Class 4 estimate. Wood is responsible for capital costs related to the process plant and infrastructure in Section 18, while RPA is responsible for capital costs related to mining, and the compilation of the overall capital cost estimate. Clifton, BGC, Newmans, Artisan, and TMCC have provided input, where appropriate, to develop the capital cost estimate. Broadly, pre-production capital costs are divided among mining, processing, infrastructure, and project indirect expenses. Sustaining capital costs are related to ongoing mine development, the crown pillar recovery, and miscellaneous infrastructure or process plant refurbishments that continue to occur after commercial production has been declared.

TABLE 21-1 SUMMARY OF CAPITAL COSTS
Fission Uranium Corp. – Patterson Lake South Property

Description	Units	Cost
Mining	C$ millions	200.7
Processing	C$ millions	349.6
Infrastructure	C$ millions	119.7
Subtotal Pre-Production Direct Costs	**C$ millions**	**670.0**
Pre-Production Indirect Costs	C$ millions	314.8
Subtotal Direct and Indirect	**C$ millions**	**984.8**
Contingency	C$ millions	192.1
Initial Capital Cost	**C$ millions**	**1,176.9**
Sustaining Capital	C$ millions	208.6
Closure and Reclamation	C$ millions	73.8
Total	**C$ millions**	**1,459.3**

MINING

Within the mining capital costs, the significant expenditures include the portal development and decline, lateral development, ventilation raises and systems, mobile equipment, waste rock piles, and mine infrastructure (Table 21-2). Note that costs related to the 505 Cut are

included in “Site Preparation”, and costs related to ground freezing and refrigeration plant occur as Sustaining Capital, as they are incurred after the pre-production period.

TABLE 21-2 MINING CAPITAL COSTS
Fission Uranium Corp. – Patterson Lake South Property

Description	Units	Total
Mine Access	C$ millions	35.8
Capital Development	C$ millions	46.0
Vertical Development	C$ millions	20.5
Mobile Equipment	C$ millions	36.2
Stationary Equipment and Services	C$ millions	48.9
Waste Piles	C$ millions	13.4
Total Mining Capital Costs	**C$ millions**	**200.7**

It is envisaged that the 505 Cut and Box Cut will be completed by an earth-moving contractor, who would shift to work on other site earth moving projects (notably the TMF) after completion of the 505 Cut and Box Cut. A mine development contractor would then commission the portal and begin development through the decline, while simultaneously mobilizing to excavate the two ventilation shafts. The same contractor would complete a substantial portion of the hard rock development. Any mining done by the Owner during Year -1 has been designated as Capitalized Pre-Production Operating Costs and is included in Indirect Costs.

The mining equipment fleet purchase schedule is summarized in Table 21-3. Due to the short life of the mine, only minimal allowances for equipment rebuilds were included in sustaining capital.

TABLE 21-3 MINING EQUIPMENT PURCHASES
Fission Uranium Corp. – Patterson Lake South Property

Description	Quantity (ea)	Unit Price (C$ 000)	Total (C$ 000)
2 Boom Jumbo Epiroc Boomer M2	3	1,280	3,840
Rock Bolter Epiroc Boltec M	2	1,324	2,648
ST14 LHD Epiroc ST14	5	1,170	5,850
Haul Truck Epiroc MT 431B	5	1,036	5,179
Production Drill Epiroc Simba E7C	2	1,738	3,476
Easer L-Mobile Raise Boring Machine Epiroc	1	2,601	2,601
Cable Bolt Drill Epiroc Cabletec M	1	1,824	1,824
ANFO Loader Truck Charmec MF 605	1	692	692
Lube Truck Utimec MF 400	1	499	499
Flat Deck Truck w. Crane Utimec LF 130	2	560	1,120
Transmixer Utimec LF 600	3	554	1,662
Shotcrete Sprayer Spraymec MF 050 D	2	685	1,370
Personnel Carrier Utimec MF 164 PER	3	350	1,050
Scissor Lift Utilift MF 540	3	550	1,650
Small Vehicle (Rad. Tech., etc.) RTV-X1100C	10	40	400
Grader	1	307	307
Mobile Rock Breaker and Scaler Scamec 2000	1	576	576
Casette Truck MF 100 Multimec	1	467	467
HiMec Basket Truck MF 905 Himec	2	502	1,004
Total Mining Equipment			**36,215**

PROCESS

Capital costs developed for the process plant are consistent with the process methodology described in Sections 13 and 17. Process plant costs were divided between direct process plant, and infrastructure related to the process plant (Table 21-4).

TABLE 21-4 PROCESS CAPITAL COSTS
Fission Uranium Corp. – Patterson Lake South Property

Description	Units	Total
Direct Process Plant	C$ millions	225.0
General Process Infrastructure	C$ millions	23.6
TMF	C$ millions	101.0
Total Process Capital Costs	**C$ millions**	**349.6**

Notes:
1. The TMF design was completed by Clifton, and the unit pricing was provided by Wood.

The direct process plant capital costs are provided in Table 21-5. In addition to direct process plant capital costs, general process infrastructure capital costs are shown in Table 21-6.

TABLE 21-5 DIRECT PROCESS PLANT CAPITAL COSTS
Fission Uranium Corp. – Patterson Lake South Property

Description	Units	Total
3000-Site Process Plant	C$ millions	85.9
3100-Ore Handling and Crushing	C$ millions	18.5
3300-Leaching	C$ millions	3.6
3400-Liquid / Solids Separation	C$ millions	24.4
3500-SX	C$ millions	23.7
3600-Precipitation	C$ millions	9.4
3700-Tailings Neutralization	C$ millions	3.7
3800-Product Drying and Packaging	C$ millions	4.4
3900-Reagents	C$ millions	51.2
Total Direct Process Plant	**C$ millions**	**225.0**

TABLE 21-6 GENERAL PROCESS INFRASTRUCTURE CAPITAL COSTS
Fission Uranium Corp. – Patterson Lake South Property

Description	Units	Total
5300-Water (Raw, Potable, Process)	C$ millions	5.2
5400-Acid Plant	C$ millions	3.5
5500-Fire Protection	C$ millions	4.2
5600-LPG	C$ millions	2.8
5700-Fuel Storage	C$ millions	0.0
6100-Admin Building & Dry	C$ millions	5.6
6200-Warehouse	C$ millions	2.1
Total General Process Infrastructure	**C$ millions**	**23.6**

INFRASTRUCTURE

The Project is located in a region of Saskatchewan with road access, but devoid of other infrastructure requirements, notably an electrical transmission line. Trade-off studies have previously been undertaken during the 2015 PEA to determine the optimal method of providing power to the Project. Options included the construction of a high voltage transmission line from various take-off points, and an onsite diesel powerplant. A subsequent review of diesel power plants and LNG power plants showed that an LNG power plant is the preferred option for power generation. RPA recommends that power supply options be further investigated in the next level of study.

In addition to the power plant, other major infrastructure expenditures include a tailings storage facility, fuel storage, site preparation, maintenance shop, administration and dry facility, water

treatment facility, airstrip, site roads, highway by-pass, and camp facility. Infrastructure capital costs are shown in Table 21-7.

TABLE 21-7 INFRASTRUCTURE CAPITAL COSTS
Fission Uranium Corp. – Patterson Lake South Property

Description	Units	Total
2100-Site Preparation	C$ millions	16.2
2200-Site Roads	C$ millions	5.2
2500-Surface Drainage and Ponds	C$ millions	2.5
2600-Airport Facilities	C$ millions	6.7
4300-Effluent Treatment	C$ millions	32.6
4600-Waste Handling	C$ millions	1.3
5000-Utilities	C$ millions	0.3
5100-Power Plant	C$ millions	31.0
5200-Power Distribution	C$ millions	7.7
6400-Permanent Accommodations	C$ millions	16.5
7100-Off-Site Roads	C$ millions	6.0
Total Infrastructure Capital Costs[1]	**C$ millions**	**125.9**

Note:
1. Totals include $6.2 million in Year 1 that is designated as a sustaining capital cost.

INDIRECT CAPITAL COSTS AND CONTINGENCY

Indirect capital costs were applied to each of the respective areas of capital expenditure and are lumped into major categories including engineering, procurement, and construction management requirements (EPCM), Owner's costs, pre-production operating costs, construction indirects, temporary facilities, construction power, temporary camp and buildings, study costs, freight, spare parts and first fills, commissioning, and non-recoverable taxes.

Contingencies were applied to the capital costs that are consistent with an AACE Level 4 estimate. Indirect costs and contingency costs are summarized in Table 21-8.

TABLE 21-8 INDIRECT AND CONTINGENCY CAPITAL COSTS
Fission Uranium Corp. – Patterson Lake South Property

Description	Units	Value	Percentage of Direct[1]
Total Direct Costs	**C$ millions**	**670.0**	**N/A**
8000-Indirects	C$ millions	61.0	9%
8100-Camp and Catering	C$ millions	28.7	4%
8200-Construction Indirects	C$ millions	111.4	17%
8400-EPCM	C$ millions	57.9	9%
9100-Owner's Costs	C$ millions	31.4	5%
9200-Owner's Costs - Misc	C$ millions	24.4	4%
Total Indirect Costs	**C$ millions**	**314.8**	**47%**
Total Direct and Indirect Costs	C$ millions	984.8	N/A
9300-Contingency	C$ millions	192.1	20%
Total Initial Capital Costs	**C$ millions**	**1,176.9**	N/A

Notes:
1. For contingency, the percentage is expressed as the total contingency compared to the combined direct and indirect costs. Further, additional contingency is included in sustaining capital costs related to the ground freezing program.

SUSTAINING CAPITAL AND CLOSURE COSTS

Capital costs that were incurred following Year -1 were considered sustaining capital. This includes all capital expenditure related to ongoing mine development, the ground freezing program, mobile equipment replacements, expansions to the TMF, expansion to the power plant, sustaining capital costs related to the process plant and surface infrastructure, and an estimate of closure and reclamation costs. Sustaining capital and closure costs are summarized in Table 21-9.

TABLE 21-9 SUSTAINING CAPITAL COSTS
Fission Uranium Corp. – Patterson Lake South Property

Description	Units	Total
Mine Development	C$ millions	32.9
Mobile Equipment	C$ millions	4.4
Crown Pillar Recovery	C$ millions	118.1
Process and Infrastructure	C$ millions	53.2
Total Sustaining Capital	**C$ millions**	**208.6**
Reclamation and Closure Cost	C$ millions	73.8
Sustaining and Closure	C$ millions	282.4

EXCLUSIONS TO CAPITAL COSTS

The capital cost estimate excludes several factors, including:

- Ongoing exploration drilling and all associated services
- Environmental and social impact studies
- Geotechnical and hydrological studies
- Permitting and fees
- Detailed metallurgical test work and marketing studies
- Cost to conduct future FSs or any other additional studies
- Project financing and interest charges
- Fluctuations in foreign exchange rates
- Working capital requirements
- Escalation and inflation

OPERATING COSTS

Operating costs were estimated for the Project and allocated to either mining, processing, or G&A. LOM operating costs are summarized in Table 21-10.

TABLE 21-10 LIFE OF MINE OPERATING COSTS
Fission Uranium Corp. – Patterson Lake South Property

Description	LOM Cost (C$ millions)	Average Annual (C$ millions)	Unit Cost (C$/t proc)	Unit Cost (C$/lb U_3O_8)
Mining	314.6	52.4	137	3.99
Processing	266.4	40.2	116	3.38
G&A	172.5	26.2	75	2.19
Total	**753.4**	**118.8**	**328**	**9.57**

Key consumable inputs related to the estimation of operating costs include the following:

- Diesel price of C$1.00/L delivered to site
- LPG price of C$0.44/L delivered to site
- LNG price equivalent of C$14.05 per Gigajoule of energy produced at site (equivalent to approximately C$0.15/kWh)
- Unslaked Lime price of C$420/t delivered to site
- Hydrogen Peroxide price of C$820/t delivered to site

MINING

Mining takes place during Years -1 to Year 6 (note that Year -1 mining costs are capitalized). Mine operating costs are summarized in Table 21-11.

TABLE 21-11 MINE OPERATING COSTS
Fission Uranium Corp. – Patterson Lake South Property

Description	LOM Cost (C$ millions)	Average Annual (C$ millions)	Unit Cost (C$/t proc)	Unit Cost (C$/lb U_3O_8)
Labour	124.2	17.7	54	1.58
Equipment Maintenance & Fuel	79.2	11.3	34	1.01
Power	50.0	7.1	22	0.64
Consumables	53.7	7.7	23	0.68
Miscellaneous	7.5	1.5	3	0.10
Total Mine Operating Costs	**314.6**	**45.4**	**137**	**3.99**

PROCESSING

Process costs are primarily composed of labour, power consumption, and consumables. Consumables consist of reagents, grinding media, mill liners, and LPG. An allowance was made for annual maintenance. Process operating costs are summarized in Table 21-12.

TABLE 21-12 PROCESS OPERATING COSTS
Fission Uranium Corp. – Patterson Lake South Property

Description	LOM Cost (C$ millions)	Average Annual (C$ millions)	Unit Cost (C$/t proc)	Unit Cost (C$/lb U_3O_8)
Labour	74.3	11.0	32	0.94
Power	39.5	5.7	17	0.50
LNG for calciner	1.7	0.3	1	0.02
Water	7.6	1.2	3	0.10
Reagents	115.9	17.6	50	1.47
Maintenance Materials	26.6	4.4	12	0.34
Laboratory	0.8	0.1	0	0.01
Total Processing	**266.4**	**40.2**	**116**	**3.38**

GENERAL AND ADMINISTRATION

G&A costs include allowances for flights to and from the work site, camp and catering costs, insurance premiums, marketing and accounting functions, and general maintenance of camp and other surface buildings. Additionally, allowances were made for departments of personnel that are atypical of a mine setting but are necessary for uranium mining in Canada. Allowances

were made for reimbursable fees paid to the CNSC. G&A operating costs are summarized in Table 21-13.

TABLE 21-13 GENERAL AND ADMINISTRATIVE OPERATING COSTS
Fission Uranium Corp. – Patterson Lake South Property

Description	LOM Cost (C$ millions)	Average Annual (C$ millions)	Unit Cost (C$/t processed)	Unit Cost (C$/lb U_3O_8)
Labour	66.1	10.0	29	0.84
Camp Costs	43.4	6.7	19	0.55
Flights and Logistics	21.8	3.4	9	0.28
Miscellaneous	32.2	4.8	14	0.41
Equipment Maintenance & Fuel	4.1	0.6	2	0.05
Portion of Power	4.9	0.7	2	0.06
Total G&A	**172.5**	**26.2**	**75**	**2.19**

POWER COSTS

The price to supply power to the Project has been calculated as C$0.15/kWh. This was calculated by summing the power demand across the entire site, adding in an allowance for maintenance of the generators, and including a portion of labour to operate and maintain the plant.

LABOUR COSTS

Labour costs have been estimated based on comparable projects.

22 ECONOMIC ANALYSIS

The economic analysis contained in this report is based entirely on Indicated Mineral Resources and excludes Inferred Resources.

OVERVIEW OF CASH FLOW MODEL PARAMETERS

The economic analysis was prepared using the following assumptions:

- No allowance has been made for cost inflation or escalation.
- No allowance has been made for corporate costs.
- Capital and operating costs are consistent with those described in Section 21.
- The capital structure is assumed to be 100% equity, with no debt or interest payments.
- The model is assessed in constant C$, with a based in the third quarter of 2019.
- No allowance for working capital has been made in the financial analysis.
- The Project has no salvage value at the end of the mine life.

ECONOMIC CRITERIA

Table 22-1 presents the cash flow for the Project. Economic criteria that were used in the cash flow model include:

- Long term price of uranium of US$50/lb U_3O_8, based on long term forecasts.
- 100% of uranium sold at a long term price.
- The recovery and sale of gold was excluded from the cash flow model.
- Exchange rate of C$1.00/US$0.75.
- LOM processing of 2,299,000 t grading 1.61% U_3O_8.
- Nominal 350,000 t of processed material per year during steady state operations.
- Processing life of six and a half years.
- Overall recovery of 96.8%, based on test work.
- Total recovered yellowcake of 78.7 Mlb U_3O_8.
- Transportation costs assumed to be covered by the buyer, FOB mine gate.
- Royalties calculated in accordance with *"Guideline: Uranium Royalty System, Government of Saskatchewan, June 2014".* Consisting of:
    - C$381 million in gross revenue royalties

  - C$436 million in profit based royalties
- Unit operating costs of C$328/t of processed material, or C$9.57/lb U_3O_8.
- Pre-production capital costs of C$1,177 million, spread over three years.
- Sustaining capital costs (including reclamation) of C$282 million, spread over the mine life.
- Corporate income taxes at a rate of 27% totalling C$653 million net of deductions.

TABLE 22-1 CASH FLOW SUMMARY
Fission Uranium Corp. - Patterson Lake South Project

	INPUTS	UNITS	TOTAL	YR -3	YR -2	YR -1	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6	YR 7	YR 8	YR 9	YR 10	YR 11	YR 12	YR 13	YR 14	YR 15
MINING																					
Underground Mine Production																					
Mine Operating Days		days	2,100	-	-	-	350	350	350	350	350	350	-	-	-	-	-	-	-	-	-
Ore Tonnes mined per day		tpd	1,008	-	-	-	1,029	1,210	1,231	1,015	1,029	869	-	-	-	-	-	-	-	-	-
Total Tonnes moved per day		tpd	913	-	-	-	2,033	2,095	1,533	1,050	1,101	906	-	-	-	-	-	-	-	-	-
Ore Tonnes mined		000 t	2,299	-	-	52	360	425	431	355	361	314.7	-	-	-	-	-	-	-	-	-
U3O8 Grade		%	1.61%	0.00%	0.00%	0.73%	1.33%	1.65%	1.99%	1.58%	2.05%	0.99%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Contained U3O8		Mlb U3O8	81.4	-	-	0.8	10.5	15.4	18.9	12.4	16.3	6.9	-	-	-	-	-	-	-	-	-
Overburden		000 t	1,853.4	1,853	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Waste Rock		000 t	1,219	22	56	337	352	309	105	13	24	3	-	-	-	-	-	-	-	-	-
Total Moved		**000 t**	**5,372**	**1,875**	**56**	**389**	**712**	**733**	**536**	**368**	**385**	**317**	-	-	-	-	-	-	-	-	-
PROCESSING																					
Mill Feed																					
Plant Operating Days		days	2,286	-	-	-	350	350	350	350	350	350	186	-	-	-	-	-	-	-	-
Plant Daily Throughput		tpd	1,005	-	-	-	1,013	1,010	1,003	1,001	1,008	1,001	1,000	-	-	-	-	-	-	-	-
Tonnes Processed		000 t	2,299	-	-	-	355	353	351	350	353	350	186	-	-	-	-	-	-	-	-
Head Grade		%	1.61%	0.00%	0.00%	0.00%	1.32%	1.73%	2.00%	1.79%	1.90%	1.28%	0.90%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Contained U3O8		Mlb U3O8	77.6	-	-	-	10.4	13.5	15.5	13.8	14.8	9.7	-	-	-	-	-	-	-	-	-
Process Recovery																					
Recovery		%	96.8%	0.0%	0.0%	0.0%	96.5%	96.9%	97.1%	96.9%	97.0%	96.4%	95.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Recovered U_3O_8		Mlb U3O8	75.2	-	-	-	10.0	13.0	15.0	13.4	14.4	9.4	-	-	-	-	-	-	-	-	-
REVENUE																					
Metal Prices		**Input Units**																			
Long-Term U3O8 Price	$ 50	US$ / lb U3O8	$ 50	-	-	-	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50	$ 50
Exchange Rate	$ 0.75	C$ / US$	$ 0.75	-	-	-	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75	$ 0.75
Realized Price		C$ / lb U3O8	$ 67	-	-	-	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67	$ 67
Total Gross Revenue		**C$ '000**	**$ 5,249,798**	-	-	-	**$ 665,884**	**$ 869,864**	**$ 1,000,969**	**$ 892,653**	**$ 957,457**	**$ 625,619**	**$ 237,251**	-	-	-	-	-	-	-	-
Transportation	$ 00 C$/t product	C$ '000	$ -	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Smelter Return	7.250%	**C$ '000**	**$ 5,249,798**	-	-	-	**$ 665,884**	**$ 869,864**	**$ 1,000,969**	**$ 892,653**	**$ 957,457**	**$ 625,619**	**$ 237,251**	-	-	-	-	-	-	-	-
Royalties																					
NSR Royalties	0.0%	C$ '000	$ -	-	-	-	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Gov't Sliding Scale Royalty		C$ '000	$ 380,610	-	-	-	48,277	63,072	72,570	64,717	69,416	45,357	17,201	-	-	-	-	-	-	-	-
Total Royalties		**C$ '000**	**$ 380,610**	-	-	-	**48,277**	**63,072**	**72,570**	**64,717**	**69,416**	**45,357**	**17,201**	-	-	-	-	-	-	-	-
Net Revenue		**C$ '000**	**$ 4,869,188**	-	-	-	**$ 617,608**	**$ 806,892**	**$ 928,398**	**$ 827,936**	**$ 888,042**	**$ 580,261**	**$ 220,051**	-	-	-	-	-	-	-	-
Unit NSR - Tonnes Processed		C$ / tonne	$ 2,118	-	-	-	$ 1,742	$ 2,284	$ 2,645	$ 2,364	$ 2,517	$ 1,655	$ 1,183	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Unit NSR - Pounds Produced		C$ / lb U3O8	$ 62	-	-	-	$ 62	$ 62	$ 62	$ 62	$ 62	$ 62	$ 62	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

	INPUTS	UNITS	TOTAL	YR -3	YR -2	YR -1	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6	YR 7	YR 8	YR 9	YR 10	YR 11	YR 12	YR 13	YR 14	YR 15
OPERATING COSTS																					
Underground Mining		C$ '000	$ 314,571	$ -	$ -	$ -	$ 44,770	$ 61,028	$ 63,124	$ 49,933	$ 51,248	$ 44,468	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Processing		C$ '000	$ 266,381	$ -	$ -	$ -	$ 36,076	$ 39,083	$ 41,458	$ 41,262	$ 43,001	$ 40,537	$ 24,964	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Surface and G&A		C$ '000	$ 172,496	$ -	$ -	$ -	$ 26,052	$ 26,182	$ 26,182	$ 26,143	$ 26,143	$ 26,225	$ 15,568	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Operating Cost		**C$ '000**	**$ 753,448**	**$ -**	**$ -**	**$ -**	**$ 106,898**	**$ 126,293**	**$ 130,764**	**$ 117,338**	**$ 120,393**	**$ 111,230**	**$ 40,532**								
UNIT OPERATING COSTS																					
Underground Mining		C$ / t ore	$ 137	$ -	$ -	$ -	$ 124	$ 144	$ 146	$ 141	$ 142	$ 141	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Processing		C$ / t ore	$ 116	$ -	$ -	$ -	$ 102	$ 111	$ 118	$ 118	$ 122	$ 116	$ 134	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Surface and G&A		C$ / t proc	$ 75	$ -	$ -	$ -	$ 73	$ 74	$ 75	$ 75	$ 74	$ 75	$ 84	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Operating Cost		**C$ / t proc**	**$ 328**	**$ -**	**$ -**	**$ -**	**$ 301**	**$ 357**	**$ 373**	**$ 335**	**$ 341**	**$ 317**	**$ 217**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Underground Mining		C$ / lb U3O8	$ 3.99	$ -	$ -	$ -	$ 4.48	$ 4.68	$ 4.20	$ 3.73	$ 3.57	$ 4.74	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Processing		C$ / lb U3O8	$ 3.38	$ -	$ -	$ -	$ 3.61	$ 3.00	$ 2.76	$ 3.08	$ 2.99	$ 4.32	$ 7.01	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Surface and G&A		C$ / lb U3O8	$ 2.19	$ -	$ -	$ -	$ 2.61	$ 2.01	$ 1.74	$ 1.95	$ 1.82	$ 2.79	$ 4.37	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Unit Operating Cost		**C$ / lb U3O8**	**$ 9.57**	**$ -**	**$ -**	**$ -**	**$ 10.70**	**$ 9.68**	**$ 8.71**	**$ 8.76**	**$ 8.38**	**$ 11.85**	**$ 11.39**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Unit Operating Cost		**US$ / lb U3O8**	**$ 7.16**																		
Operating Cash Flow		**C$ '000**	**4,115,739**	-	-	-	**510,710**	**680,598**	**797,635**	**710,598**	**767,649**	**469,031**	**179,518**	-	-	-	-	-	-	-	-
		C$ / t proc	**1,790**																		
CAPITAL COST																					
Pre-Production Direct Cost																					
Underground Mining		C$ '000	$ 200,719	$ 27,823	$ 89,629	$ 83,267	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Processing		C$ '000	$ 349,383	$ 22,820	$ 155,040	$ 194,543	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Infrastructure		C$ '000	$ 119,786	$ -	$ 44,016	$ 75,770	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Direct Cost		**C$ '000**	**$ 670,000**	**$ 50,643**	**$ 288,685**	**$ 330,671**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Indirect Costs																					
EPCM / Owners / Indirect Cost		C$ '000	$ 314,822	$ 48,808	$ 135,586	$ 130,428	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Costs		**C$ '000**	**$ 984,830**	**$ 99,451**	**$ 424,271**	**$ 461,099**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Contingency		C$ '000	$ 192,054	$ 20,748	$ 84,819	$ 86,487	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Initial Capital Cost		**C$ '000**	**$ 1,176,884**	**$ 120,208**	**$ 509,089**	**$ 547,586**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Sustaining Capital																					
Total Sustaining Capital		C$ '000	$ 208,602	$ -	$ -	$ -	$ 103,240	$ 55,479	$ 3,002	$ 39,338	$ 3,573	$ 3,970	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Reclamation and Closure		C$ '000	$ 73,788	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 36,894	$ 18,447	$ 7,379	$ 3,689	$ 3,689	$ 3,689	$ 3,689	$ -
Total Capital Cost		**C$ '000**	**$ 1,459,274**	**$ 120,208**	**$ 509,089**	**$ 547,586**	**$ 103,240**	**$ 55,479**	**$ 3,002**	**$ 39,338**	**$ 3,573**	**$ 3,970**	**$ -**	**$ 36,894**	**$ 18,447**	**$ 7,379**	**$ 3,689**	**$ 3,689**	**$ 3,689**	**$ 3,689**	**$ -**
CASH FLOW																					
Operating Cash Flow		C$ '000	$ 4,115,739	$ -	$ -	$ -	$ 510,710	$ 680,598	$ 797,635	$ 710,598	$ 767,649	$ 469,031	$ 179,518	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Operating Cash Flow less Capital Costs		C$ '000	$ 2,656,466	$ (120,208)	$ (509,089)	$ (547,586)	$ 407,470	$ 625,120	$ 794,632	$ 671,261	$ 764,075	$ 465,061	$ 179,518	$ (36,894)	$ (18,447)	$ (7,379)	$ (3,689)	$ (3,689)	$ (3,689)	$ -	$ -
Pre-Tax Cashflow		C$ '000	$ 2,656,466	$ (120,208)	$ (509,089)	$ (547,586)	$ 407,470	$ 625,120	$ 794,632	$ 671,261	$ 764,075	$ 465,061	$ 179,518	$ (36,894)	$ (18,447)	$ (7,379)	$ (3,689)	$ (3,689)	$ (3,689)	$ -	$ -
Cumulative Pre-Tax Cashflow		C$ '000		$ (120,208)	$ (629,298)	$ (1,176,884)	$ (769,414)	$ (144,294)	$ 650,338	$ 1,321,599	$ 2,085,674	$ 2,550,735	$ 2,730,253	$ 2,693,359	$ 2,674,912	$ 2,667,534	$ 2,663,844	$ 2,660,155	$ 2,656,466	$ 2,656,466	$ 2,656,466
Taxes																					
Less SK Profit Royalties		C$ '000	$ 436,135	$ -	$ -	$ -	$ -	$ -	$ 116,920	$ 103,067	$ 117,162	$ 71,426	$ 27,560	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
EBITDA		C$ '000	$ 3,679,604	$ -	$ -	$ -	$ 510,710	$ 680,598	$ 680,715	$ 607,531	$ 650,487	$ 397,605	$ 151,958	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Less Deductions		C$ '000	$ 1,560,819	$ 7,657	$ 15,095	$ 47,921	$ 446,307	$ 490,286	$ 197,443	$ 152,643	$ 119,371	$ 90,138	$ 67,867	$ 61,805	$ 51,221	$ 39,885	$ 30,389	$ 23,401	$ 18,254	$ 13,353	$ 9,778
Taxable Earnings		C$ '000	$ 2,098,786	$ (7,657)	$ (15,095)	$ (47,921)	$ 64,403	$ 190,311	$ 483,271	$ 454,888	$ 531,116	$ 307,467	$ 84,091	$ (61,805)	$ (51,221)	$ (39,885)	$ (30,389)	$ (23,401)	$ (18,254)	$ (13,353)	$ (9,778)
Corporate Taxes @ 27%	27.0%	C$ '000	$ 652,737	$ -	$ -	$ -	$ 17,929	$ 132,384	$ 130,463	$ 122,820	$ 143,401	$ 83,016	$ 22,705	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Net Profit		**C$ '000**	**$ 1,446,048**	**$ (7,657)**	**$ (15,095)**	**$ (47,921)**	**$ 46,474**	**$ 357,927**	**$ 352,788**	**$ 332,068**	**$ 387,714**	**$ 224,451**	**$ 61,387**	**$ (61,805)**	**$ (51,221)**	**$ (39,885)**	**$ (30,389)**	**$ (23,401)**	**$ (18,254)**	**$ (13,353)**	**$ (9,778)**
After-Tax Cash Flow		C$ '000	$ 1,567,593	$ (120,208)	$ (509,089)	$ (547,586)	$ 389,541	$ 492,736	$ 547,229	$ 445,374	$ 503,512	$ 310,619	$ 129,254	$ (36,894)	$ (18,447)	$ (7,379)	$ (3,689)	$ (3,689)	$ (3,689)	$ -	$ -
Cumulative		C$ '000		$ (120,208)	$ (629,298)	$ (1,176,884)	$ (787,342)	$ (294,607)	$ 252,622	$ 697,996	$ 1,201,508	$ 1,512,127	$ 1,641,380	$ 1,604,487	$ 1,586,040	$ 1,578,661	$ 1,574,972	$ 1,571,282	$ 1,567,593	$ 1,567,593	$ 1,567,593
PROJECT ECONOMICS																					
Pre-Tax Payback Period		yrs	2.2																		
Pre-Tax IRR		%	36%																		
Pre-Tax NPV @ 8%	8%	C$ '000	$1,334,164																		
Pre-Tax NPV @ 10%	10%	C$ '000	$1,117,331																		
Pre-Tax NPV @ 12%	12%	C$ '000	$932,001																		
After-Tax Payback Period		yrs	2.5																		
After-Tax IRR		%	25%																		
After-Tax NPV @ 8%	8%	C$ '000	$791,883																		
After-Tax NPV @ 10%	10%	C$ '000	$568,485																		
After-Tax NPV @ 12%	12%	C$ '000	$440,853																		

CASH FLOW ANALYSIS

Based on the economic criteria discussed previously, a summary of the cash flow is shown in Table 22-2.

TABLE 22-2 SUMMARY OF CASH FLOW
Fission Uranium Corp. – Patterson Lake South Property

Description	Units	Value
Gross Revenue	C$ millions	5,250
Less: Transportation	C$ millions	-
Net Smelter Return	C$ millions	5,250
Less: Provincial Revenue Royalties	C$ millions	(381)
Net Revenue	C$ millions	4,869
Less: Total Operating Costs	C$ millions	(753)
Operating Cash Flow	C$ millions	4,116
Less: Capital Costs	C$ millions	(1,459)
Pre-Tax Cash Flow	C$ millions	2,656
Less: Provincial Profit Royalties	C$ millions	(436)
Less: Taxes	C$ millions	(653)
After-Tax Cash Flow	C$ millions	1,568

ECONOMIC ANALYSIS

Based on the input parameters, a summary of the Project economics is shown in Table 22-3.

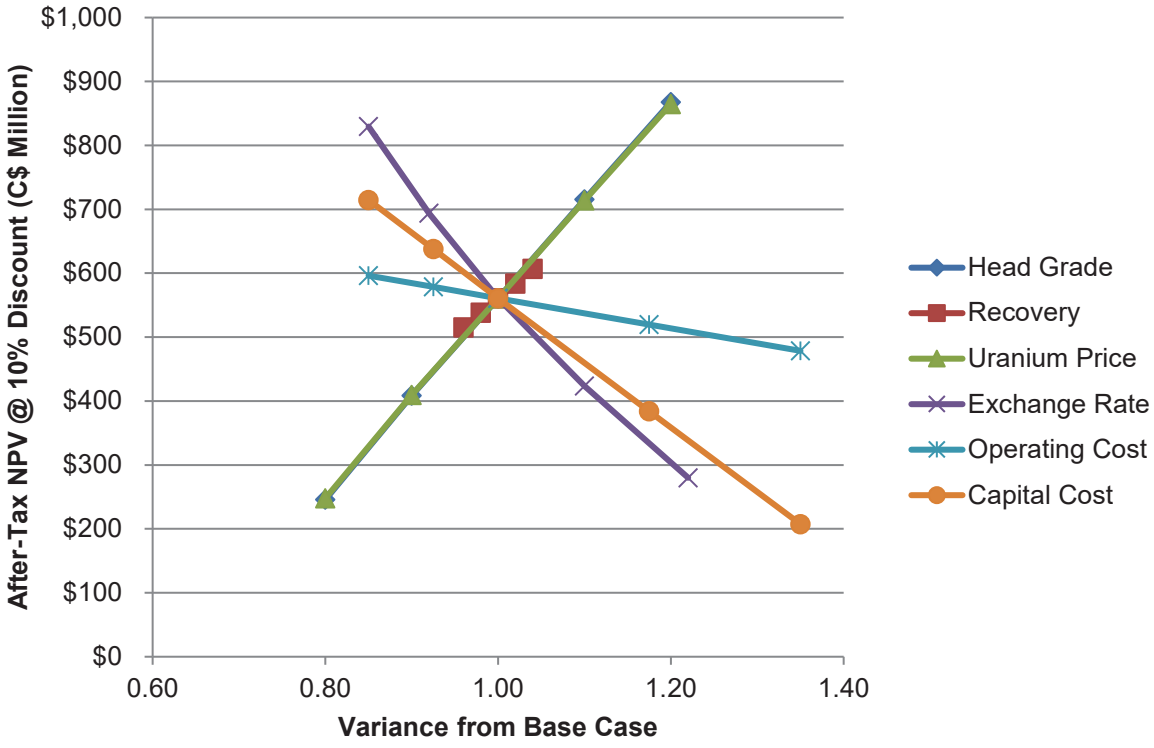
TABLE 22-3 SUMMARY OF ECONOMIC RESULTS
Fission Uranium Corp. – Patterson Lake South Property

Description	Units	Value
Pre-Tax		
Net Present Value at 8%	C$ millions	1,334
Net Present Value at 10%	C$ millions	1,117
Net Present Value at 12%	C$ millions	932
Internal Rate of Return	%	34
Payback Period	years	2.2
After-Tax		
Net Present Value at 8%	C$ millions	702
Net Present Value at 10%	C$ millions	561
Net Present Value at 12%	C$ millions	441
Internal Rate of Return	%	25
Payback Period	years	2.5

SENSITIVITY ANALYSIS

The cash flow model was tested for sensitivity to variances in head grade, process recovery, input price of yellowcake, C$/US$ exchange rate, overall operating costs, and overall capital costs. The resulting after-tax net present value (NPV) at a discount rate of 10%, sensitivity is shown in Figure 22-1, and Table 22-4.

FIGURE 22-1 SENSITIVITY ANALYSIS



As shown in Figure 22-1, the Project cash flow is most sensitive to the price of uranium, head grade, and process recovery. Yellowcake is primarily traded in US$, whereas capital and operating costs for Patterson Lake South are generally priced in C$. Therefore, the C$/US$ exchange rate also exerts significant influence over project economics. In addition to the sensitivity analysis shown in Figure 22-1, an extended sensitivity analysis was undertaken solely on uranium price. This extended sensitivity is presented in Table 22-5 and Figure 22-2.

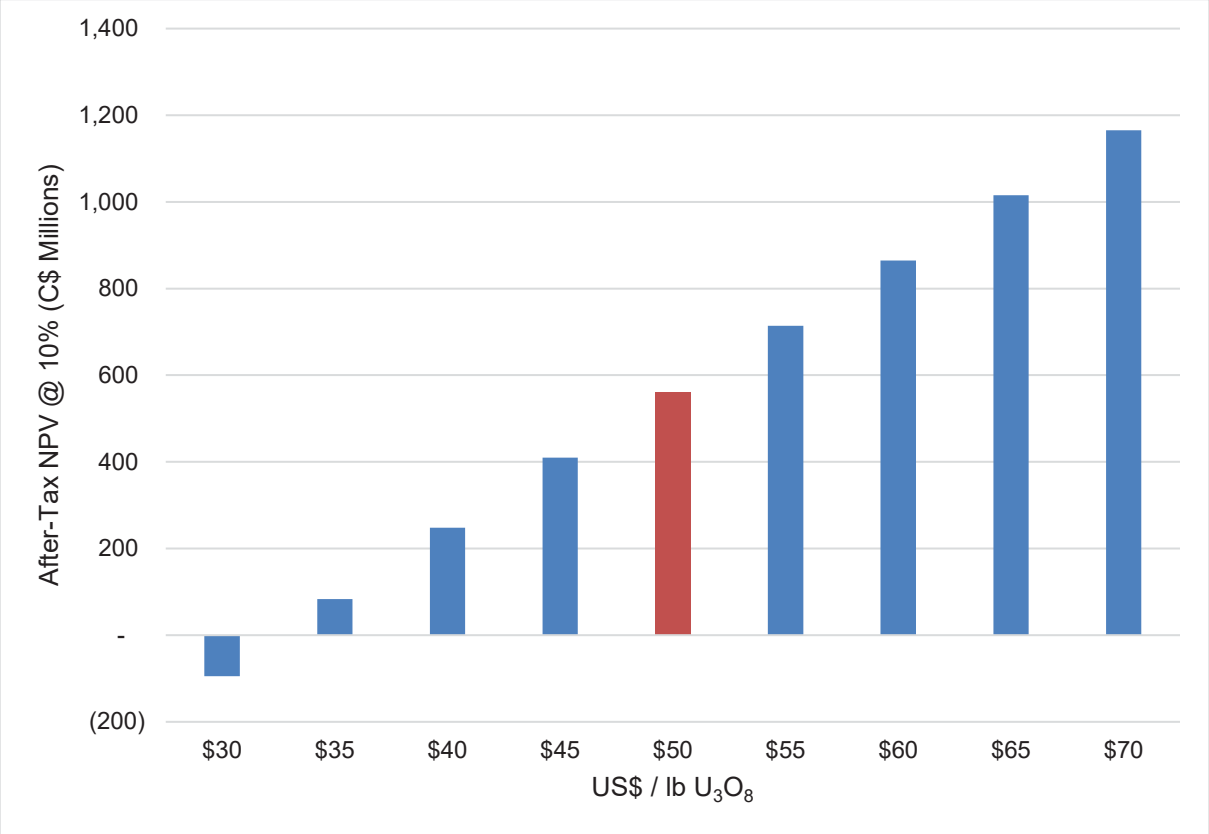
TABLE 22-4 SUMMARY OF SENSITIVITY ANALYSIS
Fission Uranium Corp. – Patterson Lake South Property

Description	Units	Low Case	Mid-Low Case	Base Case	Mid-High Case	High Case
Adjustment Factor						
Head Grade	%	-20%	-10%	N/A	10%	20%
Overall Recovery	%	-3%	-2%	N/A	1%	3%
Uranium Price	%	-20%	-10%	N/A	10%	20%
Exchange Rate	%	-15%	-8%	N/A	10%	22%
Operating Costs	%	-15%	-8%	N/A	18%	35%
Capital Cost	%	-15%	-8%	N/A	18%	35%
Resulting Input Factor						
Head Grade	%	1.28%	1.44%	1.61%	1.77%	1.93%
Overall Recovery	%	93.9%	95.3%	96.8%	98.2%	99.7%
Uranium Price	C$ / lb U_3O_8	$53	$60	$67	$73	$80
Exchange Rate	C$/US$	0.64	0.69	0.75	0.83	0.92
Operating Costs	C$/lb	8.1	8.9	9.6	11.2	12.9
Total Capital Cost	C$ millions	1,240	1,350	1,459	1,715	1,970
Output – After-Tax NPV @ 10%						
Head Grade	C$ millions	246	409	561	715	868
Overall Recovery	C$ millions	515	538	561	584	607
Uranium Price	C$ millions	248	410	561	714	865
Exchange Rate	C$ millions	829	694	561	423	280
Operating Costs	C$ millions	596	579	561	520	479
Capital Cost	C$ millions	715	638	561	384	207

TABLE 22-5 EXTENDED SENSITIVITY ANALYSIS
Fission Uranium Corp. – Patterson Lake South Property

Uranium Price (US$/lb U_3O_8)	Uranium Price (C$/lb U_3O_8)	After-Tax NPV @ 10% (C$ Millions)
30	40	(95)
35	47	84
40	53	248
45	60	410
50 (Base Case)	**67**	**561**
55	73	714
60	80	865
65	87	1,015
70	93	1,165

FIGURE 22-2 URANIUM PRICE EXTENDED SENSITIVITY ANALYSIS



TAXES, PROVINCIAL ROYALTIES, AND DEPRECIATION

Taxes and depreciation for the Project were modelled based on input from Fission Uranium's tax advisors and auditors, as well as review of documents including:

- *"Guideline: Uranium Royalty System, Government of Saskatchewan, June 2014"*
- *"A Guide to Canadian Mining Taxation, KPMG Canada, September 2011"*

To develop the tax and depreciation model, all capital costs were assigned to either of:

- Canadian Development Expense (CDE); or
- Capital Cost Allowance (CCA).

In addition, the Fission Uranium has opening balances of Canadian Exploration Expense (CEE) and operating losses that were applied in the tax model. Under current Canadian tax codes CEE has been phased out. Consequently, all pre-production capital was allocated to either CDE or CCA. Up to 30% of the CDE balance can be applied in any given year. All

mining equipment and structures that are considered depreciable fall under Class 41 of Canadian tax codes, which can be depreciated at 25% annually.

In Saskatchewan, multiple royalties are applied to uranium projects. Royalties generally fall into two categories: revenue royalties, and profit royalties. An explanation of the various royalties is provided below:

- Resource Surcharge of 3% of net revenue (where net revenue is defined as gross revenue less transportation costs directly related to the transporting of uranium to the first point of sale).
- Basic Royalty of 5% of net revenue (as defined above), less a Saskatchewan Resource Credit of 0.75% of net revenue, for an effective royalty rate of 4.25%.
- Tiered profit royalty, with a 10% royalty rate on the first C$24.14 (indexed to inflation) profit/kg of yellowcake, followed by 15% royalty on profits exceeding C$24.14/kg.

In the tiered profit royalty, the basic royalty and resource surcharge are not deductible for calculating profit royalties. Profits for the purposes of royalties are calculated by taking the net revenue, subtracting the full value of operating costs, capital costs, and exploration expenditures. Revenue royalties were included in the "pre-tax" cash flow results, while profit royalties are considered a tax, and are included in "after-tax" results.

Federal and provincial taxes were applied at a rate of 15% and 12%, respectively. Table 22-6 provides a summary of the taxes and royalties paid to the provincial and federal government.

TABLE 22-6 SUMMARY OF TAXES AND ROYALTIES
Fission Uranium Corp. – Patterson Lake South Property

Description	Units	Value
Provincial Payments		
Saskatchewan Resource Surcharge	C$ millions	157
Basic Revenue Royalty	C$ millions	223
Profit Royalty < 24.14 C$ / kg	C$ millions	61
Profit Royalty > 24.14 C$ / kg	C$ millions	375
Provincial Taxes	C$ millions	290
Total Provincial Payments	**C$ millions**	**1,107**
Federal Taxes	**C$ millions**	**363**
Total Government Royalties and Taxes	**C$ millions**	**1,469**

23 ADJACENT PROPERTIES

The PLS Property is contiguous with claims held by various companies and individuals. As of the effective date of this report, the Property is contiguous with claims registered in the names of NexGen to the east, Fission 3.0 Corp. to the south, Forum Uranium Corp. to the southwest, Dale Resources to the west, T. Young to the west and southwest, Canalaska Uranium Ltd. to the north, and a consortium consisting of Areva Resources Canada (39.5%), Cameco Corp. (39.5%), and Purepoint Uranium Group Inc. (21%) to the north and northeast (Figure 23-1).

RPA has not relied upon information from the adjacent properties in the writing of this report.

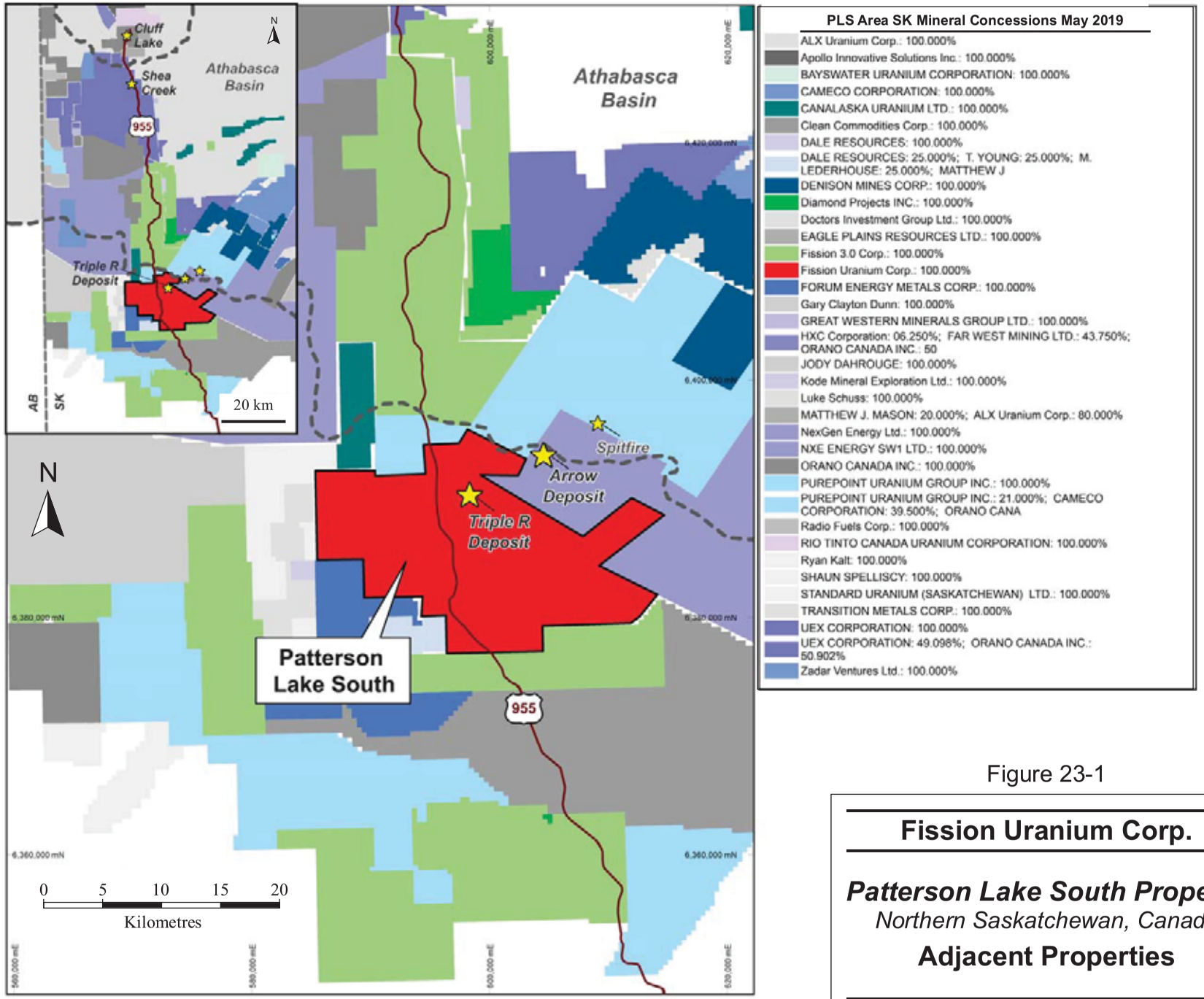


Figure 23-1

Fission Uranium Corp.

Patterson Lake South Property

Northern Saskatchewan, Canada

Adjacent Properties

November 2019

Source: Fission Uranium Corp, 2019.

24 OTHER RELEVANT DATA AND INFORMATION

The Project has previously been considered using a development scenario that includes both open pit and underground mining. Other than this, no additional information or explanation is necessary to make this Technical Report understandable and not misleading.

25 INTERPRETATION AND CONCLUSIONS

In RPA's opinion, the PFS indicates that positive economic results can be obtained for the Project. The economic analysis shows a after-tax internal rate of return (IRR) of 25%, and a after-tax NPV at a discount rate of 10% of C$561 million at a long term price of US$50/lb U_3O_8 and an exchange rate of C$1.00/US$0.75.

RPA offers the following conclusions by area:

GEOLOGY AND MINERAL RESOURCES

The Triple R deposit is a large, basement hosted, structurally controlled, sub-vertical, near surface, high grade uranium deposit. Drilling has outlined mineralization with 3D continuity, with size and grades that can potentially be extracted economically. Fission Uranium's protocols for drilling, sampling, analysis, security, and database management meet industry standard practices. The drill hole database was verified by RPA and is suitable for Mineral Resource estimation work.

RPA estimated Mineral Resources for the Triple R deposit using drill hole data available as of October 23, 2018. At a cut-off grade of 0.25% U_3O_8, Indicated Mineral Resources total 2.22 million tonnes at an average grade of 2.1% U_3O_8 for a total of 102.4 Mlb U_3O_8. Inferred Mineral Resources total 1.22 million tonnes at an average grade of 1.22% U_3O_8 for a total of 32.8 Mlb U_3O_8. Estimated grades are based on chemical assays only. Gold grades were also estimated and average 0.61 g/t for the Indicated Mineral Resources and 0.50 g/t for the Inferred Mineral Resources. Revenue from the recovery of gold is excluded from the economic analysis. Mineral Resources are reported inclusive of Mineral Reserves

The Triple R deposit is located within Fission Uranium's PLS Property, which is part of the largest mineralized trend in the Athabasca Basin region. Mineralization is known to occur at five on-strike locations on the PLS Property and all five constitute the Triple R deposit. From west to east, zones of the Triple R deposit are: 1) R1515W, 2) R840W, 3) R00E, 4) R780E, and 5) R1620E. The R780E is the most significant of the zones, as it hosts higher grade, thicker, and more continuous mineralization compared to other areas as defined by current drilling. Mineralization remains open along strike between the individual zones and down dip.

GEOTECHNICAL, MINING, AND MINERAL RESERVES

The Triple R deposit is contained primarily within metamorphosed basement lithologies and, to a much lesser extent, within overlying Meadow Lake Formation sedimentary rocks. Bedrock is overlain by 50 m to 100 m of sandy overburden, with the high grade mineralization located near the bedrock-overburden contact. Although the bedrock is generally competent, rock strengths in the mineralization have been degraded by radiological alteration. The deposit extends under Patterson Lake, and a key technical challenge to developing the operation will be water control related to Patterson Lake and saturated sandy overburden.

The mining method will be longhole retreat mining in both transverse and longitudinal methods, and some localized drift and fill mining based on current block model information. The mining will progress from the bottom levels to the top, and from the southwest to northeast.

The mine will be accessed using a decline originating to the west of the R00E deposit. The decline will include a box cut into the overburden, and a portal face collared in the overburden. The first stage of the decline will be developed through overburden for approximately 405 m,. Following this, the decline will transition through weak bedrock for an additional 133 m, until reaching the competent bedrock.

A key component of the underground design is the concept of using artificial ground freezing to extract some of the crown pillar – the mineralized material that approaches the overburden layer. This will be done using horizontal directional drilling from the shore of Patterson Lake and then pumping a refrigerated brine solution through the drill holes to effectively freeze the ground in the areas of stopes.

Over the life of mine (LOM), Mineral Reserves totalling 2.3 million tonnes grading 1.61% U_3O_8 containing 81.4 Mlb U_3O_8 are mined. The Project has a three year construction period, followed by six years of mining, while the process plant operates for an additional half year after the mine ends. Mineral Reserves are estimated using an average long term uranium price of US$50/lb U_3O_8, and an exchange rate of C$1.00/US$0.75.

MINERAL PROCESSING AND METALLURGICAL TESTING

Metallurgical test work completed to date indicates that a uranium recovery of 96.7% is a reasonable assumption for the UG PFS. The metallurgical test program included a bench test program.

The process flowsheet developed by Wood for the Project is based on unit processes commonly used effectively in uranium process plants in northern Saskatchewan and globally. Over the LOM, the process plant will produce a total of 78.7 Mlb U_3O_8. No major deleterious elements or elemental concentrations have been identified to date.

While the Triple R deposit contains gold values that may be recoverable, a high level economic analysis by RPA has shown this to have negligible impact on overall Project economics at current market conditions and gold recovery was thus excluded from the design. Should market forces change in the future, gold recovery could be reasonably easily engineered into the existing design and constructed without impacting throughput of the uranium process plant.

ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS

In support of the UG PFS, a review of the licensing, permitting and environmental aspects of the Project, including bio-physical, social, and governance, was completed through a literature search, examination of the appropriate Acts and Regulations, review of the PFS design of the project, discussions with Fission Uranium and the PFS team, examination of selected documents, and a site visit.

The preliminary baseline work has described typical northern Saskatchewan terrain of the Athabasca Basin region and has not identified anything that should significantly delay the Project if proper planning and mitigations are incorporated into the Project design. Such mitigations would include, but not be limited to, habitat compensation for any fish habitat disturbed by the Project, possibly terrestrial habitat compensation for woodland caribou habitat, and sufficient consultation with local First Nations and communities. The primary environmental goal will be the protection of Patterson Lake and the downstream water quality in the Clearwater River system as this will likely be the focus of any concerns under the underground mining only scenario.

Overall, the Project appears to be following applicable regulations governing exploration, drilling, and land use, and Fission Uranium staff and contractors are aware of their duties with respect to environmental and radiation protection. Early in the exploration program, there were some issues related to excess clearing of trails and nearby water bodies, however, Fission Uranium has worked to repair and reclaim these areas. Operations are neat and orderly, with the level of clearing and disturbance now commensurate with similar projects in northern Saskatchewan. The Project is frequently visited by Saskatchewan Conservation officers to ensure compliance.

A high level, PERA was completed to assess potential interactions of the Project with the environment. Under the UG PFS scenario, the main area of concern is development and operation of the TMF. The mitigations proposed for the TMF appear protective of the environment in the long term post decommissioning.

The TMF will use the proven sub-aqueous deposition and pervious surround methodologies, and it will require sufficient detail to demonstrate that the proposed hybrid facility (partially excavated and partially above ground) will be protective. The hybrid TMF design is optimized to meet the existing geological and hydrogeological conditions and avoids widespread dewatering during operation, although it does require a slight draw on the local groundwater to eliminate contaminant flux. The potential for impacts on Patterson Lake will be much lower in the UG PFS scenario than anticipated in the Hybrid OP/UG PFS and the mitigations will be largely related to protecting the water quality. This will need to be demonstrated in the EIA.

Most of the identified environmental risks are typical of existing uranium operations, which, in the modern era, have been demonstrated to have minimal impact on the local and regional environments.

To date, the environmental baseline detail has been sufficient for the local environment to be included in the EIA, however, the far field, downstream of Patterson Lake area, requires additional work ahead of the EIA to support pathways modelling. This additional baseline work is underway and will be largely completed in 2019 with some work required in the winter 2019/20. CanNorth has reviewed the baseline program against what is necessary to support the pathways modelling required to support the EIA and CNSC licensing, and any identified gaps are being addressed in the current work.

The level of environmental review was commensurate with a PFS; it was not an exhaustive examination of all documentation and did not include modelling or a compliance audit. The interpretation relies on the authors with more than 35 years of experience with Saskatchewan uranium projects and familiarity with mining and the federal and provincial requirements that accrue to such projects. The Project is at a stage where, with proper planning, areas of concern can be addressed in a timely fashion within an orderly project approvals process.

Consultation in support of the EIA will need to be undertaken in a manner that does not materially affect Project timing. This will require ongoing consultation with the CNSC and the Saskatchewan government to ensure that Fission Uranium meets the expected level of First Nations, Métis, and stakeholder consultation. Fission Uranium's level of governance continues to be adequate for the level of work on site, however, it will require significant improvement to support the policy-driven management systems employed at uranium projects, particularly for their safety and control areas.

RISKS AND UNCERTAINTIES

RPA, Wood, BGC, Clifton, TMCC, Artisan, and Newmans have assessed critical areas of the Project and identified key risks associated with the technical and cost assumptions used. In all cases, the level of risk refers to a subjective assessment as to how the identified risk could affect the achievement of the Project objectives. The risks identified are in addition to general risks associated with mining projects, including, but not limited to:

- general business, social, economic, political, regulatory, and competitive uncertainties;
- changes in project parameters as development plans are refined;
- changes in labour costs or other costs of production;
- adverse fluctuations in commodity prices;
- failure to comply with laws and regulations or other regulatory requirements;
- the inability to retain key management employees and shortages of skilled personnel and contractors.

The following definitions have been employed by RPA in assigning risk consequence factors to the various aspects and components of the Project:

1. **Low –** Risks that are considered to be average or typical for a deposit of this nature and could have a relatively insignificant impact on the economics. These generally can be mitigated by normal management processes combined with minor cost adjustments or schedule allowances.

2. **Minor –** Risks that have a measurable impact on the quality of the estimate but not sufficient to have a significant impact on the economics. These generally can be mitigated by normal management processes combined with minor cost adjustments or schedule allowances.
3. **Moderate –** Risks that are considered to be average or typical for a deposit of this nature but could have a more significant impact on the economics. These risks are generally recognizable and, through good planning and technical practices, can be minimized so that the impact on the deposit or its economics is manageable.
4. **Major –** Risks that have a definite, significant, and measurable impact on the economics. This may include basic errors or substandard quality in the basis of estimate studies or project definition. These risks can be mitigated through further study and expenditure that may be significant. Included in this category may be environmental/social non-compliance, particularly in regard to Equator Principles and IFC Performance Standards.
5. **High –** Risks that are largely uncontrollable, unpredictable, unusual, or are considered not to be typical for a deposit of a particular type. Good technical practices and quality planning are no guarantee of successful exploitation. These risks can have a major impact on the economics of the deposit including significant disruption of schedule, significant cost increases, and degradation of physical performance. These risks cannot likely be mitigated through further study or expenditure.

The following definitions have been employed by RPA in assigning risk probability factors to the various aspects and components of the Project:

1. **Rare –** The risk is very unlikely to occur during the Project life.
2. **Unlikely –** The risk is more likely not to occur than occur during the Project life.
3. **Possible –** There is an increased probability that the risk will occur during the Project life.
4. **Likely –** The risk is likely to occur during the Project life.
5. **Almost Certain –** The risk is expected to occur during the Project life.

A summary of key Project related risks is shown in Table 25-1, and Table 25-2.

TABLE 25-1 RISK SUMMARY TABLE
Fission Uranium Corp. – Patterson Lake South Property

LIKELIHOOD						
	Almost Certain					
	Likely					
	Possible			2, 3, 8, 9	6	
	Unlikely		5, 10	7	1, 4	
	Rare					
		Low	Minor	Moderate	Major	High
		CONSEQUENCE				

TABLE 25-2 RISKS AND UNCERTAINTIES
Fission Uranium Corp. – Patterson Lake South Property

Project Element	Issue	Risk Number	Risk Consequence	Risk Likelihood	Mitigation
Geology	Resource tonnage and/or metal grade are over-estimated	1	Major	Unlikely	Infill drilling is required in areas classified as Inferred. There is upside potential to increase resources along strike and at depth.
Mining	Thickness and nature of overburden sediments, and its impact on ground freezing	2	Moderate	Possible	Continue geotechnical assessment.
Mining	Overburden characteristics, and impact on decline development method	3	Moderate	Possible	Continue geotechnical assessment.
Mining	Ground conditions within the radiologically-altered rock cause unmanageable ground conditions	4	Major	Unlikely	Geotechnical drilling and analysis will further refine ground support requirements.
Process	Uranium recovery does not meet expectations	5	Minor	Unlikely	Test work supports recovery assumption. Additional test work will allow optimization of flowsheet.
Environment and Permitting	Permitting is not achieved	6	Major	Possible	Begin EA process and wider consultation
Environment and Permitting	Management of exposure to radiation is not achieved	7	Moderate	Unlikely	Issues are well-understood for North Saskatchewan operations.
Construction Schedule	Decline development is slower than anticipated	8	Moderate	Possible	Requires detailed planning and control. Further information on geotechnical conditions will refine schedule estimates.
Pre-production Capital Cost Estimate	TMF construction is delayed by geotechnical factors	9	Moderate	Possible	Geotechnical data collection and analysis will result in refined cost estimates.
Operating Cost Estimate	Cost of key materials and supplies is under-estimated	10	Minor	Unlikely	Close management of purchasing and logistics.

26 RECOMMENDATIONS

RPA recommends that Fission Uranium advance the Project to a FS. RPA offers the following recommendations by area:

GEOLOGY AND MINERAL RESOURCES

- The PLS Property hosts a significant uranium deposit and merits considerable exploration and development work. The primary objectives are to advance engineering work, expand the Triple R resource, upgrade Inferred Mineral Resources to Indicated classification, and explore elsewhere on the Property.
- To upgrade a sufficient quantity of Inferred Mineral Resources to Indicated to result in a 10 year Project life would require approximately 37,000 m of diamond drilling targeting R780E and R840W. This would cost approximately C$20 million to C$25 million.
- RPA has reviewed the proposed drilling with Fission Uranium technical staff and agrees with the placement and purpose of advancing the Project. RPA has recommended that the proposed drilling at R1515W be closer spaced to ensure that the Inferred Mineral Resources are properly tested and evaluated.

GEOTECHNICAL CONSIDERATIONS AND MINING

- Continue the geotechnical investigation of soil mechanics to support the crown pillar stabilization, with a primary focus on assessing the viability of artificial ground freezing using horizontal directional drilling.
- Continue the geotechnical investigation of rock mechanics to support the underground design. The program will require drilling of approximately ten oriented core geotechnical holes in rock: four for the main pit, four for the underground (two for the crown and two for the rock mass), and two short holes for a small separate zone (the R00E pit). The total length is estimated at 2,000 m for the program.
- Carry out an assessment of alternative decline development.
- Collect geotechnical data on the mineralized zones that are not included in the current PFS (R1515W, R800W, and R1620E).
- Carry out an assessment of systems such as ventilation on demand and equipment automation.

MINERAL PROCESSING AND METALLURGICAL TESTING

- Optimize the post-leaching solid-liquid separation by considering centrifuging, pressure filtration and vacuum filtration versus the PFS design which utilizes thickeners.
- Optimize gypsum precipitation to minimize the concentration of uranium co-precipitated with the gypsum and to maximize the underflow solids of the gypsum thickener.
- Conduct testing to confirm that molybdenum removal in carbon columns is not required to produce on-spec yellowcake.

INFRASTRUCTURE

- Perform a logistics study for the Project. Emphasis should be placed on the three traffic bridges on route to site to define the allowable load sizes and weights that the bridges can accommodate.
- Perform an aggregate study to determine if there are suitable quantities of aggregate available to meet the different needs of the Project.

ENVIRONMENTAL AND SOCIO-ECONOMIC CONSIDERATIONS

- Continue the engagement and consultation process, expanding it to reflect the changes in Project scale and progress.
- Carry out a detailed ERA to ensure that all reasonable mitigations are included in the EIA and the Project design.
- Complete an assessment to ensure all appropriate information is being collected to support the environmental modelling required for the EIA and CNSC licensing.
- Complete the downstream bio-physical work to complete the information required for the EIA.
- Continue bio-physical monitoring to maintain the currency of the existing environmental database.
- Continue to explore options to reduce the footprint of the TMF and the underground mine.
- Explore shared services options with other companies operating in the area (e.g., environmental data sharing, infrastructure, etc.).
- Continue to participate in the woodland caribou discussions for two zones in Saskatchewan: SK1, the Boreal Shield, which includes the Athabasca Basin, and SK2W, the Boreal Plain.
- Ensure that future work on site is of sufficient detail (feasibility level at a minimum) to support the EIA and CNSC licensing process.

BUDGET

RPA, Wood, BGC, Clifton, TMCC, Artisan, and Newmans propose the following budget for work carrying through to the completion of a FS, including completing an EA and licensing process (Table 26-1).

TABLE 26-1 PROPOSED BUDGET
Fission Uranium Corp. – Patterson Lake South Property

Item	Value (C$ millions)
Geotechnical Studies	7.1
Metallurgy Studies	1.0
FS Engineering	9.8
Exploration Drilling	24.0
Social Permitting	3.5
EA and Licensing	20.0
Total	**65.4**

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28 DATE AND SIGNATURE PAGE

This report titled “Technical Report on the Pre-Feasibility Study of the Patterson Lake South Property, Northern Saskatchewan, Canada” and dated November 7, 2019, was prepared and signed by the following authors:

(Signed & Sealed) *Jason J. Cox*

Dated at Toronto, ON
November 7, 2019

Jason J. Cox, P.Eng.
Principal Mining Engineer and Executive Vice President, Mine Engineering

(Signed & Sealed) *Mark B. Mathisen*

Dated at Lakewood, Co
November 7, 2019

Mark B. Mathisen, C.P.G.
Principal Geologist

(Signed & Sealed) *David M. Robson*

Dated at Toronto, ON
November 7, 2019

David M. Robson, M.B.A., P.Eng.
Senior Mining Engineer

(Signed & Sealed) *Charles R. Edwards*

Dated at Saskatoon, SK
November 7, 2019

Charles R. Edwards, P.Eng.
Senior Engineering Consultant
Wood Canada Limited

(Signed & Sealed) *Mark Wittrup*

Dated at Calgary, AB
November 7, 2019

Mark Wittrup, M.Sc., P.Eng., P.Geo., CMC
Vice-President Environmental and Regulatory Affairs
Clifton Associates Ltd.

29 CERTIFICATE OF QUALIFIED PERSONS

JASON J. COX

I, Jason J. Cox, P.Eng., as an author of this report entitled "Technical Report on the Pre-Feasibility Study of the Patterson Lake South Property, Northern Saskatchewan, Canada", prepared for Fission Uranium Corp., effective as of September 19, 2019 and dated November 7, 2019, do hereby certify that:

1. I am a Principal Mining Engineer and Executive Vice President, Mine Engineering, with Roscoe Postle Associates Inc. of Suite 501, 55 University Ave Toronto, ON, M5J 2H7.

2. I am a graduate of the Queen's University, Kingston, Ontario, Canada, in 1996 with a Bachelor of Science degree in Mining Engineering.

3. I am registered as a Professional Engineer in the Province of Ontario (Reg. #90487158). I have worked as a Mining Engineer for a total of 22 years since my graduation. My relevant experience for the purpose of the Technical Report is:

   - Review and report as a consultant on many mining operations and projects around the world for due diligence and regulatory requirements
   - Engineering study (PEA, PFS, and FS) project work on many mining projects around the world, including North America
   - Operational experience as Planning Engineer and Senior Mine Engineer at three North American mines
   - Contract Co-ordinator for underground construction at an American mine

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I visited the Patterson Lake South Property on August 14, 2018.

6. I am responsible for Section 2 and share responsibility with my co-authors for Sections 1, 3, 22, 25, 26, and 27 of this report.

7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

8. I have prepared a previous Technical Report on the Patterson Lake South Property dated September 14, 2015.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of this Technical Report, to the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Dated this 7th day of November, 2019.

(Signed & Sealed) ***Jason J. Cox***

Jason J. Cox, P.Eng.

MARK B. MATHISEN

I, Mark B. Mathisen, C.P.G., as an author of this report entitled "Technical Report on the Pre-Feasibility Study of the Patterson Lake South Property, Northern Saskatchewan, Canada", prepared for Fission Uranium Corp., effective as of September 19, 2019 and dated November 7, 2019, do hereby certify that:

1. I am Principal Geologist with RPA (USA) Ltd. Of Suite 505, 143 Union Boulevard, Lakewood, Co., USA 80228.

2. I am a graduate of Colorado School of Mines in 1984 with a B.Sc. degree in Geophysical Engineering.

3. I am a Registered Professional Geologist in the State of Wyoming (No. PG-2821), a Certified Professional Geologist with the American Institute of Professional Geologists (No. CPG-11648), and a Registered Member of SME (RM #04156896). I have worked as a geologist for a total of 23 years since my graduation. My relevant experience for the purpose of the Technical Report is:

   - Mineral Resource estimation and preparation of NI 43-101 Technical Reports.
   - Director, Project Resources, with Denison Mines Corp., responsible for resource evaluation and reporting for uranium projects in the USA, Canada, Africa, and Mongolia.
   - Project Geologist with Energy Fuels Nuclear, Inc., responsible for planning and direction of field activities and project development for an in situ leach uranium project in the USA. Cost analysis software development.
   - Design and direction of geophysical programs for US and international base metal and gold exploration joint venture programs.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I visited the Patterson Lake Property on August 6 to 8, 2018.

6. I am responsible for Sections 4 through 12, 14, and 23 and related disclosure in Sections 1, 3, 25, 26, and 27 of the Technical Report.

7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

8. I have had no prior involvement with the property that is the subject of the Technical Report.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 7th day of November, 2019.

(Signed & Sealed) ***Mark B. Mathisen***

Mark B. Mathisen, C.P.G.

DAVID M. ROBSON

I, David M. Robson, M.B.A., P.Eng., as an author of this report entitled “Technical Report on the Pre-Feasibility Study of the Patterson Lake South Property, Northern Saskatchewan, Canada”, prepared for Fission Uranium Corp., effective as of September 19, 2019 and dated November 7, 2019, do hereby certify that:

1. I am a Senior Mining Engineer with Roscoe Postle Associates Inc. of Suite 501, 55 University Ave Toronto, ON, M5J 2H7.

2. I am a graduate of Queen’s University, Kingston, Ontario, Canada, in 2005 with a Bachelor of Science degree in Mining Engineering.

3. I am registered as a Professional Engineer in the Province of Saskatchewan (Reg. #13601). I have worked as a Mining Engineer for a total of 13 years since my graduation. My relevant experience for the purpose of the Technical Report is:
   - Review and report as a consultant on mining operations and projects for due diligence and regulatory requirements.
   - Engineering study (scoping study, PEA, PFS) project work on mining projects around the world, including North America.
   - Operational experience as Mine Engineer at Canadian uranium mine.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I visited the Patterson Lake South Property on August 14, 2018.

6. I am responsible for preparation of Sections 15, 16, 19, and 24 of the Technical Report and share responsibility with my co-authors for Sections 1, 3, 21, 22, 25, 26, and 27 of the Technical Report.

7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

8. I have prepared a previous Technical Report on the Patterson Lake South Property dated September 14, 2015.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 7th day of November, 2019.

(Signed & Sealed) ***David M. Robson***

David M. Robson, M.B.A., P.Eng.

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CERTIFICATE OF QUALIFIED PERSON

301-121 Research Drive,
Saskatoon, SK S7N 1KS
Canada

I, Charles R. Edwards, P.Eng., do hereby certify that:

I am Senior Engineering Consultant with Wood Canada Limited, 301-121 Research Drive, Saskatoon, SK S7N 1KS, Canada

I am an author of a technical report titled “Technical Report on the Pre-Feasibility Study of the Patterson Lake South Property Using Underground Mining Methods, Northern Saskatchewan, Canada”, dated 07 November 2019, (the “Technical Report”).

I graduated from Queen’s University with a B. Sc. (Engineering Chemistry) in 1965 and an M.Sc. (Chemical Engineering) in 1969.

From 1974 to present I have been actively employed as an engineer in the area of extractive metallurgy. My uranium processing experience consists of employment as Research Engineer with Eldorado Nuclear Limited, Ottawa from 1978-1980, as Chief Metallurgist at Eldor Mines’ Rabbit Lake mill from 1986-1987, as Senior Metallurgical/Process Engineer with Kilborn Western Limited from 1987-1992, as Regional Director, Mineral Development Agreements, with Energy, Mines and Resources Canada from 1992-1994, as Senior Metallurgist (1994-1996), Chief Metallurgist (1996-2000), Manager, Process Engineering (2000-2002), Director, Engineering & Projects (2002-2007) and Principal Metallurgist (2007-2008) in Cameco’s corporate office, as Director, Metallurgy with Amec Foster Wheeler (2008 – 2017), as Process Engineering Advisor with Saskatchewan Research Council (2017 – 2018), as Principal Engineer with Chuck Edwards Extractive Metallurgy Consulting from 2018 to present, and as Senior Engineering Consultant with Wood Canada Limited from 2018 to present.

I am a member, in good standing, of APEGS in the Province of Saskatchewan, member #05915.

I have read the definition of “qualified person” set out in National Instrument 43–101 Standards of Disclosure for Mineral Projects (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I am a “qualified person” within the meaning of NI 43-101.

I have not visited the Patterson Lake South Project site.

I am responsible for Section 1 – Metallurgical test work, process and recovery methods, surface infrastructure descriptions and estimates; Section 3; Section 13; Section 17; Section 18; Section 21 – processing and infrastructure costs; Section 25 – Mineral processing and metallurgical testing; Section 26 – Mineral processing and metallurgical processing, BUDGET – Metallurgy studies estimate of the Technical Report.

I have been involved with the Patterson Lake South Project during the preparation of the pre-feasibility study.

I am independent of Fission Uranium Corp. as independence is described by Section 1.5 of NI 43–101.

As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

I have read NI 43-101 and Form 43-101F1, and the sections of the Technical Report I am responsible for have been prepared in compliance with that instrument and form.

I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public.

Dated this 7th day of November 2019, in Saskatoon, Saskatchewan.

"Signed and sealed"

Charles R. Edwards
Senior Engineering Consultant
Wood Canada Limited

Mark Wittrup, Qualified Person Statement, Fission Uranium Corp., Pre-Feasibility Study, Patterson Lake South Property, Northern Saskatchewan, Canada

I, Mark Wittrup, M.Sc., P.Eng., P.Geo., CMC, as an author of this report entitled “Technical Report on the Pre-Feasibility Study of the Patterson Lake South Property, Northern Saskatchewan, Canada”, prepared for Fission Uranium Corp., effective as of September 19, 2019 and dated November 7, 2019, do hereby certify that:

1. I am Vice-President Environmental and Regulatory Affairs with Clifton Associates Ltd. at 2222 – 30th Avenue NE, Calgary, Alberta, T2E 7K9.

2. I am a graduate of the University of Saskatchewan in 1988 with a Master of Science, Geology, and Lakehead University in 1979 with an Honours Bachelor of Science, Geology.

3. I am registered as a Professional Engineer and Geologist in the Province of Saskatchewan (#05325), and a Professional Engineer in the Provinces of Alberta (#182977), British Columbia (#183022), Manitoba (#43989) and Yukon Territory (#2739). I have worked as an environmental engineer and geologist for a total of 39 years since obtaining my undergraduate degree. My relevant experience for the purpose of the Technical Report is:
   - 31 years with a major uranium mining company with 5 years uranium exploration, and >25 years environmental and regulatory experience specifically related to uranium mines and nuclear facilities globally, with a focus on Northern Saskatchewan;
   - Project manager for the federal and provincial environmental assessment, approvals and permitting processes and main author of the EIS for a high grade uranium mine;
   - Four years Assistant Deputy Minister, Environmental Protection and Audit, and Commissioner Environmental Assessment, Saskatchewan Ministry of Environment;
   - Participated in the implementation of the IAEA Additional Protocols with a major uranium mining company and have participated in work on the IAEA NORM Guidelines; and
   - Have worked on environmental/regulatory projects directly related to 13 uranium mines and advanced properties.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I was appointed a special advisor to Fission Uranium’s Board in 2018. I receive no direct financial consideration for this appointment. The advice and observations provided to the Board are consistent with the advice and observations detailed in this Technical Report.

6. I visited the Fission Uranium, Patterson Lake South (Triple R) property on June 13 to 14, 2019.

7. I am responsible for the preparation of most of Section No. 20 (Environmental), and partial preparation of Sections #1 (Summary), #25 (Conclusions) and #26 (Recommendations) of the Technical Report.

8. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

9. I have had prior involvement with the property that is the subject of the Technical Report having worked as a QP on the PEA.
10. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

11. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Technical Report/section 20 for which I am responsible in the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 7th day of November, 2019, Calgary, Alberta

Original Signed and Sealed

Mark Wittrup, M.Sc., P.Eng., P.Geo., CMC
Vice-President Environmental and Regulatory Affairs
Clifton