F3 Uranium's PLN Project and JR Uranium Zone: An Integrated Geoscientific Approach to Uranium Targeting in the Athabasca Basin

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F3 Uranium's Patterson Lake North (PLN) Property and JR Uranium Zone showcase a significant advancement in uranium exploration through an integrated geological and geophysical framework. Convolutions Geoscience and F3 Uranium implemented an integrated framework on the PLN property, where geological data constrains geophysical inversions and geophysical data refines geological boundaries and establishes subsurface structures. This iterative process allows for the simultaneous comparison of multiple viable solutions, leading to more accurate discovery and delineation drilling of the uranium target.

Geological data: The PLN JR Zone, positioned along the A1 Main Shear Zone on Canadian Shield and Phanerozoic Basin rocks, displays basement-hosted uranium mineralization characteristic of the Athabasca Basin. A detailed geologic model, developed by F3 Uranium, was used to constrain geophysical inversion parameters such as overburden conductivity, leading to more viable geophysical inversion results. Convolutions and F3 used petrophysical data to refine the 3D model by detailing the area's lithological, alteration, and physical property variations, which was a realistic constraint for the geophysical inversion models. A crucial part of this process was the comprehensive statistical and quality control analysis conducted by Convolutions and F3 on the data. This analysis identified trends and distributions in various lithological groups from the drillcore geological and physical property data, ensuring the highest level of accuracy. Other inversion constraints include physical property values from the CMIC Footprints project and parts of the Saskatchewan Geological Survey Athabasca Basin 3D model.

Geophysical data: F3 collected a variety of geophysical data on the PLN project area; some notable surveys here include:

- Ground loop EM and DC resistivity: This led to discovering the conductive target at the JR Zone.
- MobileMT: insights into subsurface structure, lithology, alteration, and mineralization.
- SQUID EM and 3D DC resistivity: used for a joint inversion.
- Ground Gravity: 3D geologically constrained density inversions.

These surveys provided insight into the uranium target location, allowing for the interpretation of drillhole targets at JR and on the PLN property.

Geophysical inversions: The Maxwell plate conductor modelling of the ground loop EM and DC resistivity inversion results revealed a conductive target within the JR Zone, leading to the discovery of the JR Uranium Zone. The recent SQUID EM and 3D DC resistivity joint parametric inversion has further delineated prospective drill targets along the A1/B1 transition zone, opening up new possibilities for exploration. Results from other surveys, such as MobileMT and ground gravity, are being used to identify more prospective targets outside the JR Zone, adding to the excitement of the exploration project.

Feedback loop: The geophysical data collected at PLN has helped refine our knowledge of project geology. Geophysical inversion models define subsurface structures and lithological boundaries, improving geological models. These models are then used to constrain future inversions. F3 Uranium and Convolutions Geoscience's comprehensive, cyclical geoscientific analysis provides a robust framework for discovering economically viable uranium resources in Saskatchewan and beyond. This presentation will give geoscientists valuable insight into mineral exploration strategies, emphasizing the technical aspects and best practices for geoscientific data integration.

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