UTEM5 Survey Results - Lalor Mine *February 2015*

HUDBAY

Survey Background

HUDBAY discovered the Lalor Deposit near the Town of Snow Lake in March 2007 using an innovative adaptation of electromagnetic geophysical surveys to penetrate deep below the Flin Flon Greenstone Belt. The Lalor deposit has rapidly been advanced to world class zinc and gold-rich VMS deposit status.

Early exploration at Lalor focused on the base-metal-rich/zinc-rich massive sulphide. Subsequent exploration identified separate and distinct gold and copper-gold zones. On the basis of these discoveries, the Hudbay team was awarded the 2009 PDAC Bill Dennis Award for exploration

The 100% HUDBAY-owned zinc, gold and copper Lalor Mine began ore production in 2012 through the ventilation shaft. Production from the main shaft began in the second half of 2014.

Survey Layout and Setting

The Layout and Setting for the UTEM3 (January 2011 covered separately) and the UTEM5 (April 2014) is shown below. The two transmitter (Tx) loops are:
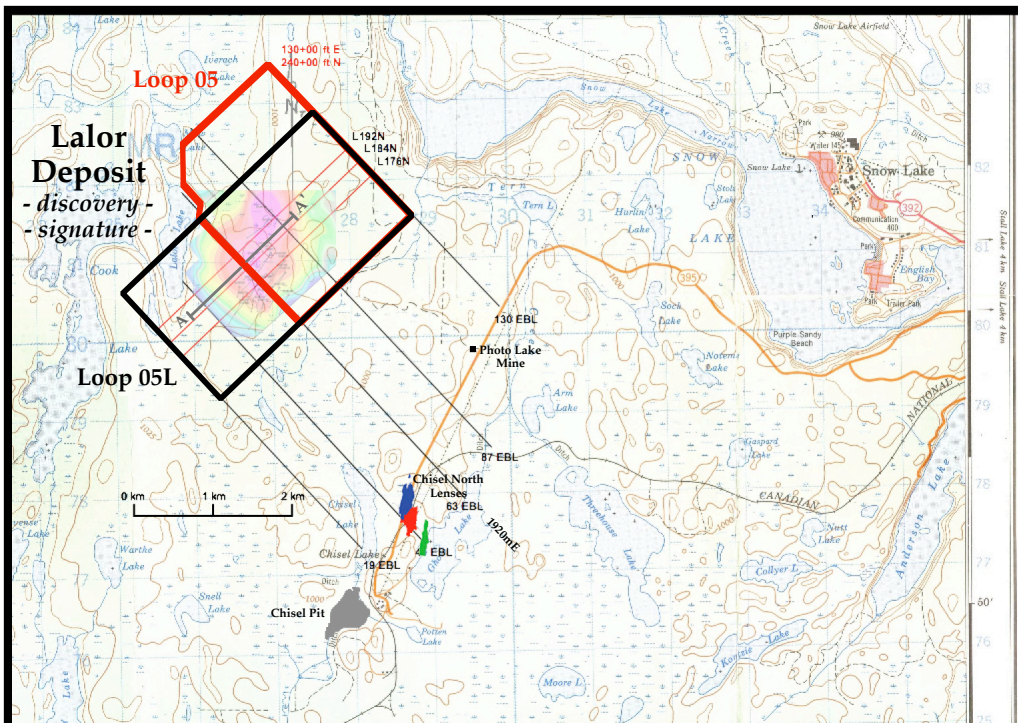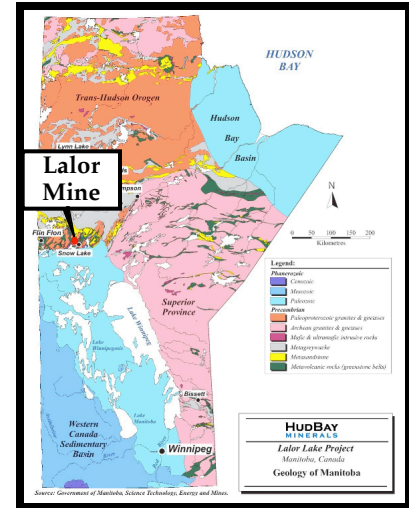
- Loop 05 : Lalor test loop. Designed to test the deeper extent of the deposit

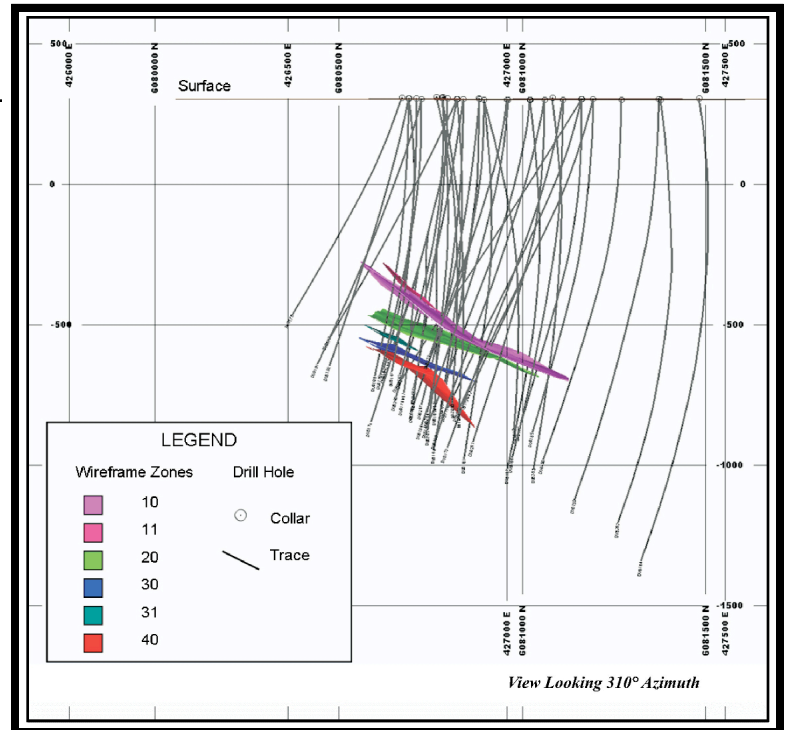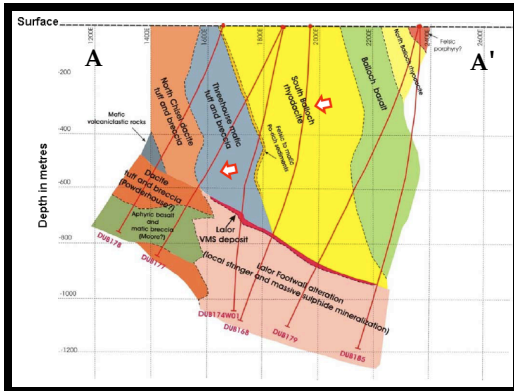- **Loop 05L**: designed to couple with the entire deposit.

UTEM5 Surveying used only **Loop 5L** and proceeded as follows:

Loop 05L was then laid out and used to survey:
- 2 lines - Lines 176/184N   HZ/HL/HT@~0.94Hz.
- 1 line   - Line   184N   HZ/HL/HT@~0.25Hz

UTEM5 collects 3-component data from up to 3 Tx loops simultaneously
  - **HZ**   the **vertical** component   (~Hz)
  - **HL**   the **in-line horizontal** component   (~Hx)
  - **HT**   the **transverse horizontal** component   (~Hy)

Lalor Deposit

The Lalor deposit, detailed in these four figures, is located in the Chisel Basin portion of the Flin Flon Greenstone Belt and is believed to be the largest VMS deposit found in this region to date.

The figures detail the Zinc-rich Base Metal zone: Mineralization occurs in six separate stacked lenses - Zones -**10,11,20,30,31,40** - of zinc rich polymetallic near-solid to solid sulphide mineralization at ~570m to 1,170m below surface. In October 2009 an
Indicated Resource of:
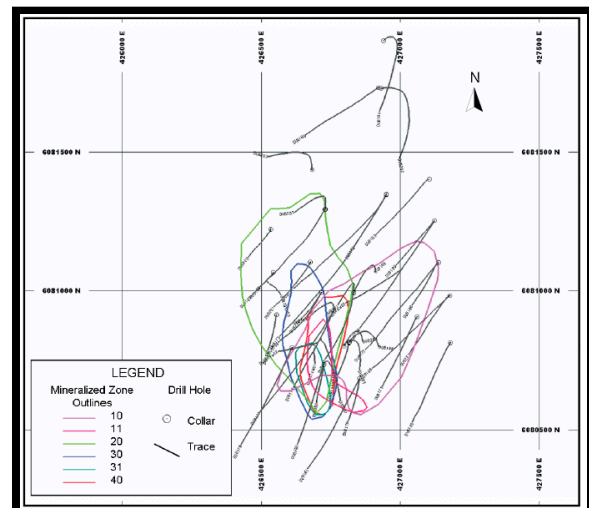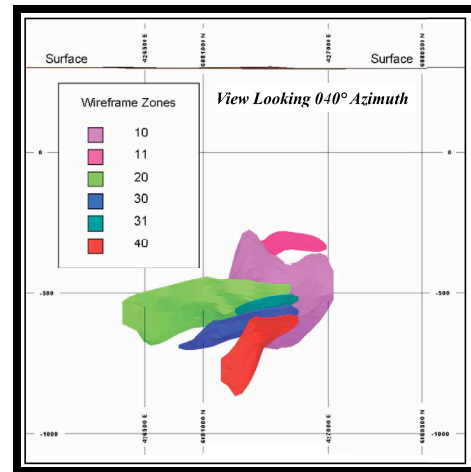 **12.3MT 1.6 g/t Au, 24.2 g/t Ag, 0.66% Cu, 8.70% Zn**
Inferred Resource of:
5.0MT 1.4 g/t Au,25.5 g/t Ag,0.57% Cu, 9.39% Zn
were disclosed.

The higher sulphide copper gold mineralization discovered down plunge of the massive sulphide lenses is responsive to borehole electromagnetic surveys. Exploration has focused on the down plunge mineralization - at depths of 1000m vertical depth and on - and to date has delineated:

Gold zone: Low-sulphide precious metal intersections associated with chalcopyrite and galena. On October 8, 2009 HudBay announced a conceptual estimate of a potential gold zone, interpreted as five discrete mineralized lenses that can contact the near solid sulphide zinc rich mineralization.

Copper-Gold zone: Disseminated-to-near-solid chalcopyrite with lesser pyrrhotite and minor pyrite, sphalerite and galena located to the north of Gold zone 27 at approximately 15 to 20 degrees down plunge and at vertical depths of between 1,200 and 1,300 meters.
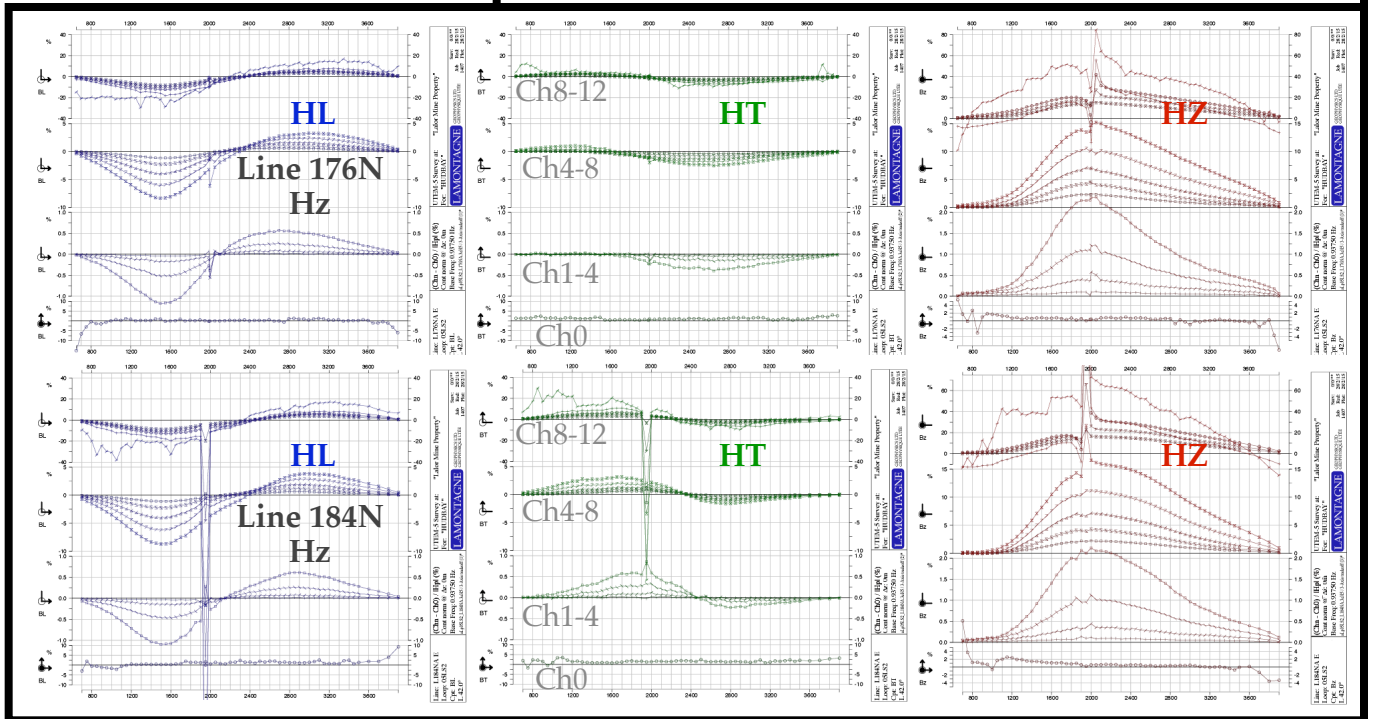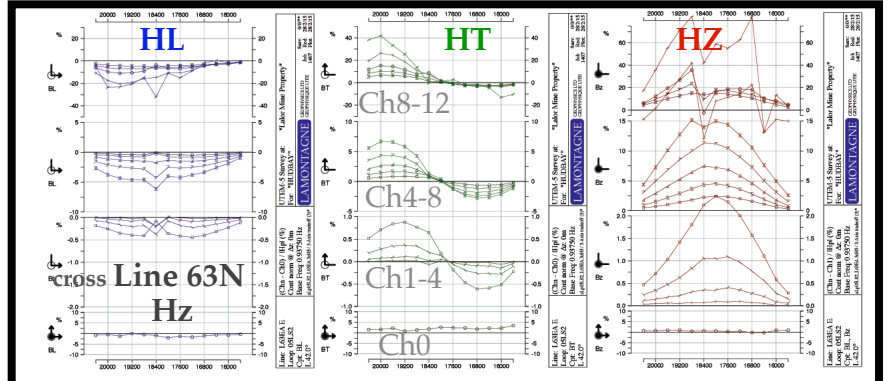
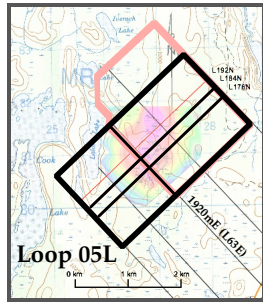# UTEM5 Survey Profiles - Lalor Mine   *February 2015*

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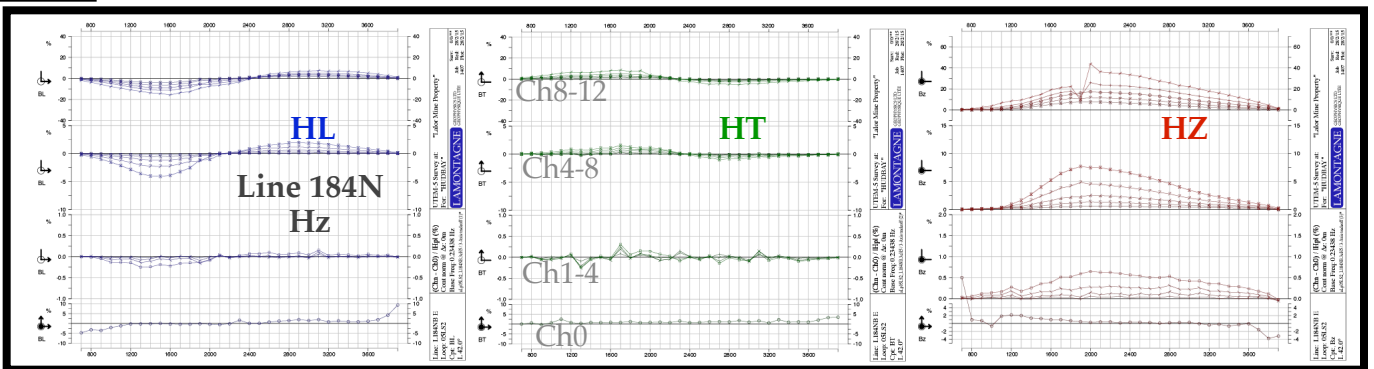### Lalor Deposit UTEM5 Profiles/notes

Profiles are shown Loop 05L reduced with UTM easting/northings and DEM topography.

Loop 05L
0.94Hz

Loop 05L
0.24Hz

Note: at that @ 0.24Hz the latest 2 time channels are - Ch1 @~1.54s and Ch0 @~2.09seconds.

MultiLoop X depth Modelling Results - Lalor

The UTEM3 and UTEM5 Lalor survey results were presented as part of the BCGS 2014 Fall Symposium:

Exploration for Deep VMS Ore Bodies: The Hudbay Lalor Case Study

in the paper:

Then and Now: UTEM3 and UTEM5 Comparison over the Hudbay Lalor Deposit

The deposit is clearly detectable at the depth-to-top at which it sits, ~600m... so how deep would it be detectable?

For the BCGS Fall Symposium presentation we used MultiLoop X to model the result of dropping the Lalor ore body down 200m increments to a depth of 1600m. The results are shown to the right for the UTEM Loop 05L profiles - Lines 176N, 184N and cross-Line 63E - surveyed with UTEM5.

MultiLoop X - EM Modeling in Your Browser - is a cross-platform version of MultiLoop 3. The user interface runs in a browser as a client HTML5 application whereas the computations are done in an application that can be either local or on a server. MlpX presents the user with a 3D-modeling scene in which it is easy to compose and modify models by using WebGL based tools.

The Lalor model shown is basically what was used in modelling the UTEM3 data in 2011 - a model put together to match the overall UTEM3 4Hz response in amplitude and wavelength with additional plates based on the geological information available in the 43-101 report.

Having the UTEM5 0.24Hz 3 component data available allowed for modelling responses out to just over 2seconds - the latest 2 time channels are - Ch1 @~1.54s and Ch0 @~2.09seconds. This is a factor of ~16 later in time than the 4Hz latest Ch. In order to match the responses seen in the later time channels @0.24 the conductivity of the main plate had to be increased appreciably. The Lalor model shown to the right is as follows:

- a single **4000S** plate modelling mineralization ~along the Upper Chisel/Lower Chisel contact surface
Note this is ~10x more conductive than the modeling results based on the 4Hz data.

- a broader, 50m deeper, **50S** plate modelling the response of the footwall alteration/mineralization package

- Zinc-rich Base Metal Zones -**10**,**11**,**20**,**30**,**31**,**40** - are roughed in as 300S plates (from the 43-101 information) erring a bit on the large size - cut off is grade, not conductivity.

From the MultiLoop X modelling results shown we feel that the Lalor deposit would be detectable to a depth of 1500m, possibly more...

For more information, please visit us at PDAC booth 1103