























## CONCLUSIONS

### Overall

An integrated hydrometallurgical pilot plant was successfully operated for 5 days using a feed concentrate from the Bear Lodge deposit. The feed solids to the process contained 3.08% REO and the final product was a 98% pure REO bulk concentrate or RE oxalate precipitate cake. The overall individual recoveries of critical rare earths were: 87% Dy, 93% Eu, 95% Nd, 95% Pr, 89% Tb, and 81% Y. The overall recovery of REEs averaged 86%. Low temperature counter current leaching was found to be effective in selectively extracting REEs from bastnaesite/ancylite ores. The oxalate precipitation route was quantitatively proven as an excellent tool for separating REEs from base metals without the need to pre-treat the PLS.

### Leach Process

REE extraction in the counter current leach step ranged from 85% to 99% (averaging 93%). The extraction of critical rare earth elements during steady state conditions (297 kg/t HCl addition at 45°C) were 89% Dy, 94% Eu, 96% Nd, 97% Pr, 93% Tb, and 86% Y. Iron extraction during this period was 44%

### Oxalate Precipitation Process

The precipitation efficiency of critical REE elements during steady state conditions (90.4 g/L total oxalate) were 98% Dy, 99% Eu, 96% Nd, 95% Pr, 98% Tb, and 91% Y. Oxalate were recycled during this campaign. The final product of the plant generated during the steady state conditions contained 44.6% TREE (96.2% of which were LREE) with the greatest impurities being 4970 g/t Th, 1.24% Ca, and 0.9% Si. Efficient PLS filtration prior to REE precipitation and optimized crystallization of oxalates from barren PLS are necessary process steps to lower calcium and silicate impurities in the final product.

## REFERENCES

Ray, J., Van Rythoven, A., & Clark, J. (2014). Mineralogical Modeling of Bull Hill and White Ridge Deposits. Rare Element Resources Inc., Internal RER Report.