

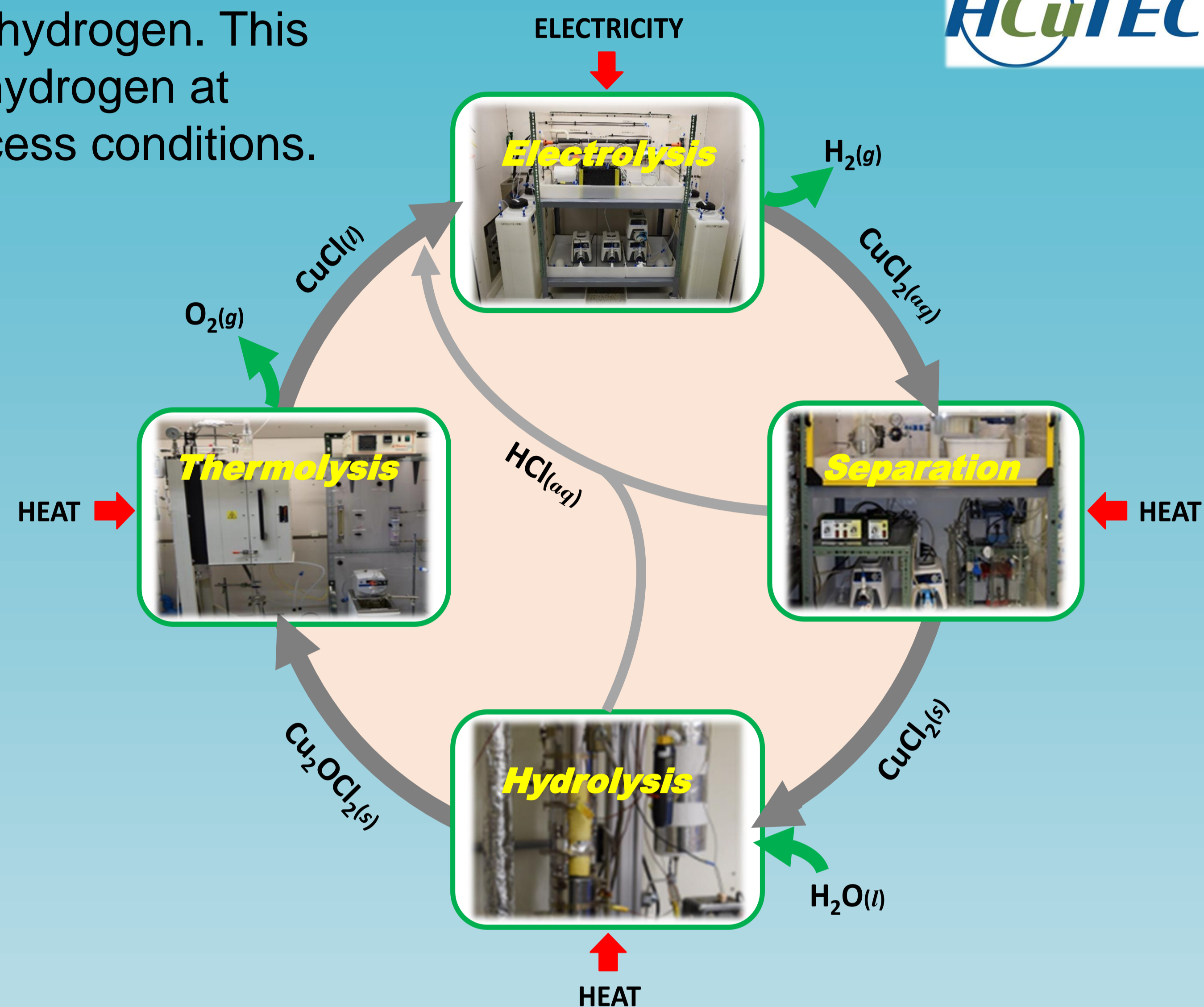
Development of an Integrated Copper-Chlorine Cycle for Efficient Hydrogen Production from Nuclear and Renewable Energy Sources

Technical Lead: Dr. Hongqiang Li



Objective: Demonstrate the practicality of the copper-chlorine cycle to produce hydrogen and generate data to determine its potential scale-up and cost

Background: Hydrogen economy will require large quantities of hydrogen. This copper-chlorine cycle (HCuTEC™) has the potential to produce hydrogen at large scales and is compatible with most SMRs owing to the process conditions.



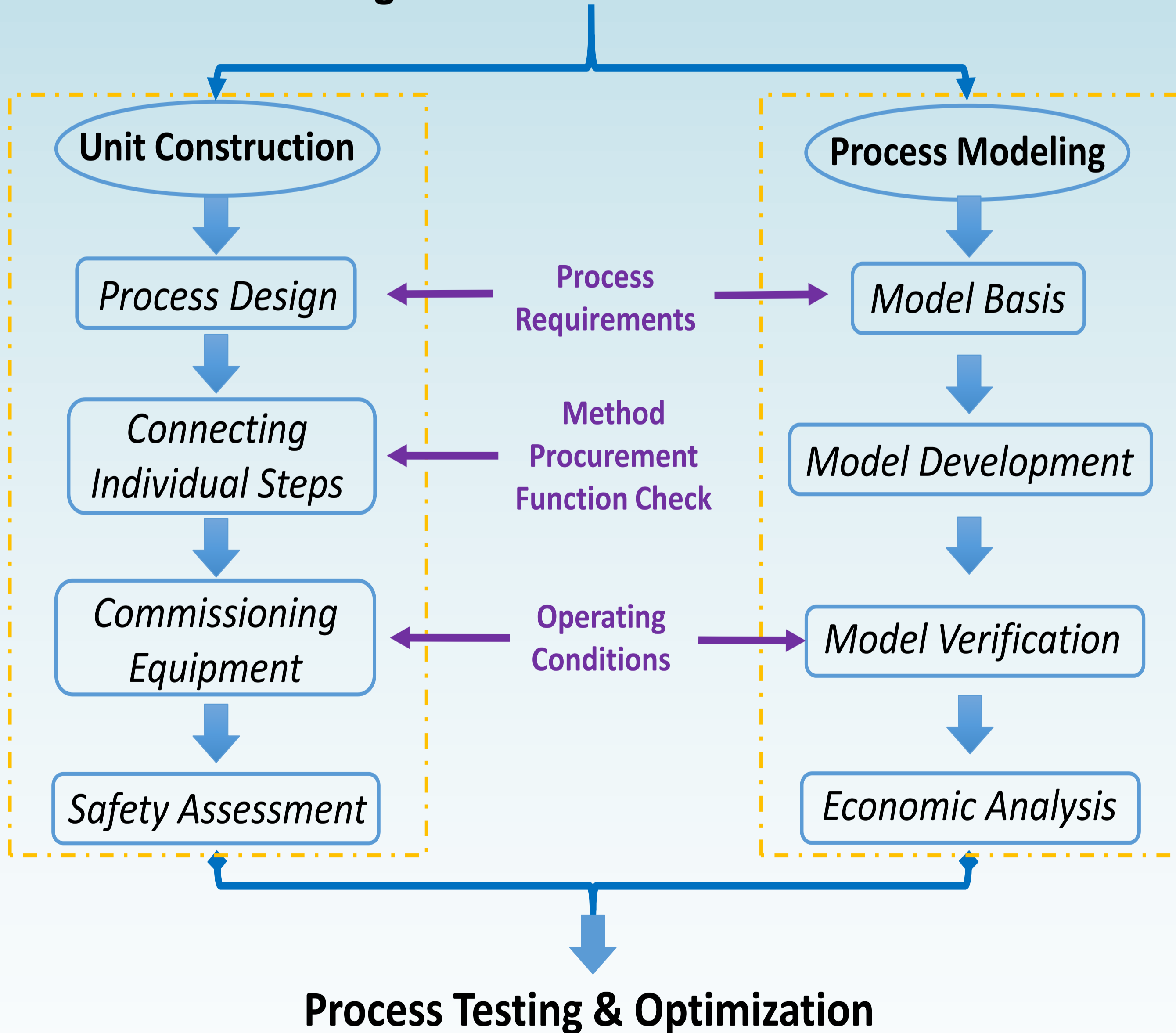
- FY 2018-2019**
- **Demonstration of Individual Steps**
 - Summary of performance of process steps
 - Report on materials compatibility with process conditions

- FY 2019-2020**
- **Process Integration**
 - Report on the model development for the Cu-Cl process
 - Safety assessment on the integrated Cu-Cl process

- FY 2020-2021**
- **Process Testing & Optimization**
 - Report on the test results of the integrated Cu-Cl cycle
 - Report on the process/cost models

Expected Outcome: An integrated Cu-Cl process capable of producing hydrogen at 100 g/day

Integration of the Cu-Cl Process



Activities in First Six Months:

- ❑ Characterized the membranes exposed to the chemical conditions during electrolysis.
- ❑ Identified method and equipment to connect the electrolysis step to two neighboring steps.
- ❑ Developed a process model for the integrated system.

Major Achievements:

- ❑ Secured a location to house the integrated Cu-Cl to meet the process requirements.
- ❑ Identified methods for connecting the electrolysis step to the separation and thermolysis steps.
- ❑ Refined thermodynamic-based process model and pinch analysis method for the integrated system.

Future Work :

- ❑ Continue commissioning equipment and complete integration.
- ❑ Start economic assessment of the integrated system.
- ❑ Test and optimize the integrated Cu-Cl system.

Federal Stakeholders:
Natural Resources Canada



Canadian Nuclear Laboratories | Laboratoires Nucléaires Canadiens

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