

# Developing New Human Performance Metrics

## Key Messages:

- Human Performance metrics are about measures of Safety and Production/Cost resultant from Human Error
- Both leading and lagging HU metrics are of value
- Leading HU metrics
  - - what might they be?
  - - are they predictive? If so how might they be leveraged?

# Bruce Power Nuclear Power Plant

- Largest nuclear site (by reactor count) in the world
- Eight CANDU reactors ~ 6,384 Mwe (7,276 Mwe gross)
  - On power, on-line refuelling
  - Electrical output load following
- ~ 4,000 full-time, direct jobs to highly skilled workers
- Built between 1970 – 1987. Refurbished in 2004-2012 timeframe
- MCR project started to maintain the reactors beyond 2020's
- Robust safety design

# GOSP Model

- Governance, Oversight, Support, and Perform (GOSP)
- Bruce Power conducts its business according to the GOSP model of accountability
- The HU Program falls under this GOSP model
- Bruce Power supports the effective implementation of a GOSP model, which includes defining requirements for ongoing metrics in each Functional area [INPO 14-004 s4.2] which includes Performance Improvement and specifically Human Performance.



# Industry Lagging Metrics

- Number of Station HU clock resets
- Number of Department HU clock resets
- Number of Section/Crew HU clock resets
- HU Station Event Rate
- HU Department Event Rate
- Number of days since last HU clock reset
- Number of average days of last 5 HU clock resets
- Human Error Rate?
- Other rates?

# Industry Leading Metrics

- What are they?
  - Input / Structural Leading metrics
  - Behavioural Leading metrics
- What makes them leading metrics?
- What are the ties to the lagging metrics?

# Human Error Rate

- What is the Human Error Rate metric?
- How does it differ from the Station or Department Event Rate?
- Is the Human Error Rate metric Lagging or Leading?

# Section / Crew HU Clock Resets

- Can they be made to be a pseudo Leading HU metric?
  - If Yes – How?
- What benefit would this provide us?
- What additional elements would be required to make this happen?
  - Behavioural event trend codes?
  - Functional area event trend codes?
  - How to apply?



# Predictive Metrics?

- What are they?
- How can they be developed?
- What are Predictive HU Metrics of value?
  - Predicting Number of Significant HU clock resets
  - Predicting Significant Event type likelihood

# HU Prediction Metrics

- How to 'present' HU Prediction metrics to Senior Management?
- What do the HU Prediction metrics mean?
- How to act on HU Prediction metrics?

# HU Prediction Metrics

- How to Validate HU Prediction metrics?
- How to know when Management is doing well in responding to HU Prediction metrics?

# HU Predictive Measure Report

- Sample HU Predictive metric report

# Industry Recommendations

- Human Error Rate
- Section – Crew HU clock resets – How to Define?
  - Criteria
  - Event codes
    - Behavioural
    - Functional area
    - Number?

# Summary Remarks

- Leading versus Lagging metrics
- Need to leverage existing HU metrics
- Need to develop more HU Leading metrics of value
- Need to develop HU Predictor metrics
- Need for standardizing approach to event codes, Observation and Coaching to facilitate correlations to HU metrics