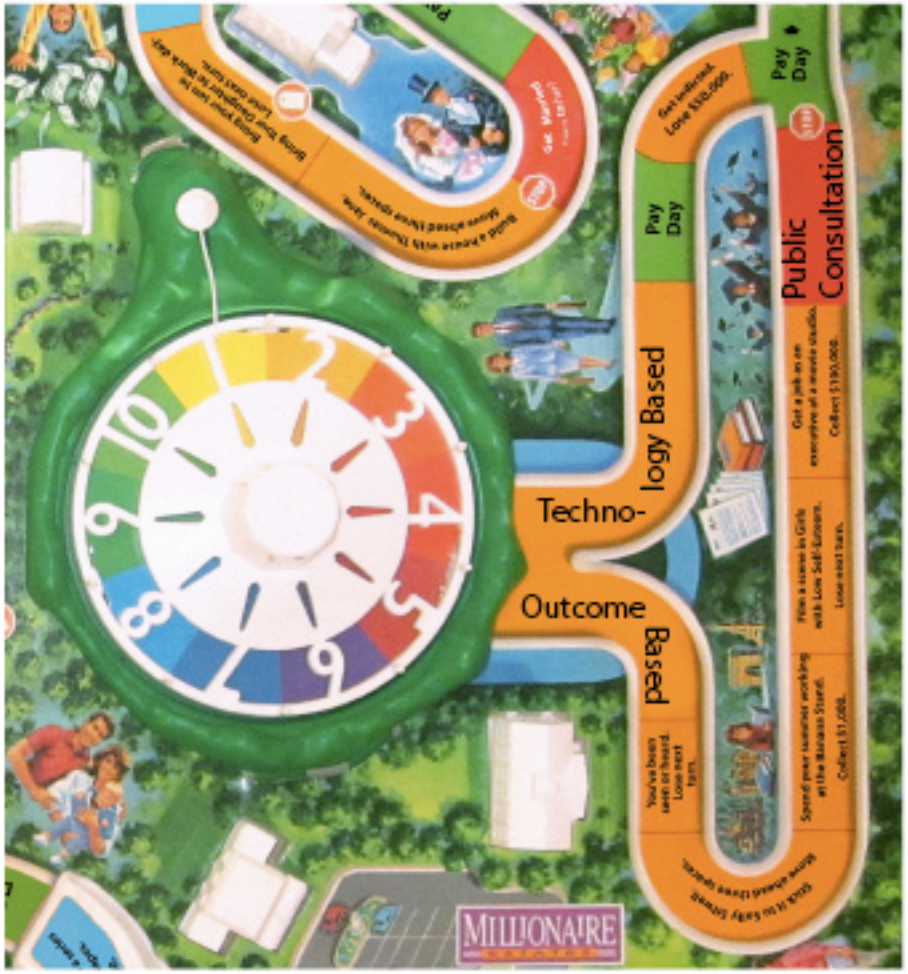
Technology & Regulation

Dr. Preston McEachern
President & CEO
PurLucid Treatment Solutions

Regulatory (Game?)



- Two Pathways to Regulation:
- Set on best practices/technologies
  - E.g. BATEA
- Set on desired outcomes
  - E.g. Sustainable environment

Image from Hasbro Game of Life

Outcomes Based

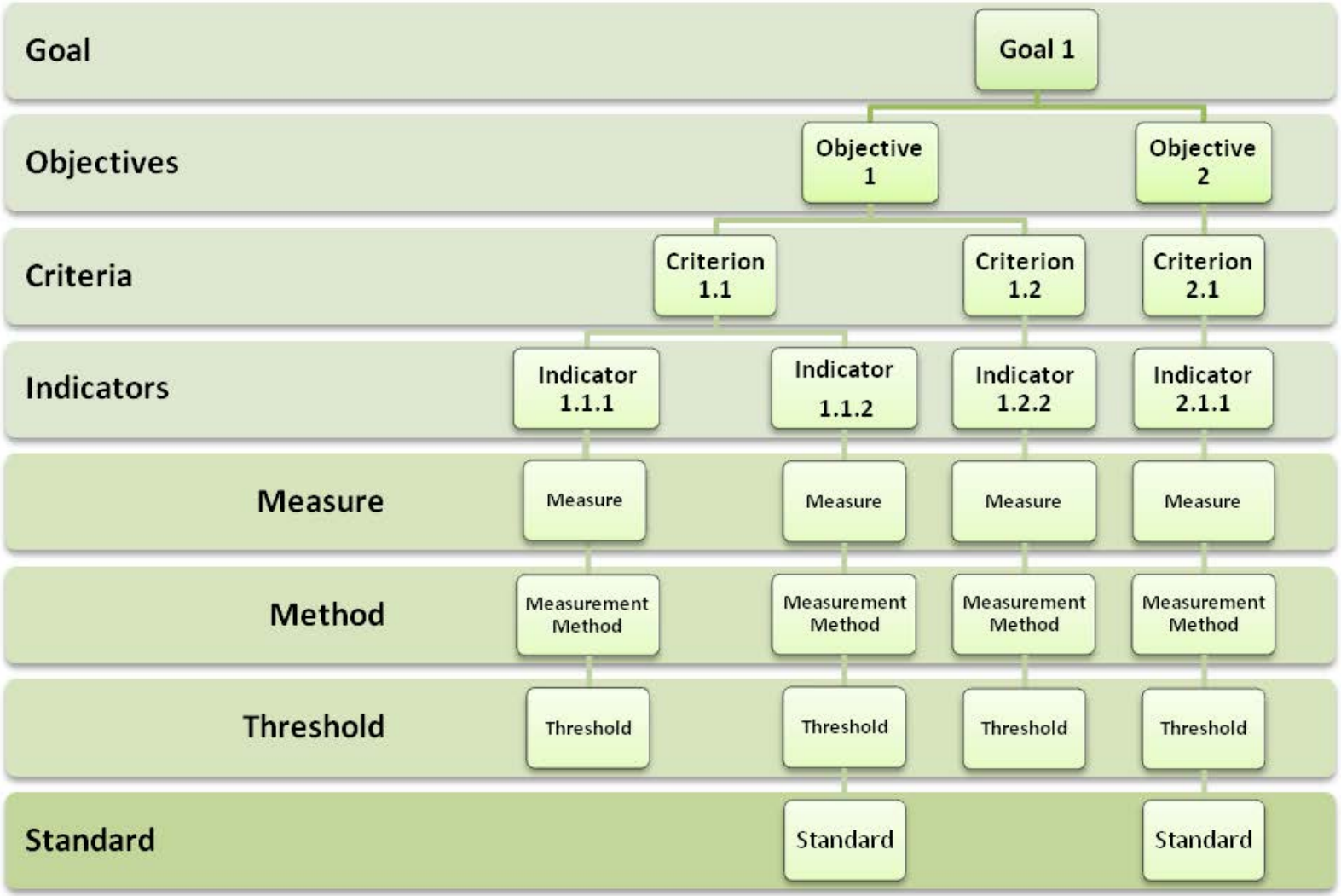
- Benefits are:
  - Typically allows flexibility in implementation
  - Facilitates integrated planning for complex projects
  - Advances “a concept” of public acceptability
- Risky because:
  - Outcomes (expectations) higher priority than feasibility.
- Uncertainty makes for poor business cases = low enthusiasm for adoption

A typical outcomes based structure

Greatest potential for game changing innovation & new technology

Criteria may be influenced by what is known about current technology

Becomes strategic in nature



With many layers and outcomes (compatibility)?

Can get very complicated to implement

GOAL:	**The reclaimed soils and landforms are capable of supporting a diverse, self sustaining, locally common boreal forest landscape, regardless of the end land use.**
Objective 1:	**Reclaimed landscapes are established that support natural ecosystem functions.**
Criteria	1.1 The landforms are integrated within and across lease boundaries. 1.2 The landforms have a natural appearance. 1.3 The landscape and its landforms incorporate watershed features such as surface drainage, lakes and wetlands. 1.4 Reclamation materials are placed appropriate to the landform. 1.5 Terrestrial and aquatic vegetation common to the boreal forest is established. 1.6 The landforms have geotechnical stability.
Objective 2:	**Natural ecosystem functions are established on the reclaimed landscape.**
Criteria	2.1 The reclaimed landforms have the required water quality. 2.2 The reclaimed landforms have the required water quantity. 2.3 Nutrient cycling is established on the reclaimed landscape. 2.4 Ecosystem productivity is established on the reclaimed landscape. 2.5 Reclaimed ecosystems display characteristics of resilience to natural disturbances.
Objective 3:	**Reclaimed landscapes support an equivalent land capability appropriate to the approved end land uses.**
Criteria	3.1 The reclaimed landscape provides for biodiversity. 3.2 The reclaimed landscape provides commercial forests. 3.3 The reclaimed landscape provides for fish and wildlife habitat. 3.4 The reclaimed landscape provides opportunities for traditional uses. 3.5 The reclaimed landscape provides opportunities for recreational uses.

Performance Based Example

- Conservation & Reclamation Regulation under EPEA.
- *The objective of conservation and reclamation of specified land is to return the specified land to an equivalent land capability. AR 115/93 s2;167/93*
- It is a good approach because it is flexible on path taken.
- However, is the flexibility responsible for:
  - Slow and/or lack of progressive reclamation?
  - Expectations that exceed feasibility?

Why flexibility is good

- Flexibility and outcome expectations have promoted research and novel approaches to reclamation? (e.g. fens, wetlands etc)

Peatland typical of northeastern Alberta

Technology Based

- Risky because it drives to technology end-points specific to the technology performance
  - Can be dissociated from social and environmental needs.
  - Can drive maintenance of status quo

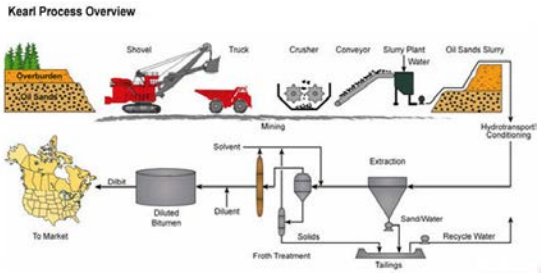
- Some benefits are:
  - Typically based on proven technologies, high probability of success
  - Business Case is easy - assuming BATEA approach
  - Implementation & compliance is easy

Technology Based Example

- Directive 074: Tailings Performance Criteria…
- Originally focused on CT because it was the dominant proposed technology
- During initial drafts promising outcomes were achieved with fines drying and centrifugation
- Final D74 contained specific criteria for success that “appear” to be directed to these technologies
- The specificity limits other technologies (arguably this is a human response not a real limitation)
- In a better world, the approach would allow rapid adoption of new technology and the success measures that define them.

Staying Ahead?

- Implicit meaning is that regulation on either path must be based on broader knowledge
  - A full range of possible technologies and their performance
  - A full range of “acceptable” outcomes (what water goals)
- There is a communication issue



I want to measure material rates (processes)

M$ - I want to measure trees (outcomes)

Engineer

Ecologist

Outcomes based barriers

- Expectations: We want to be good stewards
  - Do we set expectations too high with our enthusiasm?
    - E.g. CT, Slurry-at-Face, Fines Drying, TMF..
- Communication: In an effort to simplify do we misconstrue?
    - We will eliminate tailings ponds….
    - Contaminants in the Athabasca are “mostly” from natural sources….
  - Regulation reflects expectation (incredibly quickly)

Innovation (Technology) Barriers

- IP:
  - *Contractor* hereby grants to *XXXX* and its *Affiliates* a non-exclusive, irrevocable, worldwide, royalty-free, fully paid-up and perpetual right and license to use, maintain, practise, make, have made, modify and create derivative works of, reproduce, exploit, sub-license, offer to sell and sell, market and distribute such *Background IP* as part of the *Work Product*.
- Regulation:
  - Inability to try new things within an approval.

I have questions

- How do we do more to advance technology and therefore performance?
  - How do we reward innovators?
  - How do we commercialize game changing technology?
  - These are questions that have/are being asked by CONRAD, OSLI and now COSIA
- How do we work more closely with regulators and collaborate in regulatory development?
  - Its scary because even having the conversation could make one accountable to an outcome.