Phase 1 Geoscientific Preliminary Assessment
Southern Ontario, Sedimentary Communities

Presented to: Community Liaison Committees
(Brockton, Huron-Kinloss, South Bruce)

March 2014

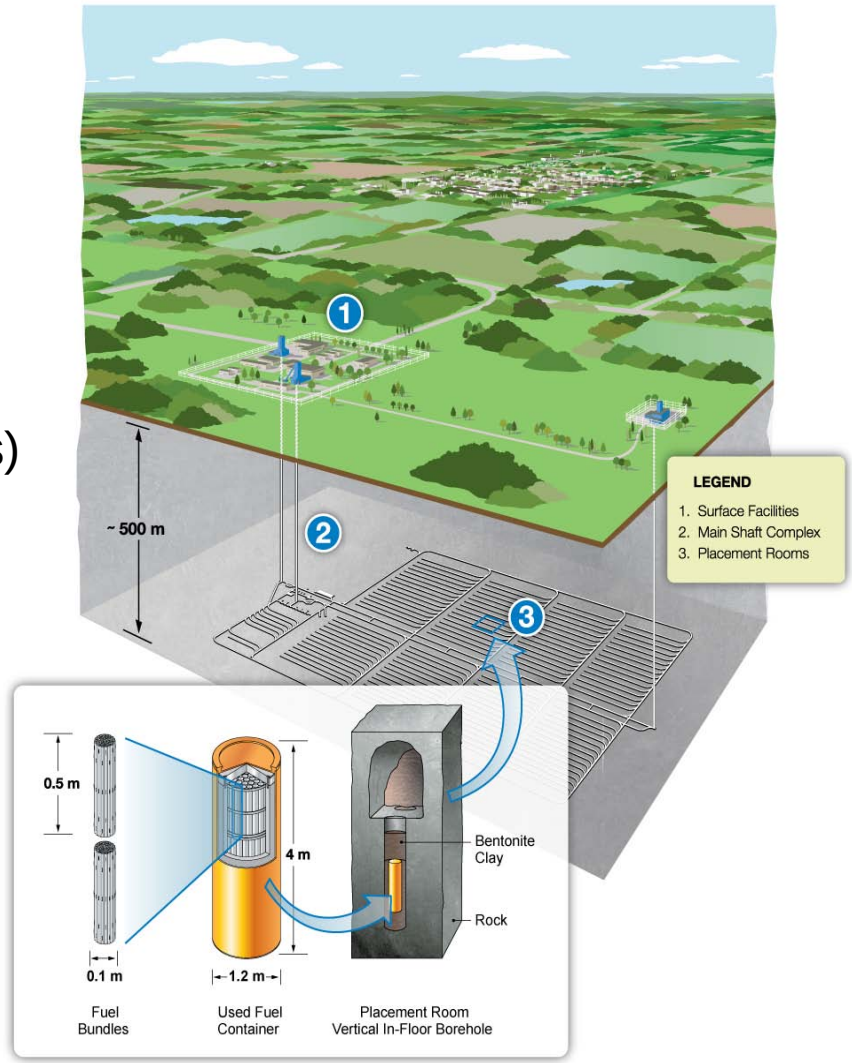
nwmo

NUCLEAR WASTE MANAGEMENT ORGANIZATION

SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

Project Description

- High technology, national infrastructure project
  - Investment of $16 billion to $24 billion
  - Will operate as centre of expertise
  - Project requires dedicated *surface* area of ~100 hectares (250 acres) and *subsurface* area of ~2.5 km x 1.5 km (375 hectares/930 acres)
  - Sustainable over more than 100 years
- Highly regulated – strict scientific and technical criteria ensure safety
- Informed and willing host community
- Long-term partnership between NWMO and community
- Fosters community well-being
- Multi-barrier system



Multiple Stages of Assessment and Dialogue

Initial Screening
(few months)

Preliminary Assessment: Phase 1 (Desktop)
(18 months)

Preliminary Assessment: Phase 2 (Field Work)
(potentially 3 yrs)

Detailed Site Characterization
~ potentially 3-5 years

(followed by regulatory approvals)

Process guided by NWMO's values and siting principles:

- Multi-year process to identify *informed, willing* community
- Community-driven: take stock at each step
- Option to withdraw for many years

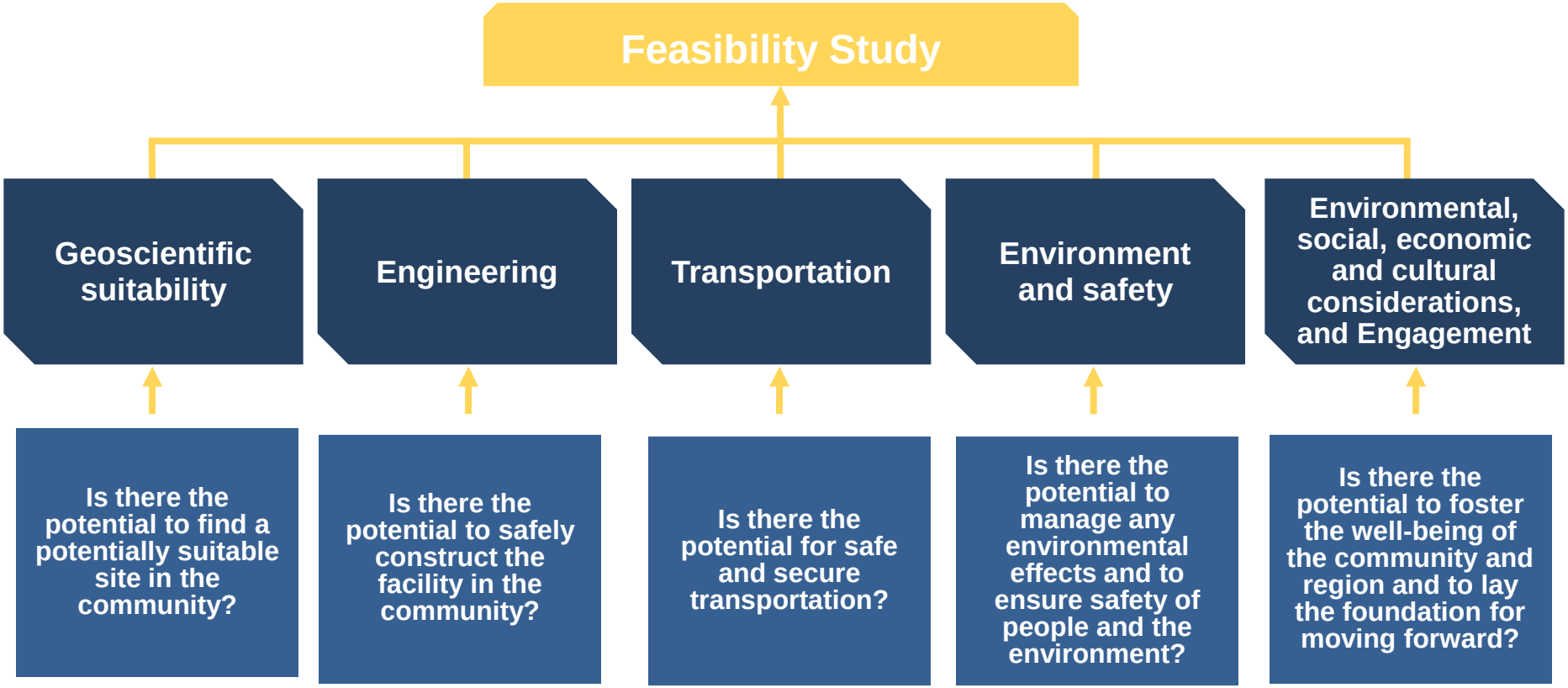
- Assessments focus on safety and community well-being
- Respect for Aboriginal rights, treaties

- Transparent, fair, clear decision-making process
- Published siting factors and process
- Assessments informed by broad base of expertise
- Planned "narrowing-down" process prior to field work

- Inclusive engagement that builds over time
- Dialogue broadens from community out – to Aboriginal people, surrounding communities, region, transportation hubs
- Extended period of learning with resources and capacity-building

- Respect for those communities in process :
  - timely reporting back on process and findings
  - timely decision-making
  - sensitive communication of results of assessments
  - honouring communities exiting process …

Feasibility Study Components



Technical Studies: Criteria

Identified siting areas must have the potential to satisfy six safety functions considering the technical evaluation factors described in the site selection process (chapter 6):

1. Safe containment and isolation of used nuclear fuel
2. Long-term resilience to future geological processes and climate change
3. Isolation of used fuel from future human activities
4. Amenable to site characterization and data interpretation activities
5. Safe construction, operation and closure of the repository
6. Safe and secure transportation

Geoscientific Preliminary Assessment

PHASE 1 – Desktop Geoscientific Studies

- For all communities electing to be the focus of a preliminary assessment
- Desktop study using available geoscientific information

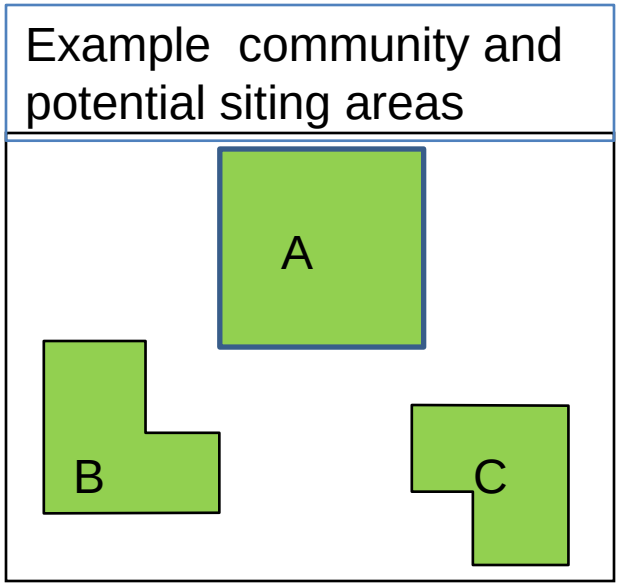
PHASE 2 – Preliminary Field Investigations

- For all subset of communities selected by NWMO to further assess potential suitability of general siting areas
- Site investigations that include geophysical surveys, detailed geological mapping and drilling of a limited number of boreholes

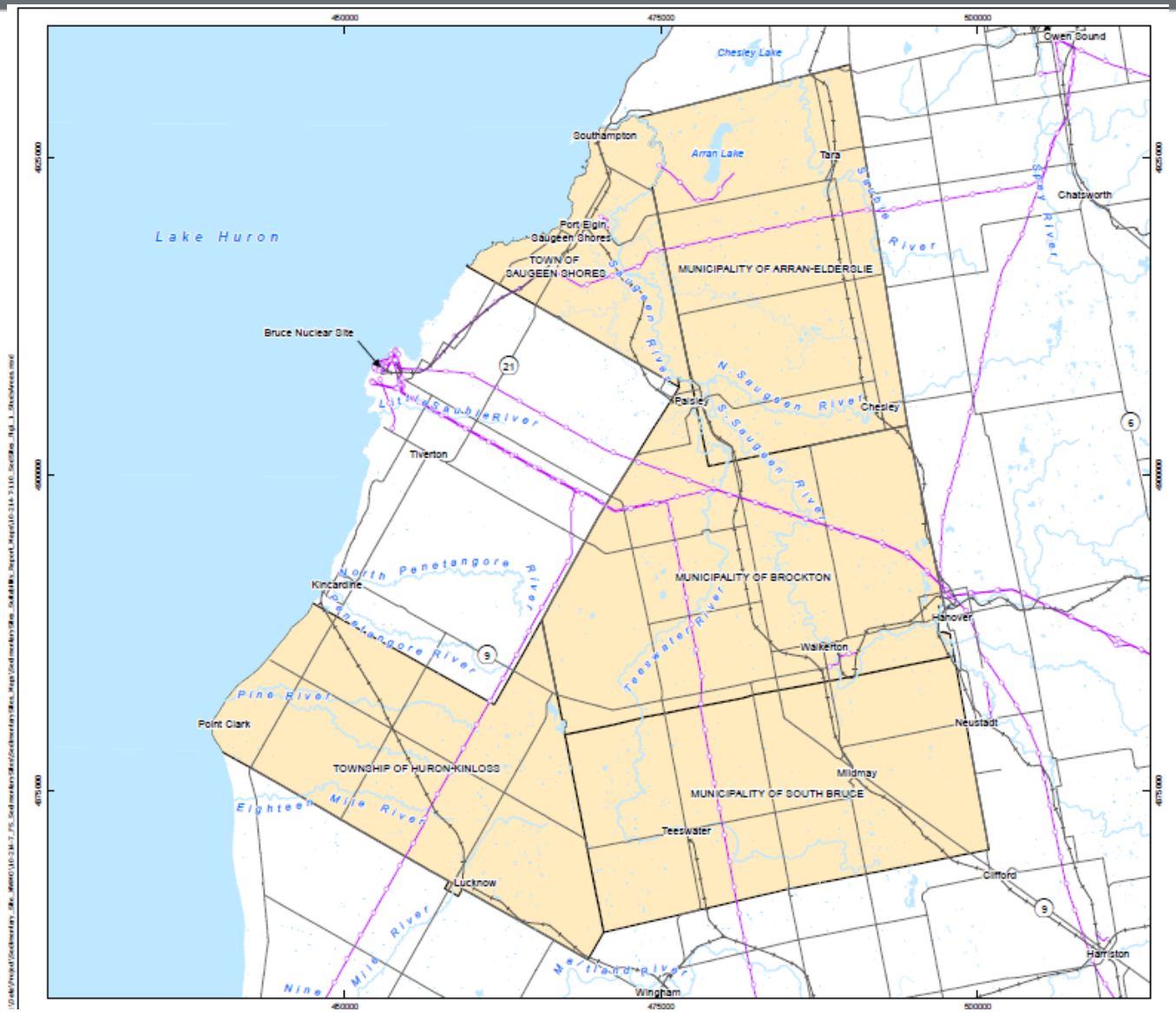
Geoscientific Preliminary Assessment (Phase 1) Objectives and Approach

PHASE 1 – Desktop Geoscientific Studies

- Assess potential suitability of the communities:
- *Can potentially suitable general siting areas be identified within each community?*
- Assess relative geoscientific suitability of communities
- Select a subset of preferred communities for Phase 2, taking into account other non-geoscientific factors



Communities in Phase 1



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Phase 1 Activities

- **Assembly and detailed review of available geoscientific information** such as geology, structural geology, natural resources, hydrogeology and overburden deposits (surficial deposits);
- **Interpretation of available geophysical surveys;**
- **Interpretation of available borehole geophysical data and selected 2-D seismic reflection surveys** to provide information on the geometry and potential structural features of the subsurface bedrock geology;
- **Terrain analysis studies** to help assess overburden (surficial deposits) type and distribution, bedrock exposures, accessibility constraints, watershed and subwatershed boundaries, groundwater discharge and recharge zones; and
- **Assessment of land use and protected areas** including parks, conservation reserves, heritage sites and source water protection areas.

Phase 1 Considerations

- **Bedrock and structural geology** – Ordovician Cobourg Formation (limestone) within the sedimentary sequence in the area of the five communities is the preferred host rock for a used fuel deep geological repository.
- **Minimum depth of top of the Cobourg Formation** - A minimum depth of 500 m is preferred in order to maintain the integrity of a repository within the Cobourg Formation.
- **Protected areas** – All known protected areas were excluded from further consideration, including: areas identified by the Communities for future development, Conservation Areas and Reserves, First Nation Reserves, Provincial Parks and Provincially Significant Wetlands.
- **Source water protection areas -** Land-based water protection zones (IPZs, Intake Protection Zones) 1 and 2, and groundwater protection areas (WHPAs, Well Head Protection Areas) A, B and C were excluded from further consideration.
- **Surface constraints** – Built-up areas were excluded from further consideration.
- **Natural resources** - Not a significant constraint.

Interim Findings from Phase 1

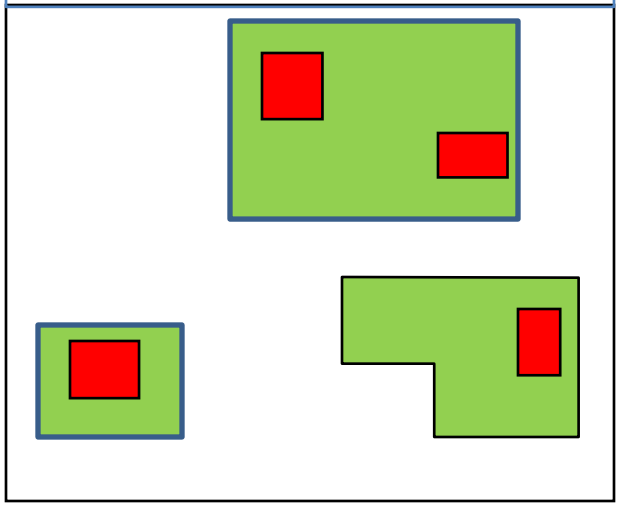
- Municipality of Arran-Elderslie and the Town of Saugeen Shores have limited potential to satisfy NWMO's geoscientific evaluation factors.
- Interim findings suggest that the Municipality of Brockton, the Township of Huron-Kinloss and the Municipality of South Bruce appear to contain areas that have the potential to satisfy NWMO's geoscientific evaluation factors.
  - NWMO is continuing the geoscientific evaluations as part of the broader Phase 1 assessments in progress.

Geoscientific Preliminary Assessment (Phase 2) Objectives and Approach

PHASE 2- Preliminary Field Investigations

- Further assess potential suitability and refine siting areas:
- *Can potentially suitable repository siting areas (in red) be identified within each community*
- Evaluate relative suitability of communities and select one or two preferred communities, taking into account other non-geoscientific factors

Example community and potential repository siting areas



Geoscientific Preliminary Assessment (Phase 2) Activities

- High resolution airborne geophysical surveys
- Detailed geological mapping
- Drilling a limited number of vertical and/or inclined boreholes

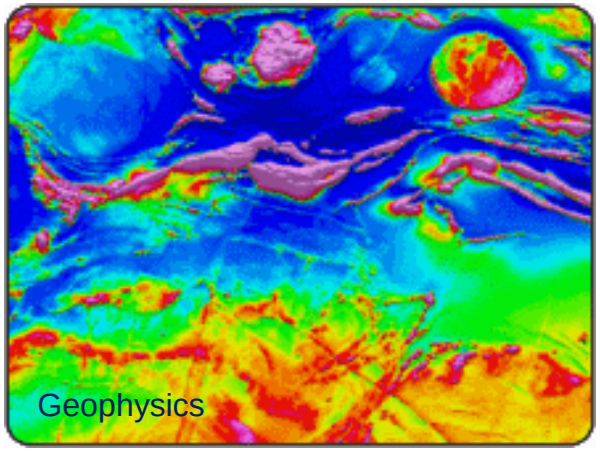
High resolution airborne geophysical surveys

Detailed geological mapping

Borehole drilling & testing

Detailed Site Evaluations

- Detailed Site Evaluations will be conducted at one or more preferred sites to confirm suitability.
- This step would include detailed site investigations involving geophysical surveys, characterization of the existing environment, drilling and sampling of boreholes, field and laboratory testing and monitoring activities.
- This step is expected to last more than five years.


Geophysics