



Northern Mine Decommissioning – Case Study of Remedial Works for Closure of Port Radium, Canada's Original Uranium Mine

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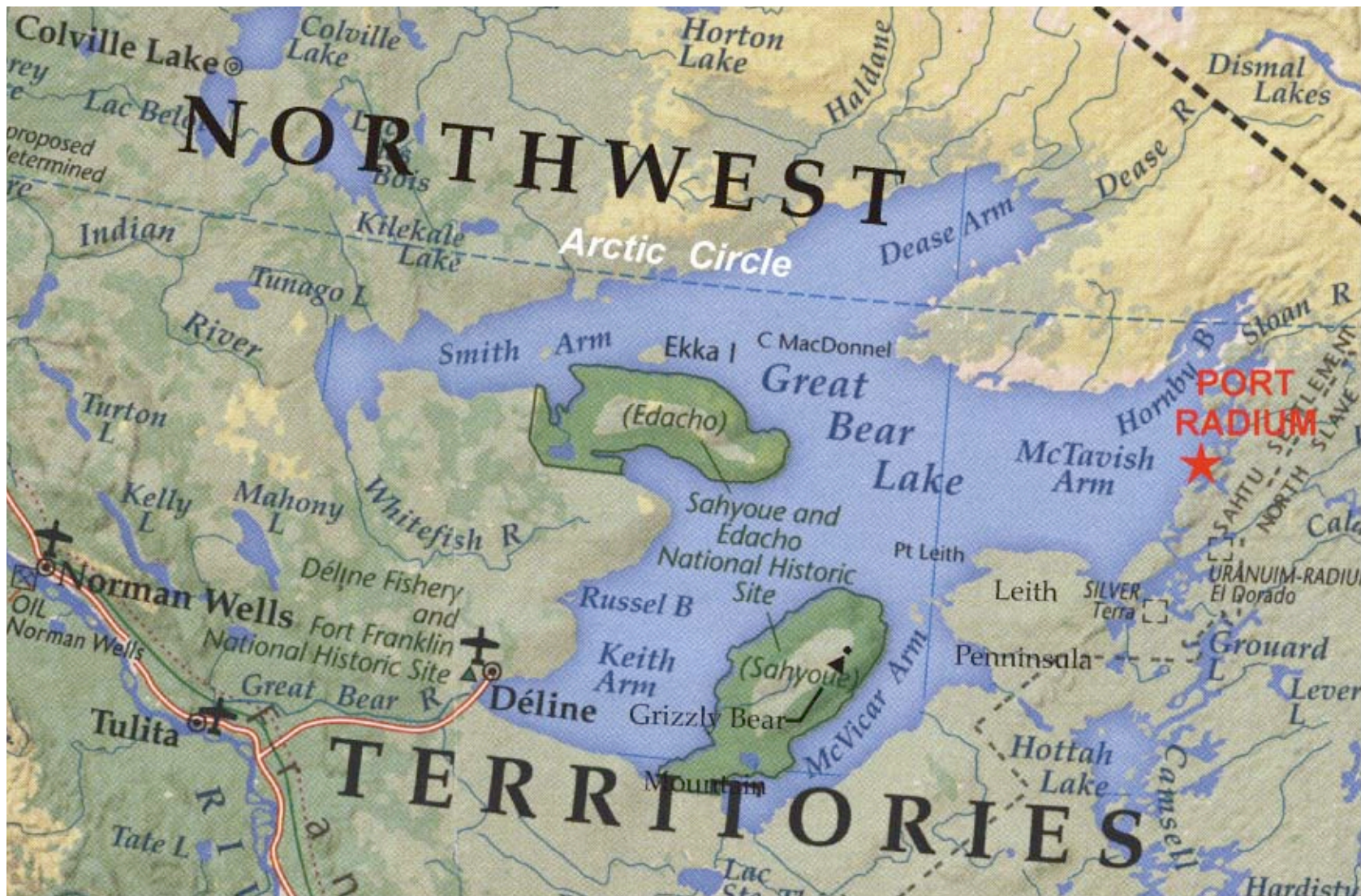
Are Northern Remedial Programs Really Different from Other Remediation Projects ?

- No and Yes
- Fundamentally – No
 - Still have concerns to identify and assess
 - Methodologies have to be derived to resolve these concerns
- Logistics, Setting and Stakeholder Interests – Yes
 - Sites often in challenging settings (e.g. rugged terrain)
 - Sites remote from nearest settlements and larger communities
 - Land Claim Agreements and Principles must be considered

Presentation Elements

- Historic Overview – Background Info
- Project Challenges During:
 - Site Assessment, RAP and Tender Documentation (Stages 1 to 5 in paper)
 - Implementation of the Work (Stage 6)
- Site Photographs

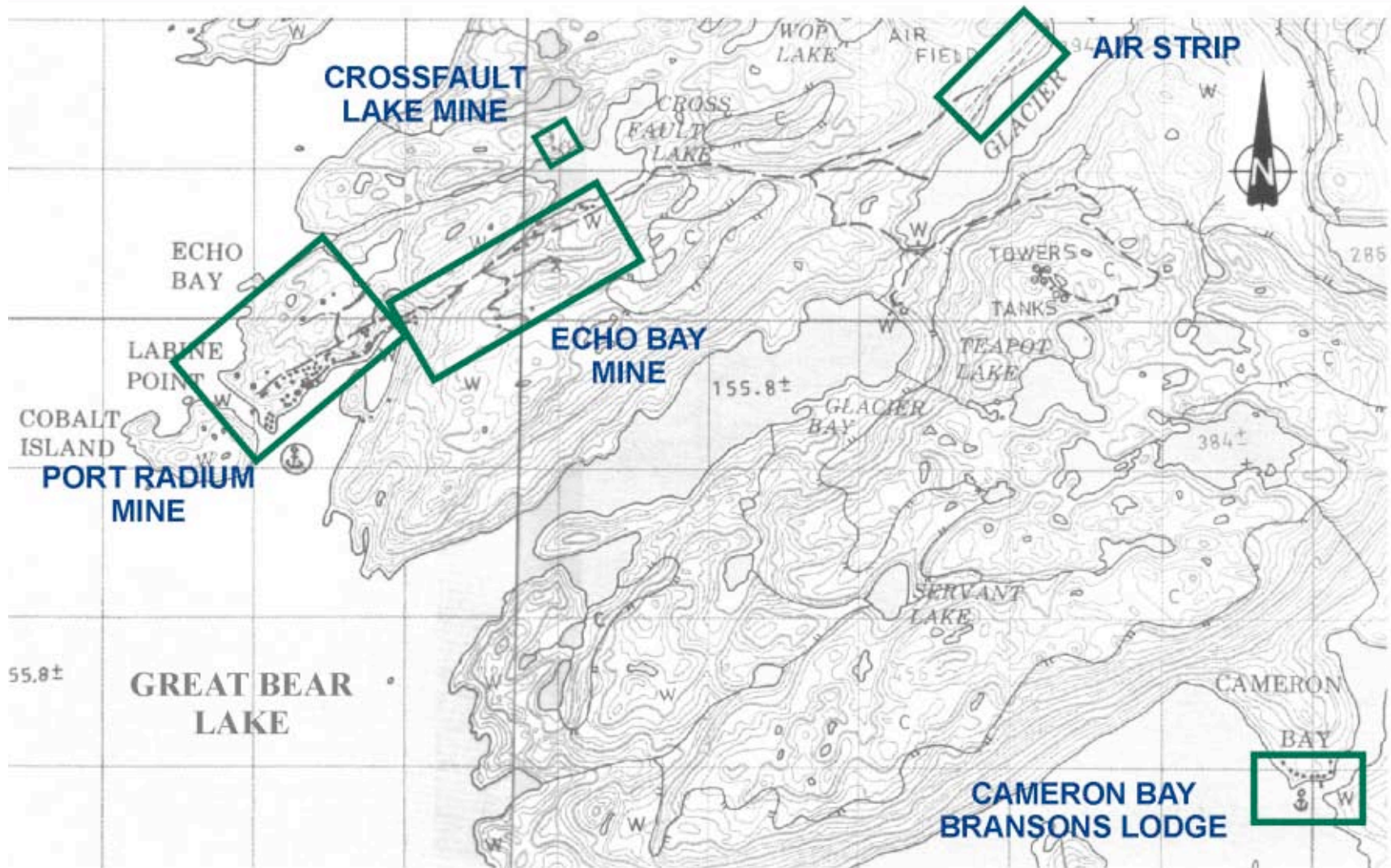
Site Location & Setting



Overview of Port Radium Site

- For purposes of remediation planning and works the Port Radium project comprised three mine sites (Port Radium, Echo Bay and Cross Fault Lake)
- An air strip located at Glacier Lake
- Port Radium is located on the eastern shores of Great Bear Lake approximately 475 km due north of Yellowknife or 275 km east of Déline.

Site Location and Activity Areas



Project History

- Mine(s) recovered radium, uranium and silver between the 1930's to the 1980's
- Initial decommissioning in 1962 (by Eldorado) and again in 1982 (by Echo Bay)
- Decommissioning work re-assessed primarily due to community concerns about lingering health issues and historical exposures
- Minor degradation of previous remediation work has occurred since 1982

Port Radium Circa 1950's



Canada-Déline Uranium Team (CDUT) Formation

- 1998 Déline brought concerns to national attention
- In 1999, Déline agreed to a partnership with Canada and CDUT was formed

CDUT's Recommendations

- Clean-up Port Radium as per the RAP developed in conjunction with the CDUT.
- INAC (CARD) procured remediation contract through PWGSC;
- PWGSC awarded remedial contract Aboriginal Engineering Limited (AEL) Dec. 2006;
- PWGSC retained SENES (with SRK and DCS in support) to provide technical and engineering program oversight

Port Radium Remediation Program Challenges

- a) Clarifying Scope of Work and Potential Additional Work

- b) Addressing Logistics – how to get equipment and supplies to site

- c) Scarcity of Resources

a) Clarifying Work

Issues:

- Data collection limitations during site assessment programs sometimes effected how work was defined (e.g. crown pillars & mine openings)
- Remote site location limits the equipment that could be practically transported for use during ESA work (e.g. no major equipment for excavation or moving of heavy objects)
- PAW items often require heavier earthmoving equipment (e.g. exposing bedrock at openings/crown pillar)

a) Clarifying Work

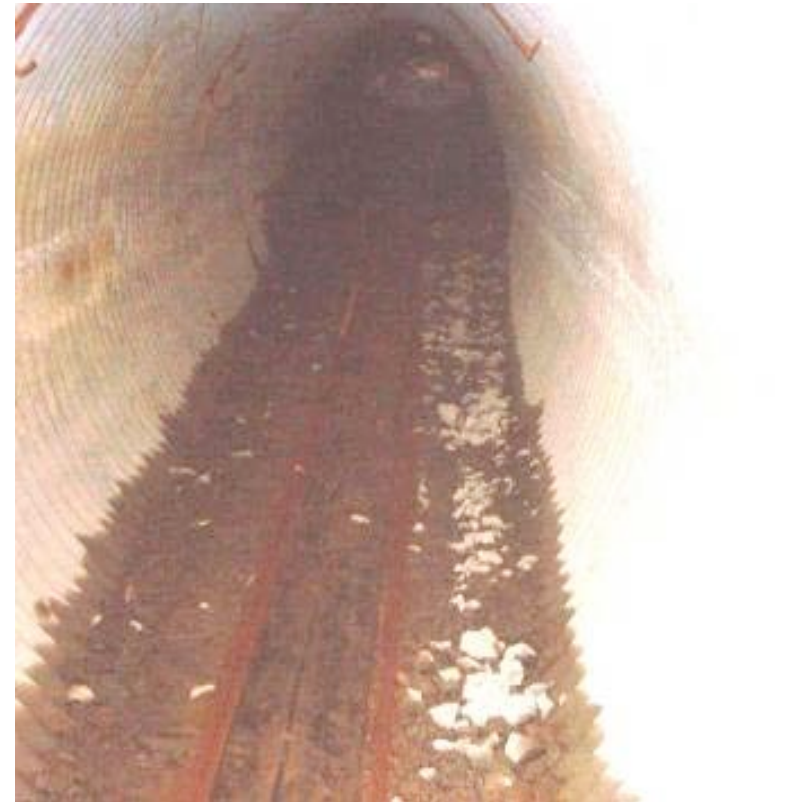
Solutions:

- Address scope uncertainty by defining in the specifications a scope of work for the PAW items
- Undertake site assessment to address areas of concern prior to commencing the remedial works so as to confirm the scope of work and associated costs.

Crown Pillars



Mine Openings



Mine Openings



b) Logistics

- Issues:
 - Mobilization options for Port Radium winter road versus barge across Great Bear Lake
 - Impact of weather on mobilization in particular ice on the lake
 - Multiple contractors on Glacier Lake airstrip (Alberta Star, Hunter Bay and AEL)
 - Routine supply of material and supplies as well as shift changes for man-power

b) Logistics

- Solutions:
 - Mobilize equipment & materials to Déline via winter road and barge across Great Bear Lake
 - Mobilize small equipment and tools via aircraft landing on Glacier Lake airstrip e.g. backhoe
 - Daily coordination in the field to track air traffic at the airstrip
 - Office and field staff coordinated the transport of materials, supplies and personnel

Mobilization to Déline



Initial Mobilization to Site



Barge Mobilization



Multiple Contractors at Airstrip



c) Scarcity of Resources

- Issues:
 - Limited manpower available in the north
 - Limited equipment available to complete a multi-faceted remediation program
 - Availability of air support
 - Competition with other companies (exploration and mining groups)

c) Scarcity of Resources

- Solutions:
 - Training programs for abatement and heavy equipment operating staff
 - Contractor had to develop methodologies to suit the equipment available to complete the work
 - Contractor has to amend schedules to accommodate the equipment available
 - Schedules had to be modified to accommodate air support

Worker Training

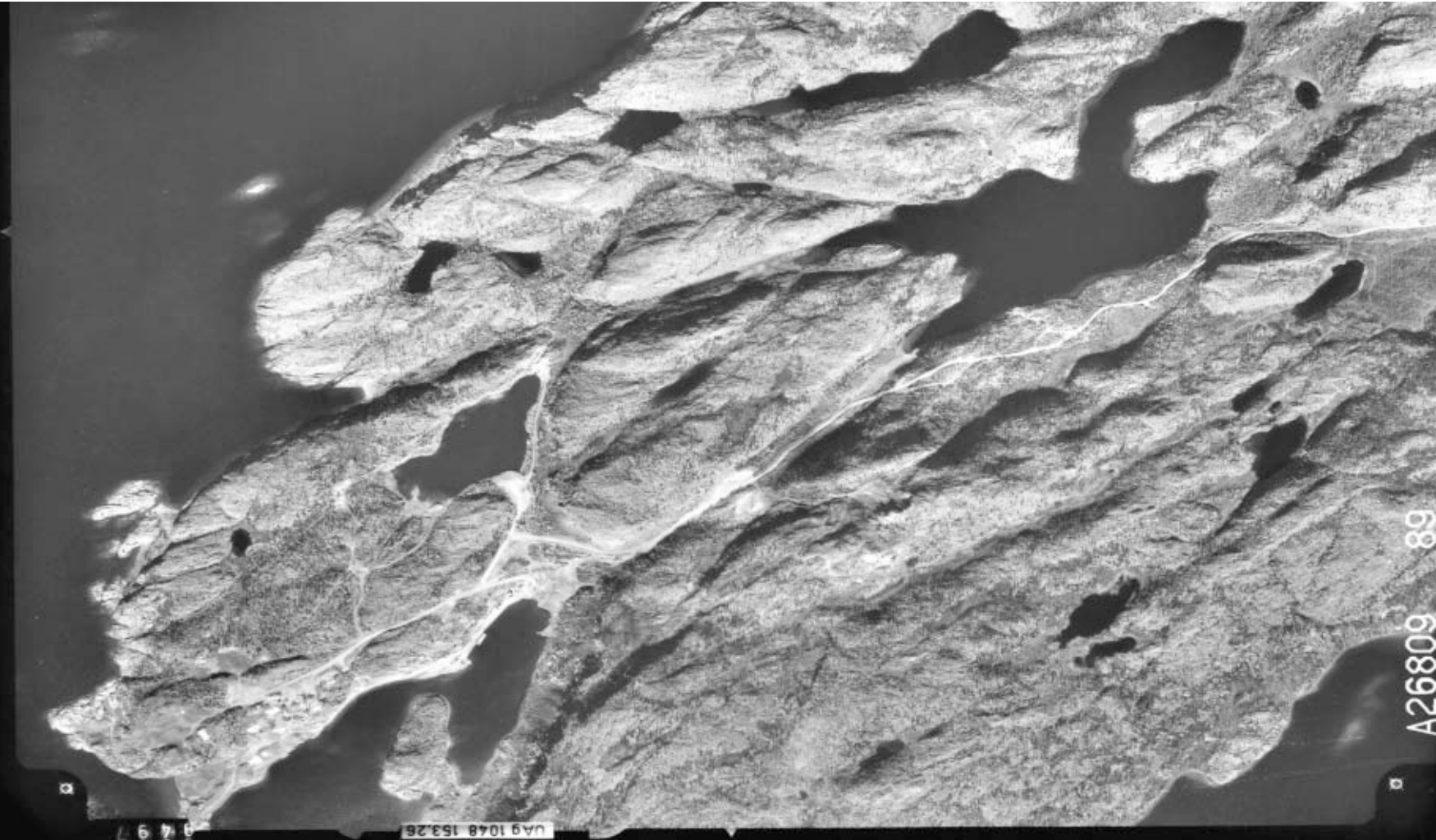


Resourcefulness with Equipment



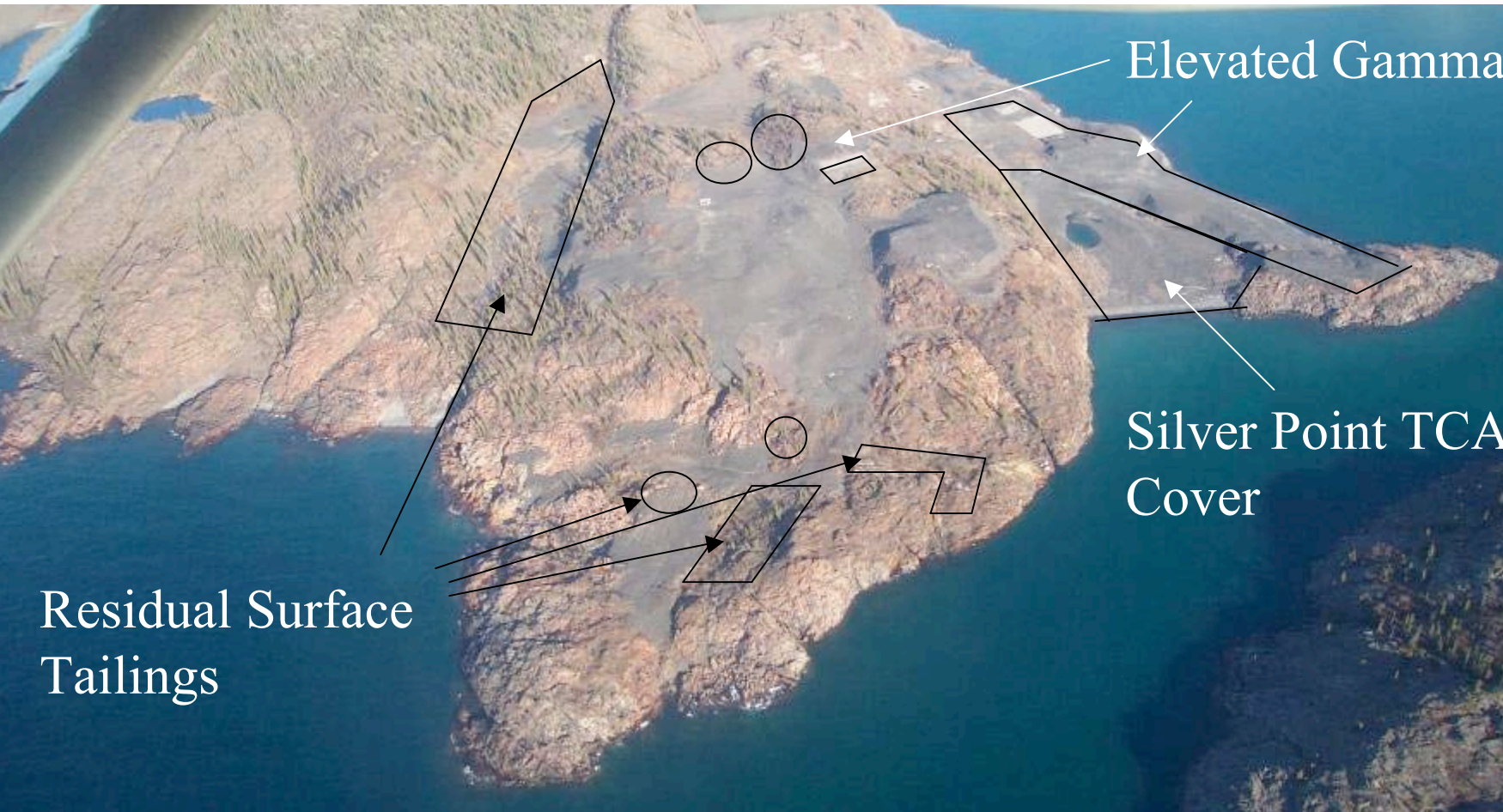
Other Site Photos

Air Photo of Port Radium Area



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Port Radium Remedial Action Areas



Port Radium Air Strip, July 2005



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Creative Falsework for Capping of Vertical Mine Openings



Silver Point Remediation

