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# Closure Liability Estimating for Cape Breton Development Corporation Properties

**Presented by:  
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# Personal Introduction

- **Principal and Manager Mining Group at SENES, (SENES is currently celebrating its 25<sup>th</sup> Year)**
  - ❖ 1974 Civil (Hons.) Engineer, University of Waterloo
  - ❖ 5 yrs Civil Eng. Designs & Project Mgr. (Kilborn)
  - ❖ 5 yrs Civil & Env. Proj. Eng/Mgr. Mining Corporation (Noranda)
  - ❖ 4 yrs Mgr. System Integration Projects (Noranda)
  - ❖ 3 yrs Dir. Strategic Systems Planning, Consulting, Implementation
  - ❖ 15+yrs SENES – decommissioning, closure, due diligence, liabilities assessments across Canada, United States, and Internationally
- **Project Mgr. 1998/9 and 2004/5 liability assessments**
- **CBDC closure work carried out to date could not have been done without the leadership and expertise of Randy Knapp, one of SENES founding partners, and the support of other SENES and DCS staff.**



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# Presentation Content

- Provide an overview of closure liability estimating for CBDC sites in the context of the:
  - ❖ process as a whole
  - ❖ challenges and issues
  - ❖ approach and activities
  - ❖ outcomes and comments.
- Note: no closure cost numbers are presented in this paper



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# Summary Overview

- ❑ **Dec. 1998 CBDC retained SENES to carry out closure audit & liability assessment**
- ❑ **Scope of work to included:**
  - ❖ **Review of historic, closed, and operating sites**
  - ❖ **Develop liability estimate for identified sites**
- ❑ **2002 Special Examination by Office of the Auditor General, agreed with liability assessment findings but recommended an update**
- ❑ **2004/2005 CBDC retained SENES to update liability assessment as recommended by TB**



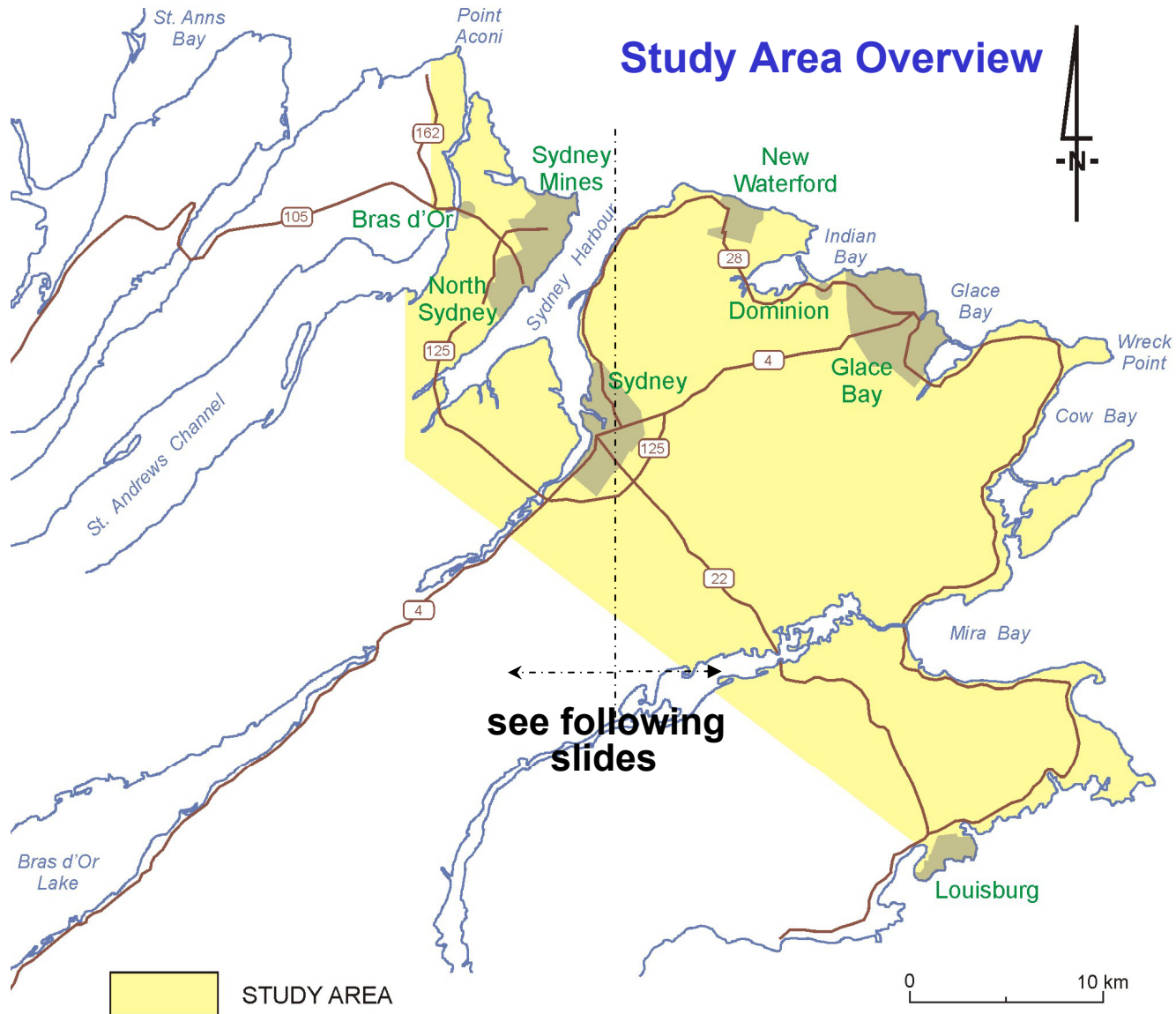
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# 1998/99 Liability Assessment Challenges

- ❑ **First attempt to quantify existing and potential closure liabilities**
- ❑ **In the absence of defined closure plans**
- ❑ **Many sites, located over a large area**
- ❑ **A wide range of facilities (size, nature, etc.)**
- ❑ **Various histories (some activities going back more than 175 yrs) and states of knowledge**
- ❑ **Within a short period of time Dec'98 – Mar'99**



# Study Area Overview



see following slides

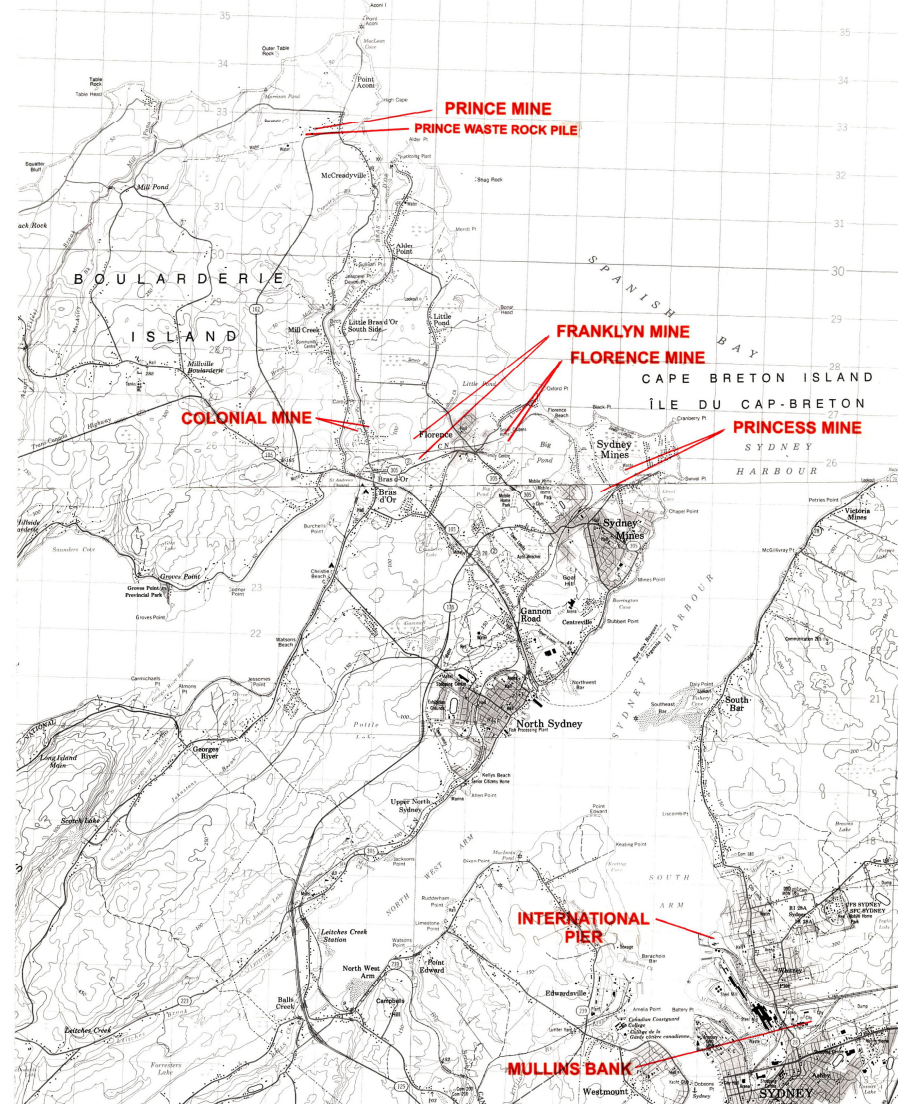


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# West Side of 1998/99 Study Area

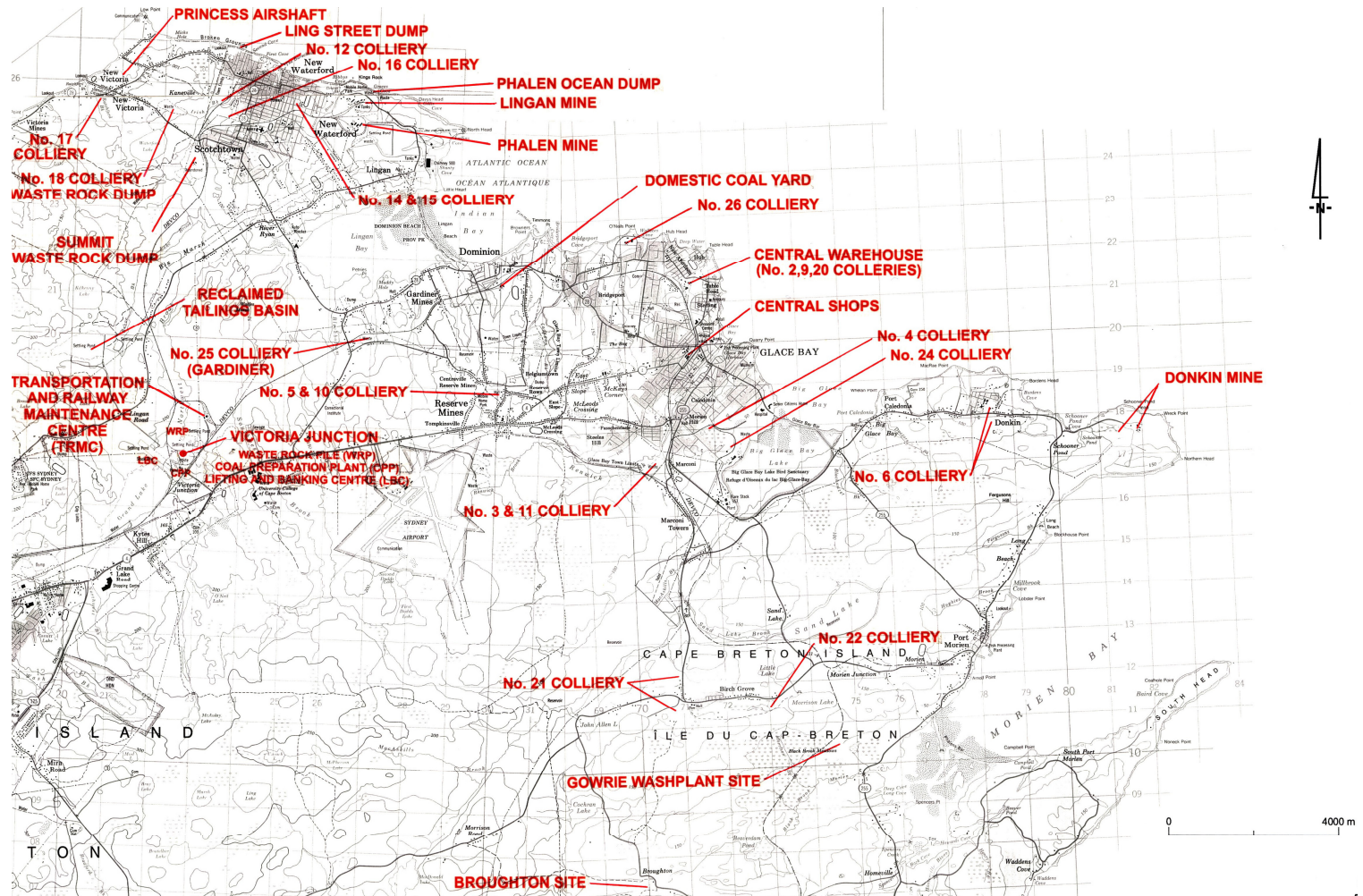
- Identified Sites Included:
  - Prince Mine
  - Colonial Mine
  - Franklyn Mine
  - Florence Mine
  - Princess Mine
  - International Pier
  - Mullins Bank



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# East Side of 1998/99 Study Area



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# Nature and Range of Facilities



□ Rail Maintenance Centre

□ International Pier

□ CBDC's rail system and right-of-ways included in assessment



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# Nature and Range of Facilities



- **Victoria Junction Lifting and Banking**



- **Lingan - Phalen Mines**



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# Nature and Range of Facilities



□ Central Shops



□ Domestic Coal Loadout



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# Nature and Range of Facilities



□ Colliery Park



□ Gowrie Wash Plant



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# Nature and Range of Facilities



- ❑ Many undeveloped properties
- ❑ Subject to non-approved activities such as dumping, bootleg pits and resultant subsidence



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# 1998/99 Liability Assessment Objectives

- ❑ Provide CBDC with a “best estimate” of likely closure liabilities for Treasury Board submission
- ❑ Provide CBDC with discussion of estimate, options & uncertainties to facilitate future planning within 4 categories
  - ❖ i then active sites
  - ❖ ii sites that were active or disturbed between 1967/'98
  - ❖ iii inactive legacy sites predating CBDC, on crown land
  - ❖ iv sites decommissioned by CBDC
- ❑ Utilize best practice, draw on leading closure guidance, comply with legislation



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# 1998/99 Liability Assessment Activities (1)

- ❑ **Developed aggressive audit/assessment plan for sites identified by CBDC**
- ❑ **Met with CBDC to refine plan and confirm logistics**
- ❑ **Carried out site audits visits using team of SENES specialists and CBDC staff**
- ❑ **Collected available site information for review (including internal and external information)**



# 1998/99 Liability Assessment Activities (2)

- **Site audits/visits assessed conditions of:**
  - ❖ **Buildings/Structures, Soil, Water, Air, and Natural Environment at each site and in vicinity of the sites; and**
  - ❖ **Allowed for initial delineation/quantification of site features**
- **Document and record reviews included:**
  - ❖ **CBDC and predecessor site plans, operating histories, etc.**
  - ❖ **Relevant CBDC experience and costing information including local unit costs, technical data (water quality, subsidence records, building plans, material lists, etc.)**
  - ❖ **External files such as archival records and aerial photographs**





# 1998/99 Liability Assessment Activities (3)

- For all sites, based on audit assessments and data review, developed statement of:
  - ❖ site location, setting, and history;
  - ❖ environmental conditions; and
  - ❖ existing and/or potential environmental concerns
- The protocols used to assess reclamation needs included:
  - ❖ assessment of long term physical and chemical stability;
  - ❖ desire to return affected lands to their former use or acceptable alternative;
  - ❖ (Note land use controls for any areas remediated through the application of an engineering multi-layer cover.



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# 1998/99 Liability Assessment Activities (4)

- **Looked at potential reclamation requirements from perspective that:**
  - ❖ **existing or potential acid generating areas with potential to impact sensitive receptors warrant highest level of intervention;**
  - ❖ **areas affected by hydrocarbon or metal contamination present the next level of priority,**
  - ❖ **stable but barren areas warrant least level reclamation effort**



# 1998/99 Liability Assessment Activities (5)

- After potential reclamation needs and actions identified, (we) selected what was felt to be the appropriate closure scenario (still to be confirmed in most cases) in keeping with the:
  - ❖ Sites location and setting;
  - ❖ Level of intervention warranted; and
  - ❖ Practical considerations and limitations with respect to potential physical works.
- Approach is in keeping with general guidance on reclamation works for mining properties as provided by federal and provincial guidance (including NSDOE Soil Remediation Petroleum Products Policy, Ontario Mine Closure Guidelines, and CCME guidelines).



# 1998/99 Liability Assessment Activities (6)

- **Material takeoffs and cost estimates were then carried out for (our) selected closure scenarios for some 33 identified “sites”**
- **Estimates included capital costs associated with:**
  - ❖ **demolition;**
  - ❖ **facility, yard, tank cleanup;**
  - ❖ **earthworks;**
  - ❖ **water treatment;**
  - ❖ **others aspects where necessary;****(Wherever possible costs reflected actual local rates)**
- **Also added costs for existing/potential liabilities associated with regional issues (e.g. subsidence, mine water treatment, groundwater contamination, and monitoring)**



# 1998/99 Liability Assessment Activities (7)

- ❑ For perspective, a sensitivity analysis was undertaken of each selected site closure scenarios.
- ❑ The sensitivity analysis assessed and provided costs for:
  - ❖ Site specific uncertainties (e.g. data limitations, limits of material/quantity takeoffs, etc.)
  - ❖ Implications of selecting alternate closure options (e.g. do nothing, more extensive works, etc.)
- ❑ All information was provided in accordance with CBDC desired categories (operating, recent, historic and decommissioned sites)



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# 1998/99 Liability Assessment Outcomes

- ❑ **CBDC was provided with a “best estimate” of likely closure costs for the sites reviewed**
- ❑ **Summary and detailed discussions of issues, concerns, and closure options were provided in support of the “best estimate” closure cost scenarios**
- ❑ **Estimating uncertainties were explicitly discussed and presented as a range around the “best estimate” and a upper and lower bound based on different closure strategies**
- ❑ **During the course of the work additional properties were identified for which CBDC has legacy responsibility.**
- ❑ **From a cost perspective, the majority of the closure liability were found to be associated with Category I sites (post 1967)**
- ❑ **The single largest liability was associated with the VJLBC.**



# 2004/5 Liability Assessment Update – Scope (1)

- In 2004 CBDC retained SENES to update the 1998/99 estimate
- Terms of Reference for the work included:
  - ❖ Need to update the assessment to include all properties identified as being owned by CBDC (700+);
  - ❖ Carry out an assessment of potential remediation options for the sites including;
    - *Ex Situ* Technologies- Cleanup, removal, and off-site disposal or management
    - *In Situ* Technologies- Passive and active treatment, various engineered isolation and cover options, waste treatment or decontamination.
    - *Risk Management Alternatives*- Change in land use, fencing, partial clean-up.



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# 2004/5 Liability Assessment Update – Scope (2)

- **Terms of Reference for the work (continued):**
  - ❖ **Preparation of individual “*Remedial Options Site Liability Reports*” that outline and evaluate remediation options, select a preferred option based on assessment matrix and cost of the preferred option for each site.**
  - ❖ **Preparation of a Summary Remediation Report that provides total costs for all preferred remedial measures for the more than 700 PIDs**





# 2004/5 Liability Assessment Update - Activities

- Work carried out included review of information generated through various programs since 1998, including:
  - ❖ Regional Summary Screening Reports by Study areas
  - ❖ Site Specific Phase I,II and III assessments
  - ❖ Issue specific studies such as hydrology, etc.
- Property (PID) information, regional information, and studies were made available through CBDC/PWGSC GIS Website
- In addition to document reviews, another round of site audits/visits were carried out with CBDC and PWGSC to provide first hand insight into additional properties



# 2004/5 Liability Assessment Update – Study Areas and PIDs

	Study Area	No PIDs
1	Albert Bridge-Beaver Mine	4
2	Alder Point Study Area	2
3	Birch Grove Study Area	23
4	Black Brook - Gowrie Wash Plant Study Area	13
5	Bras D'Or Study Area	7
6	Broughton Area Properties	23
7	Catalone Study Area	4
8	Dominion Study Area	58
9	Donkin Study Area	55
10	Florence Study Area	7
11	Gardiner Study Area	12
12	Glace Bay Study Area	145
13	Grand Lake Road Study Area	17
14	Homeville Study Area	3
15	Lingan Road Study Area	14
16	Lingan Study Area	3
17	Louisburg Study Area	3
18	Millville Study Area	1
19	Mira Gut Study Area	3
20	Mira Road Study Area	5
21	New Victoria Study Area	38
22	New Waterford Study Area	83
23	North Sydney Study Area	3
24	Point Aconi -Prince Mine Study Area	17
25	Port Caledonia Study Area	9
26	Port Morien Study Area	29
27	Reserve Mines Study Area	57
28	Round Island Study Area	3
29	Scotchtown Study Area	1
30	South Bar Study Area	9
31	South Head Study Area	2
32	Sydney Mines Princess Study Area	13
33	Sydney Study Area	20
34	Tower Road Study Area	7
35	Victoria Mines Study Area	14



# 2004/5 Liability Assessment Update – Outcomes

- ❑ 35 Individual Study Area reports were created that summarize conditions for 700+ properties
- ❑ The ISA reports identified and assessed alternative remedial options including insitu, exsitu and risk management approaches using updated unit costs
- ❑ The remedial options were screened against industry best practice and CBDC's closure objectives
- ❑ The recommended remedial option was carried forward in the summary of liabilities for the CBDC properties
- ❑ As in 1998/9, regional liabilities were added to site specific liabilities to establish CBDC's 2005 total liability



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# 2004/5 Liability Assessment Update – Concluding Comments

- ❑ Significant efforts have been undertaken to assess and determine CBDC's existing and potential closure liabilities for all its properties
- ❑ The work has utilized best practice, applicable codes, and CBDC Remediation standards
- ❑ Uncertainties will remain with respect to individual site estimates until such time that actual site specific closure designs are developed and accepted
- ❑ Efforts to date provide a wealth of information that can be drawn on by CBDC as it moves forward in closure planning and implementation.



# CBDC Liability Assessment – Concluding Comments

- That concludes this presentation
- Thank you for your time and attention



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