

1999 Dam Safety Inspection Reports

PUB 1.2
Attachment A

Seal Cove Development

NEWFOUNDLAND POWER

January 27, 2000

Memorandum From: J. P. Halliday

To: M. C. Hunter

Subject: 1999 Dam Safety Inspection Reports
Seal Cove Development

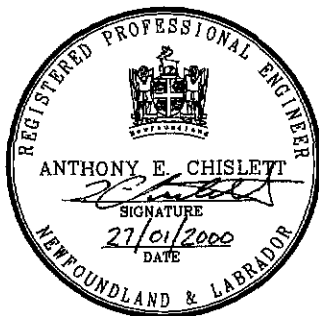
File: 401.01.03.20.01

Attached is a copy of the Dam Safety Inspection Report for structures located in the Seal Cove Development. The structures in this system require both general maintenance and capital improvements.

Some of the more important items noted in the report include:

- Predominant low areas / settlement along crest of Soldiers Pond Dam/Spillway,
- Deterioration of timbers and additional rockfill required at Soldiers Pond Spillway,
- Increased rate of leakage at Fenelons Pond Gate,
- Deterioration of timbers and cribbing at Fenelons Pond Spillway,
- Deterioration of crest and cutoff wall at Fenelons Pond Dam.

TC/sa
Attach:



A large, stylized handwritten signature, likely belonging to J. P. Halliday, written in black ink.

DAM SAFETY INSPECTION

Soldiers Pond -- Dam and Outlet

Dam Type: Earthfill Dam, Timber Crib Outlet

Date & Time of Examination: 99-10-21 (3:30 PM)

Operational Status at Time of Examination:

Reservoir Water surface elevation	<u>5.5 ft</u>
Releases	<u>25 mm (open slightly to maintain minimum flow downstream)</u>
Weather Conditions	<u>Cloudy, 4°C</u>
Water in storage	<u></u>
Recent Seismic Events	<u>None</u>

Examining Party
G.Humby
T.Chislett
L.Stapleton

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TC/sa

Attach:

INSPECTION CHECKLIST FOR EMBANKMENT DAM

DAM

Upstream Face

Slide movements	<u>None observed</u>
Slope protection	<u>Excellent – well graded rip rap</u>
Erosion - beaching	<u>None observed</u>
Cracks	<u>None observed</u>
Sinkholes	<u>None observed</u>
Settlement	<u>None observed</u>
Displacement	<u>None observed</u>
Debris	<u>None</u>
Unusual conditions	<u>None</u>

Downstream Face

Slide movements	<u>Areas of erosion along D/S slope, Especially on both sides of outlet.</u>
Signs of movements	<u>None</u>
Cracks	<u>None observed</u>
Seepage or wet areas	<u>None</u>
Unusual conditions	<u>None</u>

Abutments

Seepage	<u>None</u>
Cracks, joints, and bedding planes	<u>None</u>
Slides	<u>None</u>
Signs of movement	<u>None</u>

Crest

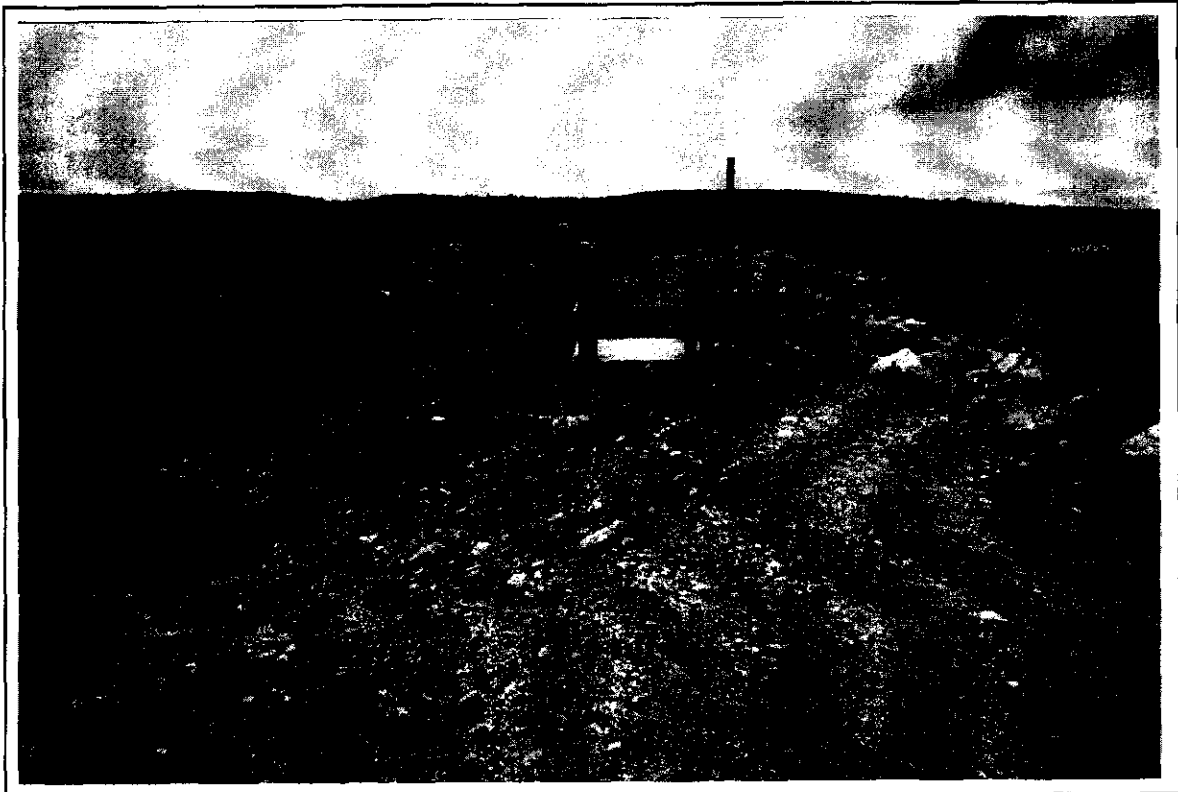
Surface cracking	<u>None</u>
Settlement	<u>Minor settlement. Erosion on D/S side on left of outlet has cut into crest</u>
Lateral movement	<u>None</u>
Camber	<u>None</u>

Seepage and Drainage

Locations(s)	<u>None</u>
Estimated flow(s)	<u></u>
Color (staining)	<u></u>
Toe drain and relief wells	<u></u>

Development : Seal Cove

Structure : Soldiers Pond Dam/Outlet



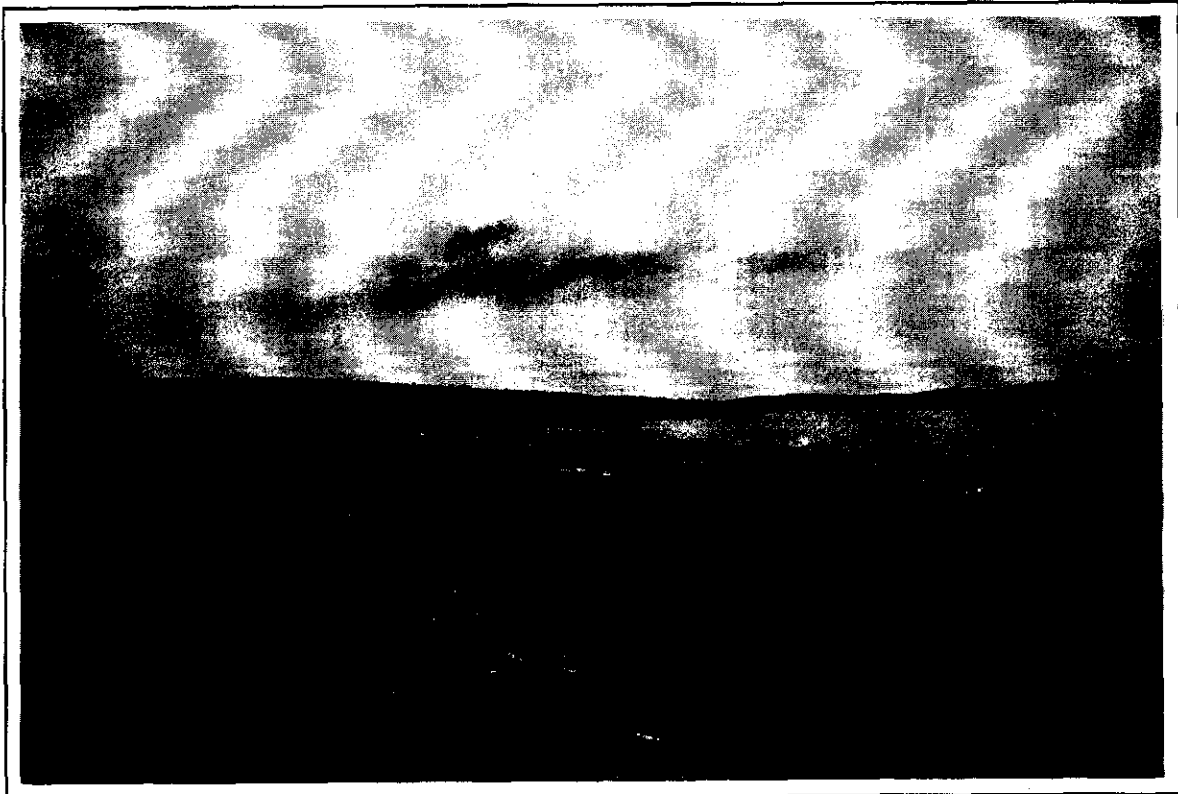
Erosion/settlement on downstream slope



Erosion/settlement on downstream slope

Development : Seal Cove

Structure : Soldiers Pond Dam/Outlet



General View

OUTLET WORKS

Intake

Trashrack N/A

Concrete N/A

Outlet Conduit

Metal work N/A

Penstock _____

Control Facilities

Gatehouse N/A

Crane N/A

Gate and controls (description) Timber gate - mechanical lift

General condition Good

Operation at time of examination Gate open 25 mm (minimum flow)

Control System Mechanical items Good condition

Ventilation N/A

Lighting N/A

Stop logs _____

General condition Good

Seals _____

Chute

Debris None

Walls _____

Movement (offsets) Gabion wing walls appear stable

Settlement _____

Joints _____

Cracks or areas of distress
Condition of backfill

None observed
Considerable erosion along gabion
retaining walls on D/S slope, U/S
gabions in good shape

Outlet Channel

Slope Protection	<u>Good</u>
Stability of Side Slopes	<u>Good</u>
Vegetation and other obstructions	<u>None</u>

Remarks Gabion mat D/S of outlet, and lower gabions in retaining wall (at or below W/L) starting to rust.

DAM SAFETY INSPECTION

Soldiers Pond – Spillway

Dam Type: Timber Sheathing

Date & Time of Examination: 2000-01-24 (11:30 AM)

Operational Status at Time of Examination:

Reservoir Water surface elevation 1.0 m below FSL

Releases

Weather Conditions Sunny

Water in storage

Recent Seismic Events None

Examining Party
T. Chislett
G. Humby

INSPECTION CHECKLIST FOR TIMBER-CRIB DAM

Structure

Timber structural members	<u>Deteriorated – several rotted members.</u>
Timber planking	<u>Good Condition.</u>
Crib Content	<u>Considerable settlement – additional fill required.</u> <u>Spillway requires additional rip rap under chute and downstream.</u>

Upstream Face

Alignment	<u>Fair – offset in places.</u>
Seepage on Downstream Face	<u>None observed. Wet area on left dam section and in D/S spillway channel.</u>
Downstream toe settlement	<u>None observed.</u>

Crest

Surface cracking	<u>None</u>
Settlement	<u>Significant settlement just downstream of cutoff.</u>

Abutments

Seepage	<u>None</u>
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Remarks Timbers in poor condition.
Considerable settlement along crest.
Vegetation needs to be cut on downstream slope.

Development : Seal Cove

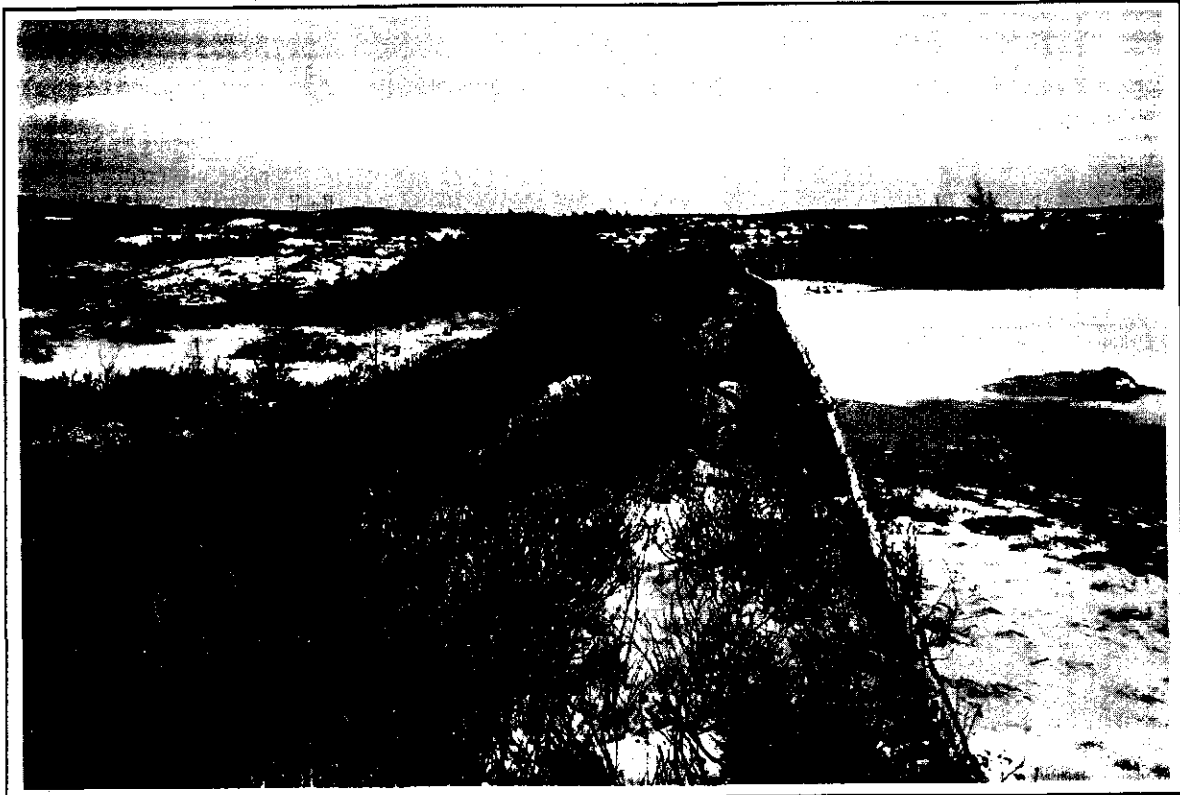
Structure : Soldiers Pond Dam/Spillway



General view - upstream face

Development : Seal Cove

Structure : Soldiers Pond Dam/Spillway



Crest - looking east



Crest - looking west

Development : Seal Cove

Structure : Soldiers Pond Dam/Spillway



Settlement of crest beind cutoff wall



Settlement of crest beind cutoff wall

SPILLWAY

Control Structures

Crest Deck in poor condition

Orifices N/A

Gates and Controls

Type of Gate N/A

General condition

Operation of gates
at time of inspection

Approach Channel

Debris None

Slides over channel None

Channel side slope stability Good

Slope protection Adequate

Walkway

Condition of Piers N/A

Condition of decking and beams

Condition of rails

Stilling Basin

Debris None

Walls movement

Walls settlement

Outlet Channel

Slope Protection	OK
Stability of Slopes	OK
Vegetation and other obstructions	<u>D/S channel not well defined.</u> <u>Should clear alders.</u>

Flashboards

Condition	N/A
Operation	

Remarks

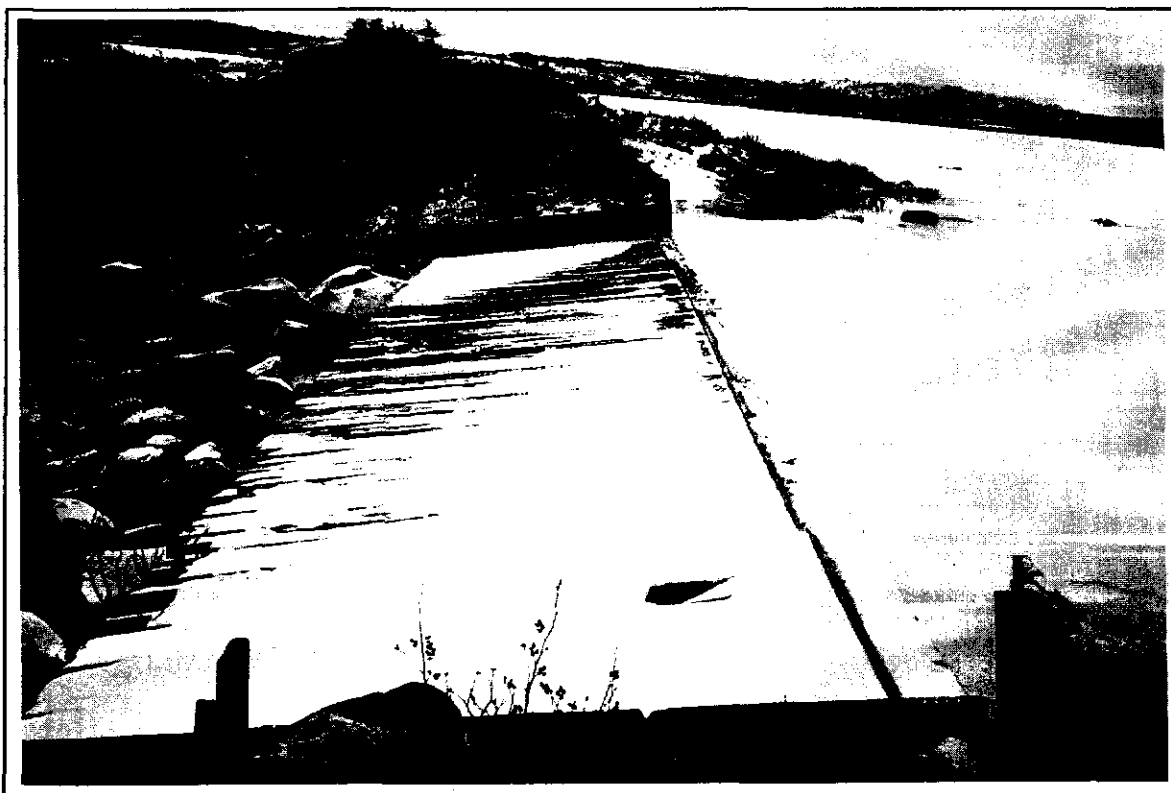
- Alders should be cleared along crest and D/S slope of dam sections.
- Excessive deterioration of structural members under spillway apron.
- Freeboard dam on right side appears low and should be checked.

Development : Seal Cove

Structure : Soldiers Pond Dam/Spillway



General view



Spillway apron

Development : Seal Cove

Structure : Soldiers Pond Dam/Spillway



Downstream view of spillway



Rockfill and structural members below spillway apron

DAM SAFETY INSPECTION

Fenelons Pond - Dam, Spillway, and Outlet

Dam Type: Rockfill – Timber Cutoff Wall

Date & Time of Examination: 99-10-21 (2:30 PM)

Operational Status at Time of Examination:

Reservoir Water surface elevation 450 mm above Culvert Invert

Releases Gate closed

Weather Conditions Cloudy

Water in storage _____

Recent Seismic Events _____

Examining Party

G. Humby

T. Chislett

L. Stapleton

INSPECTION CHECKLIST FOR EMBANKMENT DAM

DAM

Upstream Face

Slide movements	<u>None</u>
Slope protection	<u>O.K - riprap not well graded - mostly large boulders. Sparse near outlet.</u>
Erosion - beaching	<u>None</u>
Cracks	<u>None</u>
Sinkholes	<u>None</u>
Settlement	<u>None</u>
Displacement	<u>None</u>
Debris	<u>Some minor alder growth</u>
Unusual conditions	<u>U/S slope well protected</u>

Downstream Face

Slide movements	<u>None</u>
Signs of movements	<u>None</u>
Cracks	<u>None</u>
Seepage or wet areas	<u>None observed. Very little water on structure.</u>
Unusual conditions	<u>- Leakage evident under and through culvert. Gate fully closed at time of inspection.</u> <u>- Substantial alder growth on D/S slope.</u>

Abutments

Seepage	<u>None</u>
Cracks, joints, and bedding planes	<u>None</u>
Slides	<u>None</u>
Signs of movement	<u>None</u>

Crest

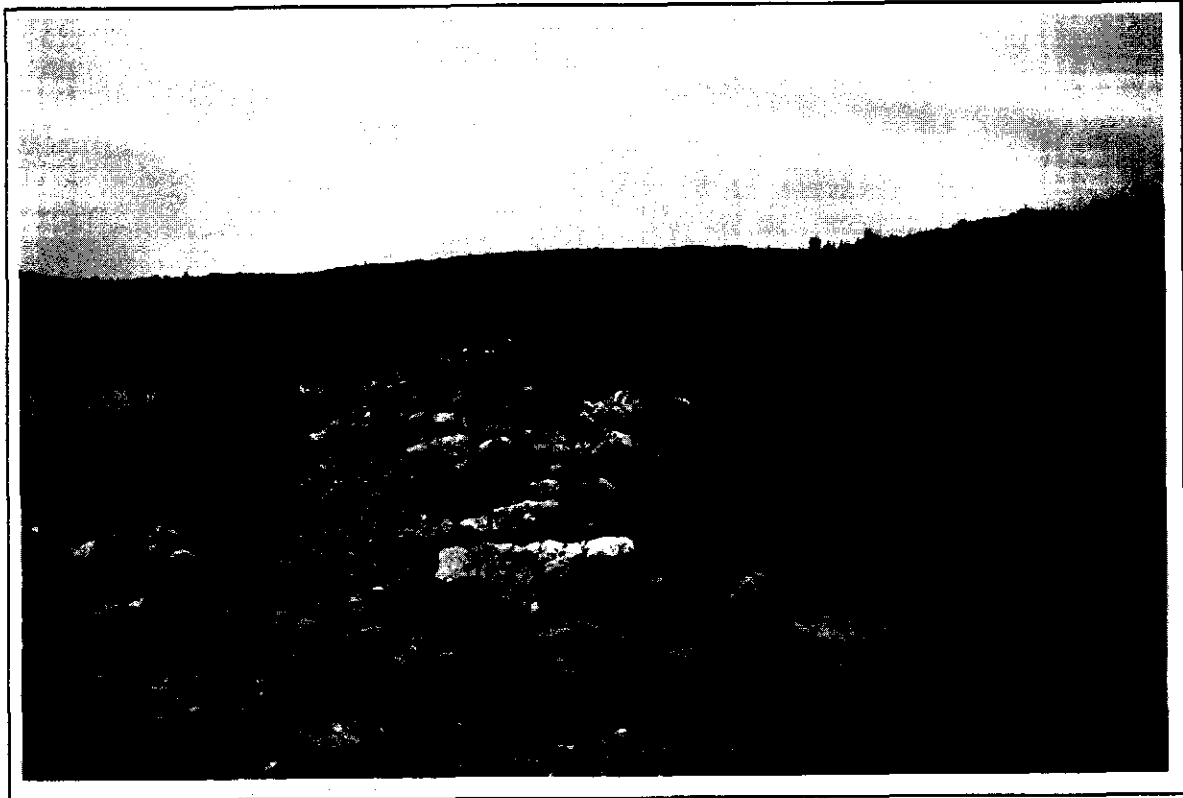
Surface cracking	<u>None - timber / parged concrete cutoff wall along crest in poor condition throughout.</u>
Settlement	<u>None</u>
Lateral movement	<u>None</u>
Camber	<u>None - crest fairly narrow. Some erosion / settlement in few areas near cutoff wall.</u>

Seepage and Drainage

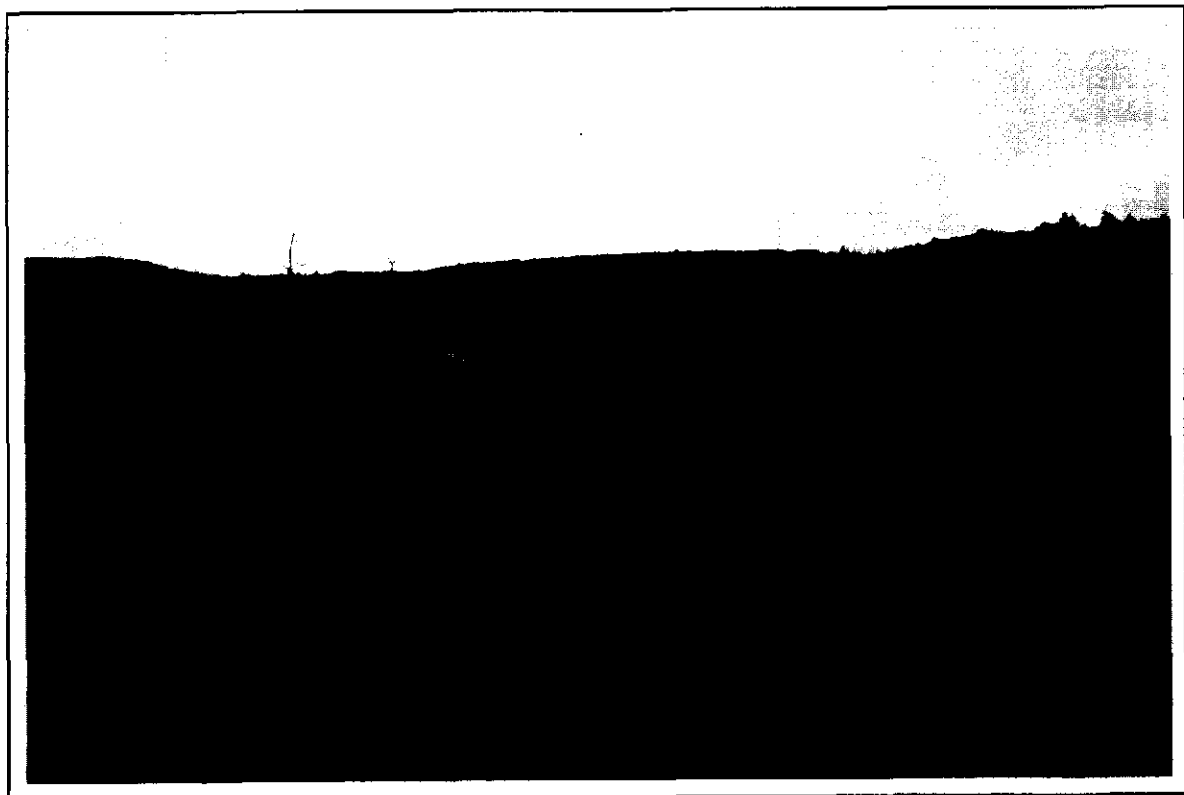
Locations(s)	<u>Under culvert and on right side of outlet</u>
Estimated flow(s)	<u>5 – 10 l/s</u>
Color (staining)	<u>Clear</u>
Toe drain and relief wells	<u>N/A</u>

Development : Seal Cove

Structure : Fenelons Pond Dam



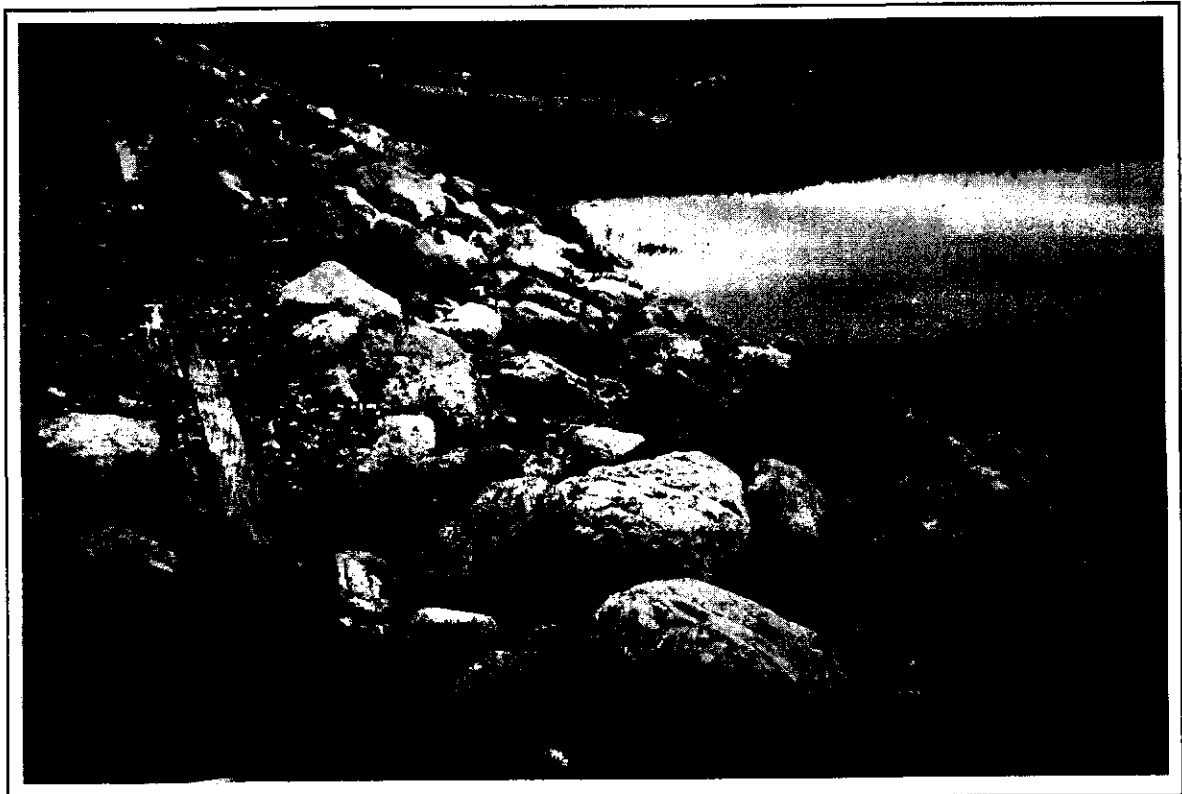
General view of crest near north abutment



Alder growth on downstream slope

Development : Seal Cove

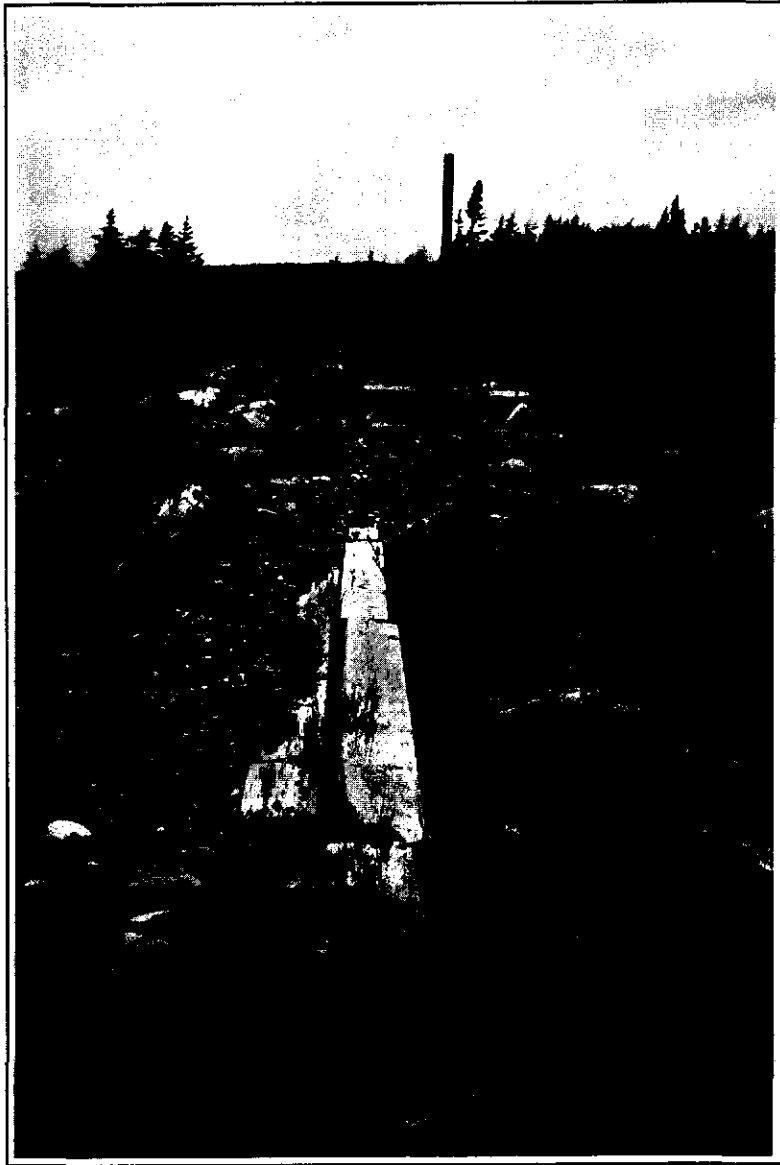
Structure : Fenelons Pond Dam



Deterioration of crest and cutoff

Development : Seal Cove

Structure : Fenelons Pond Dam



Deterioration of crest and cutoff

SPILLWAY

Timber Crib Overflow

Control Structures

N/A

Crest

Orifices

Gates and Controls

N/A

Type of Gate

General condition

Operation of gates
at time of inspection

Approach Channel

Debris

None

Slides over channel

None observed

Channel side slope stability

Good

Slope protection

Good – gabion retaining walls stable and
in good condition.

Walkway

Condition of Piers

Fair - Poor

Condition of decking and beams

Fair

Condition of rails

Poor – sections of handrail missing and
should be replaced.

Stilling Basin

Debris in basin

None observed

Walls movement

Some minor erosion D/S on right
abutment. Right training wall has been
replaced.

Walls settlement, etc

None

Outlet Channel

Slope Protection	<u>O.K</u>
Stability of Slopes	<u>O.K</u>
Vegetation and other obstructions	<u>D/S channel choked with alders and should be cleared.</u>

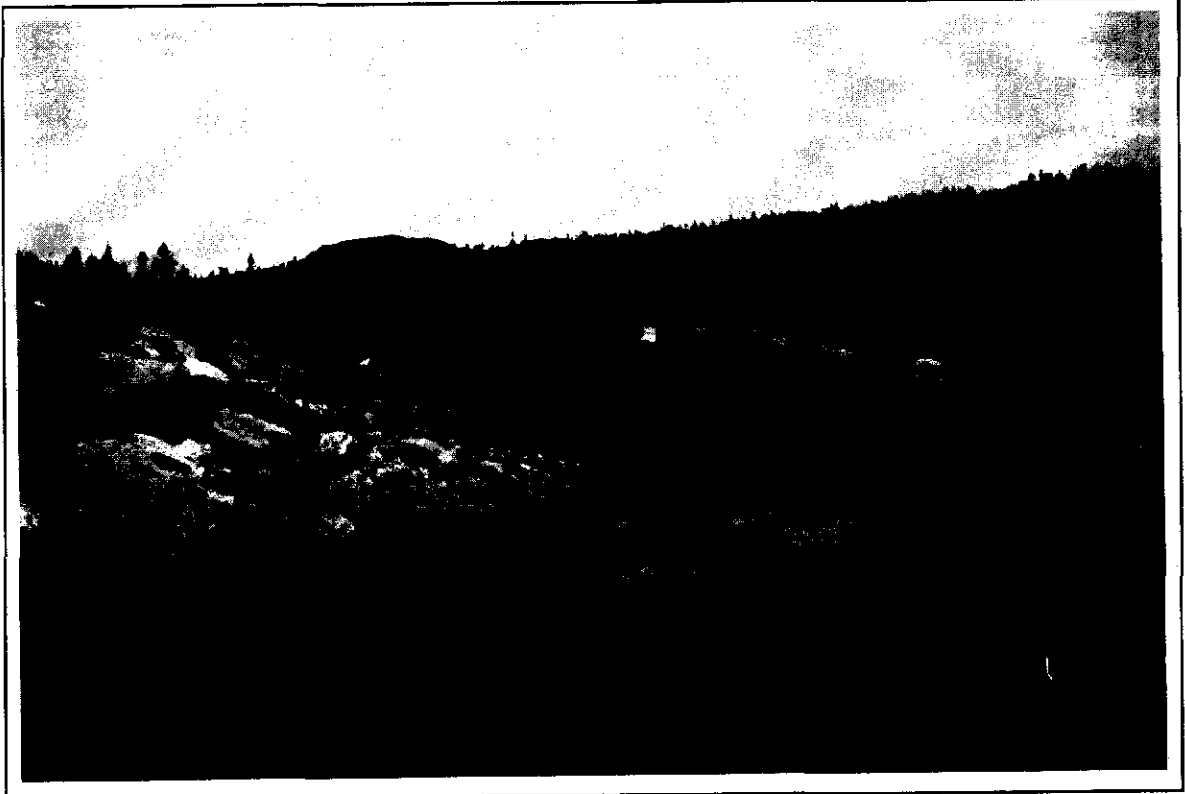
Flashboards

Condition	<u>No flashboards in place</u>
Operation	<u></u>

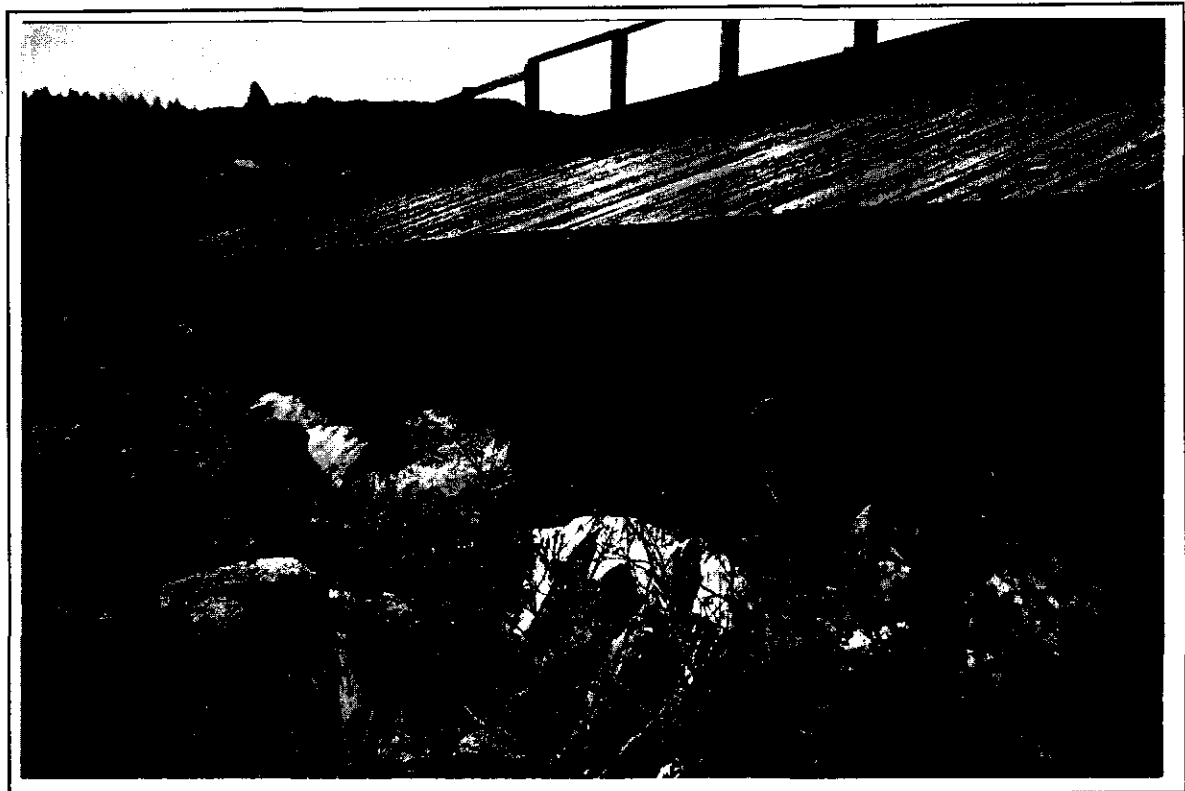
Remarks Downstream apron showing signs of deterioration.
Cribbing requires additional ballast/rockfill.
Handrail on spillway should be replaced.

Development : Seal Cove

Structure : Fenelons Pond Spillway



Upstream view of spillway



Downstream apron

OUTLET WORKS

(4' diameter culvert – timber gate)

Intake

Trashrack None

Concrete

Outlet Conduit

Metal work Good – evidence of rust

Penstock N/A

Control Facilities

Gatehouse N/A

Crane N/A

Gate and controls (description) Timber gate – manual lift

General condition Fair – Gate extremely difficult to operate at high W/L. Takes approximately 2 hours to open gate 15".

Operation at time of examination Fully closed. Approximately 5–10 l/s leaking through and under culvert.

Control System Mechanical items Good

Ventilation N/A

Lighting N/A

Stop logs
General condition N/A
Seals

Chute

Debris None

Walls

Movement (offsets) None

Settlement None

Joints	<u>None</u>
Cracks or areas of distress	<u>None</u>
Condition of backfill	<u>O.K</u>

Floor	<u>N/A</u>
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Movement	<u></u>
Settlement	<u></u>
Joints	<u></u>
Drains	<u></u>
Cracks	<u></u>
Drains	<u></u>
Amount of flow	<u></u>
Location of seeping drains	<u></u>

Stilling Basin(observed operation)	<u>N/A</u>
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Debris in basin	<u></u>
Walls	
Movement (offsets)	<u></u>
Settlement	<u></u>
Joints	<u></u>
Cracks or areas of distress	<u></u>
Floor (if visible)	<u></u>
Cracks or areas of distress	<u></u>
Movement	<u></u>
Joints	<u></u>
Erosion	<u></u>

Outlet Channel	
Slope protection	<u>Good</u>
Stability of side slopes	<u>Good</u>
Vegetation or other	
Obstructions	<u>None</u>

Remarks	<u>Leakage on right side of culvert. Should be monitored, especially at higher water levels.</u>
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Development : Seal Cove

Structure : Fenelons Pond Dam



Downstream view of gate

DAM SAFETY INSPECTION

Forebay -Dam, Spillway & Outlet

Dam Type: Concrete Buttress

Date & Time of Examination: 99-10-21 (11:30 AM)

Operational Status at Time of Examination:

Reservoir Water surface elevation 0.98 m below Forebay Dam Crest

Releases

Weather Conditions Overcast 4°C

Water in storage

Recent Seismic Events None

Examining Party

G.Humby

T. Chislett

L. Stapleton

INSPECTION CHECKLIST FOR CONCRETE DAM

DAM

Upstream Face

Cracks	<u>Minor, some spalling, slight deterioration</u>
Joint offsets	<u>O.K</u>

Downstream Face

Cracks	<u></u>
Joint offsets	<u></u>
Seepage on Downstream Face	<u>Minor, few locations</u>
Other	<u>Erosion near crest at couple locations due to overtopping</u>

Downstream Toe

Cracks	<u>N/A</u>
Undercutting (from erosion)	<u>Minor</u>
Other	<u>Small amount of ponded water should be drained</u>

Crest

Roadway	<u>N/A</u>
Walks	<u>Minor settlement</u>
Parapet	<u>Some deterioration</u>
Lighting, etc.	<u></u>
Other	<u>Displacement of rockfill from crest due to overtopping</u>

ABUTMENTS

Foundation at Downstream Toe of Dam

Seepage around dam None

Location _____

Amount _____

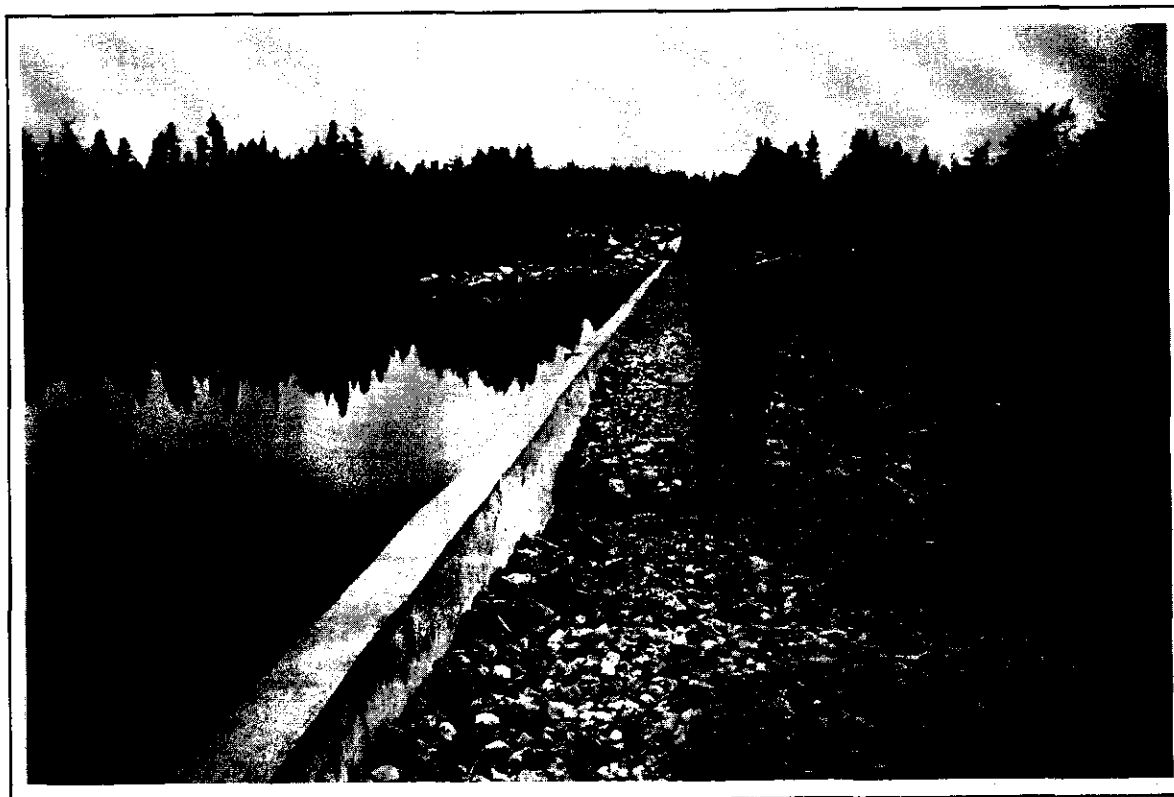
Measurement Methods _____

Remarks None

Development : Seal Cove
Structure : Forebay Dam



Erosion/settlement at crest



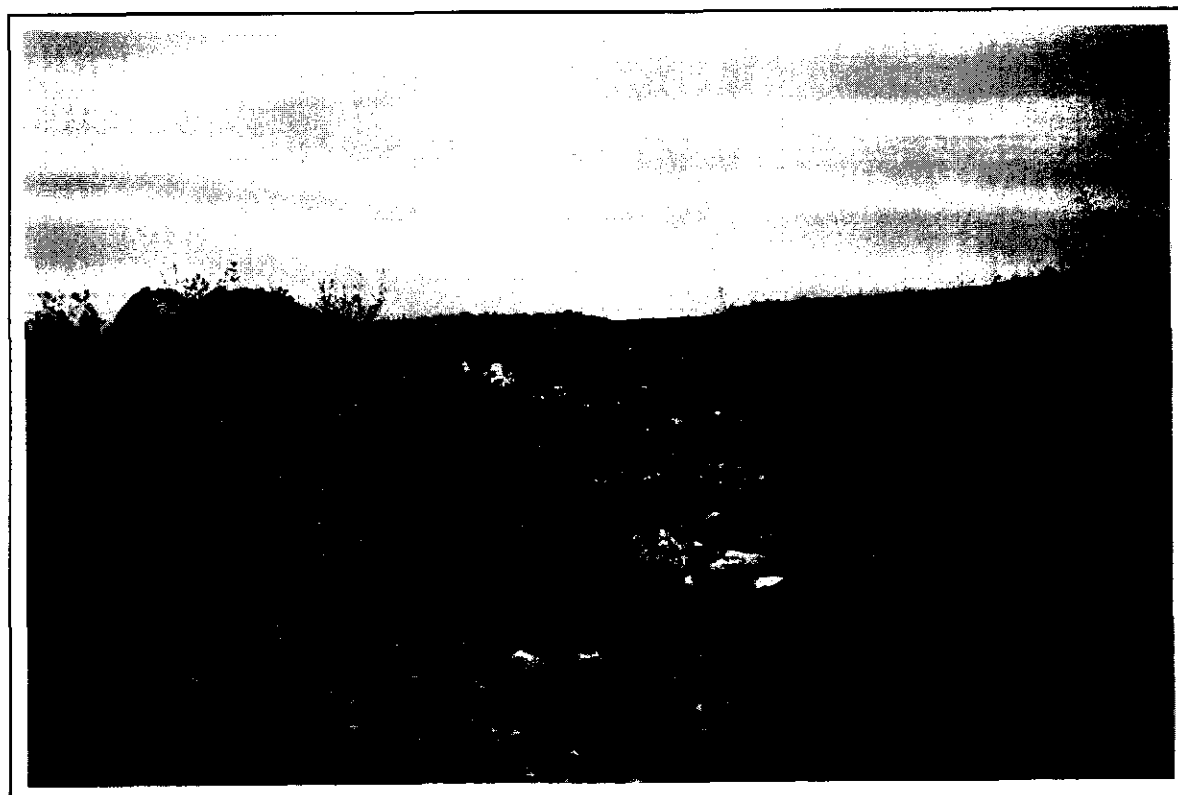
Erosion/settlement at crest

Development : Seal Cove

Structure : Forebay Dam



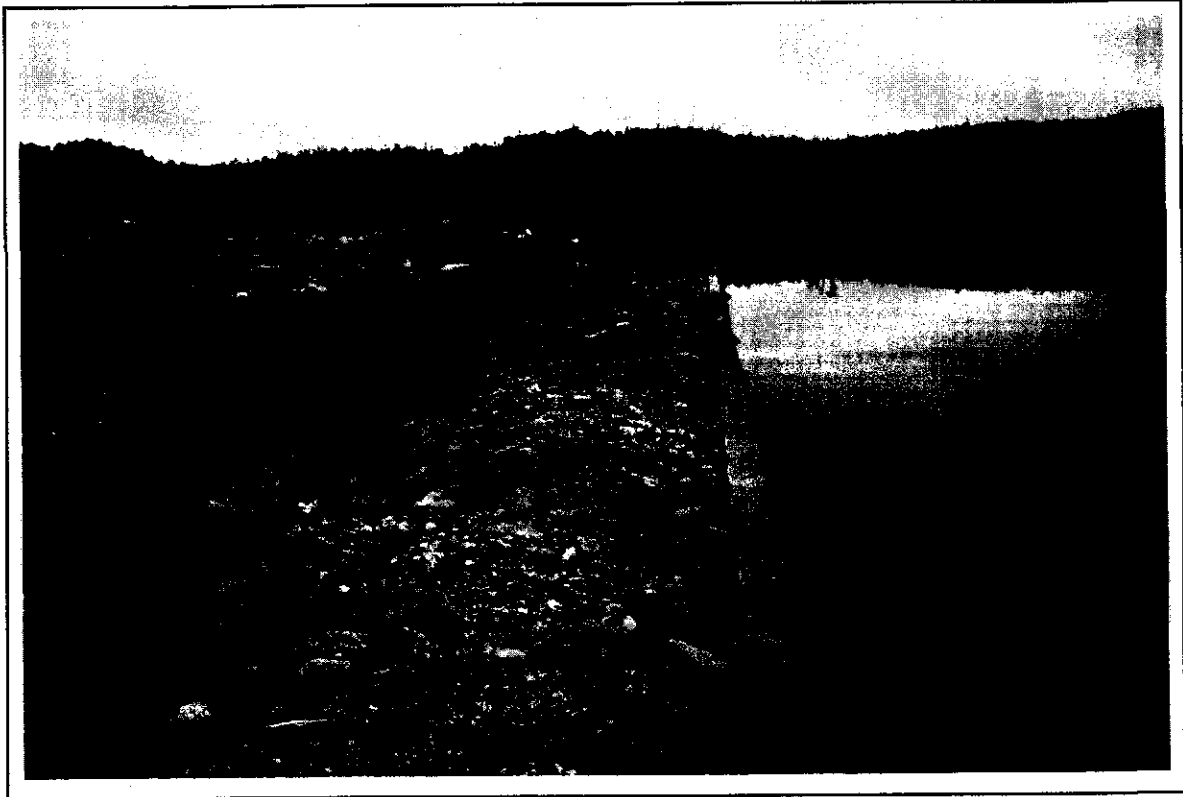
Erosion on downstream face due to overtopping



Erosion on downstream face due to overtopping

Development : Seal Cove

Structure : Forebay Dam



General View - looking north



Ponded water at downstream toe

SPILLWAY

(concrete overflow)

Control Structures

Crest	<u>Deteriorated with exposed steel and aggregate</u>
Orifices	<u>N/A</u>

Gates and Controls

Type of Gate	<u>N/A</u>
General condition	<u></u>
Operation of gates at time of inspection	<u></u>

Approach Channel

Debris	<u>Minor</u>
Slides over channel	<u>None observed</u>
Channel side slope stability	<u>Good</u>
Slope protection	<u>Good</u>

Walkway

	<u>N/A</u>
Condition of Piers	<u></u>
Condition of decking and beams	<u></u>
Condition of rails	<u></u>

Stilling Basin

Debris	<u>Minor</u>
Walls movement	<u>None</u>
Walls settlement	<u>None</u>

Outlet Channel

Slope Protection Good

Stability of Slopes Good

Vegetation and other obstructions Clear.

Flashboards

N/A

Condition	
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Operation _____

Remarks

- Gabions good
- D/S riprap good
- No evidence of displaced material

Development : Seal Cove

Structure : Forebay Spillway



General View - looking north



Some deterioration of crest

Development : Seal Cove

Structure : Forebay Emergency Spillway



General View - looking north

OUTLET WORKS

Intake

Trashrack	<u>Good Condition (recently replaced)</u>
Concrete	<u>Some deterioration. Significant spalling along crest and D/S Face of left wingwall. Leak on right wing wall next to intake concrete. (Significant leakage at high W/L)</u>

Outlet Conduit

Metal work	<u>N/A</u>
Penstock	<u>Woodstave</u>

Control Facilities

Gatehouse	<u>Good condition. Concrete foundation deteriorated</u>
Crane	<u>N/A</u>
Gate and controls (description)	<u>Mechanical lift – steel gates</u>
General condition	<u>Good</u>
Operation at time of examination	<u>Open</u>
Control System Mechanical items	<u>Good condition</u>
Ventilation	<u>Adequate</u>
Lighting	<u>Adequate</u>
Stop logs	
General condition	<u>N/A</u>
Seals	<u></u>

Chute

Debris

Walls

Movement (offsets)

Settlement

Joints

Cracks or areas of distress

Condition of backfill

Remarks

None

Development : Seal Cove

Structure : Intake



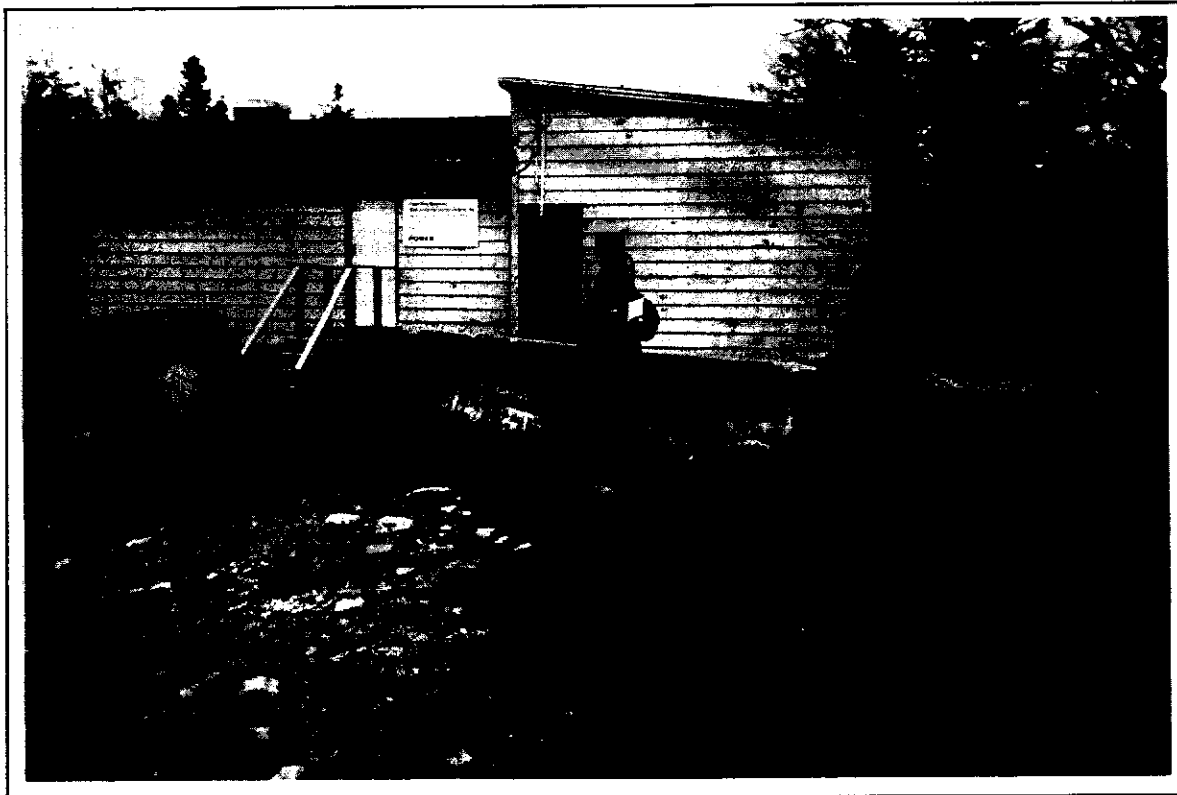
North Abutment - downstream face



North Abutment - downstream face

Development : Seal Cove

Structure : Intake



South Abutment

PENSTOCK

Right of way

Vegetation	<u>Clearing of vegetation required</u>
Drainage ditches	<u>Poor drainage in some areas</u>
Culverts	<u>N/A</u>

Condition of Penstock Bed

Alignment	<u></u>
Settlement	<u></u>
Other	<u>Poor drainage</u>

Penstock Type

Condition of wood, steel, fibreglass	<u>Deterioration of staves</u>
Cracks	<u></u>
Stresses	<u></u>

Penstock Supports

Cradles	<u></u>
Saddles	<u></u>

Anchor blocks	<u>N/A</u>
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Expansion Joints

Leaks	<u>Few</u>
Stress cracks	<u></u>

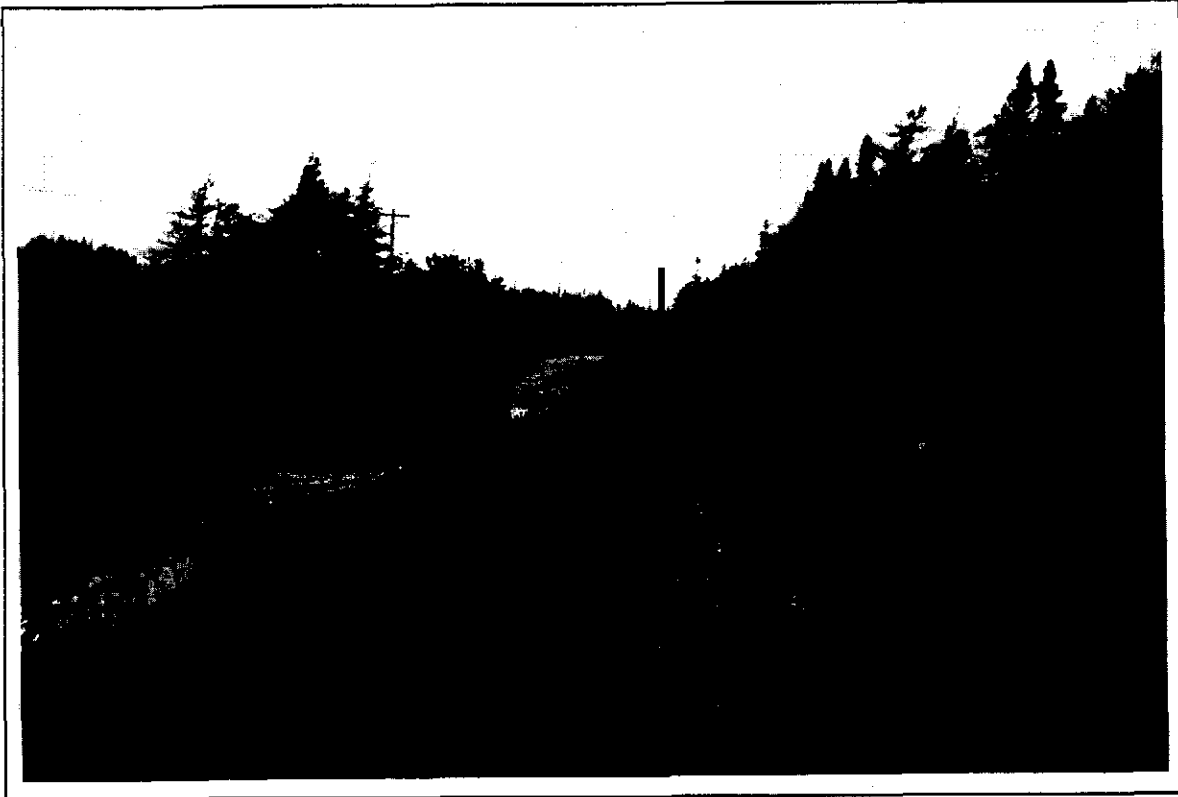
Penstock Cover	<u>N/A</u>
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Remarks:

- Some bands excessively corroded
- Excessive movement of pipe
- Bracing system is in good condition
- Slightly irregular alignment (horizontal and vertical)

Development : Seal Cove

Structure : Penstock



General view - looking downstream from intake



Deterioration of staves and bands