4.5. OVERVIEW OF PERMAFROST FOR ARD CONTROL

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NORWEST

AN OVERVIEW OF PERMAFROST FOR ARD CONTROL

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OUTLINE

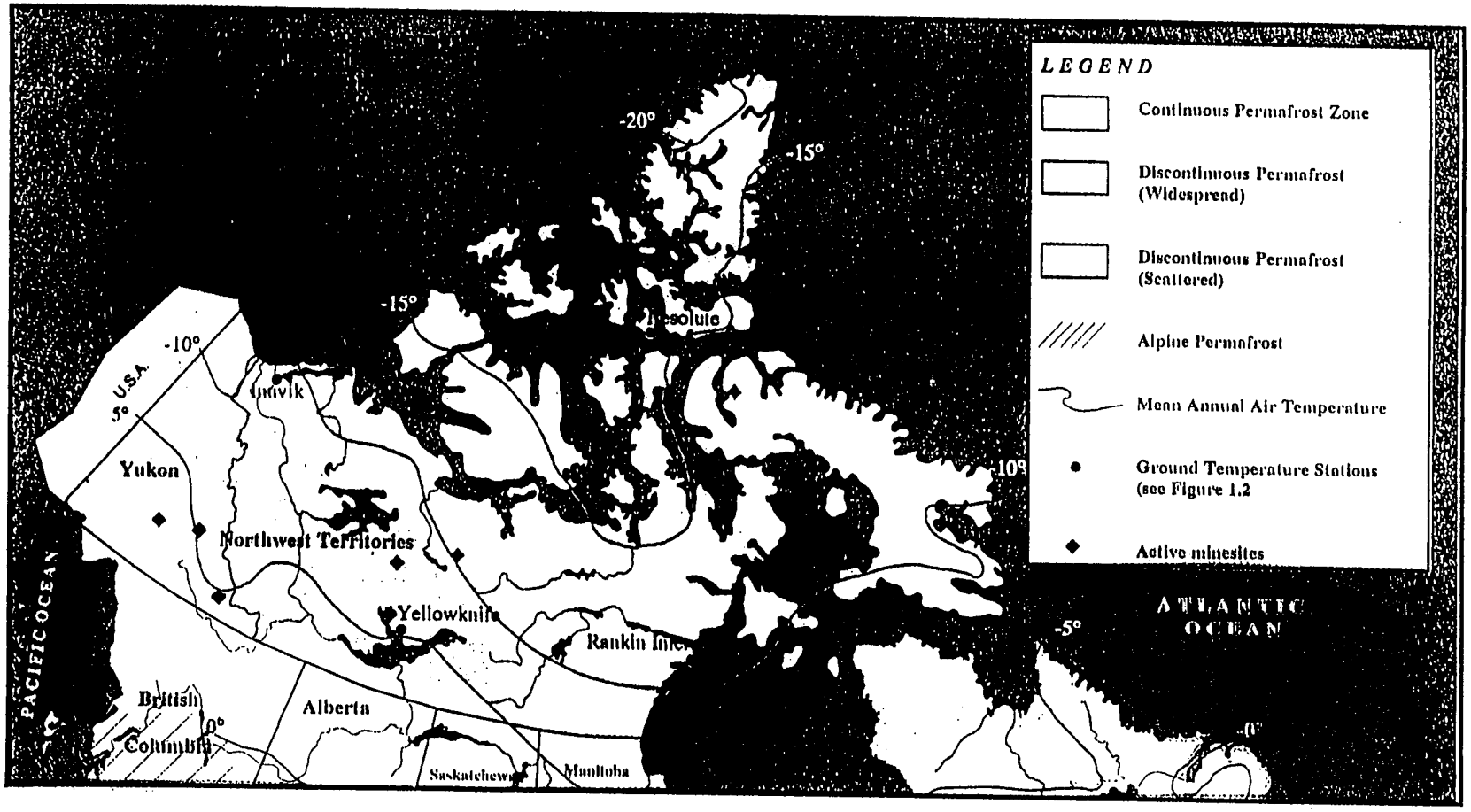
-BACKGROUND

- ISSUES

- CONTROL STRATEGIES

- RESEARCH REQUIREMENTS

Figure 1.1 Canada's Northern Permafrost Regions



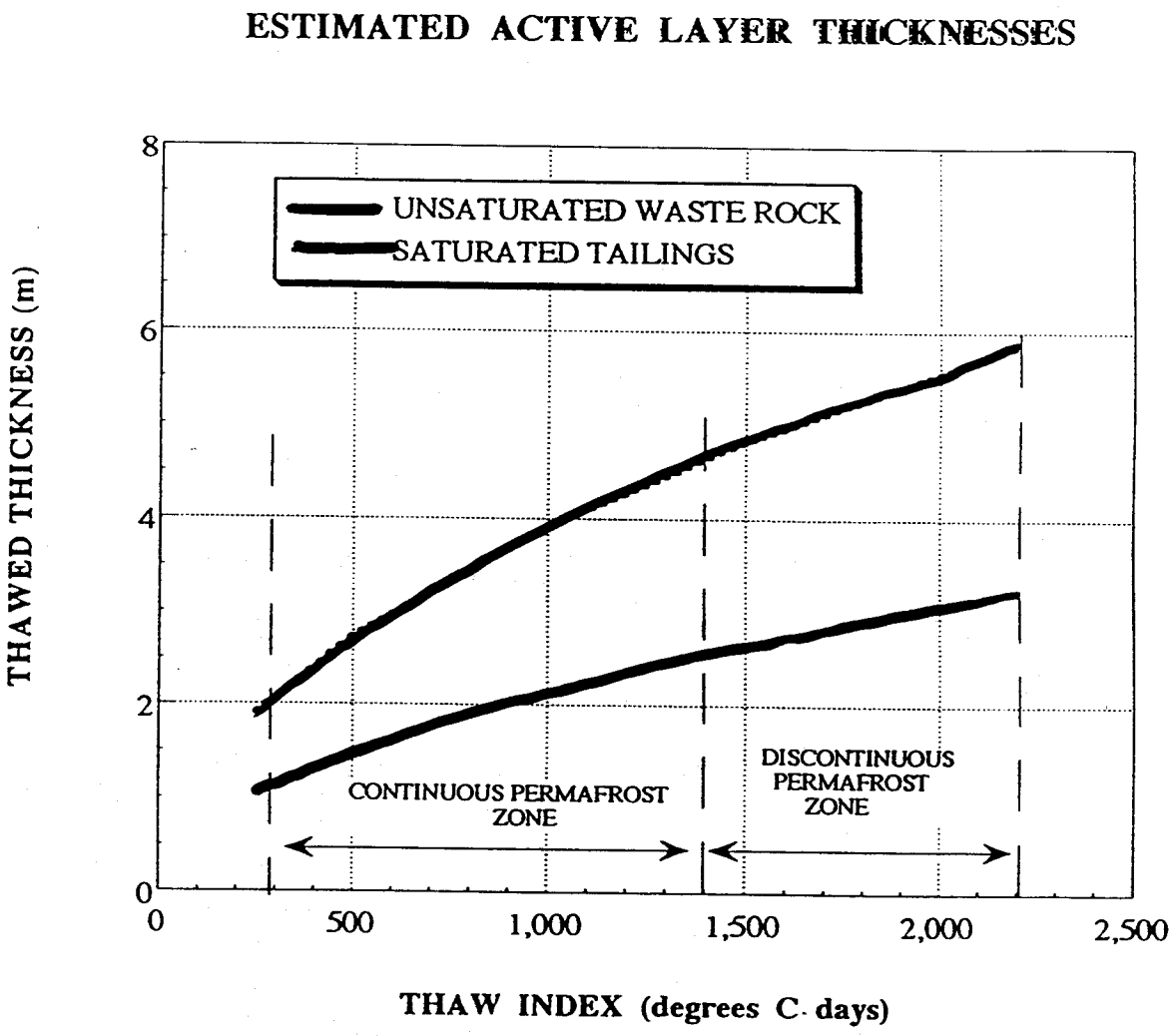


Figure 4.1: Seasonal Thawing Thickness for Mine Waste in Permafrost Regions

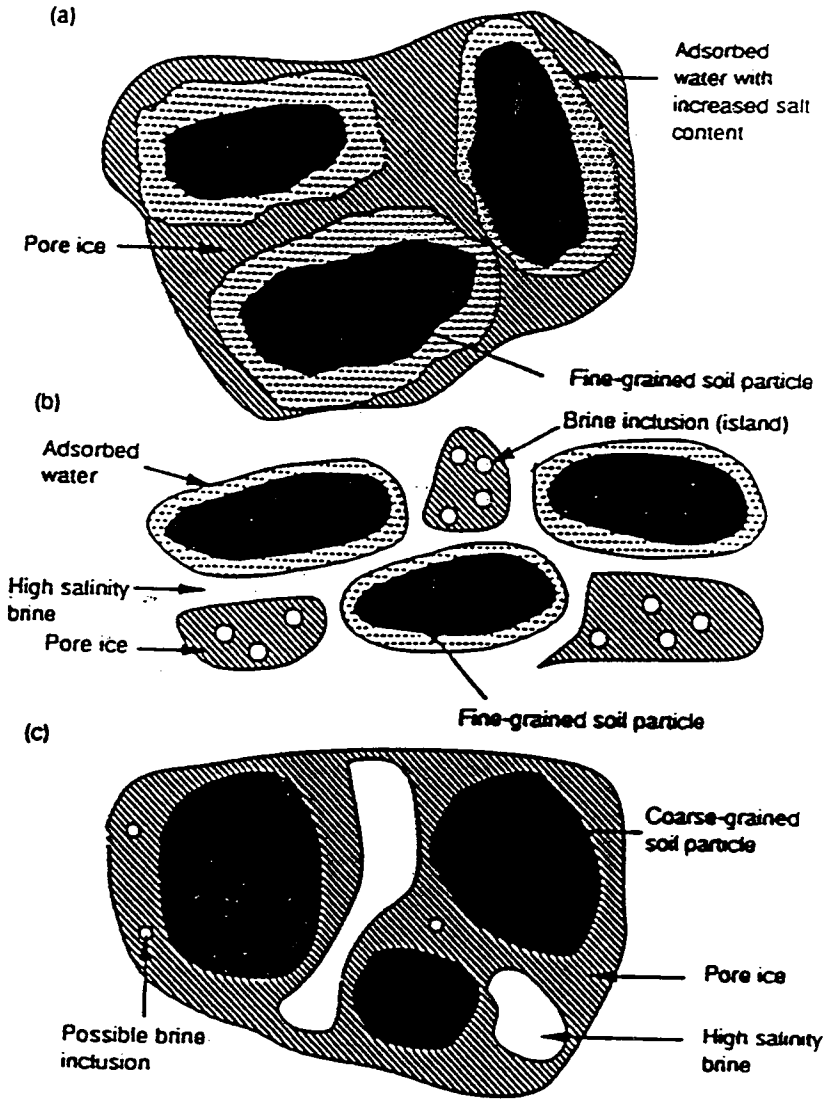


Figure 3.5 Distribution of Unfrozen water in frozen soils.
(a) Low salt concentration pore fluid in fine - grained soil.
(b) High salt concentration pore fluid in fined - grained soil.
(a and b) following Sheeran and Yong (1975).
(c) High salt concentration pore fluid in coarse - grained soil.

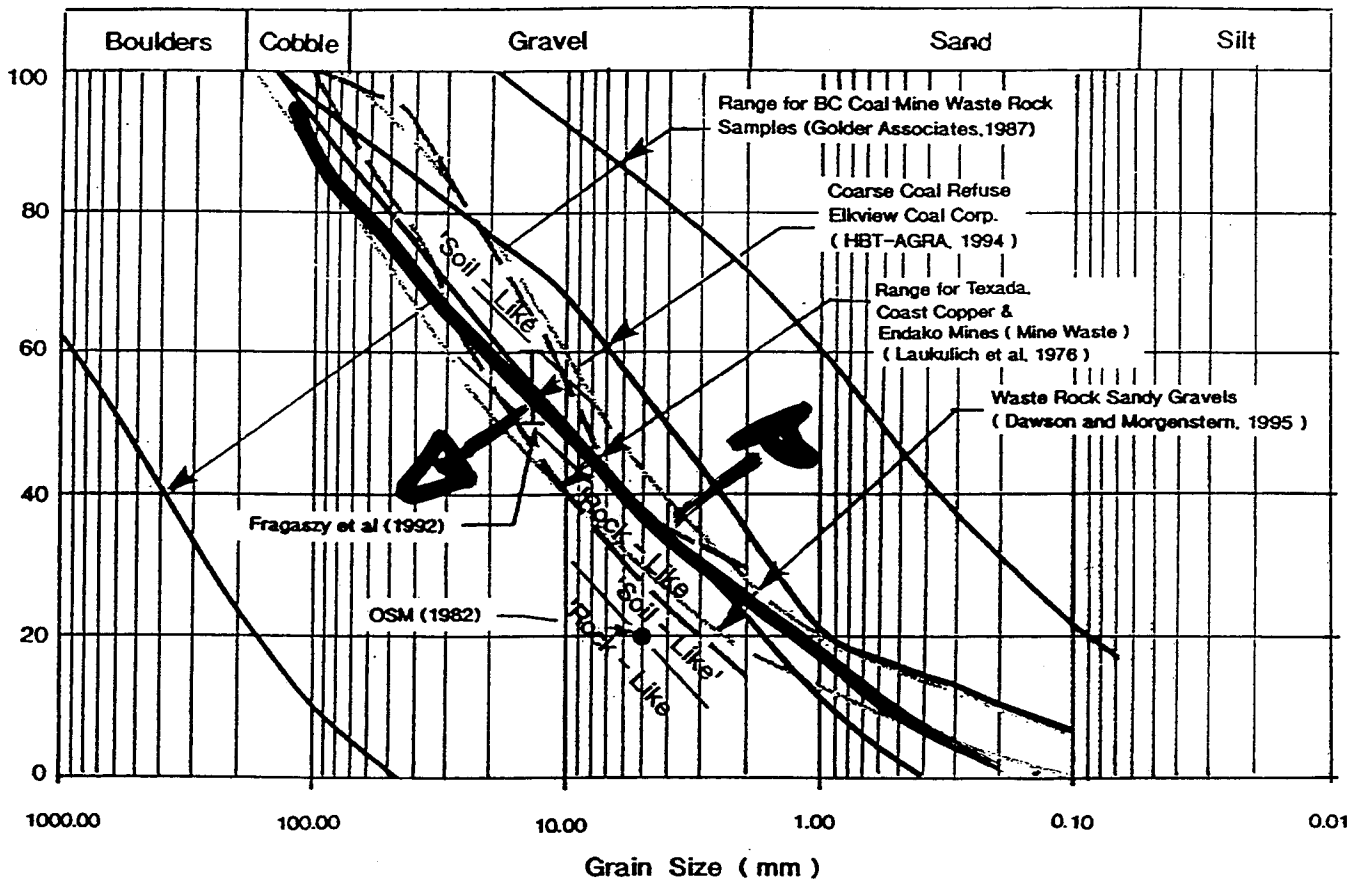


Figure 4.6: Typical Grain Size Distributions of Waste Rock Materials

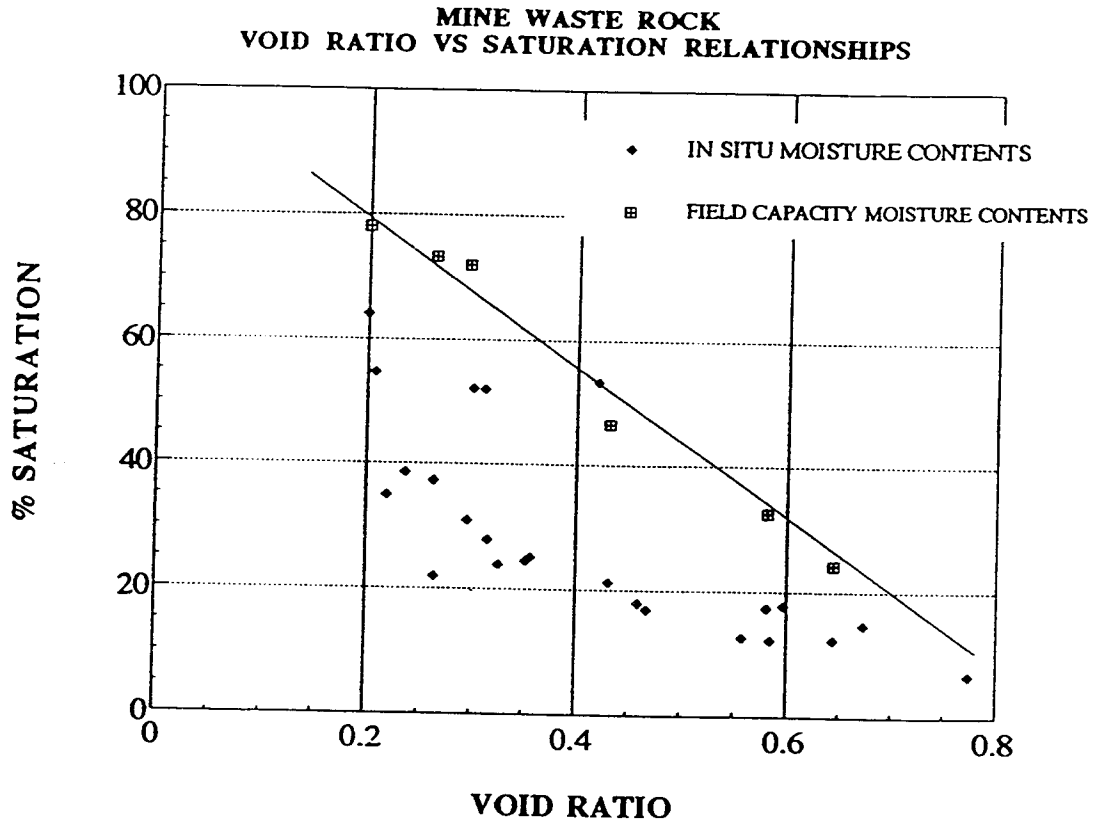
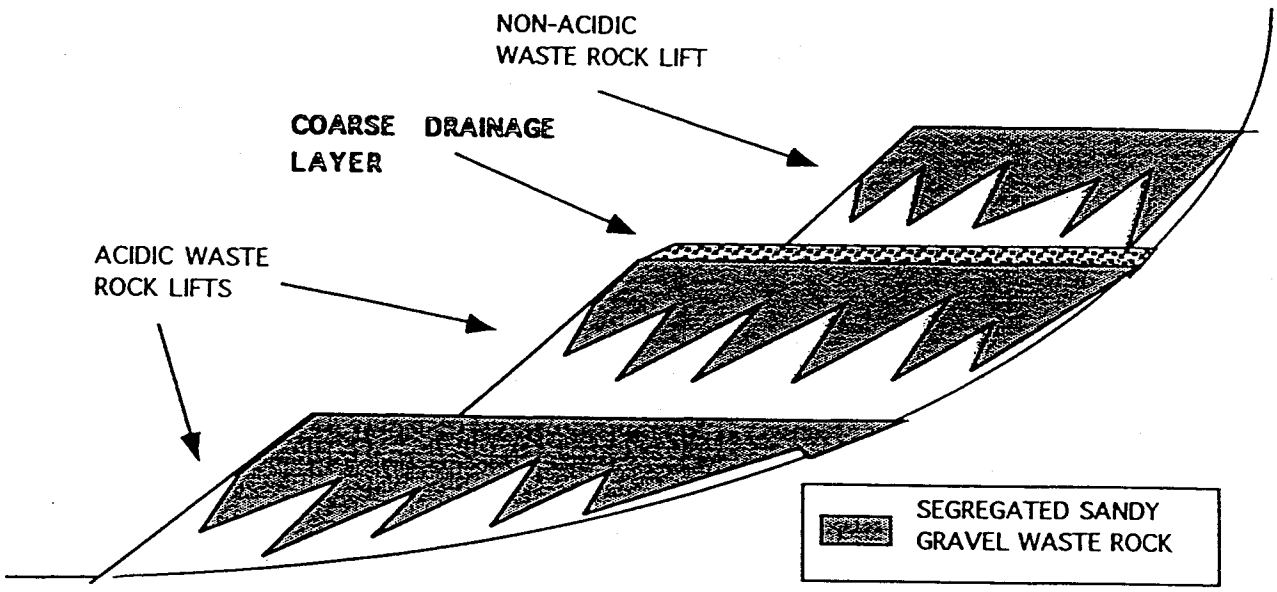


Figure 4.7: Saturation Relationships for Sandy Gravel Mine Waste Rock Materials

A. CONSTRUCTION CONFIGURATION



B. RE-SLOPED CONFIGURATION

NOTE: RE-SLOPING OF FINER SANDY GRAVEL
WASTE SERVES TO REDUCE AIR FLOW THRU BASE OF PILE.
COARSE DRAINAGE LAYER BENEATH NON-ACIDIC UPPER
LIFT LIMITS INFILTRATION INTO ACIDIC WASTE

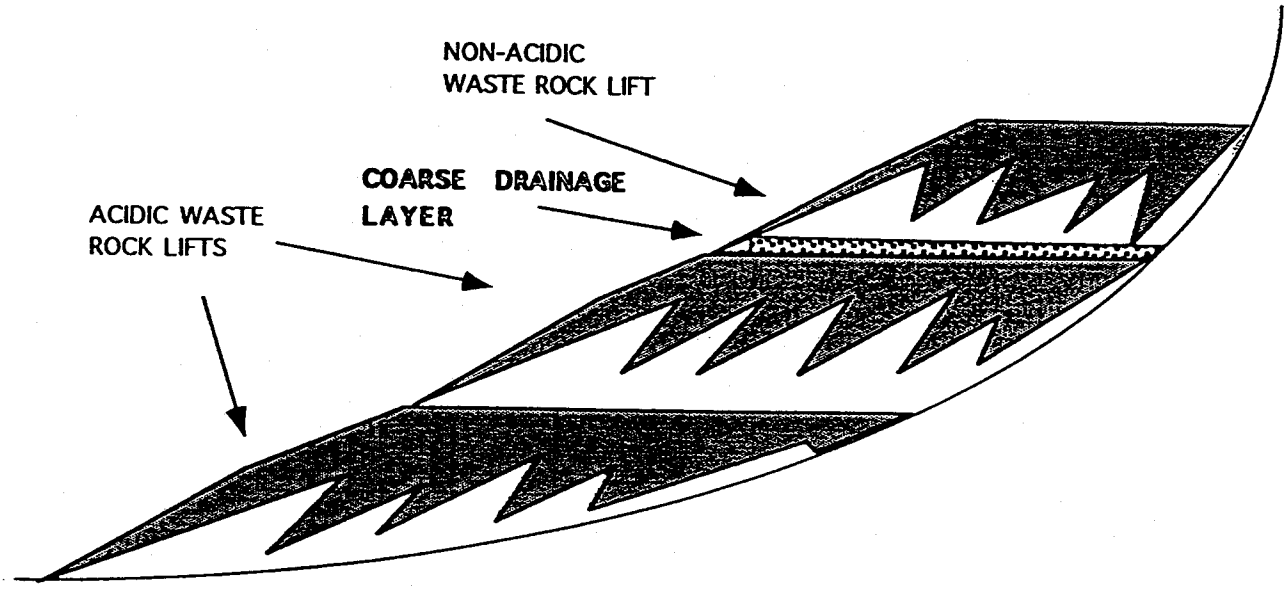


Figure 4.10: Climate Controlled ARD Strategy for Terraced End-Dumped Construction

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RESEARCH AND DEMONSTRATION REQUIREMENTS

- FREEZING POINT DEPRESSION DUE TO PROCESS CHEMEICALS

- ECONOMIC INSULATING COVER DESIGNS

- WATER AND HEAT TRANSFER IN WASTE ROCK DUMPS