Jim N

APPLICATION FOR PROJECT XL: LEACHATE RECIRCULATION AND BIOREACTOR SYSTEMS

WASTE MANAGEMENT

King George County Landfill and Recycling Center
Maplewood Recycling and Waste Disposal Facility

1 August 2000

WASTE MANAGEMENT

DEQ
VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

GeoSyntec Consultants

Jim S

Overview

- Purpose of Project and Overview
- Permitting
- Description of Leachate Recirculation and Bioreactor System Programs
- Components of Final Project Agreement
  - Technical Scope of Work Performed
  - ~~Propos~~ Outline of Proposed Monitoring Program
  - Legal Requirements of USEPA

Tim S

What are Leachate Recirculation and Bioreactor Technologies About?

- Well-established technologies; (California 1970's)
  (1960's extensive laboratory studies)
- First used in 1974; hundreds of successful applications since then;
- Currently being used at nearly one hundred landfills;
- WM is recirculating leachate at three landfills in Virginia: Charles City County, Middle Peninsula, and Atlantic Waste.

DE Solid Waste Authorits since Mid 1980's.

Germany, Switzerland and Austria

Benefits of Bioreactor Landfills

Jim S

- Improved leachate quality;
- Decreased leachate management costs;
- Increased waste disposal capacity;
- Improved economics of energy recovery project feasibility;
- Earlier re-use of site;
- Reduced settlement and strain in final cover system;
- Decreased post-closure care maintenance requirements;
- Decreased potential for post-closure impacts to environment.

Jim S

Introduction

- Project involves development of leachate recirculation system at Maplewood Landfill and landfill bioreactor at King George County Landfill
- Overall Goals are:
  - Evaluate the relative effectiveness of different liquid application rates for bioreactors
  - Quantify the many benefits of leachate recirculation and bioreactor technologies on an operational scale
- Requires regulatory flexibility regarding the Liquids Restriction of 40 CFR 258.28.

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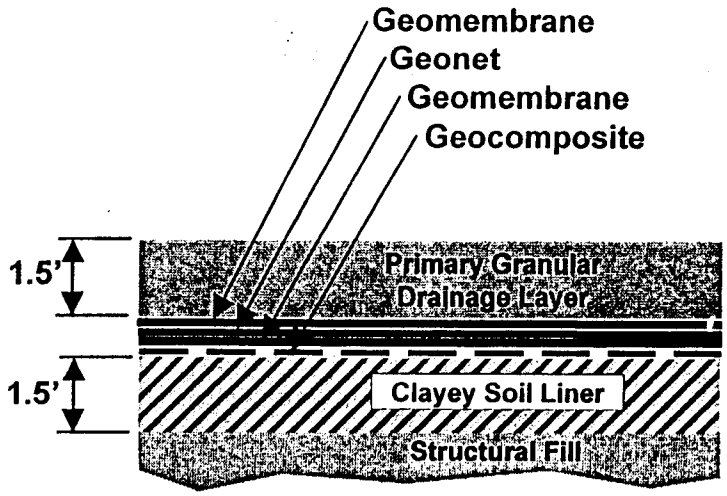
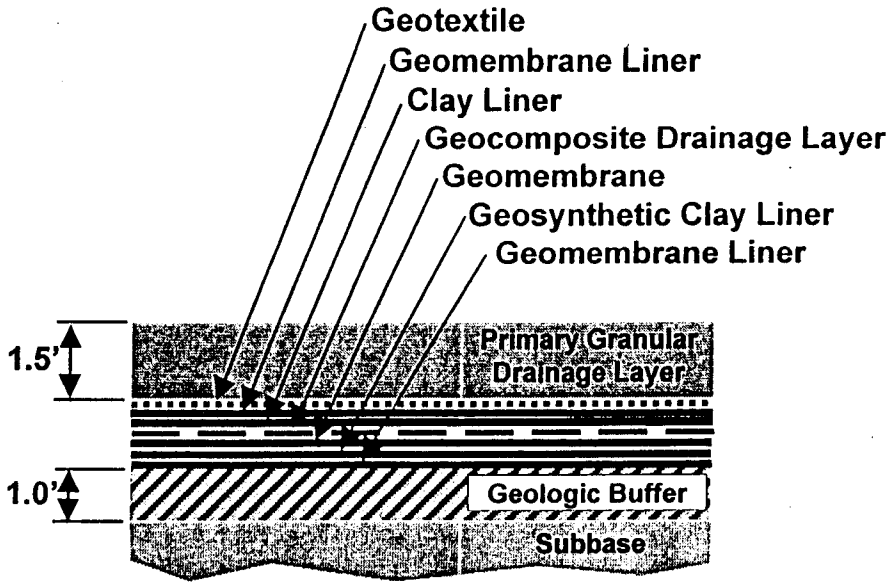
Liner System Details: Maplewood and King George County Landfills



MAPLEWOOD LANDFILL



KING GEORGE COUNTY LANDFILL

Paul F.

Commonwealth of Virginia Benefits

- Pollution Prevention
  - Air - no long-term gas potential
  - Groundwater/surface water - no long-term leachate potential
  - Avoid other leachate disposal issues
- No Future "Open Dump" Status
- Waste Stabilization
  - Prior to closure
  - Active permit control
  - Financial assurance
  - Reduced cost to Commonwealth

Permitting

- Permit Amendment
  - Solid Waste Experimental Facility Permit
    - (9 VAC 20-80-480.G.)
      - for solid waste facility which proposes to utilize an innovative and experimental solid waste treatment technology or process
      - protect human health and the environment
      - permit review: local certification, design, operation, closure, variance, financial assurance, public participation
      - duration: 4 years maximum, 1 year renewable

Permitting

- Permit Amendment
  - Variances
    - VSWMR requires a composite liner
      - Lower component: 2' soil ($1X10^{-7}$ cm/sec)
      - Upper component: 60-mil HDPE
    - Both facilities currently have variances to alternate liner
    - Need a variance to leachate collection for alternate liner
    - Need a variance to recirculating bulk liquids in an alternate liner facility

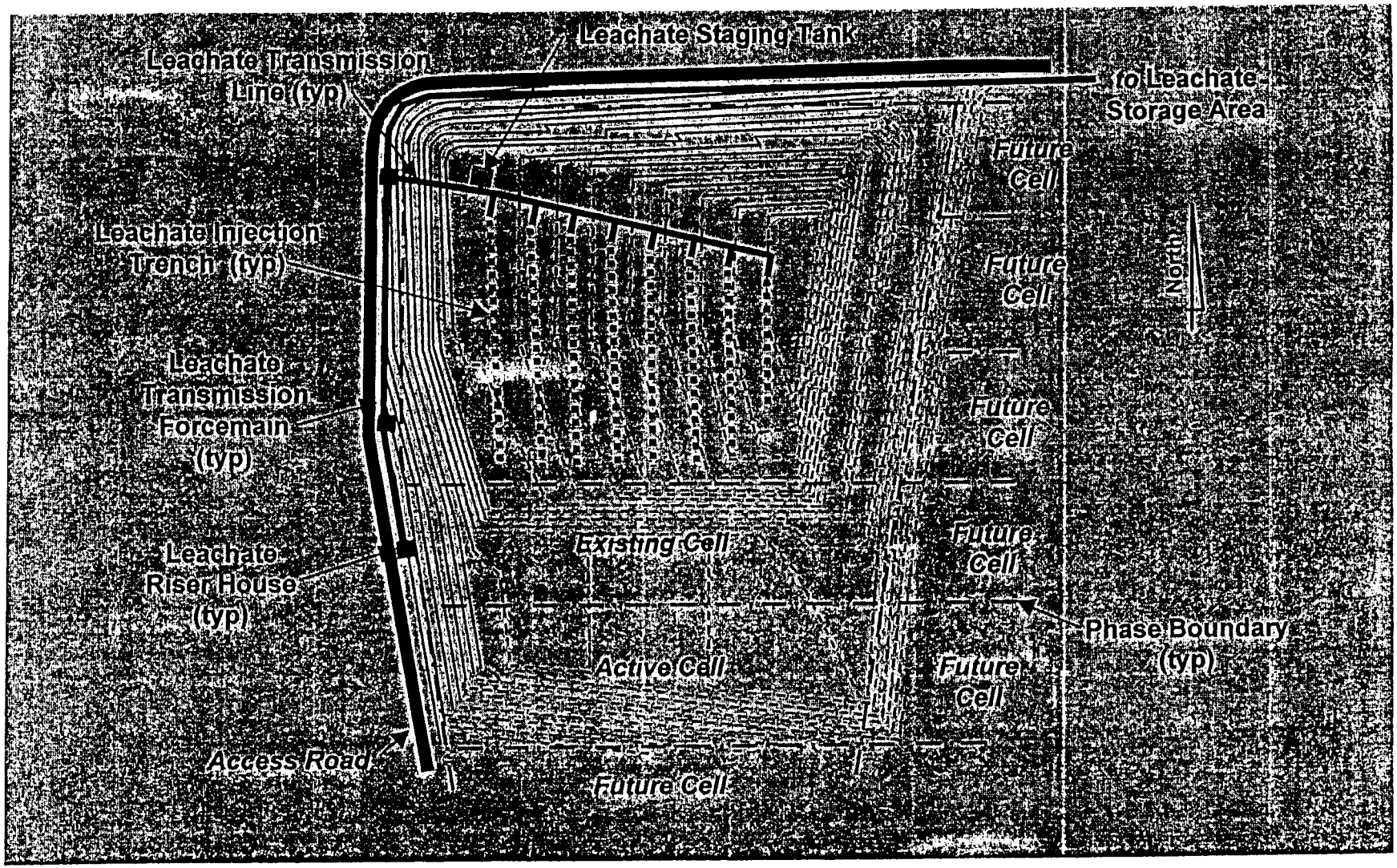
Permitting

- Permit Amendment
  - Water Discharge Permit
  - Air Permit
    - NSPS (40 CFR §60.750)

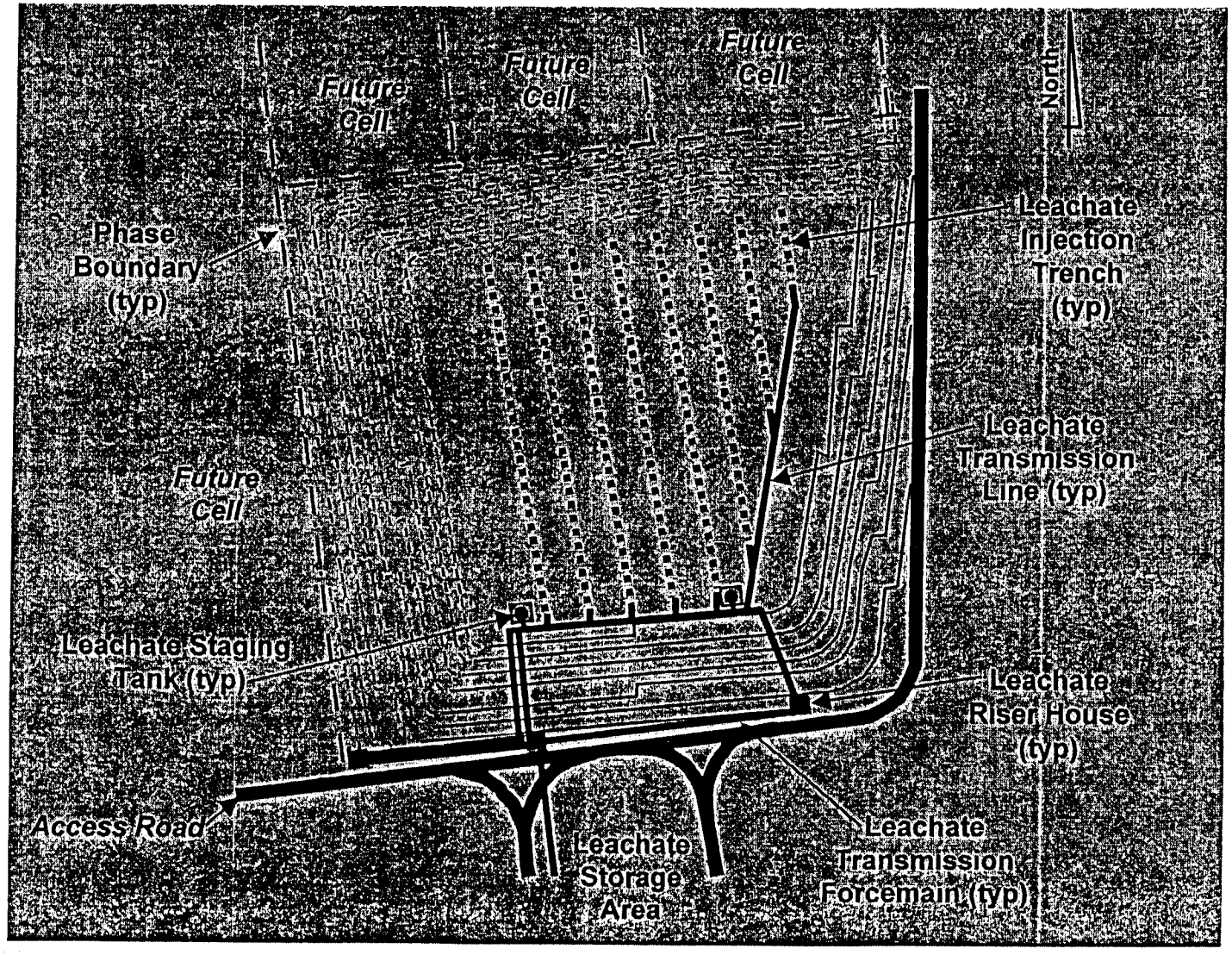
Design Criteria

- Maplewood Landfill: recirculate all of the leachate generated;
- King George County Landfill: recirculate twice the amount recirculated at the Maplewood Landfill;
- Uniformly distribute leachate throughout the waste mass;
- Place distribution structures at least 100 feet from the crests of slopes;
- Provide monitoring features within the liquid application structures; and
- Manage landfill gas throughout the recirculation process.

Leachate Recirculation System Layout: Maplewood Landfill



Landfill Bioreactor System Layout: King George County Landfill



Monitoring Program

- Measure leachate quality in test cells and control cells;
- Track the total quantity of leachate collected and treated;
- Track the total cost for leachate treatment at off-site sources;
- Track the rate that leachate can be applied to the trenches;
- Monitor for the occurrence of odors;
- Monitor for landfill gas components (i.e., NMOCs, methane); and
- Track the settlement of the waste.