

Management of Hazardous Wastes: Issues in Mexico

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Issues That Should Be Considered in Management of Hazardous Waste

Emphasis on Landfilling - Protection of Public Health, Environment, Groundwater Resources, & Interest of Those Who Live/Work near Landfill

Solid Waste Generation in USA

Each Person in USA Generates about

- 1 ton Hazardous Wastes/year
- 1 ton "Non-Hazardous" Wastes/year

from Industrial, Commercial, Residential & Agricultural Activities

Who Generates Hazardous Waste?

Although Industry Actually Produces the Hazardous Waste,

People - You & I - Cause the Generation of Hazardous Wastes through the Goods We Purchase

If the True Cost for Proper Disposal of Hazardous Wastes Were Paid Limited Hazardous Waste Management Problem

- Industry Must Pay for and Effect Proper Disposal
- Public Must Accept Responsibility for Payment in Cost of Goods

"Disposal" of Hazardous Wastes

Formerly:

- In Drums Left at Disposal Site (Municipal or Industrial Landfill) or Buried on Industrial Facility Property
- Dumped into Water or Along Roadways

Currently:

- Landfilled in Plastic-Sheeting- & Clay-Lined Pits
- Incinerated
- Deep-Well-Injected

Ideally for Non-Recoverable Residues:

- Detoxified/Immobilized; Placed in Landfills That Are Properly Designed, Constructed, Operated & Closed to **Ensure** No Release of Waste Constituents at Any Time in the Future

Hazardous Waste Management in Mexico

Status of Hazardous Waste Management in Mexico Today about Where USA Was in 1980's

Adopting Similar Regulatory Approaches

Has Potential to Avoid Mistakes Made in Hazardous Waste Management in USA

Consequence of Improper Management of Hazardous Waste in USA

Large-Scale, Localized Environmental Pollution That Will Ultimately Require Expenditure of > \$500 Billion for "Clean-Up" of Polluted Sites & Groundwater

Superfund - CERCLA

Classification of Solid Wastes

Hazardous Waste

- High Concentration of Leachate-Chemicals That Are "Toxic" in Low Concentrations to People & Animals
- Corrosive - Acids, Bases
- Reactive - Explosive
- Ignitable/Flammable

"Non-Hazardous Waste"

- Lower Concentration of Hazardous Waste Chemicals, Other Chemicals, Pathogens

Arbitrary Definition/Classification

- "Non-Hazardous" Wastes Contain Hazardous Chemicals & Other Chemicals That Can Render a Groundwater Unusable as Domestic Water Supply

Waste Leaching Characteristics

Toxicity Characteristic Leaching Procedure (TCLP)

For "Non-Hazardous Wastes" US EPA Allows Leaching of Chemicals from Wastes in TCLP up to 100-Times Drinking Water Standards

Not Protective

Hazardous Waste Disposal in Municipal Solid Waste Landfills in USA

Small Amounts of "Hazardous Wastes" Allowed in MSW Landfills

- Small Generators
- Household Hazardous Wastes

Illegal Disposal by Industry & Commercial Establishments

- Municipal Landfill Disposal Cost: \$20-\$70/ton
- Hazardous Waste Landfill Cost: \$200-\$500/ton

Economic Incentive to Dispose of "Hazardous Wastes" in Municipal Solid Waste Landfills

Disposal of Hazardous Wastes

Treatment to Reduce/Eliminate Highly Hazardous Characteristics

- Incineration
- Biological Treatment
- Bacteria/Fungi Degrade Some Wastes;
- Composting; Land-Farming of Oily Wastes

- Chemical Treatment
- Degrade Chemical;
- Fix/Immobilize Chemicals Forming "Cement"-Like Structure
- Dry Waste to Eliminate Liquids

Concerns for Protection of Groundwater Quality

Regulated Hazardous Chemicals

"Priority Pollutants" - 125 Chemicals Toxic to People and/or Wildlife

Selected Heavy Metals, Chlorinated Solvents, Pesticides, PCB's

Conventional Pollutants

e.g., Iron, Manganese, Total Dissolved Solids, H₂S, Hardness, BOD, Taste & Odor, Color

Non-Conventional Pollutants

Unregulated Hazardous & Detrimental Chemicals

95% of Organics in Solid Wastes Are of Unknown Character & Hazard

Management of Hazardous Wastes

Waste Minimization

Minimization of Development of Hazardous Waste Required by USA Regulations

- Change Industrial Processes to Use Less Hazardous Chemicals

High Cost of Proper Hazardous Waste Disposal Causes Industry to Reduce Generation of Hazardous Waste

Resource Recovery

Re-Use Hazardous Waste for Beneficial Purposes

Waste Exchange

Diagram of double composite liner

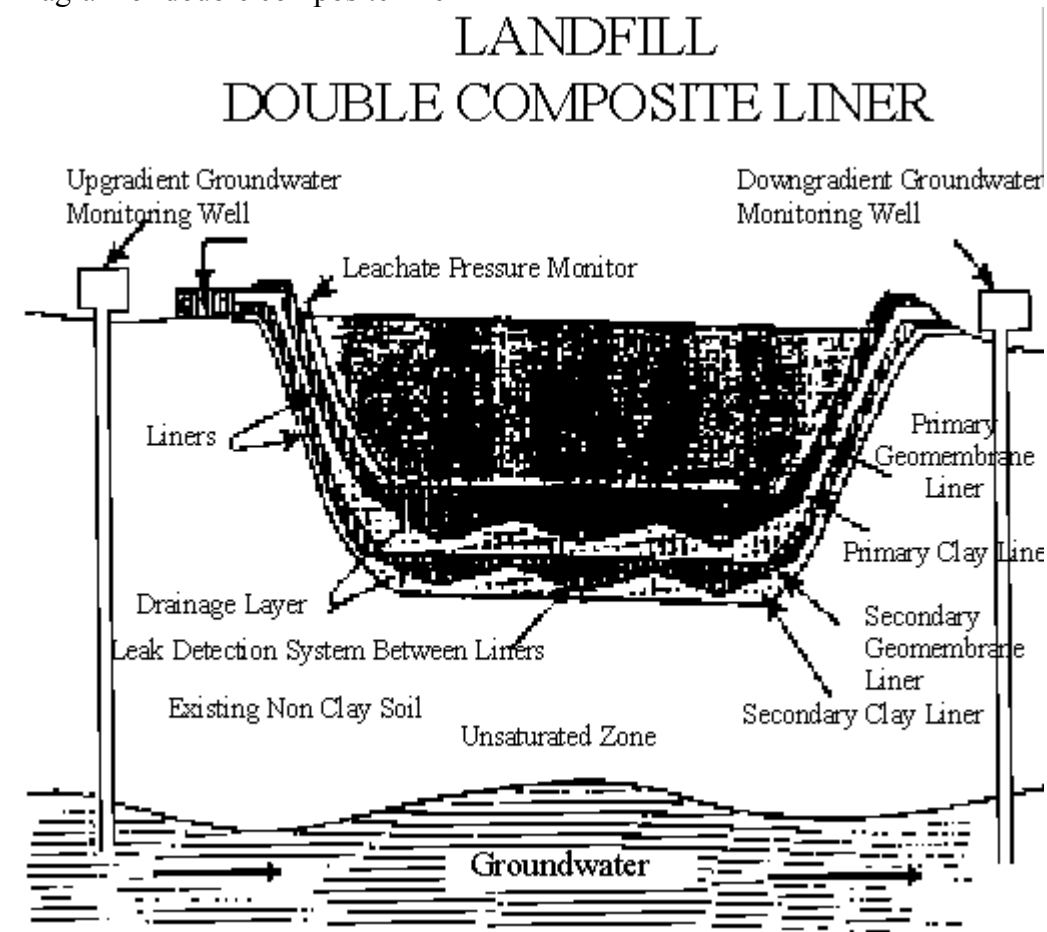


Diagram of Landfill Cap at Closure

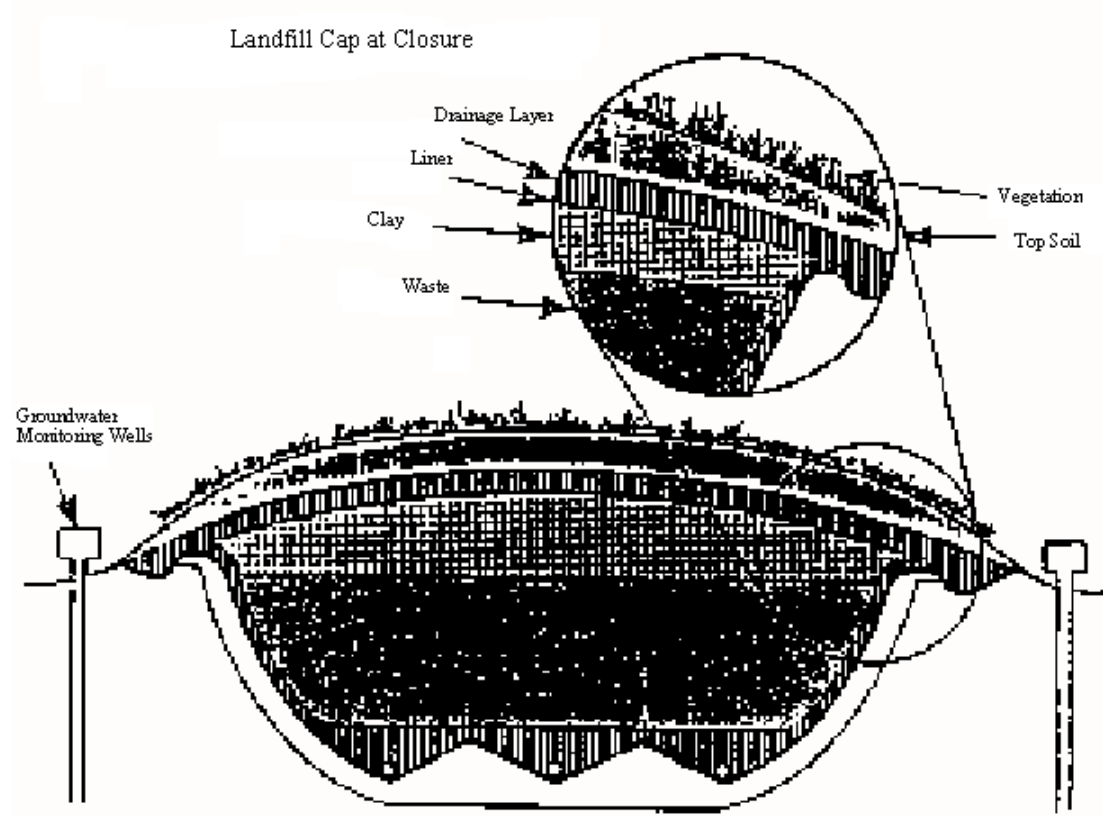


Diagram of Secure Chemical Landfill

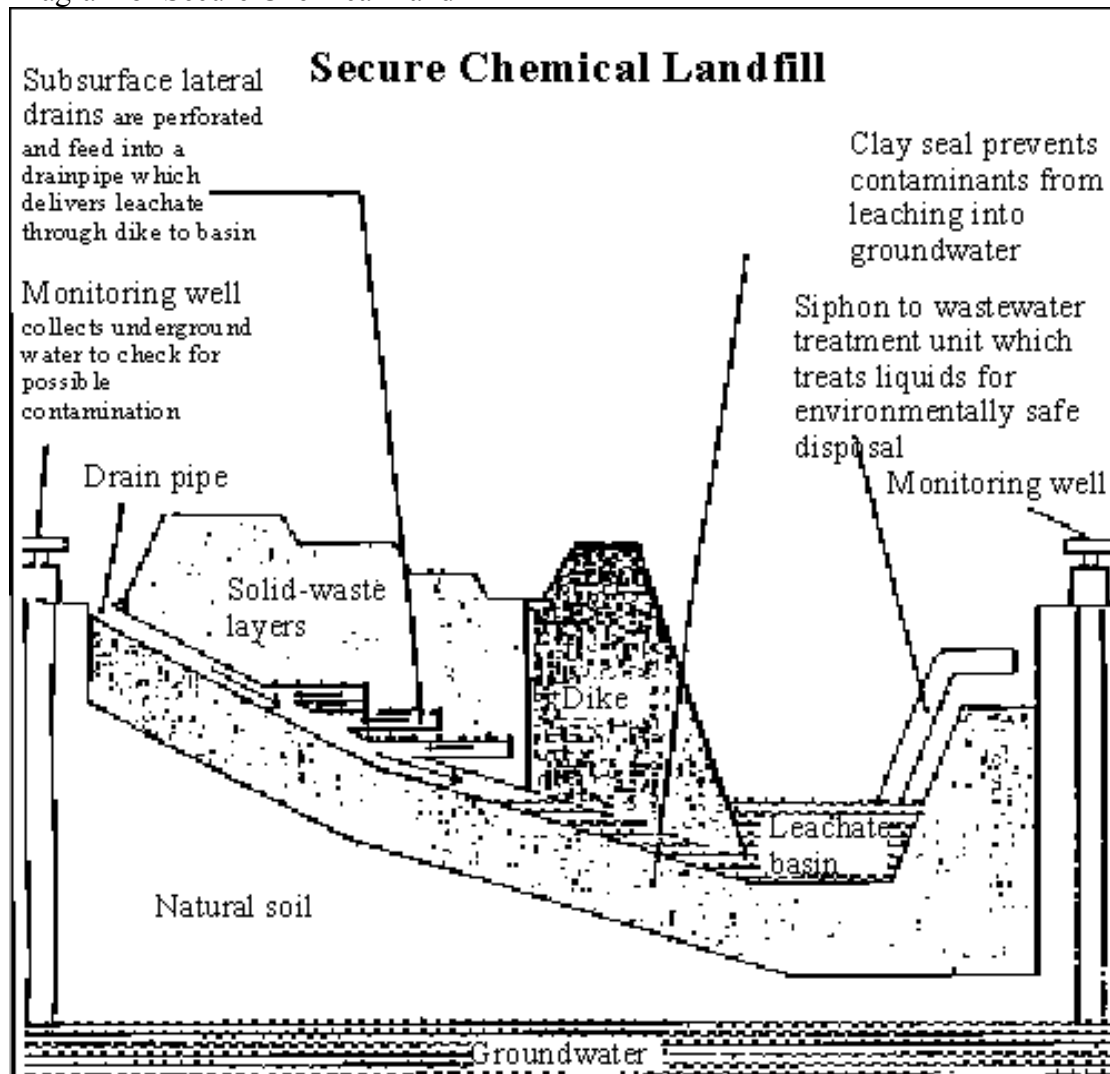
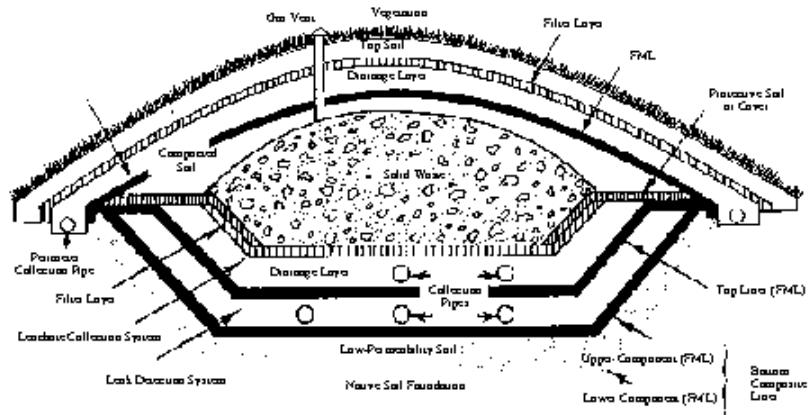


Diagram of Closed Double Composite Lined Landfill



Above-Ground Landfills

Problem with In-Ground Landfills: Cannot Determine When They Start to Leak

Liners Can Leak for Years without Detection by Monitoring Wells

Place Landfill above Ground, on Elevated Platform

See When and from Where Leakage Occurs

Cost Estimated to Be Somewhat Higher

No Significant Experience; Difficult for Regulatory Agencies to Try New Approaches

Problems with Incineration

Expensive - Must Be Competitive

Operation Problems - Public Health & Environmental Concerns & Hazards

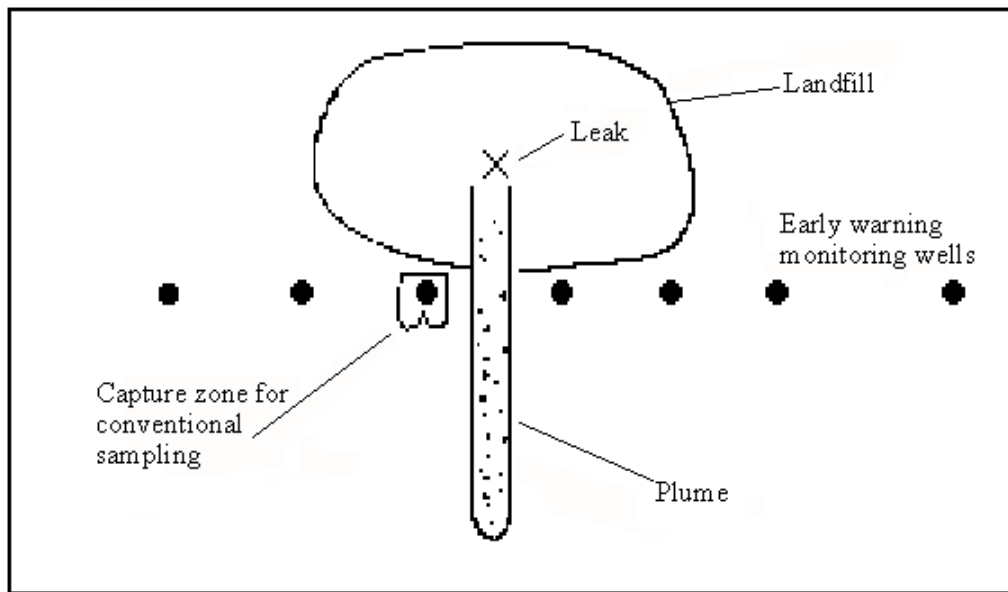
Public Opposition

Problems with Deep-Well Injection

Plugging of Aquifer

Difficult to Control to Avoid Pollution of Usable Aquifer

Pattern of landfill leakage - groundwater contamination from lined landfills (After Cherry 1990)



After Cherry 1990

Composite-Lined "Dry Tomb" Landfill * In Concept *

Prevents Moisture from Entering Landfill & Generating Leachate

Any Leachate Generated in Landfill to Be Collected in Leachate Collection & Removal System

Any Leachate That Passes Through Liner & Pollutes Groundwater Should Be Detected by Groundwater Monitoring Wells at Point of Compliance

Any Leachate-Polluted Groundwater That Passes Point of Compliance Will Be Cleaned Up

All Potential Problems with a Landfill Will Occur within 30 Years after Landfill Closure

The Funds Typically Provided for Mandated 30-yr Post-Closure Care Period Will Meet All Needs



To Address "Other" Problems of Landfills

Must Have Adequate Landfill Owner-Owned Buffer Lands to Dissipate Adverse Releases from Landfill

Typically 1 to 2 miles of Buffer Land Needed

Problems with RCRA "Dry Tomb" Hazardous Waste Landfills

Do Not Provide Protection of Public Health, Groundwater Quality, and Environment for as Long as Wastes in Landfill Represent a Threat

- Even with "Treatment," the Wastes Placed in the Landfill Will Be a Threat to Public Health, Groundwater Resources, & Environment **Forever**
- Landfill Cover Will Not Keep Wastes Dry - i.e., Leachate Will Be Generated in the Landfill
- Eventually, Liner System Will Not Be Effective in Collecting Leachate Which Will Lead to Pollution of Groundwater by Leachate
- Groundwater Monitoring Wells Will Not Likely Detect Incipient Leachate-Pollution of Groundwater Before Widespread Pollution of Groundwater Occurs
- No Assurance That Adequate Funds Will Be Available to Provide Appropriate Post-Closure Maintenance, Monitoring & Contingencies Associated with Groundwater Clean-Up

Overall

The Plastic- & Compacted Clay-Lined RCRA Hazardous Waste Landfills Are Based on a Flawed Technological Approach That, at Best, Only Postpones Groundwater Pollution by Leachate




NIMBY "Not In My Back Yard"


Everyone Becomes a "NIMBY" When a Landfill Is Proposed for Siting in His/Her Backyard

Why?

Landfills Are Adverse to Those Who Own or Use Properties near Landfills



Recommendations for Development of Hazardous Waste Landfills

- Practice Waste Minimization & Reuse of Hazardous Wastes to Maximum Extent Possible
 - Site Characteristics Paramount Consideration -Hydrogeological, Groundwater Resource
 - `Double-Composite Liner for Landfills - Lower Composite "Liner" Used as Leak Detection System for Upper Liner
 - Require Removal of Landfilled Wastes When Landfill Owner/Operator Cannot Stop Leachate from Occurring in Leak Detection System between the Two Composite Liners
 - Require Leak-Detectable Covers at Closure, and Their Operation & Maintenance for as Long as the Landfill Exists
 - Require Post-Closure Care for as Long as the Wastes in Landfill Represent a Threat, Which for a "Dry Tomb"-Type Landfill, Is Understood to Be Forever
 - Require Dedicated Trust Fund to Be Developed from Disposal Fees to Ensure That Adequate Funds Will, in Fact, Be Available When Needed for Perpetual Monitoring, Maintenance & Care, and to Meet Plausible Worst-Case Contingencies That Could Occur at Landfill, Including Waste Exhumation and Clean-Up of Polluted Groundwater
 - Develop Regulations to Ensure That All Justifiable NIMBY Impacts Associated with the Landfill Are Controlled within the Landfill Owner's Property Boundary
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References as:"Lee, G. F. 'Management of Hazardous Wastes: Issues in Mexico,' Presentation Greenpeace Mexico Conference, "Foro Ciudadano Sobre Desechos Toxicos," San Luis Potosi, SLP, Mexico (1995)."