Waste Area Group 7 - Operable Unit 7-13/14

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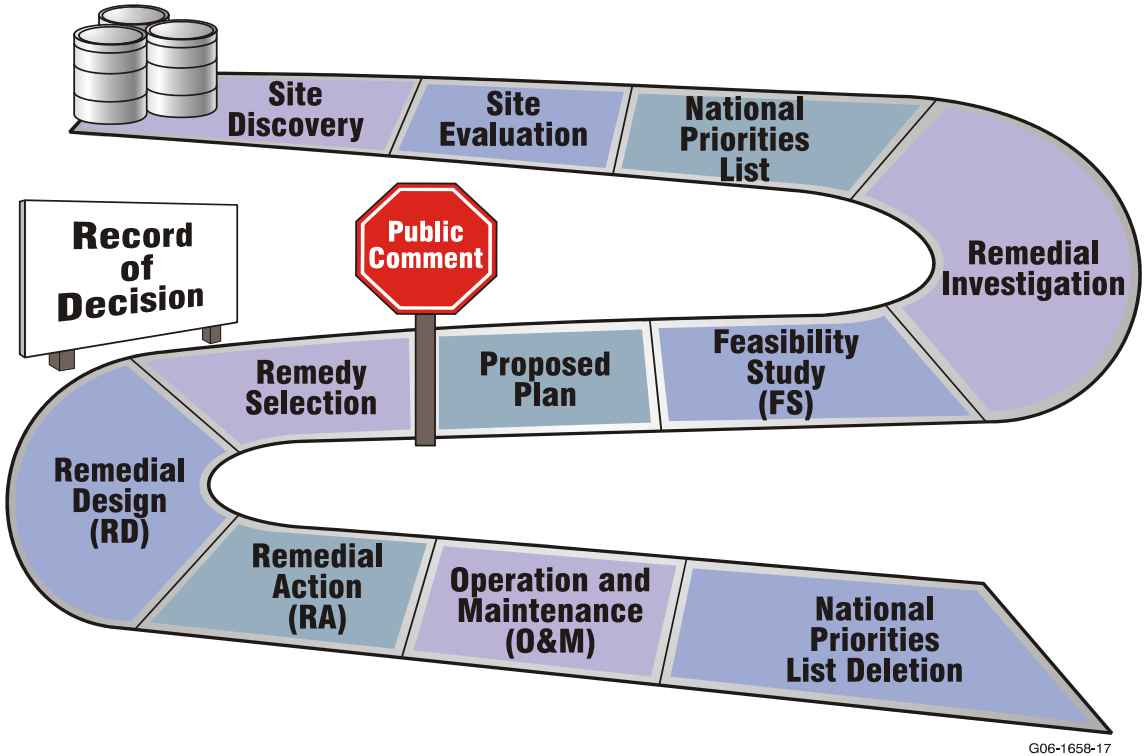
Federal Project Director

Where Are We At Now ?



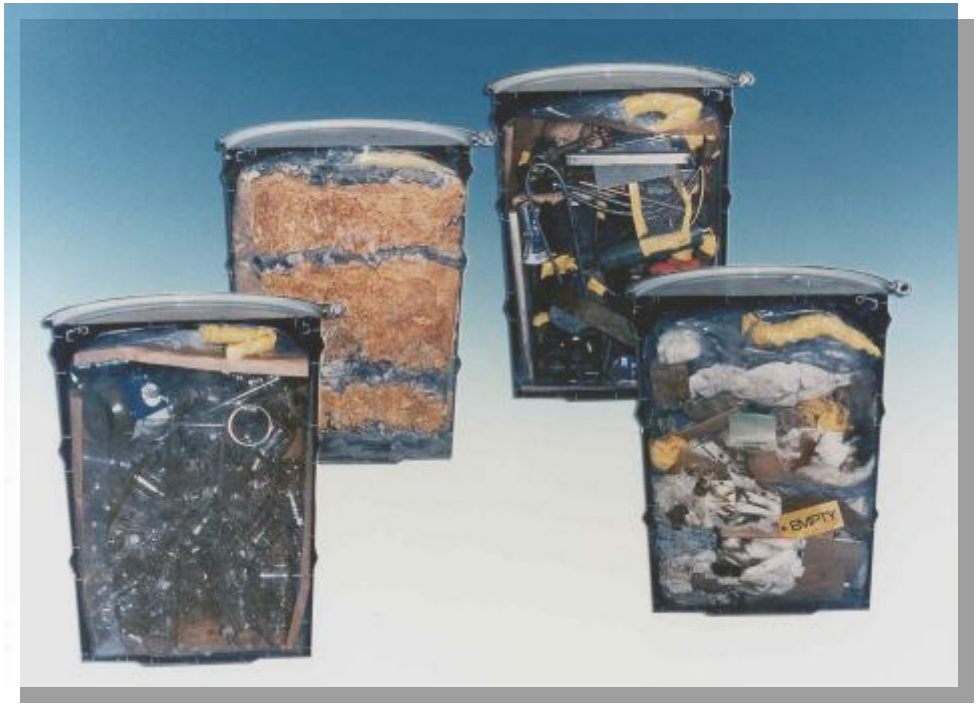
Subsurface Disposal Area (SDA) at the Radioactive Waste Management Complex

History of the Subsurface Disposal Area (SDA) Radioactive Waste Management Complex (RWMC)

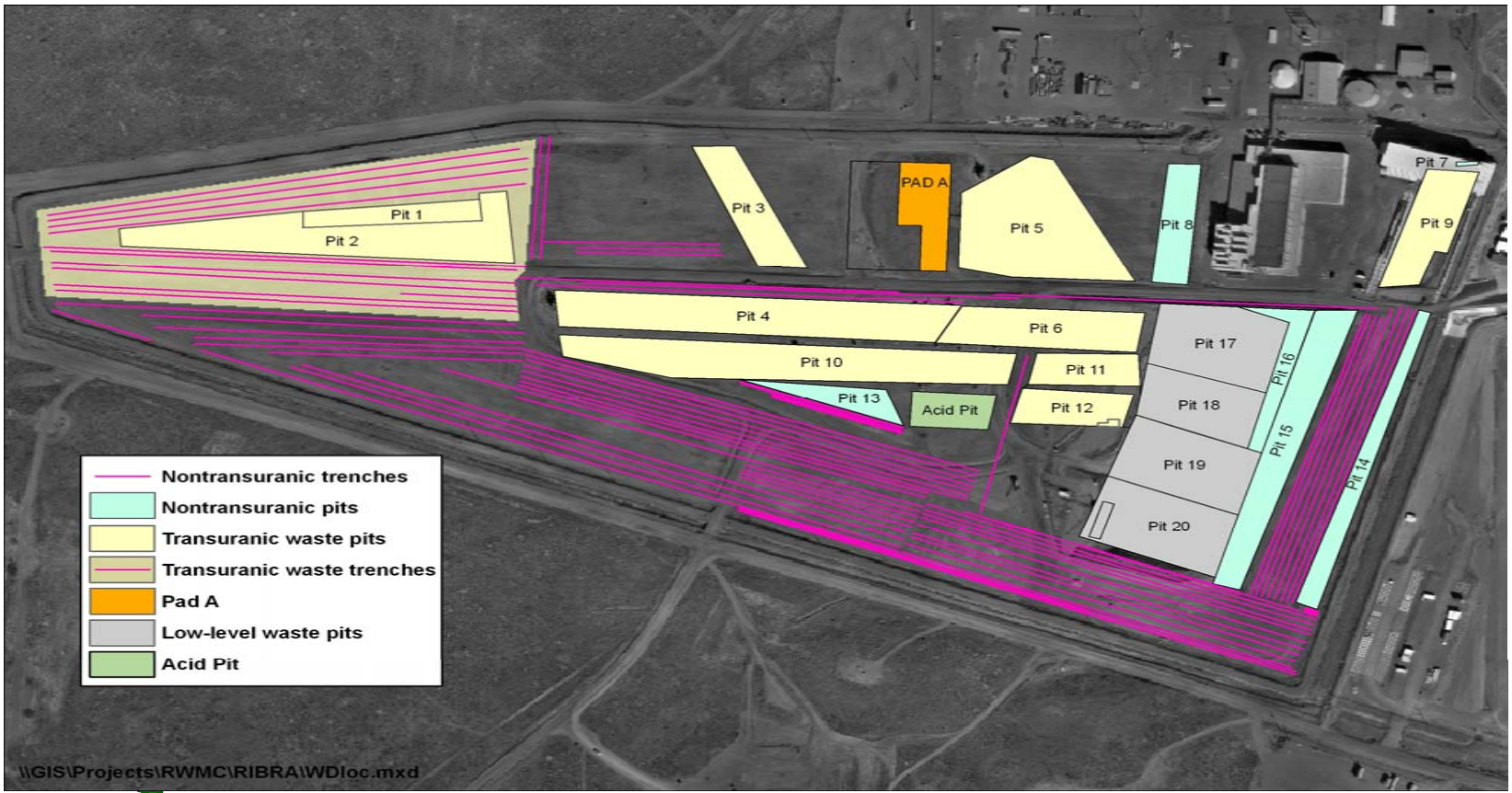
- The RWMC disposal site was established in 1952 and currently the SDA encompasses 97 acres within the fence boundary with waste occupying approximately 35 acres
- The Rocky Flats Plant (RFP) began shipping transuranic waste for permanent landfill disposal in 1954
- Pre-1970 – accepted waste from Rocky Flats, INL, and other generators
- Post 1970 to present – low-level waste disposal; TRU waste storage at the Transuranic Storage Area (TSA)
- Burial of transuranic waste was discontinued in 1970

Waste Shipments to the SDA

- 30,000 waste shipments made to the SDA
  - 2,300 shipments from Rocky Flats Plant
- Approximately 241,000 m^3 of waste disposed of
  - 73,000 m^3 from Rocky Flats Plant
- Nearly 425,000 containers of waste
  - 230,000 containers from Rocky Flats Plant



Transuranic and Low-Level Waste Disposal Locations in the Subsurface Disposal Area



Remedial Investigation/Baseline Risk Assessment (RI/BRA) Overview

- The RI/BRA presented site characterization information, modeling results, exposure pathways, and estimates of cumulative human health risk and ecological risk associated with buried waste in the SDA
- The RI/BRA represented more than 10 years of characterization and assessment of hazards in the SDA
- The purpose of the RI/BRA was to provide decision makers with a basis for determining whether additional remedial action at the SDA is necessary
- The RI/BRA determined that the Baseline Risk (without remediation) is unacceptable
  - Twelve radionuclides and six nonradionuclides pose unacceptable risk to human health and the environment based on a 1,000 year simulation period

Feasibility Study

- The Feasibility Study outlined preliminary remediation goals and evaluated a range of remedial alternatives
- Alternatives evaluated vary from taking no action to complete removal of all source term at the SDA
- A Proposed Plan was generated based on the results of the RI/BRA and Feasibility Study. The regulatory agencies are reviewing it right now. It will be provided to the public for review in 2007

Common Elements of the Alternatives

Each action alternative includes the following:

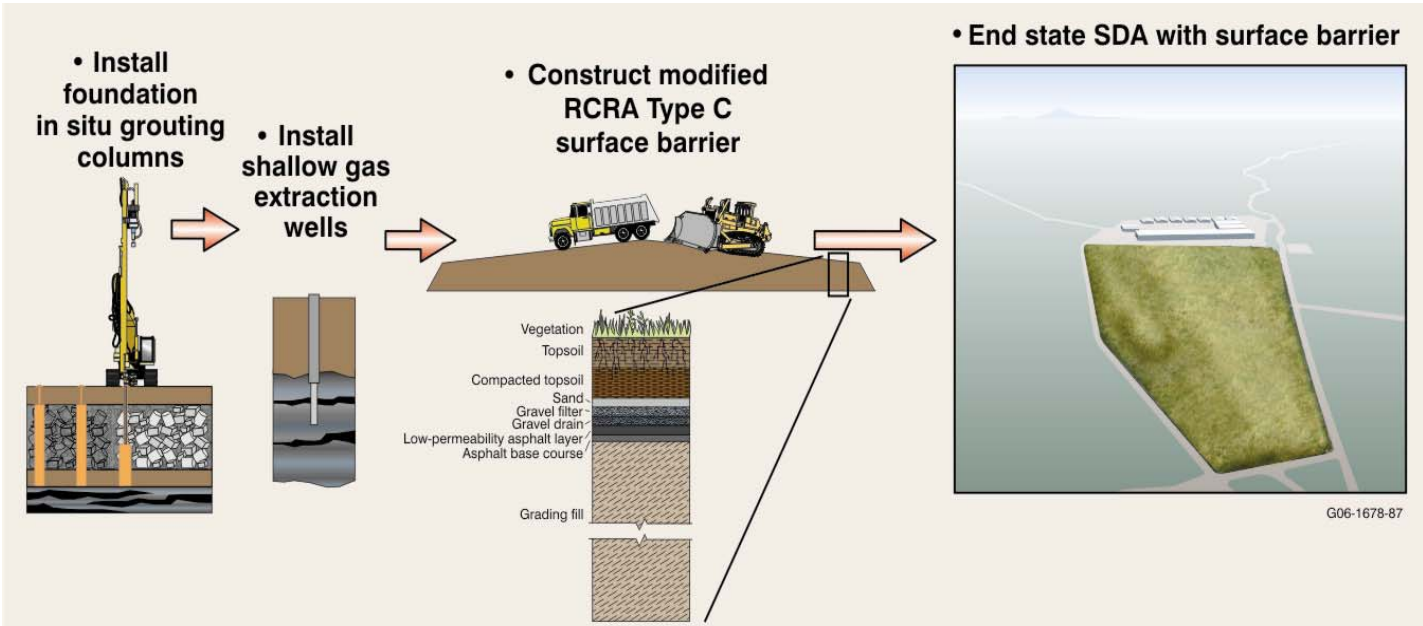
- **An engineered surface barrier**
- **Continued operation of the Organic Contaminants in the Vadose Zone (OCVZ) system**
- **Long-term surveillance and maintenance**
- **Long-term monitoring**
- **Long-term institutional control**

Alternative 1—No Action

- **Environmental monitoring only using the existing network**

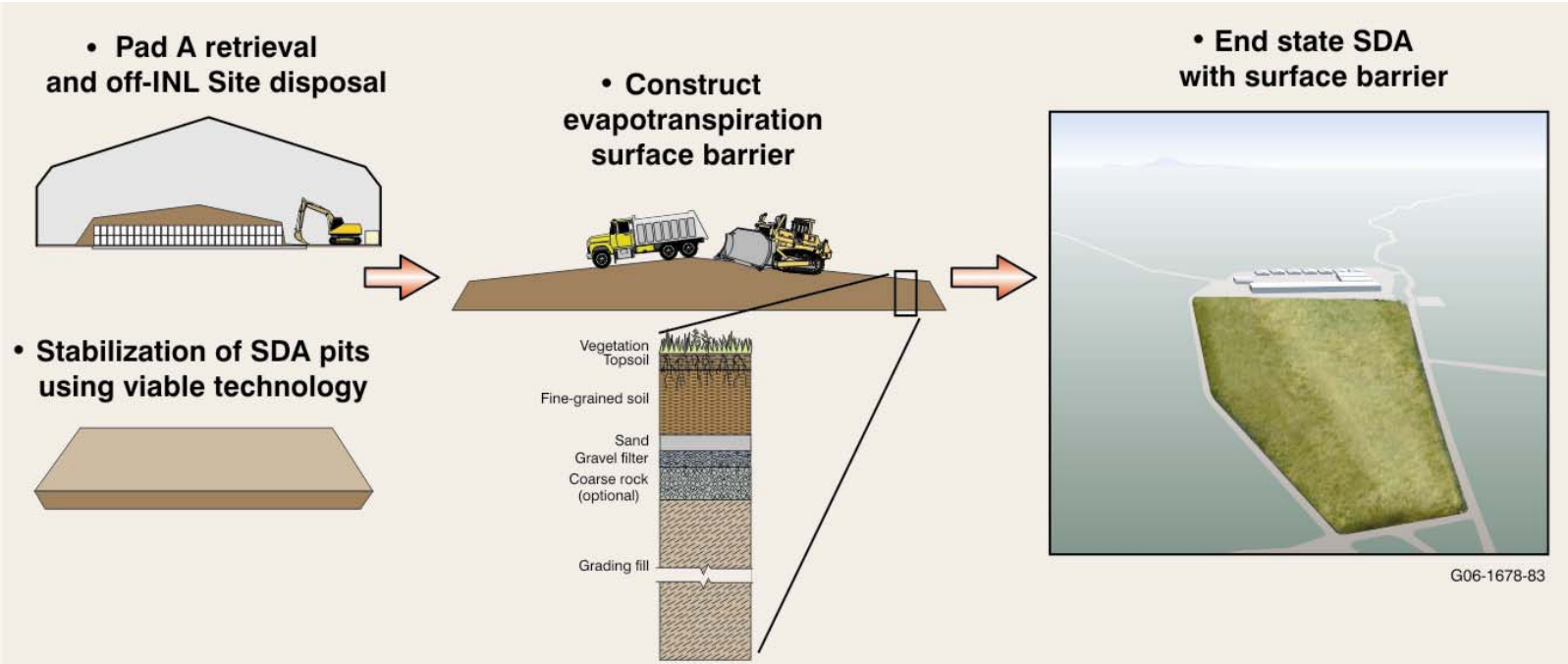
Alternative 2a—Modified RCRA Type C Surface Barrier

- **Grout columns installed in pits to provide stable cap foundation**
- **Near-surface extraction wells added to the OCVZ system to preclude accumulation of gases beneath the asphalt layer**
- **Pad A left as is and incorporated into the cap**
- **Remediation completed by Modified RCRA Type C surface barrier**



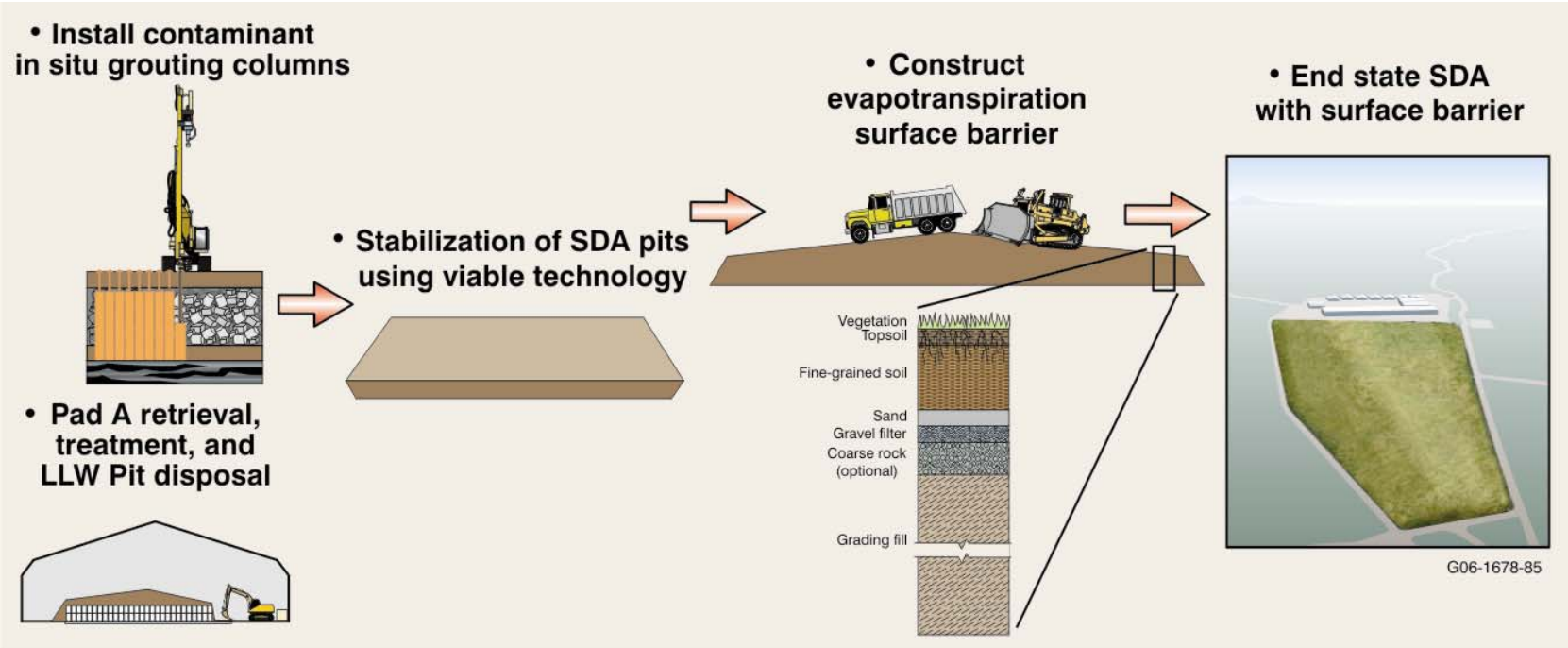
Alternative 2b—Evapotranspiration Surface Barrier

- **Pad A waste retrieved and relocated to the LLW pit**
- **Pits stabilized to provide stable cap foundation**
- **Remediation completed by ET surface barrier with active venting**



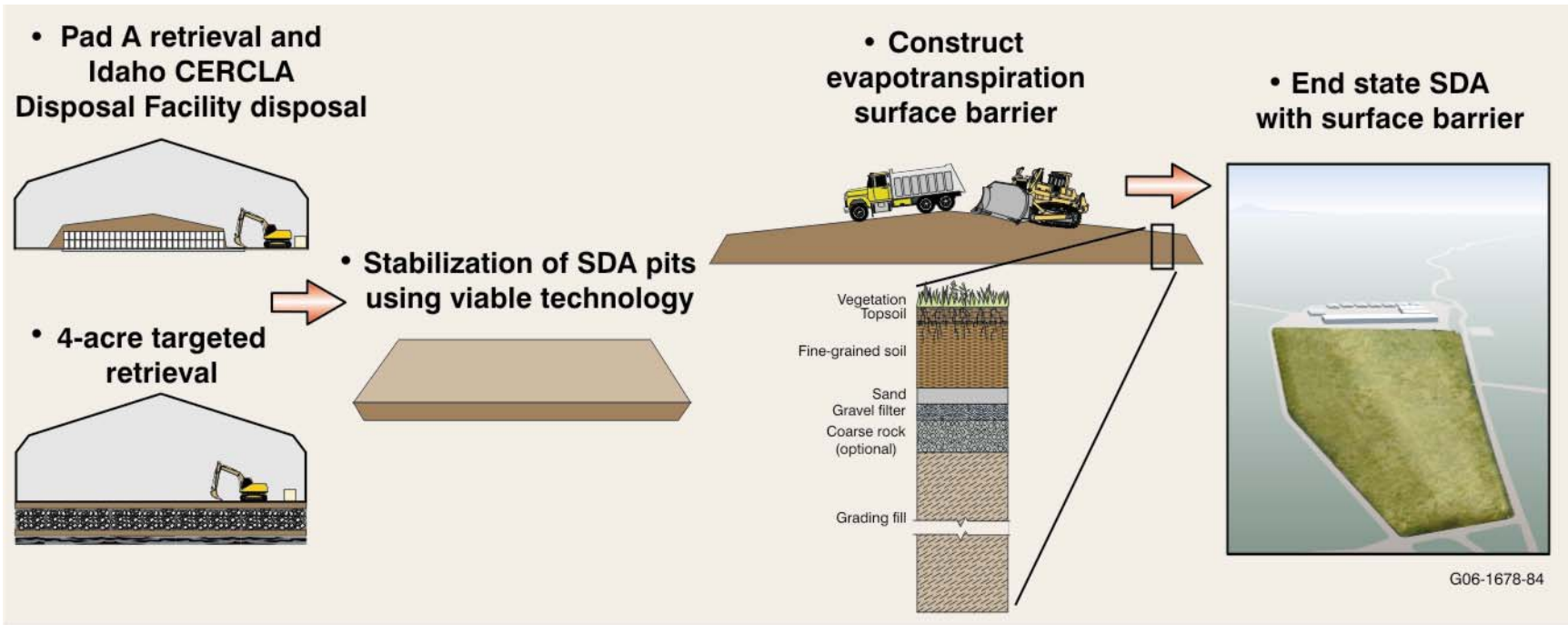
Alternative 3—In Situ Grouting

- **Specified disposals with mobile Tc-99 and I-129 grouted in situ**
- **Pad A waste retrieved, grouted ex situ, and relocated to the LLW pit**
- **Pits stabilized to provide stable cap foundation**
- **Remediation completed by ET surface barrier with passive venting**



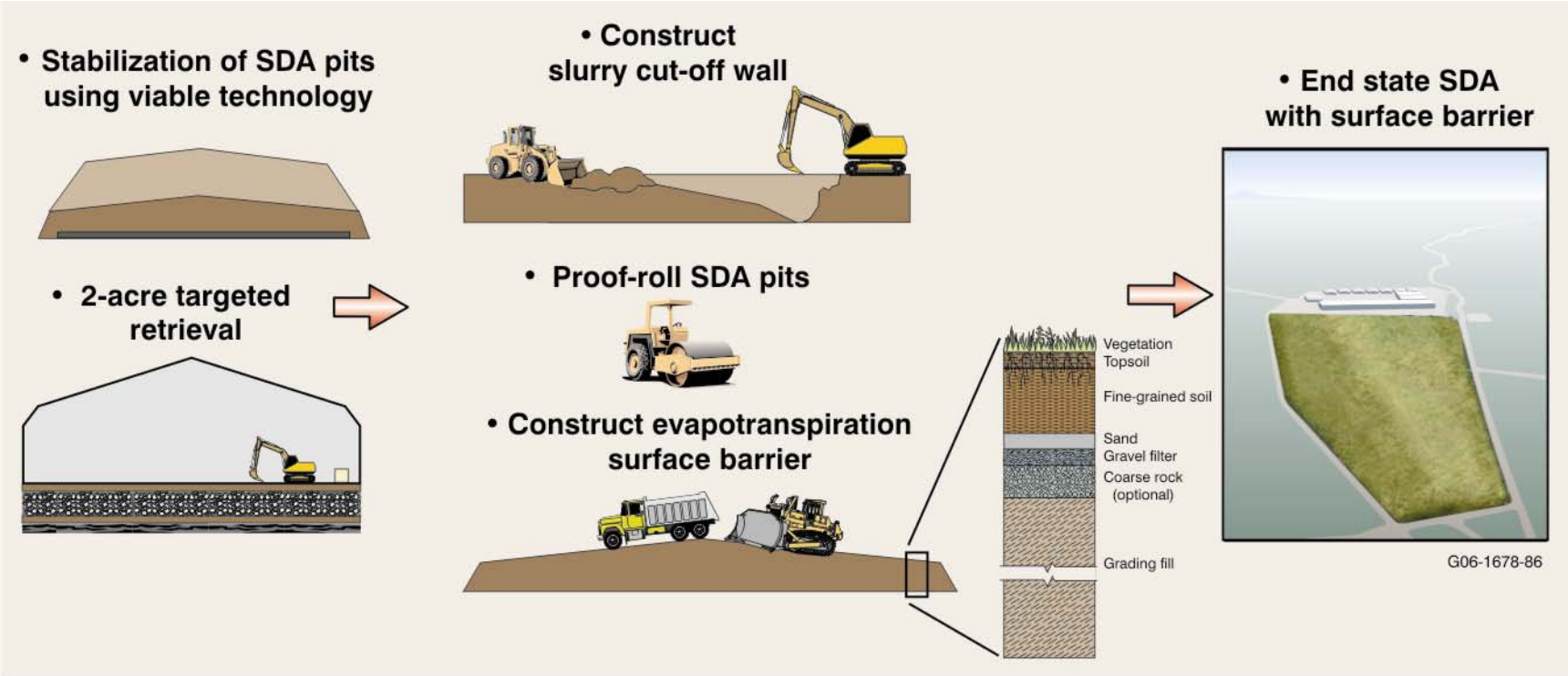
Alternative 4a—4-Acre Partial RTD

- **Pad A waste retrieved and sent to ICDF for treatment and disposal**
- **Targeted waste retrieved from 4 acres of pit area**
- **Pits stabilized to provide stable cap foundation**
- **Remediation completed by ET surface barrier with passive venting**



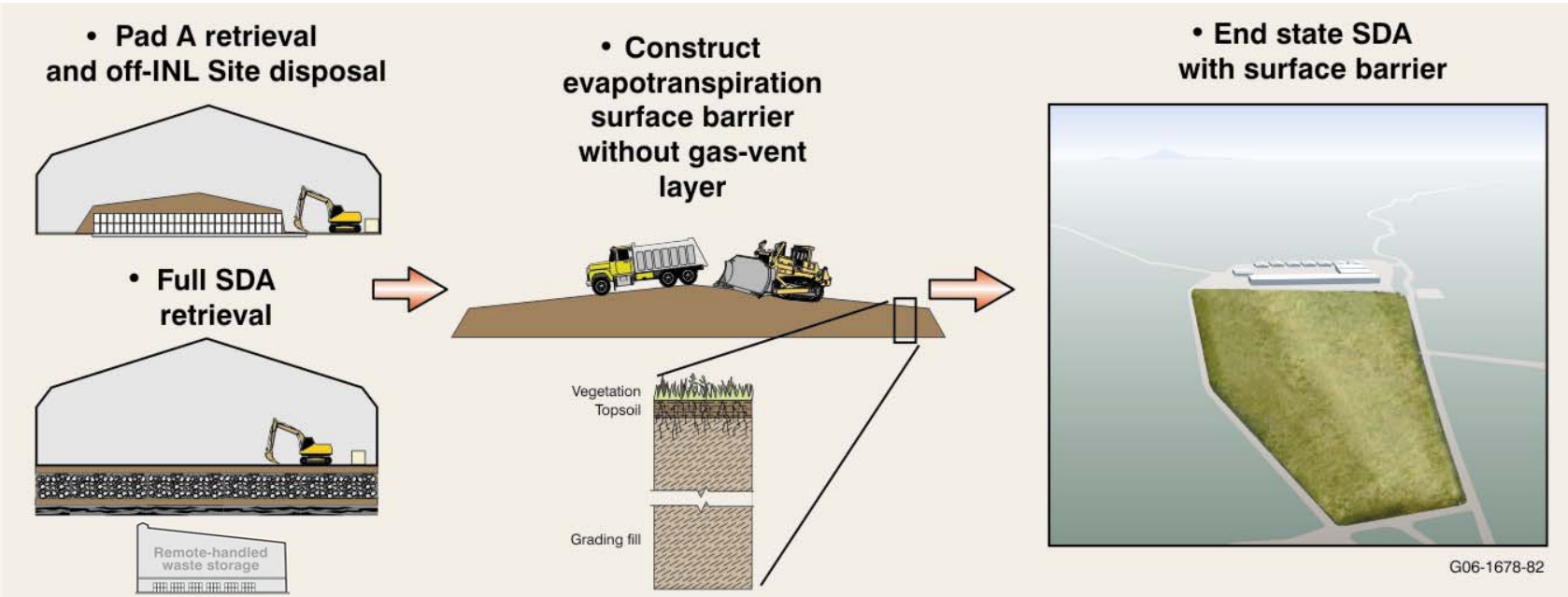
Alternative 4b—2-Acre Partial RTD

- **Pad A stabilized to provide stable cap foundation**
- **Targeted waste retrieved from 2 acres of pit area**
- **Slurry cut-off wall installed around perimeter and pits proof rolled**



Alternative 5—Full RTD

- **Pad A waste retrieved and sent to off-INL facility for treatment and disposal**
- **All other waste retrieved from the SDA (approximately 35 acres)**
- **Temporary (e.g., 20 years) storage facility constructed on the INL Site for remote-handled non-transuranic waste**
- **Remediation completed by simplified ET surface barrier**



Criteria for Analyzing Remedial Actions

- **Threshold Criteria**
  - Overall protection of human health and the environment
  - Compliance with Applicable or Relevant and Appropriate Requirements
- **Balancing Criteria**
  - Long-term Effectiveness and Permanence
  - Reduction of Toxicity, Mobility, or Volume Through Treatment
  - Short-term Effectiveness
  - Implementability
  - Cost
- **Modifying Criteria**
  - State Acceptance
  - Community Acceptance

Comparative Analysis

- **All action alternatives satisfy threshold criteria**
- **All action alternatives satisfy Remedial Action Objective (RAO)s and Preliminary Remediation Goals (PRG)s, primarily because of the surface barrier and continued operation of the OCVZ system**
- **Evaluation of short-term effectiveness, implementability, and cost provide greatest discrimination between alternatives**
- **Evaluation of long-term effectiveness and reduction of toxicity, mobility, or volume through treatment provides marginal discrimination**

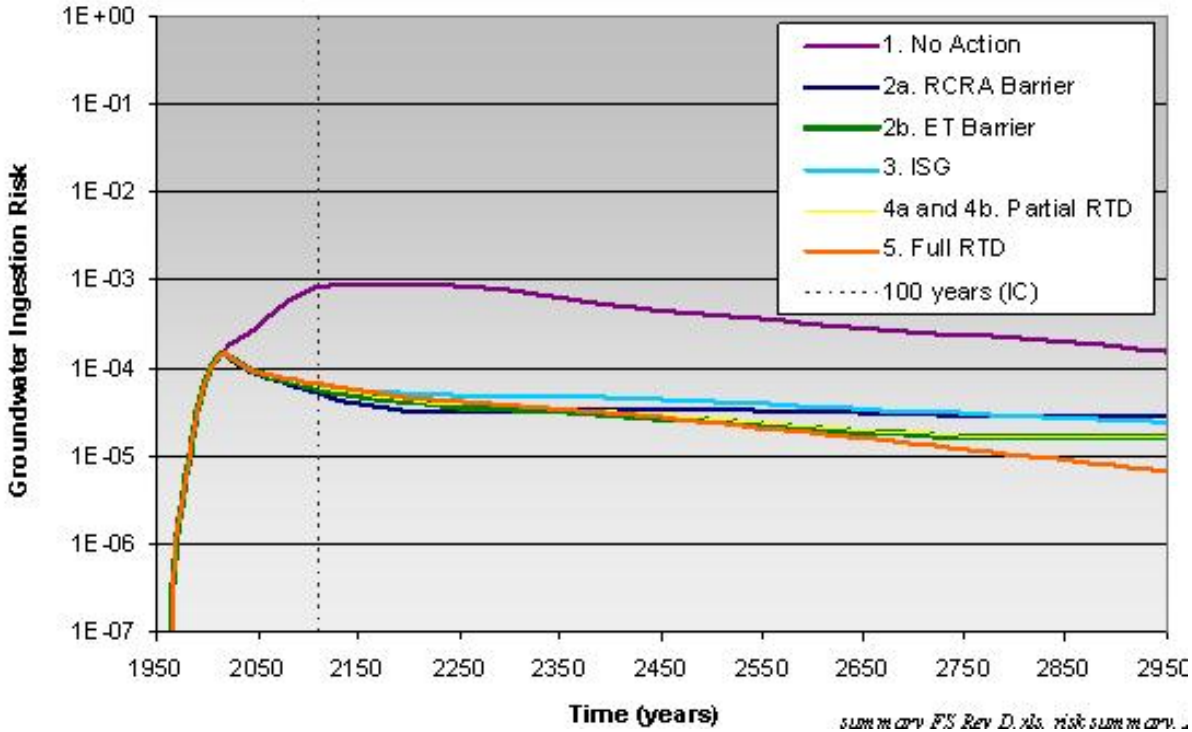
Each Alternative Was Structured to Evaluate Differences in Implementation

- What kind of surface barrier to build
- How to deal with subsidence
- What to do with Pad A
- How to deal with vapor extraction

Selecting the Preferred Alternative

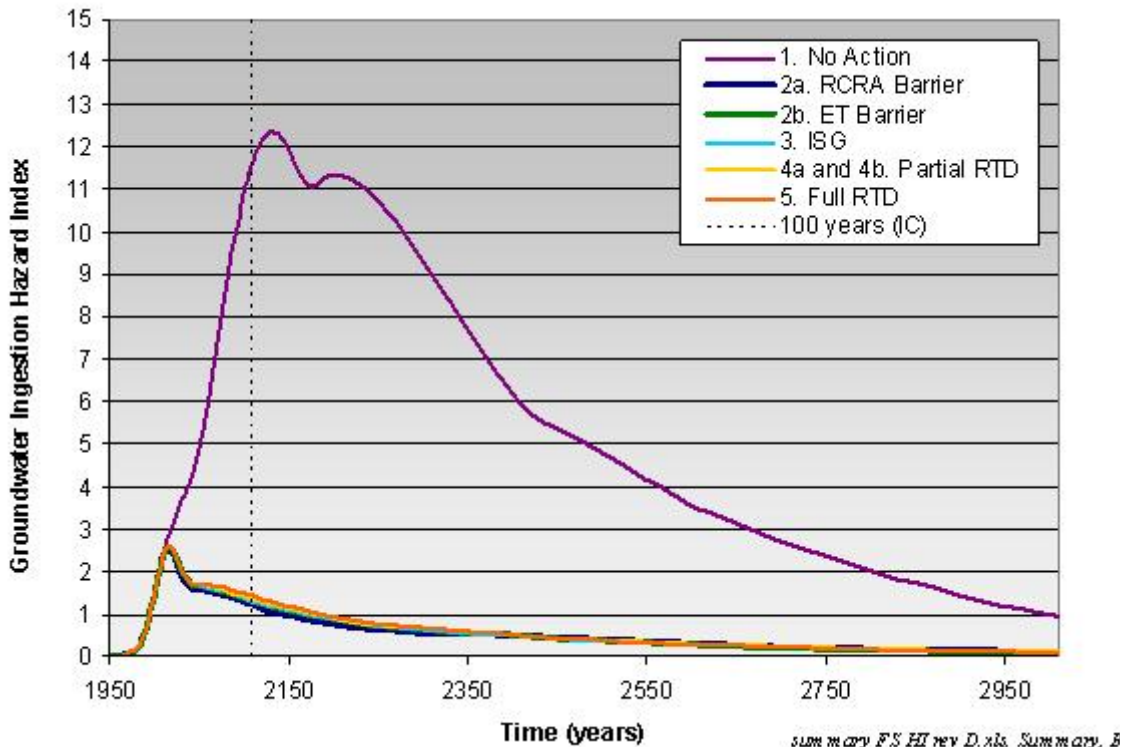
- Many combinations of technologies and implementation methods are possible
- The five assembled alternatives allow for complete analysis by including the range of options
- The selected remedy can be made up of options from more than one alternative
- Allows for selection of desirable attributes from more than one alternative

Comparison—Risk (groundwater)



Comparison of long-term effectiveness based on cumulative carcinogenic risk for groundwater ingestion provided by each remedial alternative

Comparison—Hazard Index (groundwater)

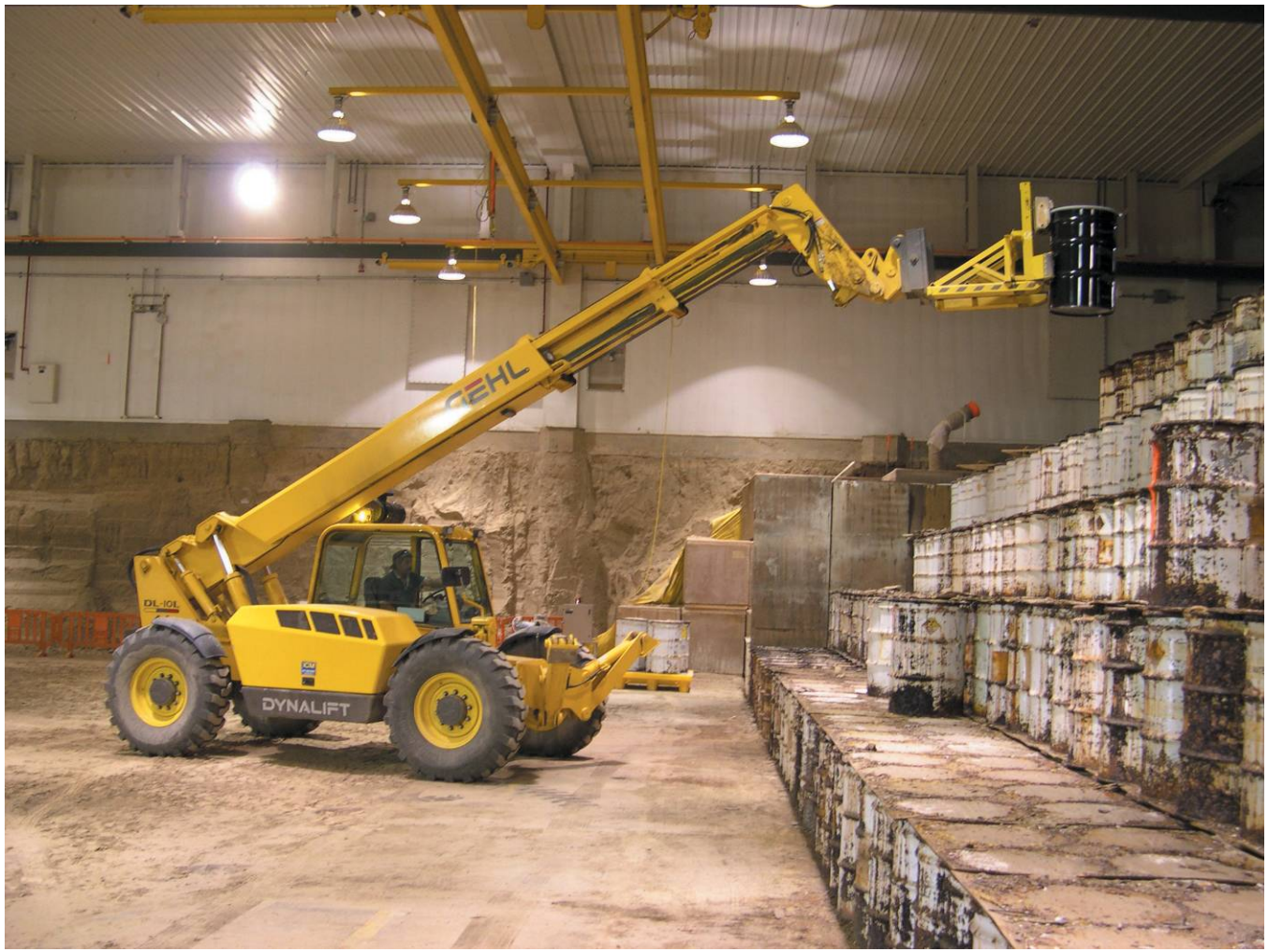


Comparison of long-term effectiveness based on cumulative hazard index for groundwater ingestion provided by each remedial alternative; hazard indexes are overestimated for all alternatives

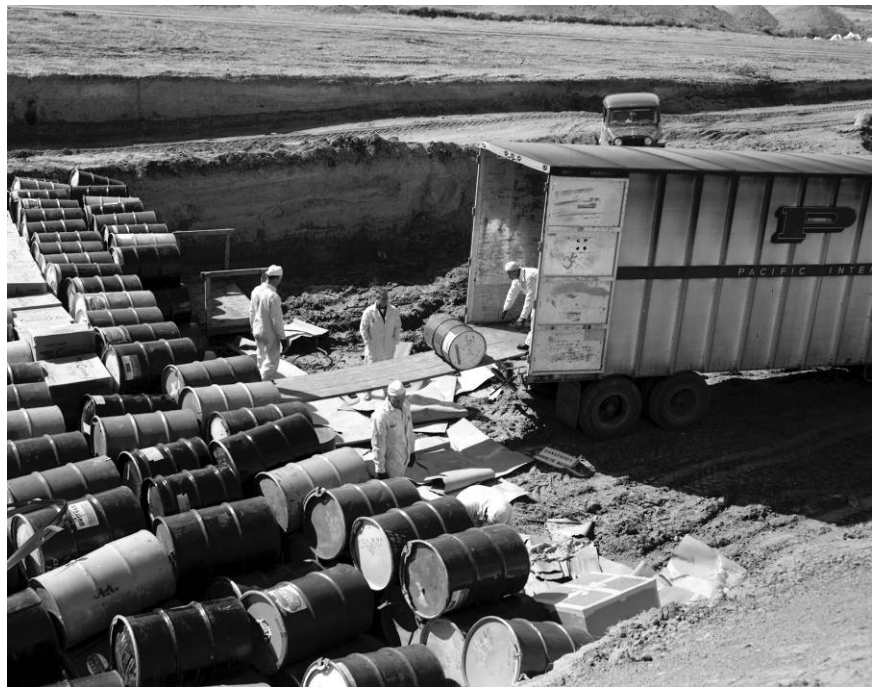
Next Steps

- Develop the Proposed Plan
  - Submitted to the agencies for comments
  - Develop agency agreement on the Preferred Alternative
- Provide the Proposed Plan to the public for input and comments
- Consider public comments in the development of a Record of Decision
- Develop a draft Record of Decision
- Issue the Record of Decision

Stored Waste at the Advanced Mixed Waste Treatment Project



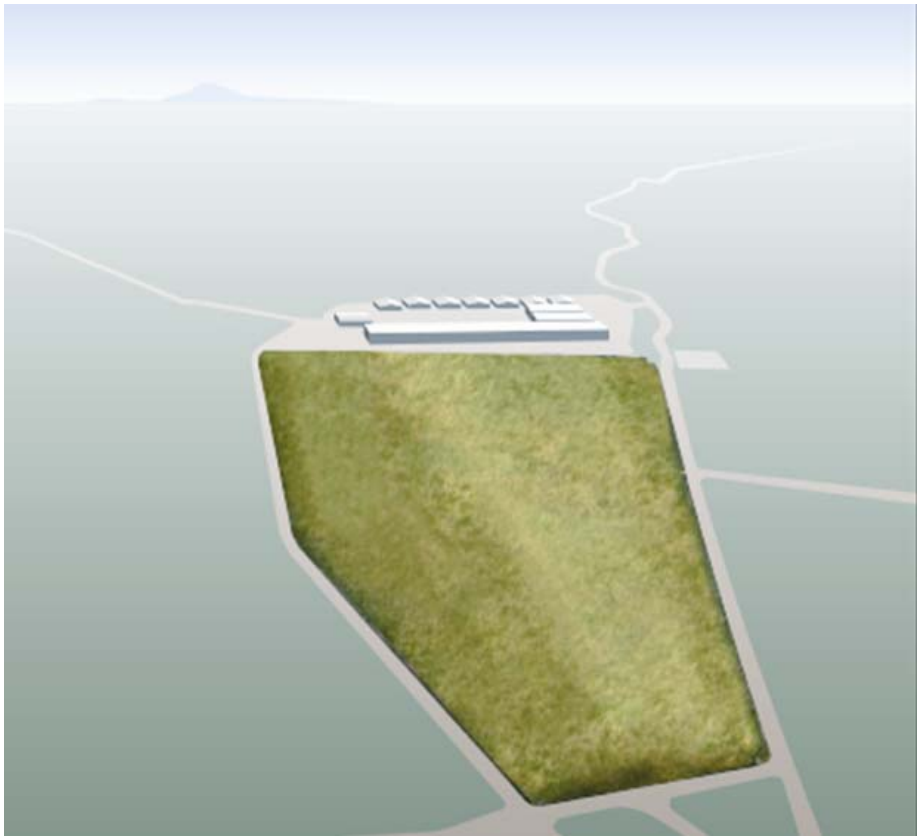
Buried Waste in the SDA (Past Disposal Practice)

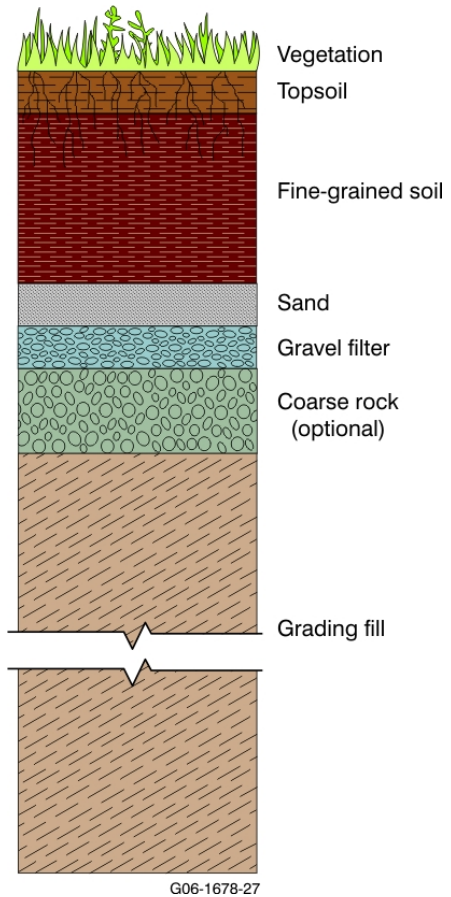


Waste Retrieval

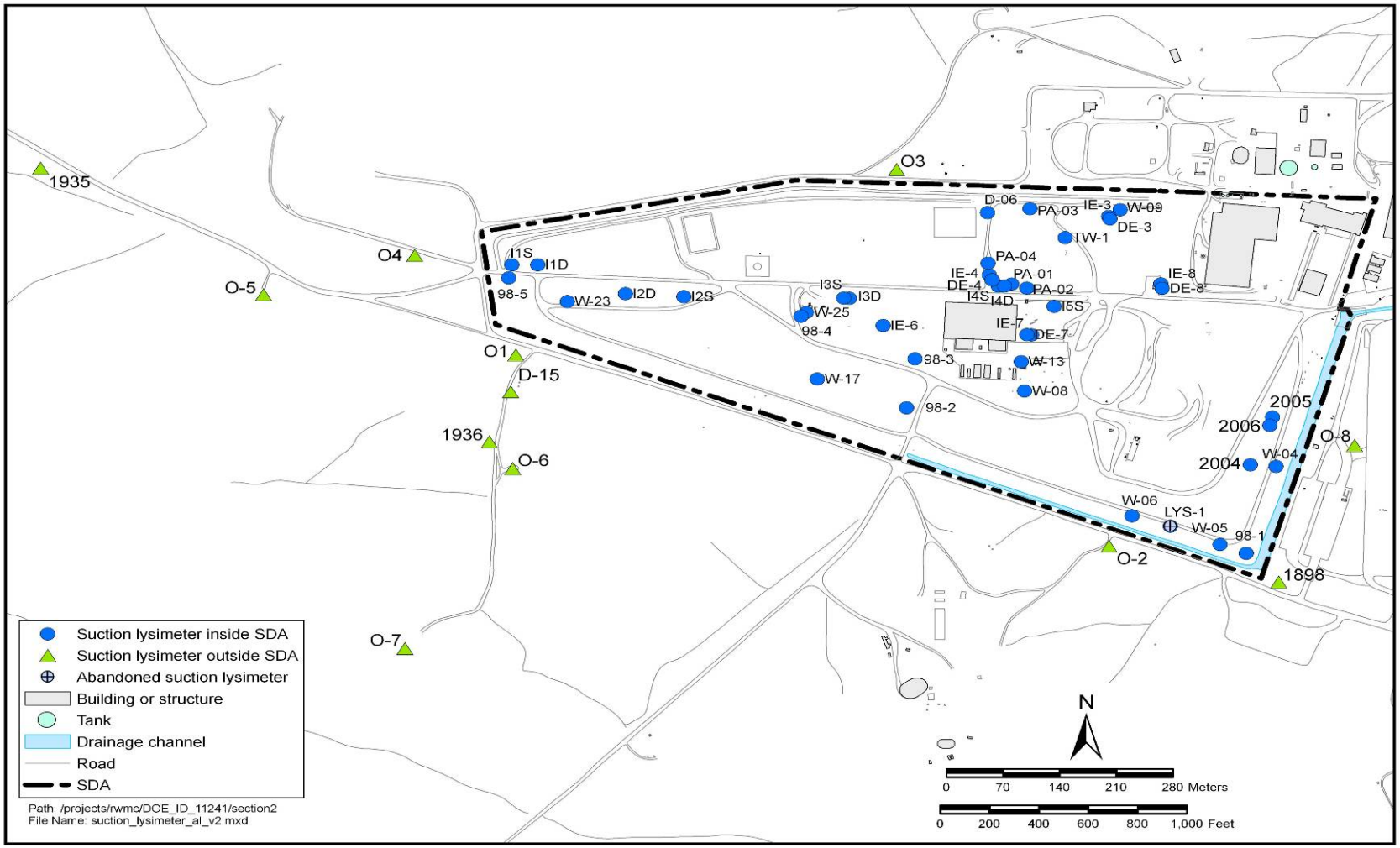
Generating New Waste Packages for Shipment to WIPP

Surface Barrier - Cap





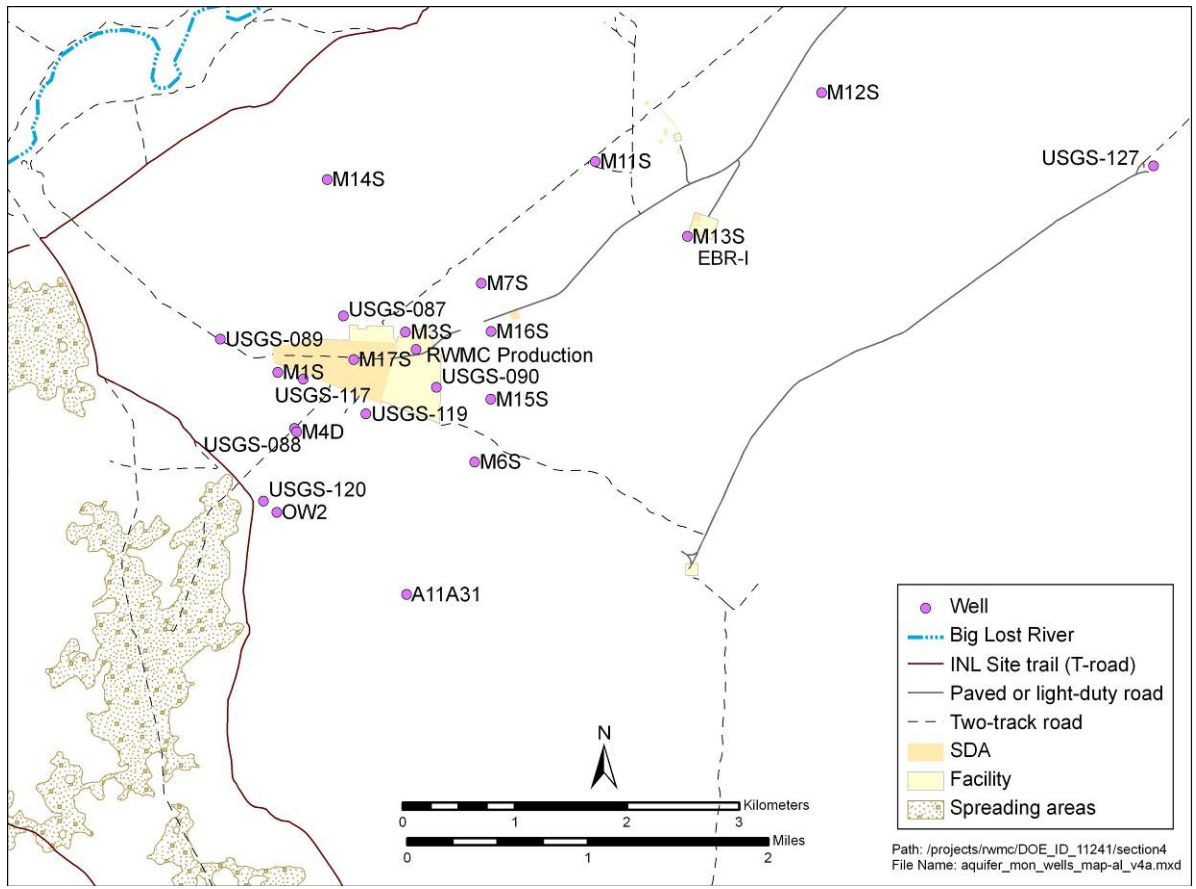
Vadose Zone Monitoring



Aquifer Sampling

- 23 aquifer monitoring wells in vicinity of RWMC

  - 15 sampled by ICP
  - 7 sampled by USGS



Vapor Extraction – OCVZ Unit D

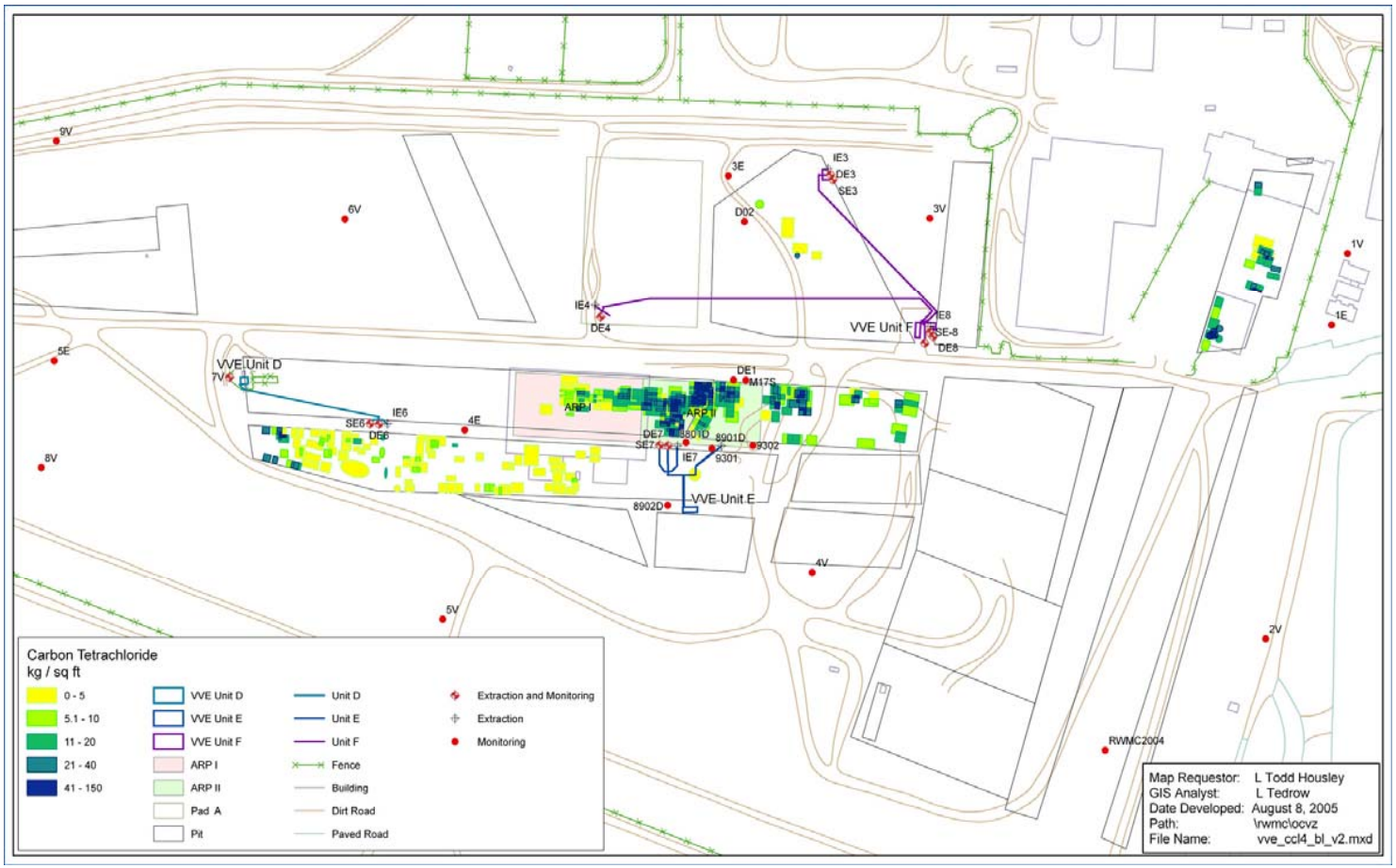
Organic Contaminants in the Vadose Zone (OCVZ)

- In 1987 - chlorinated VOC's were found in groundwater at the RWMC
  - Carbon Tetrachloride CCl_4
  - Trichloroethylene TCE
  - Chloroform $CHCl_3$
  - Trichloroethane TCA
  - Tetrachloroethylene PCE

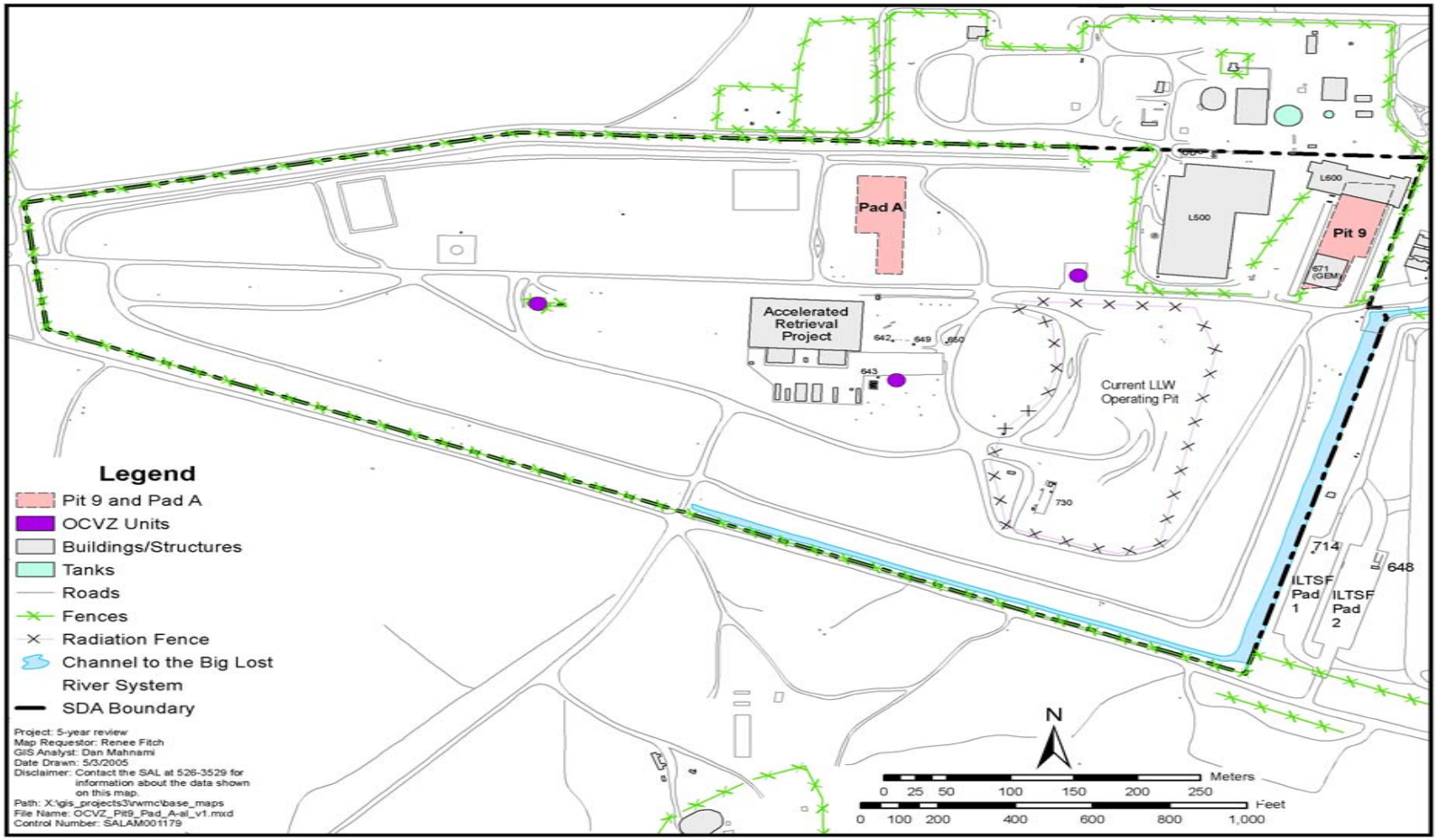
VOC remediation

- 1994 – The CERLA Record of Decision Identified vapor vacuum extraction with treatment (VVET) as the preferred method of remediation
- Vapor vacuum extraction with treatment extracts organic contaminants from the subsurface and subsequently destroys them at the surface by means of recuperative flameless thermal or catalytic oxidation processes.

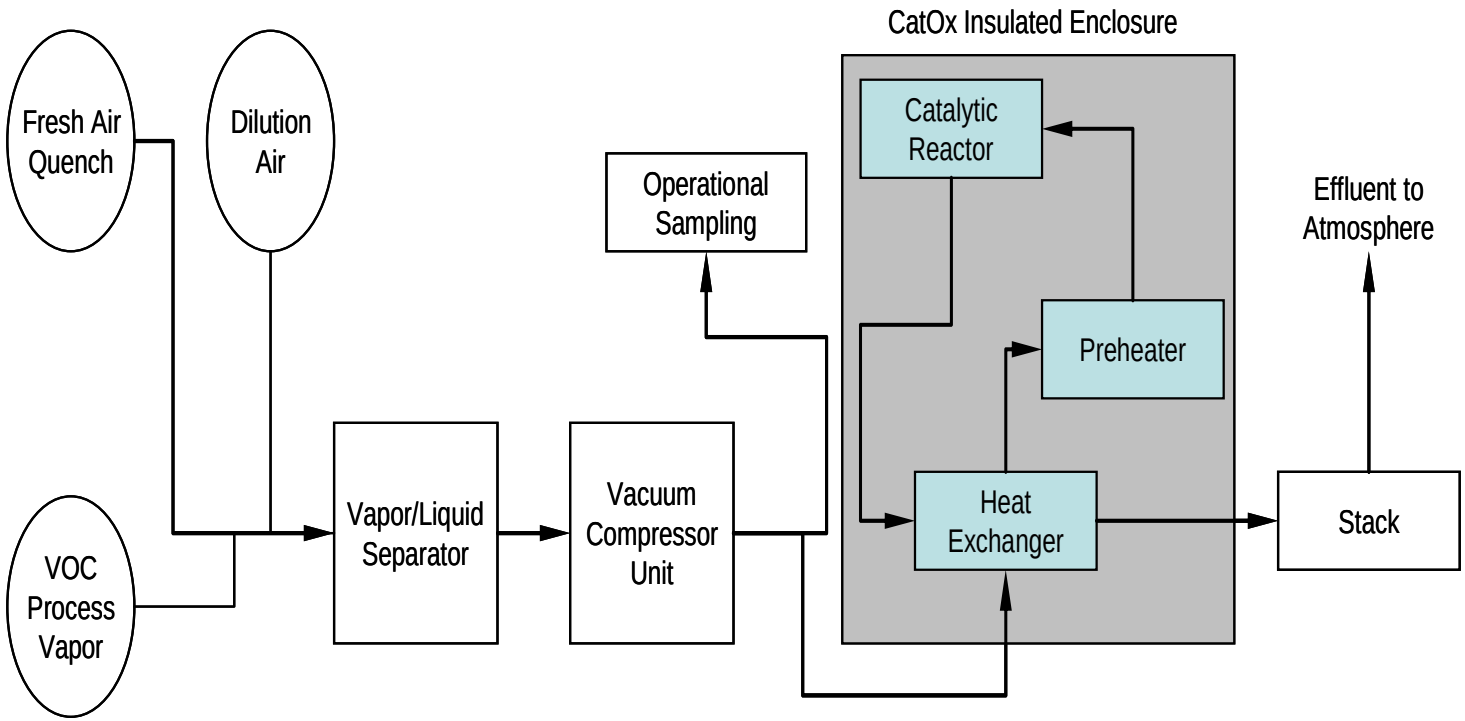
Extent of Contamination



VVET System Location



Catalytic Oxidation System



Process

- A blower introduces solvent laden fume to the oxidizer. The stream is pre-heated by exiting flue gas from the same system in a heat exchanger or recuperator.
- A burner then heats the air to the required temperature of 600° F. The air is then passed through a catalytic bed where the solvent laden air is converted to CO2 and H2O.
- The CO2 and H2O are then passed through the heat exchanger where incoming fume is preheated by the heat of the exiting flue gas. Finally, the clean flue gas is discharged into the atmosphere.

VOC Destruction Through June 2007