

# **K-25/K-27 Waste Disposition Approach**

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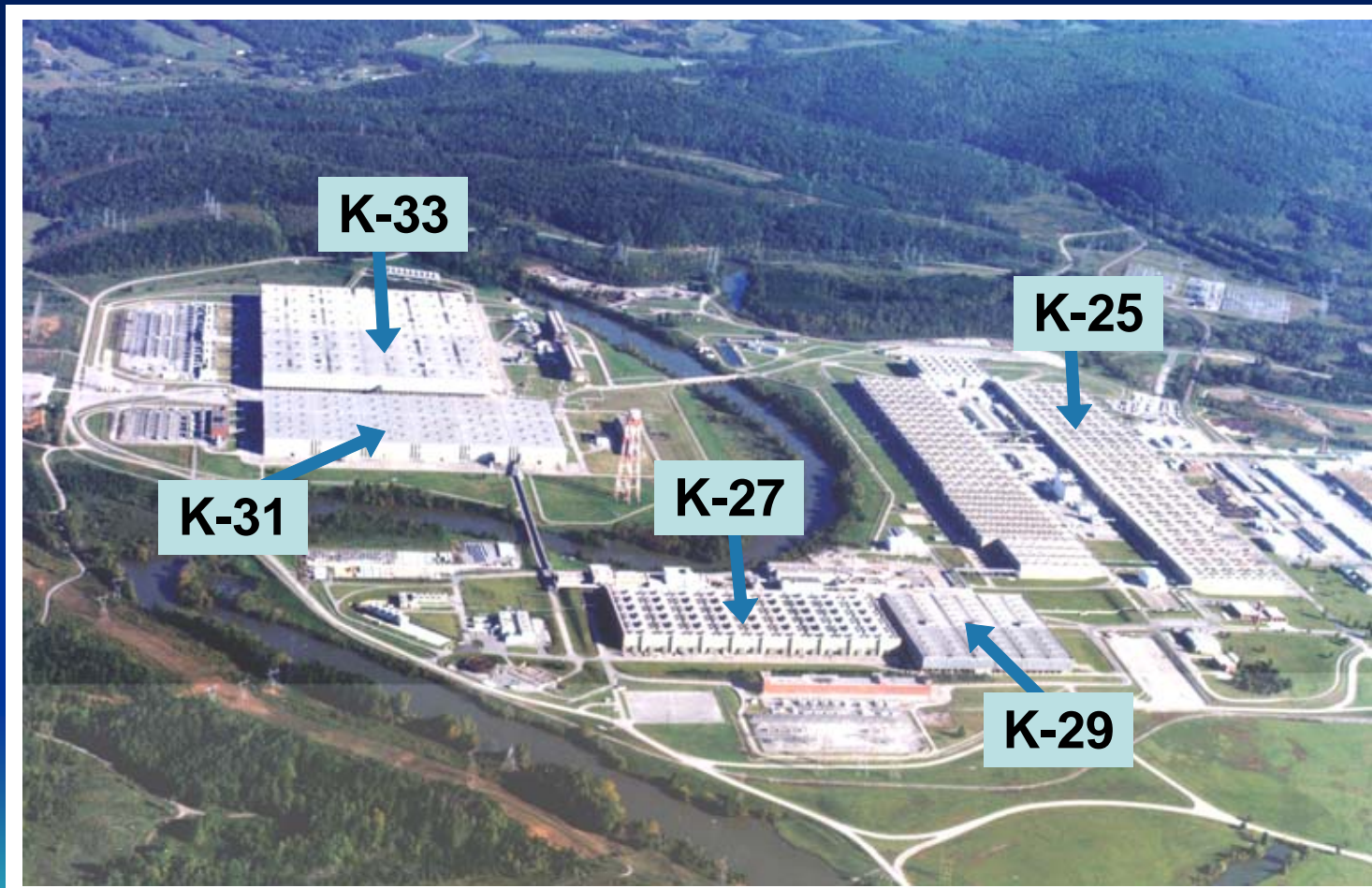


# K-25/K-27 Waste Disposition Approach

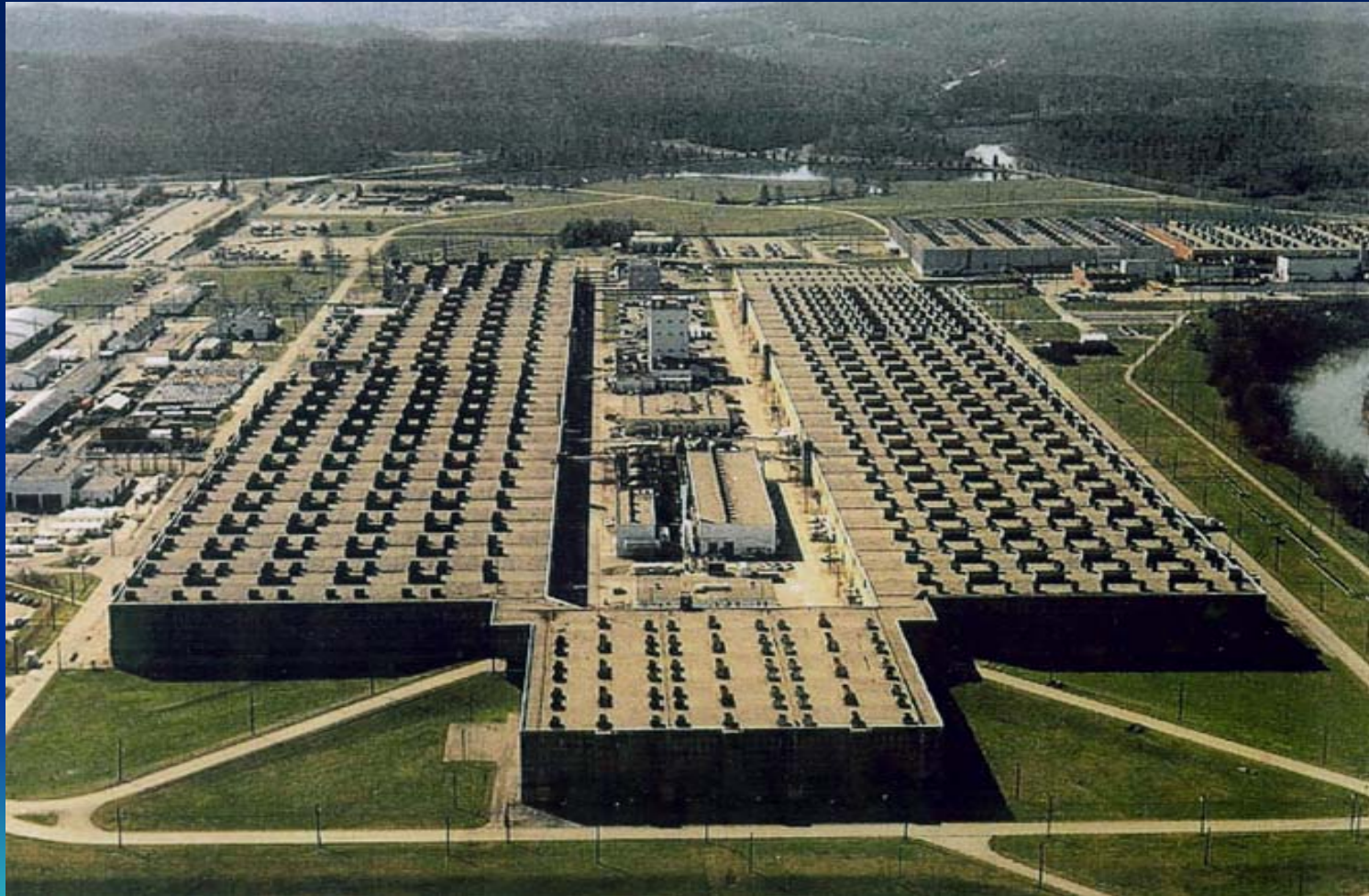
- Balanced Approach - Fernald & Rocky Flats
  - High activity/Low Volume waste disposed at NTS
  - Low activity/High Volume waste disposed of onsite
- Consideration Factors
  - Number and cost of transport containers
  - Number of offsite transportation movements
  - Unique transport requirements
  - Offsite vs. Onsite Waste Acceptance Criteria
  - Regulator/Public Acceptance



# Location of K25 at ETTP



# K-25 Building

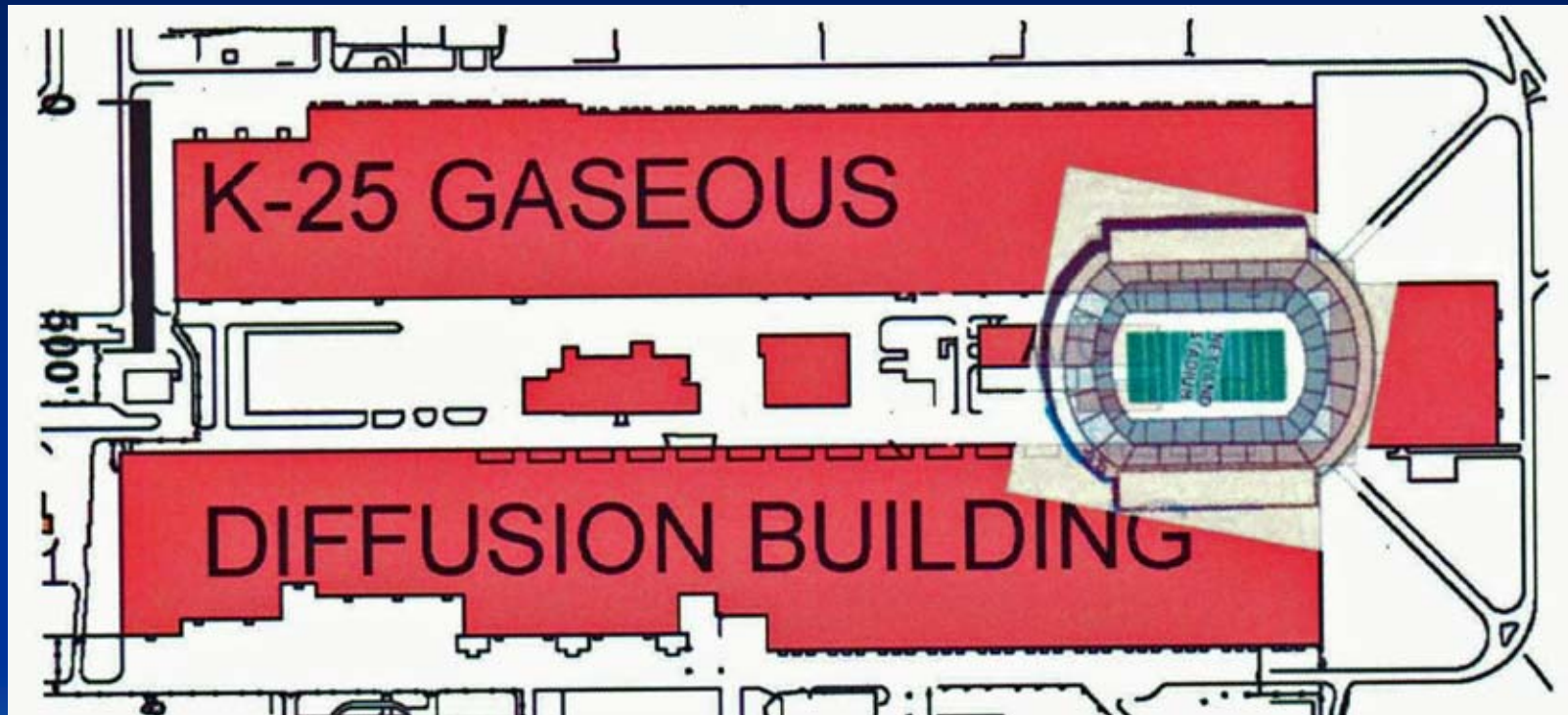


# K-25 Building

- Building K-25 is arranged in a “U” shape
- Covers approximately 40 acres
- Four-level building is a steel-frame structure with corrugated cement-asbestos siding.
- The basement, or vault area, has reinforced concrete columns and floors and can be accessed at grade level from the outside perimeter of the “U.”
- The length of the building around its exterior is 4,975 feet
- Maximum width is 400 feet.
- Building height is 58 feet.

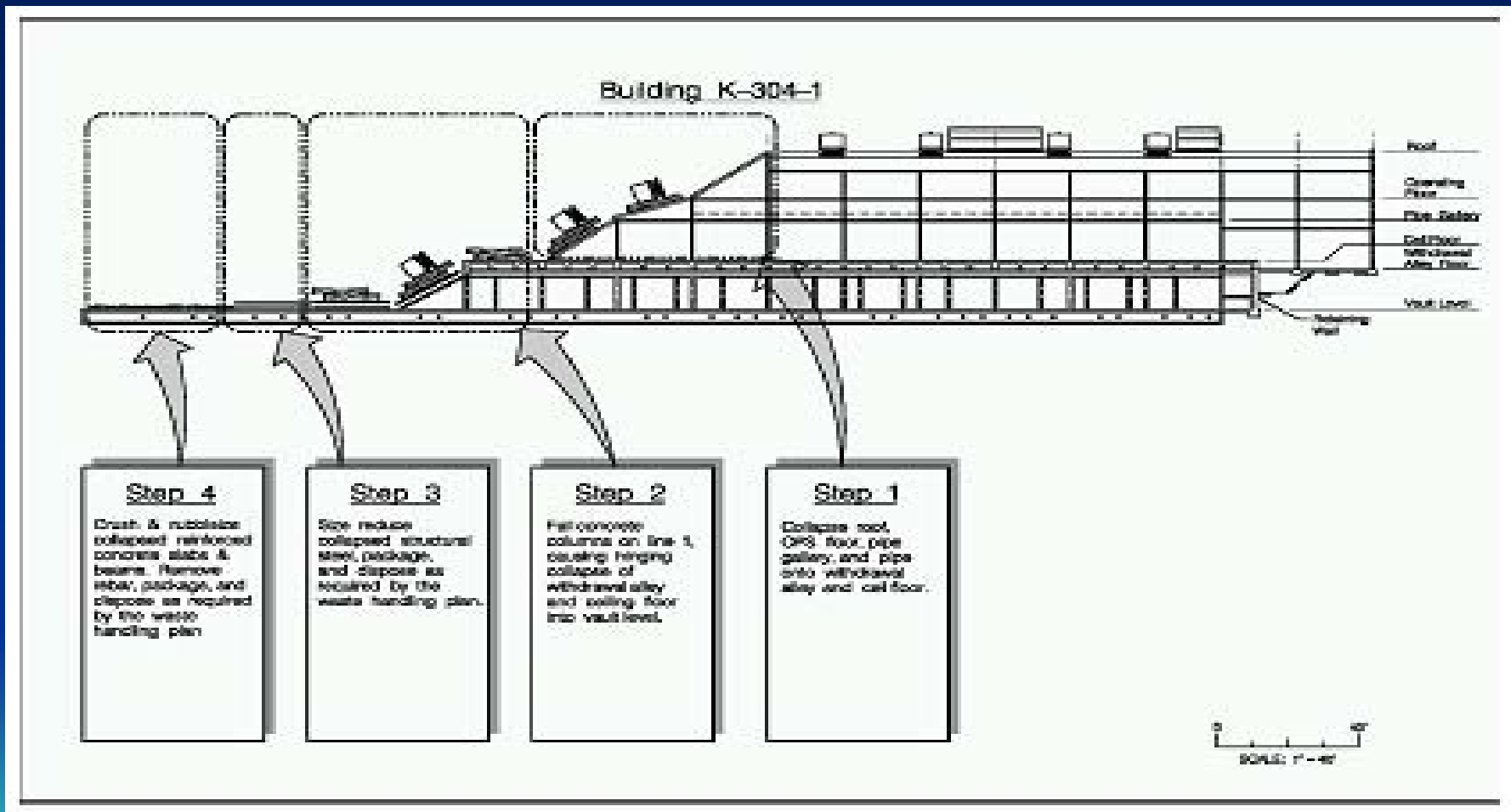


# Relative Size of K-25





# Demolition Sequence





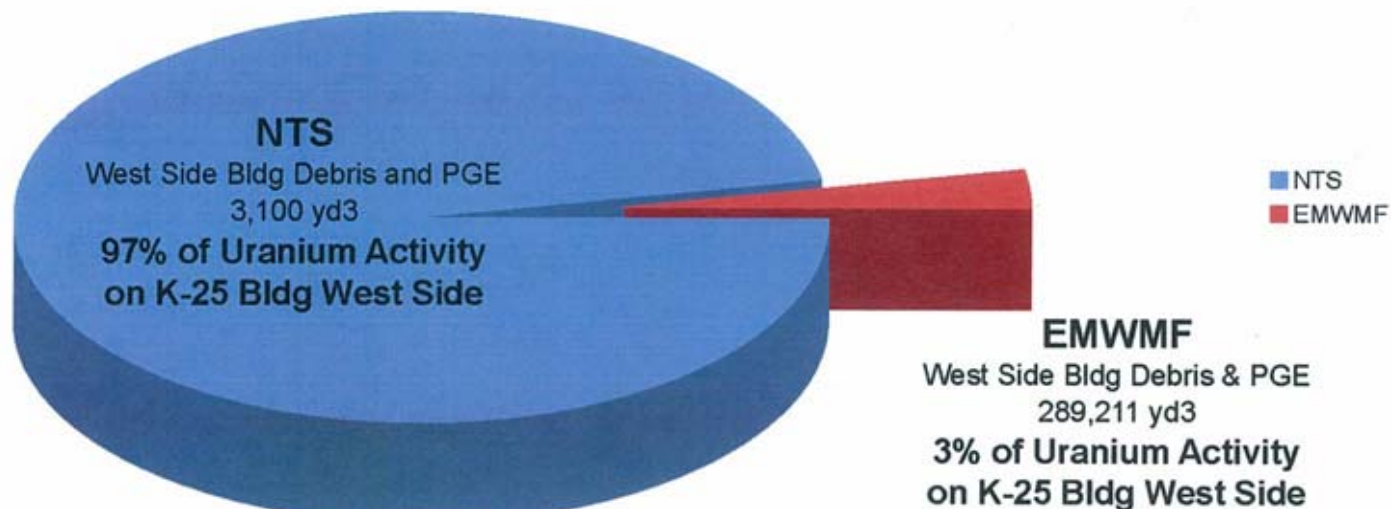
# Waste Generation Sequence

- Flag items from Offsite Disposal
- Remove high activity item and package for disposal
- Demolish Building
- Remove Flagged items from waste piles
- Package and dispose of flagged items
- Items remaining to Onsite Disposal



# Waste Disposal Balanced Approach

## K-25 West Side Building Debris and Process Gas Equipment (PGE) Percent Distribution of Uranium Activity by Disposal Facility



K-25 Bldg West Side units are K-304, K-305, K-306, and K-312.  
All volumes from Removal Action Work Plan (RmAWP).  
Uranium activity based on Process Knowledge, historical information and EMWMF SOF.

# Potential NTS Disposal Waste Items

- Process Gas Equipment (PGE)
  - Converters
  - Compressors
  - Piping (0.25" to 16" diameter size)
  - Heat Exchangers/ Surge Tanks
  - Product Withdrawal Stations/Traps/Cylinders
  - Macro-encapsulated Hazardous Debris



# Potential Onsite Disposal Waste Items

- Auxiliary Systems
  - Nitrogen/Fluorine Lines
  - Conduit
- Low Activity PGE
- Miscellaneous Excess Materials
- Building Structure/ Demolition Debris
- Concrete / Transite Panels



# Onsite WAC Considerations

- U-234 limit of 1,700 pCi/g
- U-235 limit of 1,500 pCi/g
- U-238 limit of 1,200 pCi/g
- Tc-99 limit of 172 pCi/g
- Np-237 limit of 320 pCi/g
- Pu-239 limit of 720 pCi/g



# Characterization

- Radiological Characterization
  - Primarily based on Non-Destructive Assay (NDA)
  - Supplemented with intrusive sampling & analysis data
  - Isotopic Uranium Bq/m<sup>3</sup> limits based on differences in enrichment
    - U-234 max Bq/m<sup>3</sup> limit based on 93% enrichment
    - U-238 max Bq/m<sup>3</sup> limit based on 10% enrichment
    - U-235 max Bq/m<sup>3</sup> limit based on 350 grams U-235
  - Maximum Bq/m<sup>3</sup> limits for all other isotopes based on ratio of activity to U-235 activity
  - Maximum Bq/m<sup>3</sup> limits based on smallest volume (30 gal drum) in a fissile rated 30-/55-gallon combination package



# NTS Transportation/Disposal Challenges

- Security & Safeguards Requirements
- 49 CFR 173.453 Fissile Requirements
  - DOT Special Permit 14267
  - Fissile Exceptions (mass limitations based on component size and enrichment)
- Container selection based on component size, fissile exceptions and/or fissile requirements



# NTS Transportation/Disposal Challenges

- Void space issues due to nuclear criticality safety restrictions, weight limitations, irregular component geometry
- Limited number of waste packages per conveyance resulting in increased number of shipments and transportation risks





# Conceptual End State

