WEST VALLEY REPROCESSING 1966-1972

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Origin

- US AEC Contract

  - To encourage fuel cycle development

- Participants

  – NYS ASDA as owner/landlord of site - licensee

  - NFS (division of W. R. Grace) as operator – licensee

  - AMF as mechanical design participant

  - Bechtel as architect/engineer and constructor

“Base-Load” Contract

- Provided **up to** 625 tonnes of AEC-owned fuel
- Required licensing by AEC - Regulatory
- Limited pricing to about $23,000/tonne
- Required AEC access to almost all information and a resident AEC representative
- Included monetary penalties failure to meet either product recoveries (by campaign) or specifications (by delivered batch)

Siting

- WNY Nuclear Service Center

  -3300 acres, about 200 acre exclusion ("plant") area
- Reprocessing plant, waste tank farm, lagoons, NRC-licensed burial area, and commercial burial area
- Issues

  – stack discharge below crest of hill

  – liquid discharge to small on-site streams

  – varying depth to bedrock

Construction

- AEC issued a Construction Permit in May 1963
- Fuel Receipt and Storage – began operation in May 1965
- Waste Tank Farm (8D-1/2 and 8D-3/4)
- Reprocessing Plant - began operation on April 19, 1966
- Total cost about $33 million – less than 5% above NFS budget.

Process Operations

- Mechanical
  - abrasive saw removed non-fueled hardware
  - hydraulic shear cut fuel rods into 1/2" pieces
- Dissolution by nitric acid in baskets; "hulls" to burial in NRC-licensed disposal area
- PUREX separation using pulsed plate columns then
  - two U cycles
  - one Pu cycle and then ion exchange
- Product concentrations by evaporation

Licensing & Regulation

- AEC (NRC) Provisional License CSF- I (Docket 50-201)

  - for a production and utilization facility under 10 CFR 50

  – Technical Specifications focused on effluents, criticality safety, and avoiding accidents that had occurred at AEC facilities

- Inspections by NRC Region I and Headquarters

Operational Successes

- PUREX process performed superbly
- Shear performed very well for a “first-of-a – kind” production device
- Plant Personnel Staffing

  - “lean” in numbers (about 131)

  - Experienced groups of managers from AEC facilities

  – talented local hires for operators, mechanics and chemistry technicians

Operational Issues

- Mechanical
  - fines from the abrasive saw
  - end piece cuts by shear
  - contact maintenance of manipulators & cranes
  - use of greasy lubricants

Operational Issues

- Degraded Fuel Element Cladding

  – primarily NPR fuel but some power reactor fuel

  – necessitated additional pool cleanups and installation of the FRS Decon Facility

  – caused “exothermic” reactions in dissolvers; reduced batch sizes; slowed dissolution cycles; increased radioactive load on DOG HEPA filters that were not designed for remote removal

Operational Issues

- Unstable Rad Waste Evaporators' Performance
  - "burps" of evaporator concentrates
  - moisture carryover through demisters to the VOG HEPA filters
  - increased radioactive load on the VOG HEPA filters that were not designed for remote removal.

Process Performance

- Processed 625 tonnes U during 26 campaigns and recovered 1926 kilograms of Pu.
- Recovered 99 % of the U and 97.4 % of the Pu

Primary Recommendations

- Provide very detailed attention to ventilation systems, especially for abnormal events.
- Include robust design bases for mechanical equipment used for remote maintenance