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