



DUKE COGEMA  
STONE & WEBSTER

---

# **KCD package NRC presentation**

MP BROSSARD  
October 19, 2000



DUKE COGEMA  
STONE & WEBSTER

## KCD Oxalic Mother Liquors Recovery unit

---

- Design Requirements of MFFF
  - SOW :
    - must be able to provide for receiving 3.5T per year of weapon grade plutonium from PDCF
    - must be able to operate the MFFF such that a minimum of 99.5% of the process charged plutonium is fabricated into commercial quality fuel
  - 10CFR 70
    - Confinement
    - criticality
    - shielding



DUKE COGEMA  
STONE & WEBSTER

## KCD Oxalic Mother Liquors Recovery unit

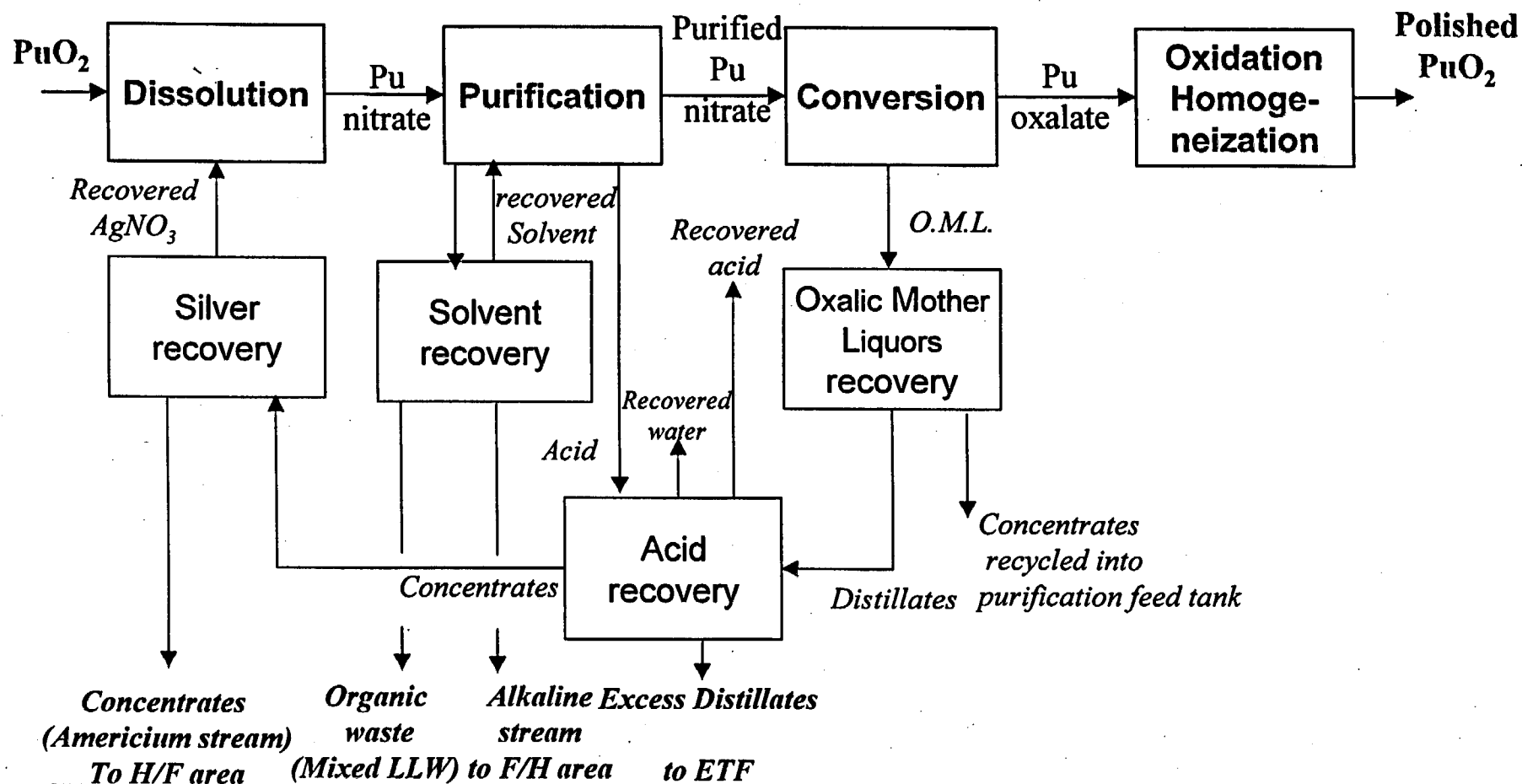
---

- Purpose of the Oxalic mother liquors recovery unit
  - continuously receive (96h/week) the oxalic mother liquor from filtration of the Pu oxalate
  - continuously receive the effluents from cap impactor off gas treatment unit
  - concentrate them in an evaporator
    - to destroy the oxalic ions
    - to purify the distillates
  - Monitor and recycles the concentrates in the Purification cycle
  - Check and transfer the distillates to the acid recovery unit



DUKE COGEMA  
STONE & WEBSTER

## Aqueous Polishing Process





DUKE COGEMA  
STONE & WEBSTER

## KCD Oxalic Mother Liquors Recovery unit Main Process parameters

---

- **Process parameters have been established to meet SOW requirements:**
  - OML flowrate is based on the precipitate flowrate which meets the annual Pu capacity
  - ~ 15 kg/year of Pu are recycled through this unit
- Continuous operation (not continuous feeding)
- Feed Characteristics (nominal conditions)
  - Pu content < 0.1g/l,
- Concentrates characteristics
  - Pu content < 10.1g/l, Condensates characteristics



DUKE COGEMA  
STONE & WEBSTER

## KCD Oxalic Mother Liquors Recovery unit Main equipment data

---

- **Equipment data are established to meet**
  - **criticality requirements**
  - **Confinement requirements**
  - **process parameters requirements**
- **tanks**
  - **feed and concentrates : Annular and slab tanks (Geometrically safe due to Pu content or possible Pu Content)**
  - **Feed tanks, concentrates tanks stainless steel**
- **Evaporator condenser and condenser and cooler**
  - **geometrically safe ( cylindrical)**
  - **equipment made of zirconium**
  - **Thermosiphon boiler heated with vapor produced by its own loop**
  - **tube and bundle condenser and cooler cooled with water (MFFF loop)**



DUKE COGEMA  
STONE & WEBSTER

## KCD Oxalic Mother Liquors Recovery unit Organization of documents

---

- general documents for Aqueous Polishing process
    - DRD recall SOW and 10 CFR 70 and main MFFF requirements
    - Basis of design for aqueous Polishing Process criteria: present analogies with La Hague facilities, interfaces with other facilities and Mox Process, operating parameters
    - Choice of process and conversion unit description
    - Block diagram
    - Chemical flowsheet calculation basis
    - Chemical flowsheets
    - Basic data for AP equipment design (in progress not in the package)
-

## KCD Oxalic Mother Liquors Recovery unit Organization of documents(cont.)

---

- Specific documents for the whole Oxalic Mother Liquors Recovery unit
  - Process flow diagram
  - Process description note
  - Control description note
  - instrumentation process data sheet
  - automation process data sheet
  - P&ID's





DUKE COGEMA  
STONE & WEBSTER

## KCD Oxalic Mother Liquors Recovery unit Organization of documents(cont.)

---

- Specific documents for each equipment of the Oxalic Mother Liquors Recovery unit
  - Process calculation of equipment notes
  - Process equipment data sheets for tanks
  - equipment data sheets
    - assembly drawings
    - detail drawings