UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

Docket File

February 13, 1997

LICENSEE: Commonwealth Edison Company (ComEd)

FACILITIES: Byron Station, Braidwood Station, and LaSalle County Station

SUMMARY: SUMMARY OF MIXED OXIDE FUEL MEETING OF JANUARY 28, 1997

On January 28, 1997, the staff met with Commonwealth Edison Company (ComEd), at ComEd's request to discuss its program to dispose of weapons grade plutonium through use as a mixed oxide (MOX) fuel. Enclosure 1 includes a list of attendees. A copy of the licensee's presentation is included in Enclosure 2.

The Department of Energy (DOE), as the lead agency, is developing a program for the disposition of weapons grade plutonium. In its Record of Decision issued in January 1997, the DOE proposed a "dual track" approach comprised of immobilizing, through vitrification, some of the excess plutonium, and burning the remainder in commercial nuclear reactors as MOX. ComEd in concert with Duke Power, British Nuclear Fuels (BNFL), and Cogema has assembled a project team to develop a plan for the possible use of MOX. The project for Plutonium Excess Converted to Electricity (Project PEACE) will consider burning MOX at several of their sites, specifically Byron, Braidwood, LaSalle, Catawba, and McGuire.

If the Project PEACE team is selected as a responder to a DOE request for proposals, scheduled to be issued in 1997, the team proposes to evaluate the performance of MOX through the use of a lead test assembly (LTA) program. Based on successful performance of the LTA, MOX fuel would be integrated as part of the normal core reloads. Using fuel fabricated in Europe, the earliest LTA placement in a core would occur in late 1999; and assuming a successful test, inclusion of MOX in a reload would occur in late 2003.

The licensees' team stressed that, while weapons grade plutonium has not been used in commercial reactors, there is a considerable amount of data on the use of MOX in Europe obtained from the utilization of reprocessed fuels. MOX was also used as fuel in several U.S. reactors in the 1960s and 1970s. However, the team acknowledged that the use of MOX as proposed in Project PEACE will require a license amendment supported by the appropriate safety and accident analyses.

During the meeting, both the staff and the Project PEACE team acknowledged that there are a number of non-technical issues (e.g. political and contractual) that will have be solved before the project can proceed. The staff provided questions and comments for those technical areas that it believes will have to be addressed in any request for a license amendment. At the conclusion of the

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meeting it was mutually agreed that as progress occurs on the use of MOX, further meetings between the staff and the Project PEACE team will be beneficial.

/s/

George F. Dick, Jr., Project Manager
Project Directorate III-2
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Docket Nos. STN 50-454, STN 50-455, STN 50-456,
STN 50-457, 50-373, and 50-374

Enclosures: 1. List of Attendees
2. Licensee's Presentation

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LIST OF MEETING ATTENDEES
JANUARY 28, 1997

NRC/Office of the Commissioners

Janice Dunn Lee
Jeffery Sharkey

NRC/Office of the Executive Director for Operations

Glenn Tracy

NRC/Office of the General Counsel

Sherwin Turk

NRC/Office of Nuclear Reactor Regulation

Elinor Adensam
Robert Capra
Jim Lyons
Larry Phillips
Ralph Architzel
Kerri Kavanagh
Tony Attard
Peter Tam
Jim Wilson
Ramin Assa
Donna Skay
M. David Lynch
George Dick

NRC/Office of Reasearch

Ralph Meyer
David Ebert

NRC/Office of Nuclear Material Safety and Safeguards

C. W. Emeigh
Bruce Moran
Vanice Perin
Michael Weber

ENCLOSURE

NRC/Office for Analysis and Evaluation of Operational Data

William Jones

Commonwealth Edison

Kenneth Ainger
William Naughton
George Edgar
Dave Jenkins
Ronald Chin

Duke Power Company

Steve Nesbit

Cogema

Frank Shallo
Vijay Sazawal

Doc-Search Associates

Lynn Connor

CISAC at Stanford University

A. David Rossin

Nuclear Information Resource and
Nuclear Energy Information Service

Mary Olson

SAIC

Sidney Crawford

Project P.E.A.C.E. Team Meeting with NRC January 28, 1997

ComEd

ENCLOSURE 2

DOE Role in Weapons Plutonium Disposition

- λ U.S. and Russia agreed to declare portions of their weapons materials as surplus to defense needs
- λ DOE Office of Fissile Materials Disposition formed and tasked with determining technical options
- λ DOE performed environmental, technical, and non-proliferation studies
- λ DOE proposed a "dual-track" approach
  - MOX in commercial LWR reactors
  - Immobilization using vitrifcation

Timeline to DOE Record of Decision

- λ Dec '95 - Request for Expression of Interest (EOI)
- λ Jan '96 - Initial Expression of Interest
- λ Feb'96 - Supplement to EOI
- λ Mar '96 - Draft PEIS Issued
- λ Jul '96 - Technical Summary Report Issued
- λ Oct '96 - Non-Proliferation Assessment Issued
- λ Dec '96 - Final PEIS issued
- λ Jan '97 - Record of Decision issued

PROJECT P.E.A.C.E.

Plutonium

Excess

Arms

Converted to

Electricity

ComEd

PROJECT P.E.A.C.E. MISSION

Effect optimal disposition of excess weapons grade plutonium inventories in the United States and the former Soviet Union through the use of MOX fuel technology

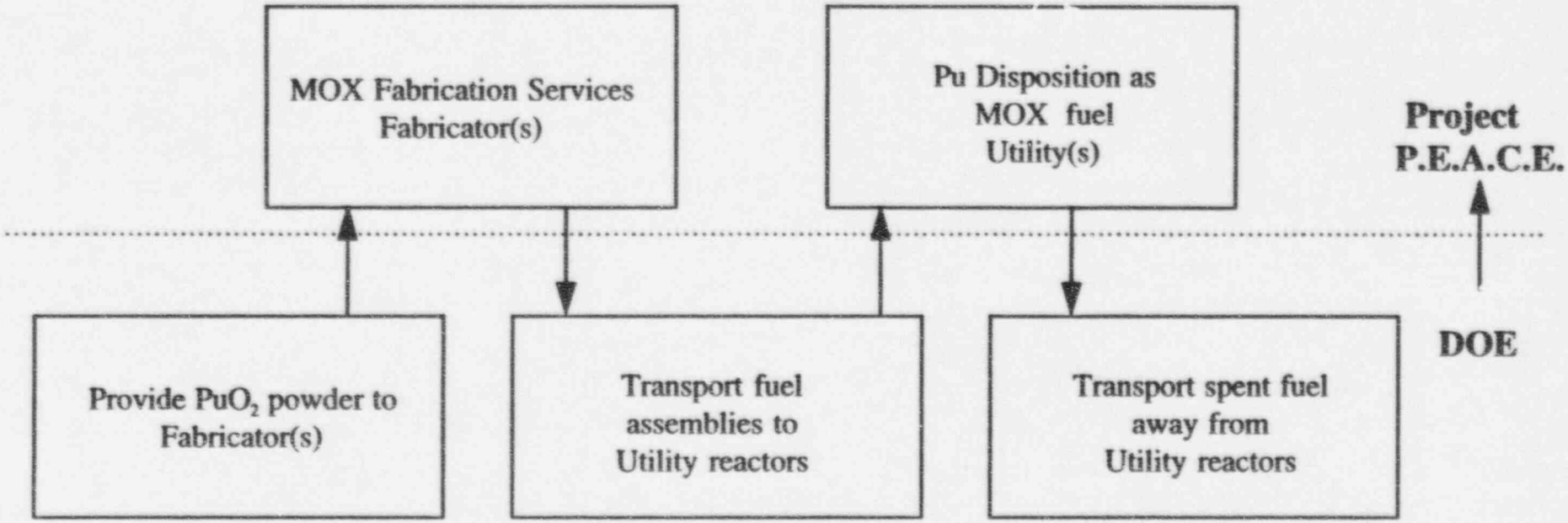
PROJECT P.E.A.C.E. TEAM

- λ ComEd and Duke Power
  - Major US Nuclear Utilities
- λ BNFL and Cogema
  - World's Leading MOX Fuel Fabricators
- λ Electricite de France via Cogema
  - World Leader in MOX Fuel Experience
- λ Provides full range of capabilities to meet DOE disposition mission

Project P.E.A.C.E. Approach

- λ Primary - Use Euro-Fab rapid start
  - Lead Test Assembly (LTA) Program
  - First full MOX reload
  - Disposition via multiple reactors
- λ Secondary - Use U.S. government fabrication
  - Build and license facility
  - Confirmatory program
  - Disposition via multiple reactors

Scope of Responsibilities: Project P.E.A.C.E. /DOE Team



Project P.E.A.C.E. handles all analyses, NRC interface, regulatory action, etc., to support the LTA program and full scale MOX use. DOE provides technical and financial support as required by Project P.E.A.C.E.

Potential NRC Involvement

- λ Transportation of plutonium oxide and MOX assemblies
- λ Licensing of U.S. nuclear plants
  - LTA programs
  - Reload cores
- λ Licensing of U.S. MOX fabrication plant under DOE

Technical Discussion

- λ State of Mixed Oxide (MOX) Technology
- λ MOX Lead Test Assembly (LTA) Program
- λ MOX reload irradiation

State of MOX Technology

- λ Over 400 tons of MOX fuel safely loaded in reactors since 1963
- λ EdF PWRs used for MOX irradiation very similar to the ComEd/Duke PWRs
- λ ComEd MOX experience in the '60's and '70's
  - Dresden and Quad Cities
  - Achieved burnups, residence time and power density representative of those required for today's operation

MOX Lead Test Assembly Program

- λ ComEd's practise is to confirm fuel design changes with an LTA program if existing database needs to be supplemented
- λ Program Elements
  - Use existing MOX database to the extent possible
  - Address technical issues:
    - » 12 vs 18 month cycles
    - » Reactor grade vs weapons grade plutonium

MOX LTA
When and How

- λ Earliest LTA insertion - late 1999
  (based on DOE Technical Summary Report)
- λ Process elements
  - DOE pit conversion to plutonium oxide
  - MOX pellets manufactured and assembled in Europe for shipment to US as finished products
  - Pool-side examinations and hot cell examinations of irradiated pre-characterized MOX fuel rods
- λ Expected results from design process: Overall core behavior expected to be more representative of a uranium than a MOX core - licensing basis events not expected to need reanalysis

MOX Reloads When and How

- λ Earliest reload insertion - late 2003
  (Based on DOE Technical Summary Report)
- λ Utilization of European fabrication route
- λ Overall core behavior expected to be more representative of MOX than uranium cores
  - Licensing basis events may require reanalysis
- λ Plant modifications may be necessary
  - Control rods replacement
  - Use of soluble boron enriched in isotope B10

Summary

- λ No significant technical issues
- λ Project P.E.A.C.E. team has the experience and can provide the full range of technical capabilities to meet DOE's MOX disposition mission