



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

November 3, 2000

MEMORANDUM TO: Eric J. Leeds, Chief  
Special Projects Branch  
Division of Fuel Cycle Safety  
and Safeguards, NMSS

THRU: Melanie A. Galloway, Chief  
Enrichment Section  
Special Projects Branch  
Division of Fuel Cycle Safety  
and Safeguards, NMSS

FROM: Andrew Persinko, Project Manager  
Enrichment Section  
Special Projects Branch  
Division of Fuel Cycle Safety  
and Safeguards, NMSS

SUBJECT: SUMMARY OF IN-OFFICE REVIEW OF DUKE COGEMA STONE &  
WEBSTER QUALITY ASSURANCE DOCUMENTS FOR THE MIXED  
OXIDE FUEL FABRICATION FACILITY

Executive Summary

The Nuclear Regulatory Commission (NRC) is currently reviewing the Mixed Oxide (MOX) Project Quality Assurance Plan (MPQAP) submitted by letter dated June 22, 2000. To support its review, on October 17-20, 2000, NRC staff from the Division of Fuel Cycle Safety and Safeguards (FCSS) conducted an in-office review of quality assurance (QA) documents and information associated with the mixed oxide (MOX) fuel fabrication facility being designed by Duke Cogema Stone & Webster (DCS). The review was conducted at COGEMA/SGN's offices in Bagnols-sur-Ceze, France. SGN is a wholly owned subsidiary of COGEMA and is doing much of the DCS design work on the MOX fuel fabrication facility. A similar review was conducted at the DCS offices in Charlotte, North Carolina, on August 16-18, 2000. Information reviewed during the in-office review included the project design, engineering, and QA organization and functional responsibilities, relationship of the COGEMA/SGN organization in Bagnols-sur-Ceze, France, to the DCS organization in Charlotte, North Carolina, design control, records management and document control, internal DCS/SGN audit activities, and QA training. The applicant, DCS, and its team member/subcontractor, COGEMA/SGN, responded to questions posed by NRC staff during the visit about the DCS QA plan and its implementation for the MOX fuel fabrication facility project activities.

Review Details

During October 17-20, 2000, Andrew Persinko (MOX Project Manager) and Wilkins Smith (MOX QA reviewer) conducted an in-office review of QA documents and information associated

with the MOX fuel fabrication facility project. The MPQAP applies to all DCS MOX project activities, including the MOX fuel fabrication process design being performed by COGEMA/SGN. The MPQAP has been submitted to the NRC for review, in advance of the application for construction authorization. The staff reviewed the QA organization and functional responsibilities, relationship of the COGEMA/SGN organization in Bagnols, France, to the DCS organization in Charlotte, North Carolina, design control, records management and document control, internal DCS/SGN audit activities, and QA training. DCS/COGEMA/SGN provided QA procedures, examples of design control processes and products, training records and responded to questions from NRC staff about the DCS QA plan and its implementation for the MOX fuel fabrication facility.

In general, the documents appeared to be in order with proper sign-offs and approvals, the documents appeared to be technically clear and understandable, and the NRC staff had full cooperation of COGEMA/SGN personnel and obtained prompt answers to questions it posed to SGN. There were no indications of any wide-ranging QA programmatic deficiencies. The NRC staff noted, however, that some of the controlling QA procedures could be improved to more completely address: (1) design control with respect to when confirmation of data in a calculation or procedure is necessary and date convention, (2) records management with respect to removing controlled documents from the central records center and management of information that is received via email from other DCS offices, (3) sources of design input to be more specific with respect to reliance on Melox or LaHague experience, and (4) QA training and documentation of training. As a result of the NRC staff review, the DCS QA manager stated his intent to review these procedures for possible improvement and to issue an internal DCS QA corrective action request to more thoroughly review the training records and assure that they meet the QA plan.

NRC staff noted that it intends to conduct a more thorough audit of DCS QA implementation at a future time. Slides used by COGEMA/SGN in its introductory remarks are attached.

Exit Meeting Attendees on 10/20/2000

Andrew Persinko	NRC
Wilkens Smith	NRC
J. Bach	COGEMA/SGN
M. Broussard	COGEMA/SGN
M. De Donder	COGEMA/SGN
J. Belmont	COGEMA/SGN
J. Weiss	COGEMA/SGN
J. Crustin	COGEMA/SGN
R. Brackett	DCS

Docket: 70-3098

Attachment: COGEMA/SGN Meeting Slides

cc:

P. Hastings, DCS  
J. Johnson, DOE  
H. Potter, SC Dept. of HEC  
J. Conway, DNFSB

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NAME	APersinko:cc		WSmith	RS	DHedley		MConway			
DATE	11/3/00		11/03/00		11/3/00		11/3/00			

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In general, the documents appeared to be in order with proper sign-offs and approvals, the documents appeared to be technically clear and understandable, and the NRC staff had full cooperation of DCS and COGEMA/SGN personnel and obtained prompt answers to questions. There were no indications of any wide-ranging QA programmatic deficiencies. The NRC staff noted, however, that SGN had not fully implemented or documented DCS MPQAP requirements for document control and QA training. The NRC staff also noted that some of the controlling QA procedures could be improved to more completely address: (1) design control with respect to when confirmation of data in a calculation or procedure is necessary and with respect to date convention, (2) records management with respect to removing controlled documents from the central records center and management of information that is received via e-mail from other DCS offices, (3) sources of design input to be more specific with respect to reliance on Melox or LaHague experience, and (4) QA training and documentation of training. As a result of the NRC staff review, the DCS QA manager stated his intent to review these procedures for possible improvement and to issue an internal DCS QA corrective action request to more thoroughly review the training records and assure that they meet the QA plan.

NRC staff noted that it intends to conduct inspections of DCS QA implementation after the DCS application for construction authorization is submitted. Slides used by COGEMA/SGN in its introductory remarks are attached.

Exit Meeting Attendees on 10/20/2000

Andrew Persinko	NRC
Wilkins Smith	NRC
J. Bach	COGEMA/SGN
M. Broussard	COGEMA/SGN
M. De Donder	COGEMA/SGN
J. Belmont	COGEMA/SGN
J. Weiss	COGEMA/SGN
J. Crustin	COGEMA/SGN
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# **KCD package NRC presentation**

MP BROSSARD  
October 19, 2000

## KCD Oxalic Mother Liquors Recovery unit

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- 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

## KCD Oxalic Mother Liquors Recovery unit

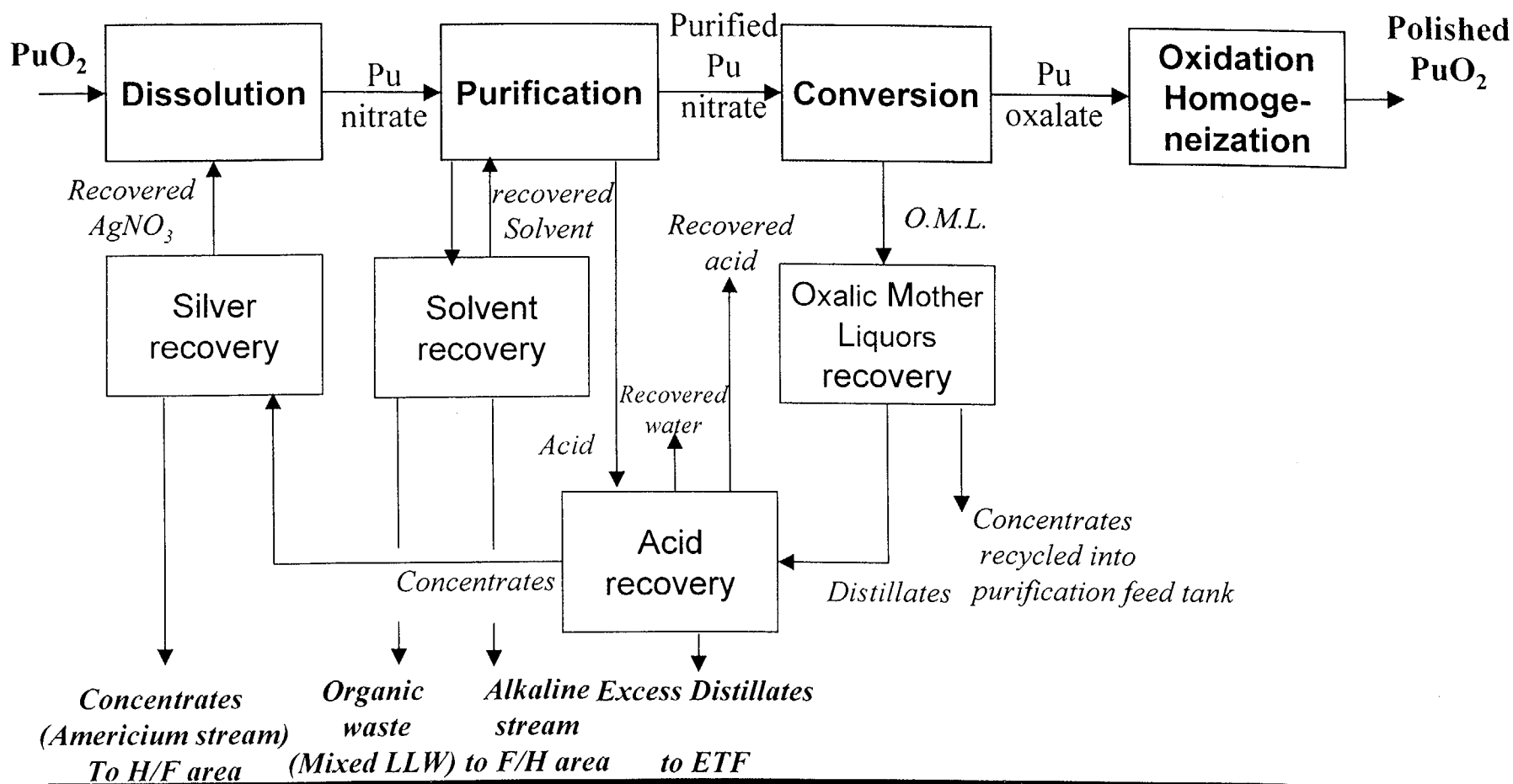
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- Purpose of the Oxalic mother liquors recovery unit
  - continuously receive (96h/week) the oxalic mother liquor from filtration of the Pu oxalate
  - continuously receive the effluents from cap impactor off gas treatment unit
  - concentrate them 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



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## Aqueous Polishing Process





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## KCD Oxalic Mother Liquors Recovery unit Main Process parameters

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- **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





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## KCD Oxalic Mother Liquors Recovery unit

### Main equipment data

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- **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)

## KCD Oxalic Mother Liquors Recovery unit Organization of documents

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

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- 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



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

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- 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



## ***COGEMA, Inc. & Subcontractors***

### ***Organization, Roles & Responsibilities***

Presentation to NRC

October 17-20, 2000

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October 17-20, 2000

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## **Duke Cogema Stone & Webster**

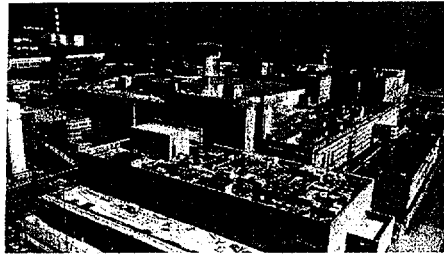
- Combines leading nuclear, engineering, fuel fabrication and utility firms
- Utilizes the existing, proven database of mixed oxide fuel fabrication and irradiation technology already available in Europe
- Utilizes existing, commercial light water reactors for irradiation services

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October 17-20, 2000

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## Fuel Fabrication Facility



- Based on the European design : MELOX
- 10 CFR 70 licensing approach
- Transfer of proven technology : design, commissioning, operation.

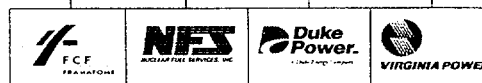
October 17-20, 2000

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## The DCS Team



### MAJOR SUBCONTRACTORS



October 17-20, 2000

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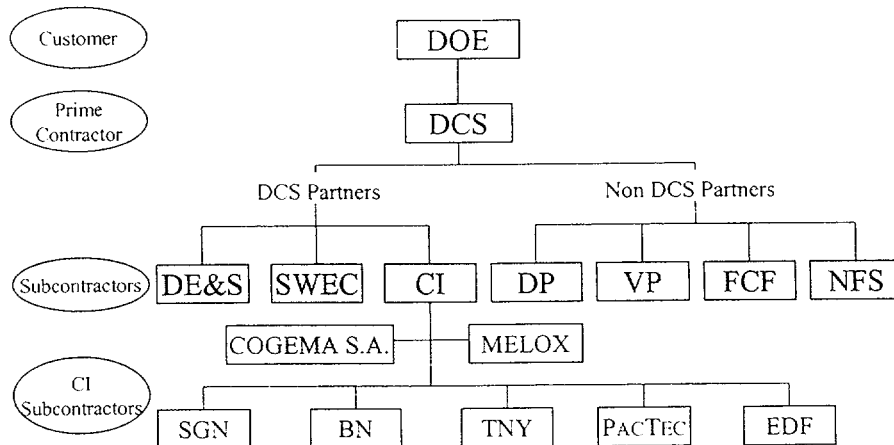
## COGEMA, Inc. in the MOX Project

- COGEMA, Inc. (CI) is a 30% Partner in the LLC (w/DE&S and SWEC) and is subcontractor to DCS
- CI represents the COGEMA Group and its associates
- CI = 7 subcontractors involved in all areas :
  - 5 subcontracts from CI to affiliate and non-affiliate companies:
    - SGN, TRANSNUCLEAR, Inc. (TNY), PACTEC
    - BELGONUCLEAIRE (BN), EDF
  - 2 Expert Support subcontracts: COGEMA, MELOX

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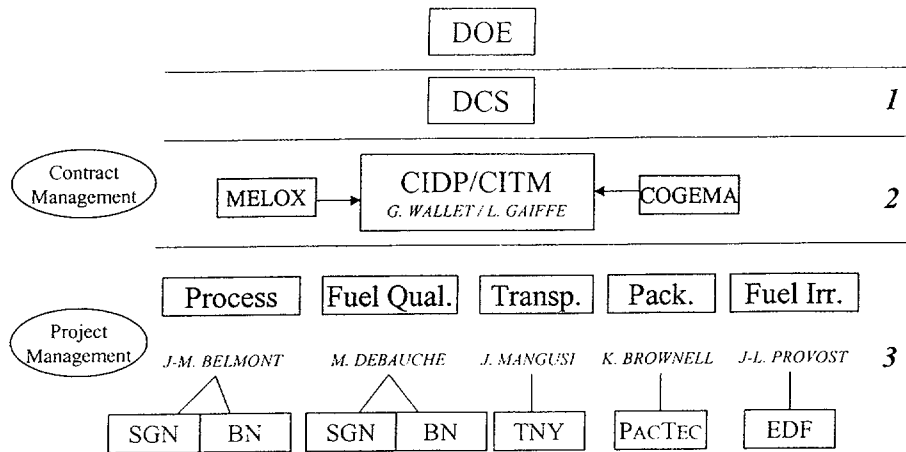
## Contractual Organization



October 17-20, 2000

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## Contractual Organization



October 17-20, 2000

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# **MOX Fuel Fabrication Facility**

## **NRC Visit of Process Design Group**

J-M. Belmont  
M. De Donder  
M-P. Brossard

17 October 2000

SGN Office Bagnols-sur-Cèze

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# Summary

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- Organization
- Roles and Responsibilities
- Delegation of Work  
& Delegation of Authority
- Definition of Work



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# Organization

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- MPQAP

- Section 1.2.1 : DCS Project Manager

- Responsible for project management of all DCS MOX Fuel Project activities.*

- Section 1.2.3 : Deputy Project Manager - MFFF Engineering and Construction Manager

- Responsible for the MFFF process and facility design.*

- Section 1.2.3.2 : MFFF Process Design Manager

- The Process Design Manager reports to the Deputy Project Manager - MFFF engineering and Construction and is responsible for the design of the MFFF process and for the development of systems and equipment specifications that can be licensed by the NRC.*

- Project Management Plan

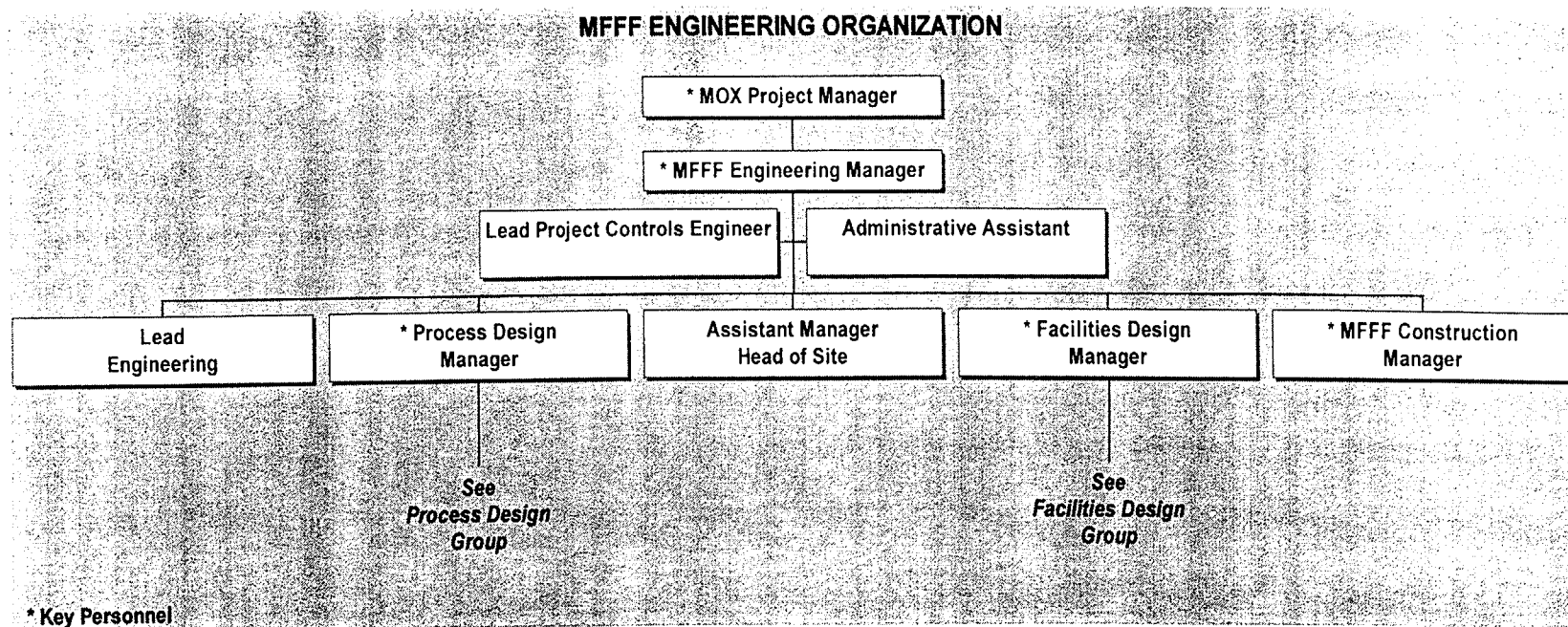
- Section 2.1 and the associated organizational charts



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## Organization (Contd.)

- EG2-0
  - EG2-0 defines the structure and chain of command for the MFFF Engineering Organization (Attach A)

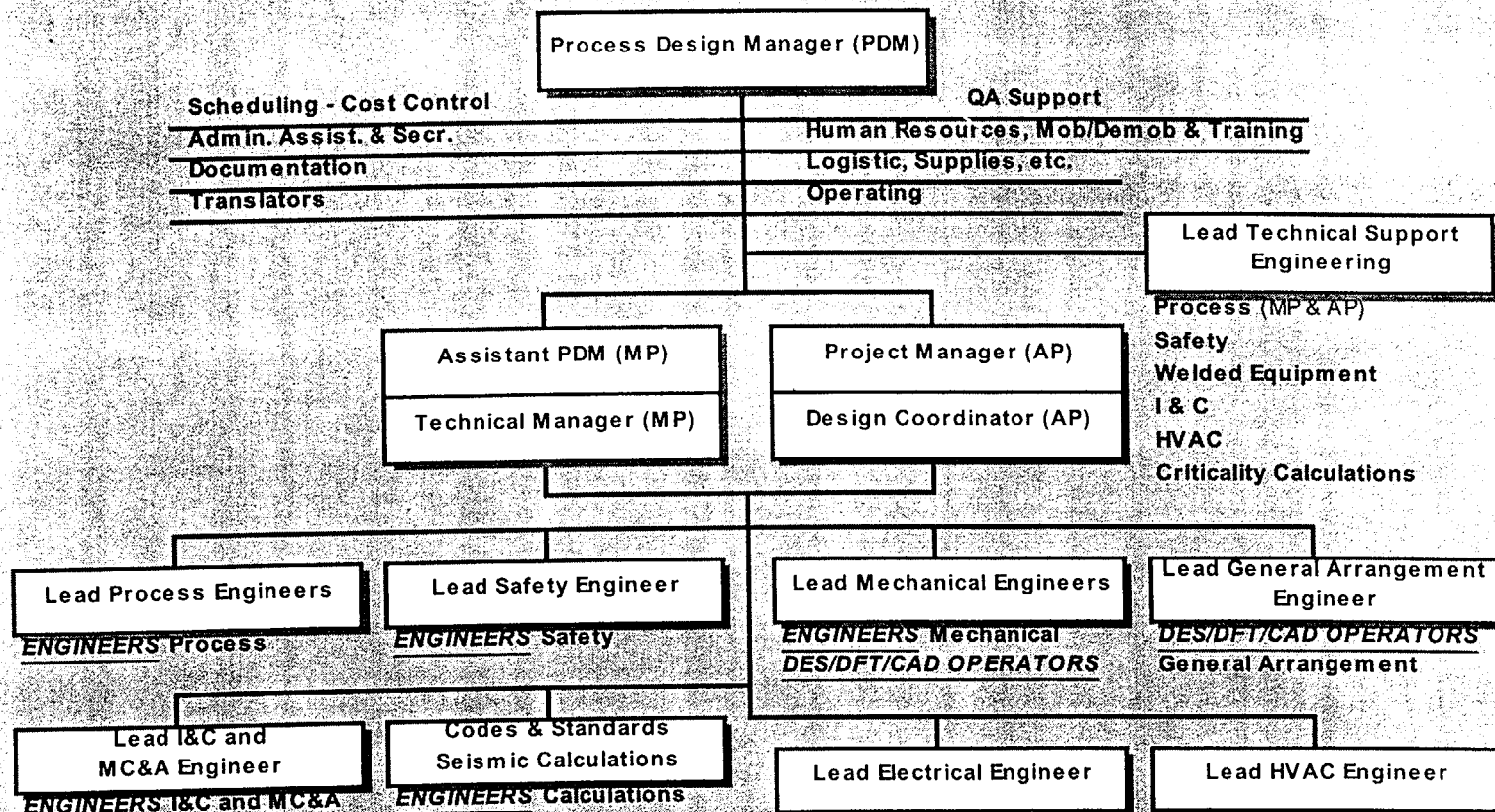




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## Organization (Contd.)

### PROCESS DESIGN GROUP ORGANIZATION





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## Roles and Responsibilities

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- Defined in MPQAP and detailed in EG2-0
  - EG2-0 Section 3.4 : Process Design Group Role and Responsibilities

*The Process Design Group acts as “System Engineers” for the process and equipment. This includes responsibility for:*

    - *Defining the overall process parameters*
    - *Defining all process equipment requirements*
    - *Defining support system requirements from a process perspective*
    - *Proposing overall plant layout*
    - *Providing basis of design, system descriptions, calculations and other technical documents as well as basic layout drawings for process equipment*
    - *Review and approval of all design documents determined to be germane to process design*



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## Roles and Responsibilities (contd.)

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- EG2-0 defines the Role and Responsibilities for the various supervisory personnel (Attach B)
- EG2-0 defines in section 3.5 the relationship between the Facilities Design Group (S&W, DE&S and NFS) and the Process Design Group (COGEMA-SGN/Belgonucléaire)

*The Facilities Design Group will receive the process information from the Process Design Group and implement into the final design documents. The Process Design Group will review and have approval authority over any features that affect the process. This is to be accomplished by a formal process to ensure that this review and approval by the Process Design Group is executed correctly. This formal review process is to be in accordance with PP9-3, Design Control, and the implementing procedure for each type of design document and will cover the SSCs in the various process areas.*

## Delegation of work & Delegation of Authority

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- MPQAP section 1.4 : Delegation of Work

*Responsible managers have the authority to delegate tasks to another qualified individual within their organization provided the designated individual and their qualifications are documented. All delegations shall be in writing. The responsible manager retains the ultimate responsibility and accountability for implementing the applicable requirements.*

- EG2-0 Attach B : details the responsibilities of the supervisory personnel

- Process Design Manager (PDM)
- Aqueous Polishing Project Manager
- MOX Process Technical Manager
- Lead Technical Support Engineer - PDG
- Lead Discipline Engineers (LDE - PDG)