NRC Meeting Diesel Fuel Oil LAR

June 22, 2011

Xcel Energy Participants

- **Christopher Lethgo – Engineering Supervisor**
- **Dale Vincent – Licensing Engineer**

Agenda

- Introductions - Vincent
- Meeting purpose - Vincent
- Background - Lethgo
- Unit 1 DFO System - Lethgo
- Unit 2 DFO System - Lethgo
- Current TS and Bases - Vincent
- Proposed TS and Bases - Vincent
- Proposed LAR Scope - Vincent
- Summary - Vincent

Meeting Goals

- **Discuss diesel fuel oil issues**
- **Provide scope of proposed LAR and basis**

Background

- Issues
  - Review of DFO storage system
    - License basis
    - Single failure design requirements
    - Compensatory measures

Background

- **Issues continued…**
  - **CDBI (2007) identified EDG frequency issue**
    - **Higher frequency – more DFO consumption**
    - **Compensatory measures**
      - **Limit frequency range**
      - **Increase DFO storage requirement**

Background

- Issues continued…
  - 2010 identified single failure issue
    - Each FOST has only one transfer pump
    - Multiple transfer pumps have the same power supply
    - A single failure could prevent access to fuel oil in multiple FOSTs until repairs were made.
    - Compensatory measures
      - 7 days of fuel oil supply in each train

Background

- DFO System
  - Unit 1 Operation – 1973
  - Unit 2 Operation – 1974
  - Two emergency diesel generators (D1, D2)
  - Plant only had the safeguards DFO system now associated with Unit 1

Background

- DFO System continued…
  - Unit 2 safeguard buses reconfigured – 1992
    - Unit 2 EDGs installed (D5, D6)
      - Address SBO requirements
    - Unit 2 safeguards buses separated from Unit 1 EDGs
    - Unit 2 DFO system installed
    - Safeguards power to 121 MDCLP from Unit 2 EDGs

Unit 1 DFO System

- D1 – Fairbanks Morse EDG
  - Train A Safeguards Bus
- D2 – Fairbanks Morse EDG
  - Train B Safeguards Bus
- 12 DDCLP
  - CL Train A header
- 22 DDCLP
  - CL Train B header

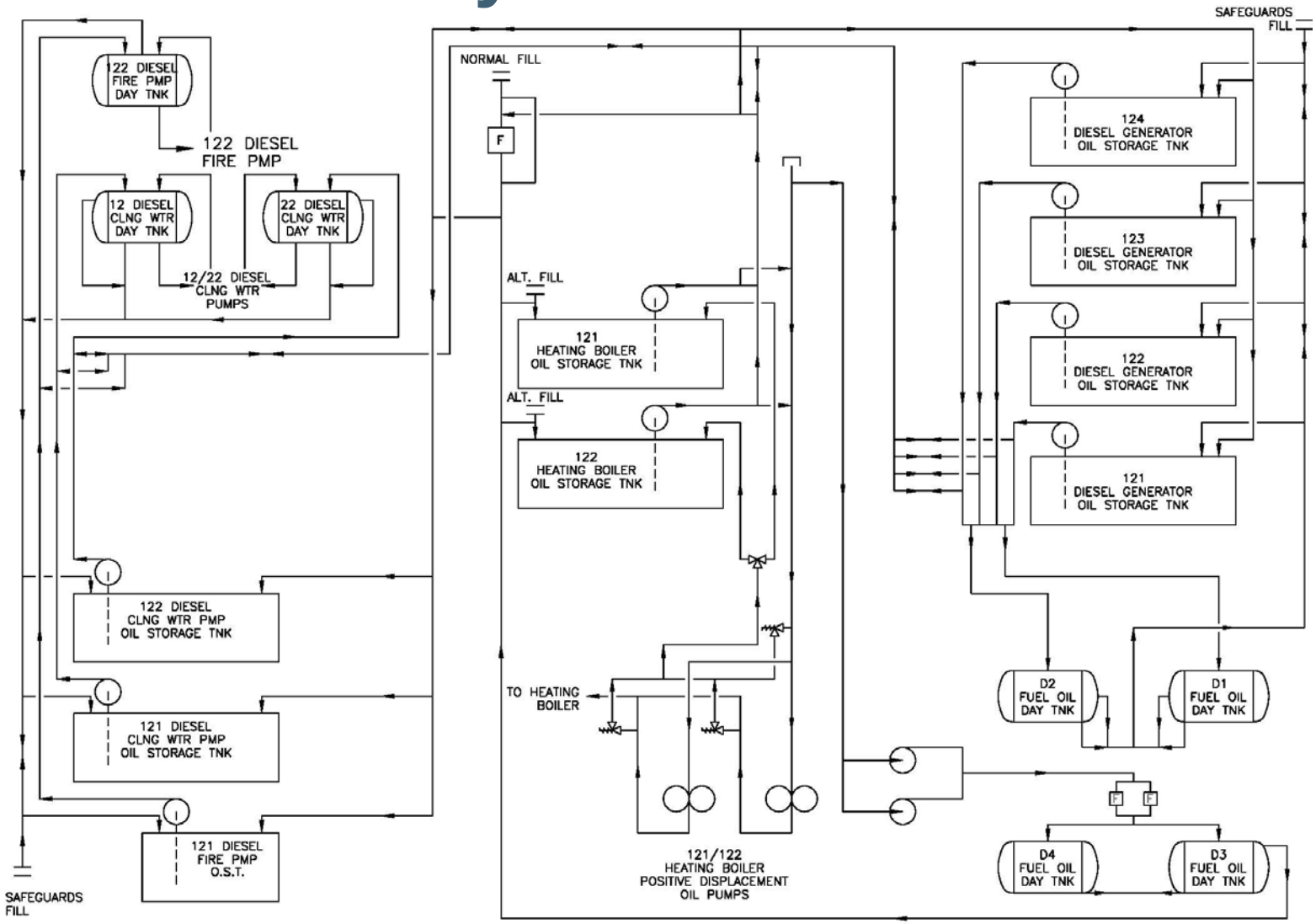
Unit 1 DFO System

- Contributes to Cooling Water (CL) System
  - Equivalent to service water and emergency service water systems at other plants
  - System is shared between the units
  - Five CL pumps
  - Two safeguards DD pumps
    - Separate TS DFO requirement
  - One safeguards MD pump
    - Powered by either Unit 2 EDG

Unit 1 DFO System

- Six Class I tanks
  - All tanks interconnected
  - Any tank can supply any Unit 1 or CL diesel
  - Available volume – 17,500 gallons/tank
  - Maximum volume – 19,500 gallons/tank
- 2 non-Class I tanks for heating boiler
  - Volume – 35,000 gallons/tank

Unit 1 DFO System



Drawing For Information Only

Unit 1 DFO System

- Design features
  - All tanks interconnected
  - Seismic
  - Designed for Probable Maximum Flood
    - Buried
    - Anchored
    - Elevated vent

Unit 1 DFO System

- **Transfer pumps**
  - One transfer pump per tank
  - Pumps are safety-related
  - 121 and 122 EDG FO storage tank pumps
    - Train A safeguards bus
  - 121 DDCLP tank pump
    - Train A safeguards bus
    - May also be powered from Unit 2
  - 123 and 124 EDG FO storage tank pumps
    - Train B safeguards bus
  - 122 DDCLP tank pump
    - Train B safeguards bus
    - May also be powered from Unit 2

Unit 1 DFO System

- Transfer pumps continued…
  - Any tank can supply any Unit 1 or CL diesel
  - 121 and 122 EDG FO storage tank pumps
    - Provide automatic makeup for D1
  - 121 DDCLP tank pump
    - Provide automatic makeup for 12 DDCLP
  - 123 and 124 EDG FO storage tank pumps
    - Provide automatic makeup for D2
  - 122 DDCLP tank pump
    - Provide automatic makeup for 22 DDCLP

Unit 1 DFO System

- **License basis**
  - **14 day supply for one EDG and one DDCLP**
  - **Probable Maximum Flood duration 13 days**
  - **Replenish supply after 14 days**
  - **Single failure not a consideration for external flood event**
  - **EDG loading**
    - **Original license basis: FSAR Table 8.4-1 loads (one unit DBA, other unit hot shutdown)**
    - **Current license basis: USAR Table 8.4-1 loads (Unit 1 DBA)**

Unit 1 DFO System

- **Current volume requirements**
  - **Approximately 42,000 gallons for one EDG**
  - **Approximately 19,500 gallons for one DDCLP**
  - **These volumes require minimum of 4 tanks**

Unit 2 DFO System

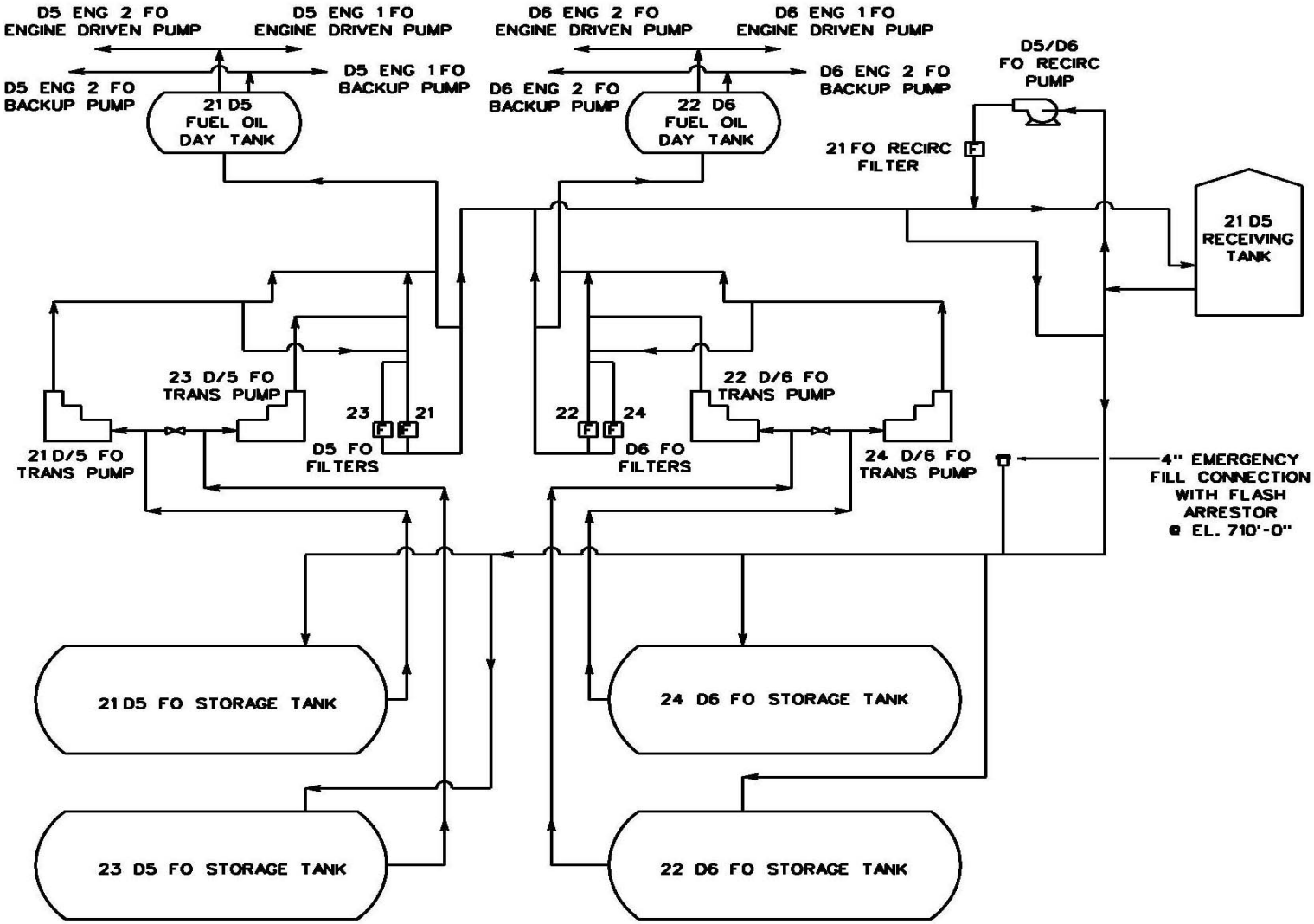
- D5 – SACM* EDG
  - Train A safeguards bus
- D6 – SACM EDG
  - Train B safeguards bus

*Societe Alsacienne de Constructions Mecaniques de Mulhouse (SACM)

Unit 2 DFO System

- Four Class I tanks
  - 21, 22, 23, and 24
  - Available volume – 30,800 gallons/tank
  - Maximum volume – 32,800 gallons/tank
- One Non-Class 1 receiving tank
  - Approximately 15,000 gallons

Unit 2 DFO System



Drawing For Information Only

Unit 2 DFO System

- Design features
  - All tanks interconnected
  - Seismic
  - Designed for Probable Maximum Flood
    - Underground concrete vault
    - Anchored
    - Elevated vent
    - Emergency fill connection above flood level

Unit 2 DFO System

- Transfer pumps
  - One transfer pump per tank
  - Pumps are safety-related
  - 21 and 23 tank pumps
    - Train A safeguards bus
  - 22 and 24 tank pumps
    - Train B safeguards bus

Unit 2 DFO System

- License basis
  - 14 day supply for one EDG
  - Probable Maximum Flood duration 13 days
  - Replenish supply after 14 days
  - Single failure not a consideration for external flood event
  - USAR Table 8.4-2 loads (Unit 2 DBA)

Unit 2 DFO System

- **Current volume requirements**
  - **Maintain 75,000 gallons for one EDG**
  - **This volume requires a minimum of 3 tanks**

Current TS and Bases

- **Technical Specification**
  - **Total supply within limits**
  - **Total supply applicable – one or both EDGs operable**
  - **Limits based on operation of one EDG for 14 days**
  - **Basis: maximum probable flood**

Current TS and Bases

- Bases
  - Background discussion
    - Mixed NUREG-1431 and old TS Bases
    - Basis for requirements not clear
  - ASA discussion
    - Discusses DBA - confusing
  - Good discussion of DFO system

Current TS and Bases

- **Regulatory requirement - 10CFR 50.36(2)**
  - (ii) A technical specification limiting condition for operation of a nuclear reactor must be established for each item meeting one or more of the following criteria:
    - (C) *Criterion 3*. A structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Proposed TS and Bases

- **High level changes**
  - **Replace current TS**
  - **More alignment with standard TS**

Proposed LAR Scope

- **Add new license basis**
  - **Supply to mitigate DBA+LOOP**
  - **Assume single failure**
  - **7-day supply**
  - **Make license basis same for both units**

Proposed LAR Scope

- **TS changes**
  - **Implement proposed new license basis**
  - **7-day supply for each EDG**
  - **Replace current TS**
  - **Administrative changes**

Proposed LAR Scope

- **Basis for TS change**
  - **Current TS**
    - **Cope with external flood**
    - **Does not meet 10CFR 50.36(2)(ii)(C)**
  - **Proposed TS**
    - **Mitigate DBA with assumed single failure**
    - **Meets 10CFR 50.36(2)(ii)(C)**

Proposed LAR Scope

- **Proposed TS consistent with regulatory guidance**
  - **Regulatory Guide 1.137**
  - **NUREG-0800**
  - **NUREG-1431**

Proposed LAR Scope

- **Proposed TS improves safety**
  - **7-day supply available for each EDG**
  - **More DFO required**
  - **DFO supply can be replenished in 7 days**
  - **System design supports proposed TS**
    - **No modifications required**

Proposed LAR Scope

- **Relocate DFO volumes to Bases**
  - **Resolve non-conservative TS issue**
  - **Flexibility for future volume changes**
  - **Per TSTF-501**
  - **Calculate volumes per RG 1.137 – both units**

Proposed LAR Scope

- **Improve TS alignment with NUREG-1431**
  - **New license basis**
  - **Uniform interpretation and compliance**
  - **Improve clarity for operator use**
  - **Administrative changes**

Proposed LAR Scope

- **Bases**
  - **Make consistent**
  - **Reflect new license basis**
  - **Include DFO volumes per TSTF-501**

Questions / Comments

- **Discussion**

Summary

- Propose to add new license basis
- Propose new TS
- Relocate DFO volumes to Bases
- Current DFO system designs support the proposed license basis and TS
- Meets regulations for required TS
- Consistent with regulatory guidance
- Plant safety is improved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