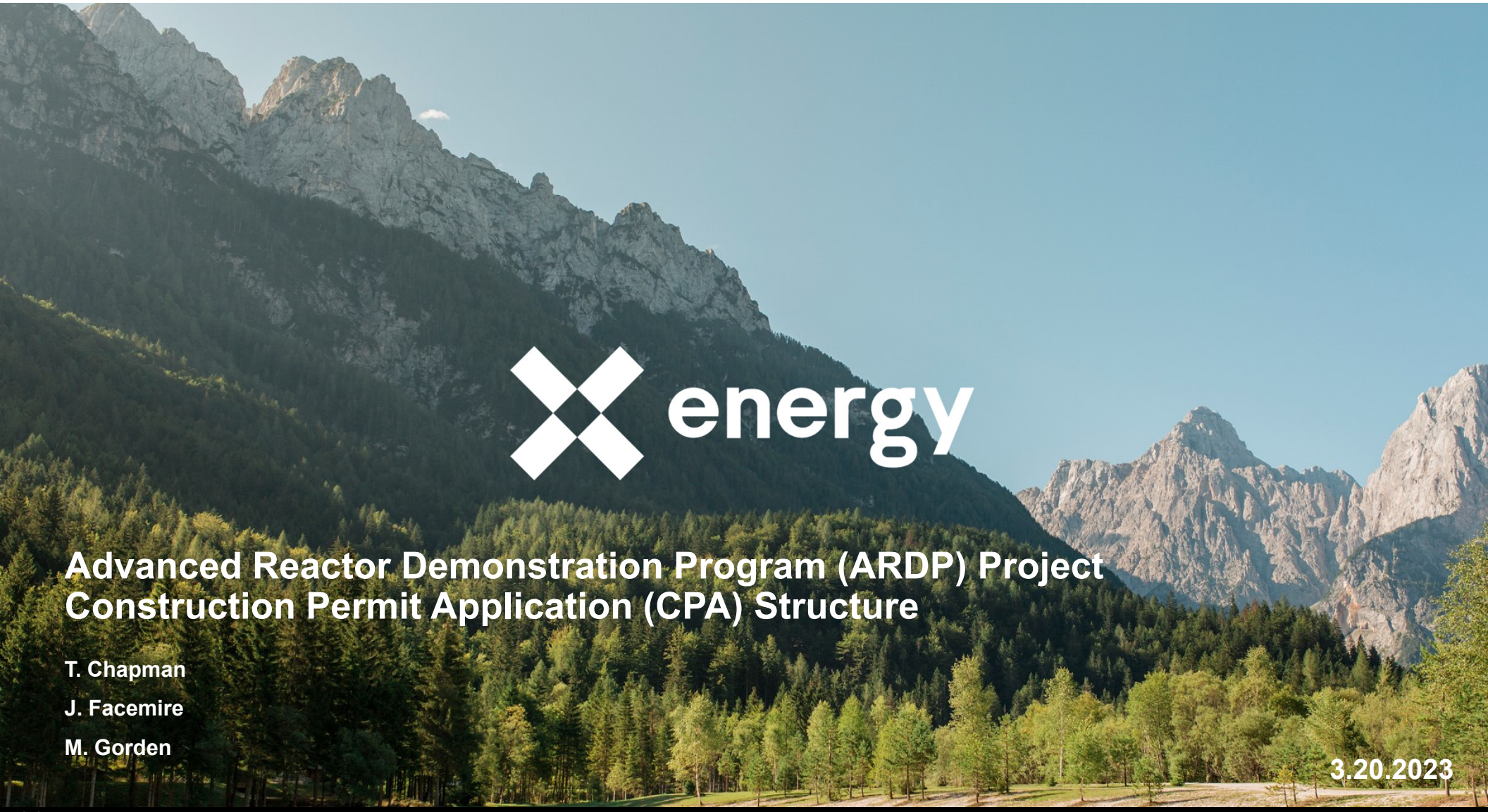

Advanced Reactor Demonstration Program (ARDP) Project Construction Permit Application (CPA) Structure

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Agenda & Objectives

Agenda:

- Regulatory Basis
- Construction Permit Application (CPA) Structure
  - PSAR Structure (Part II)
  - ER Structure (Part III)
  - Additional Parts of the CPA
- Open Discussion

Objective:

- Introduce X-energy's approach and format for a 10 CFR 50 Construction Permit application based on regulation, regulatory guidance, and advanced reactor regulatory framework development.
- Identify challenges to how information is organized that may affect application acceptance.

Regulatory Basis - Regulations

- Construction Permit application is being developed to principally meet the regulatory requirements of 10 CFR 50, 51, and 100
  - Addresses other regulations as applicable (i.e., Parts 20, 70, 74, etc.)
  - Based on NRC guidance for applicability of regulations and X-energy's regulatory analysis preapplication engagements
- Submittal in accordance with 10 CFR 2
  - Project schedule development is being used for insight into the need for splitting the application submissions
- Addressing 50.33 and 50.34(a) information requirements
- Opportunities for finality are being evaluated, but will be limited
- Most programmatic requirements will be addressed as plans in the CPA (Chapters 8/11, Enclosures) for further review in future submittals (e.g., Operating License application)

Regulatory Basis - Guidance

- NEI 21-07 provides guidance on “Safety Analysis Report Content for Applicants Using the NEI 18-04 Methodology”
  - NEI 21-07 has not yet been endorsed by the NRC, but comments were provided during development of NEI 21-07 through NRC public meetings and based on X-energy’s tabletop exercise.
  - Establishes a proposed layout for Chapters 1-8
- NRC has provided Draft Advanced Reactor Content of Applications Project (ARCAP) Guidance for proposed Chapters 9-12 as well as a proposed ARCAP Chapter 2 for “Site Information”
- RG 1.206 provides guidance on content that inform other Parts of an application* including (example):
  - *General and Financial Information*
  - *Safety Analysis Report (SAR)*
  - *Environmental Report (ER)*
  - *Technical Specifications (TS)*
  - *Emergency Plans (EP)*
  - *Security Plans*
  - *Exemptions, Departures and Variances*
  - *License Conditions and Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC)*
  - *Withheld Information*
  - *Quality Assurance Program Description (QAPD)*

*While RG 1.206 is informed by Part 52 experience, it remains relevant to many types of licensing activities and the respective applications

Regulatory Basis - Guidance

- X-energy reviewed the guidance in NEI 21-07, ARCAP, and RG 1.206 since 2020 and has developed the structure and content presented in the following slides.
- Due to guidance availability, X-energy's PSAR structure uses NUREG-0800 as a basis for Chapter 2 *Site Characteristics* content and organization, while incorporating NEI 21-07/ARCAP guidance in a combined Chapter 3 that includes methodologies, analyses, and licensing basis event content.
- RG 1.206 guidance reviewed for applicability for a Construction Permit Application and overall application development, preconstruction, and submittal guidance.

CPA Structure

- Part I - General and Financial Information
- Part II - Preliminary Safety Analysis Report
- Part III - Environmental Report
- Part IV – Preliminary Technical Specifications
- Part V – Non-Applicabilities and Requested Exemptions
- Part VI - Proposed License Conditions
- Part VII - Enclosures

PSAR Structure (Part II)

- Chapter 1 - General Plant and Site Description
- Chapter 2 - Site Characteristics
- Chapter 3 - Licensing Basis Events [including Methodologies and Analysis]
- Chapter 4 - Integrated Evaluations
- Chapter 5 - Safety Functions, Design Criteria, and SSC Classification
- Chapter 6 – Safety-Related SSC Criteria and Capabilities
- Chapter 7 - NSRST SSC Criteria and Capabilities
- Chapter 8 - Plant Programs
- Chapter 9 – Radioactive Waste Management
- Chapter 10 - Control of Occupational and Public Dose
- Chapter 11 – Conduct of Operations
- Chapter 12 – Initial Startup and Test Programs

PSAR Content Discussion

Chapter 3/4/5

- LBEs based on FPIE PRA, DBHLs identifying bounding DBAs with few exceptions (Seismic-DBA), bounding analyses for non-core sources and lower modes.
- PRA self-assessed inline with X-energy's PRA technical adequacy WP (no Peer Review)
- Methodologies generally associated with topical reports, and analysis codes have V&V plans, but may be at various stages of completion with associated commitments per 10 CFR 50.35(a)

Chapters 6/7

- Detail based on Construction Permit content guidance in NEI 21-07
  - SR - "functional level and should identify the performance-based requirements needed for individual major components."
  - NSRST – "populated to the extent the DID evaluation has been performed"…"identify safety-significant functions to be provided by those SSCs"

ER Structure (Part III)

- Chapter 1 - Introduction
- Chapter 2 – Environmental Description
- Chapter 3 – Plant and Project Description
- Chapter 4 – Environmental Impacts of Construction
- Chapter 5 – Environmental Impacts of Station Operations
- Chapter 6 – Environmental Measurements and Monitoring Programs
- Chapter 7 – Environmental Impacts of *Postulated Accidents* Involving Radioactive Materials
- Chapter 8 – *Need for Power*
- Chapter 9 – *Alternatives to the Proposed Action*
- Chapter 10 – Environmental Consequences of the Proposed Action

Additional Parts of the CPA

- Part I - General and Financial Information
- Part IV - Technical Specifications
- Part V – Non-Applicabilities and Requested Exemptions
- Part VI - Proposed License/Permit Conditions
- Part VII – Enclosures
  - QAPDs
  - Plans for Operational Programs/Plans
  - Site Redress Plan
  - Aircraft Impact Assessment (SGI)
  - Research & Development Plan ((§50.34(a)(8), §50.35(a))

Conclusions

- Application development follows 10 CFR regulations and advanced reactor regulatory guidance
- PSAR is based on NEI 21-07 guidance during TICAP development and NRC endorsement with incorporation of multiple advanced reactor regulatory framework elements (DGs, RGs, etc.)
- ER is based on RG 4.2/NUREG 1555; no significant deviations
- Overall application structure is adaptable for the Part 50 two-step licensing approach from Construction Permit application through Operating License application