Palo Verde / NRC Meeting
Risk Informed Completion Times

February 17, 2015

DRAFT

Introductions

Bryan Thiele
Department Leader
Nuclear Engineering

DRAFT

PALO VERDE

Agenda

- Introduction ..... Bryan Thiele
- Palo Verde Overview ..... Tom Romay
- License Amendment ..... Thomas Weber
- PRA Summary ..... Everett DePue
- Implementation Plan ..... Tom Romay
- Path Forward and Closing Comments ..... Bryan Thiele

Desired Meeting Outcomes

- Summarize PVNGS design with focus on unique features
- Discuss license amendment content and variances from TSTF 505
- Provide overview of PRA models
- Discuss implementation plan
- Describe path forward

Palo Verde Design Overview

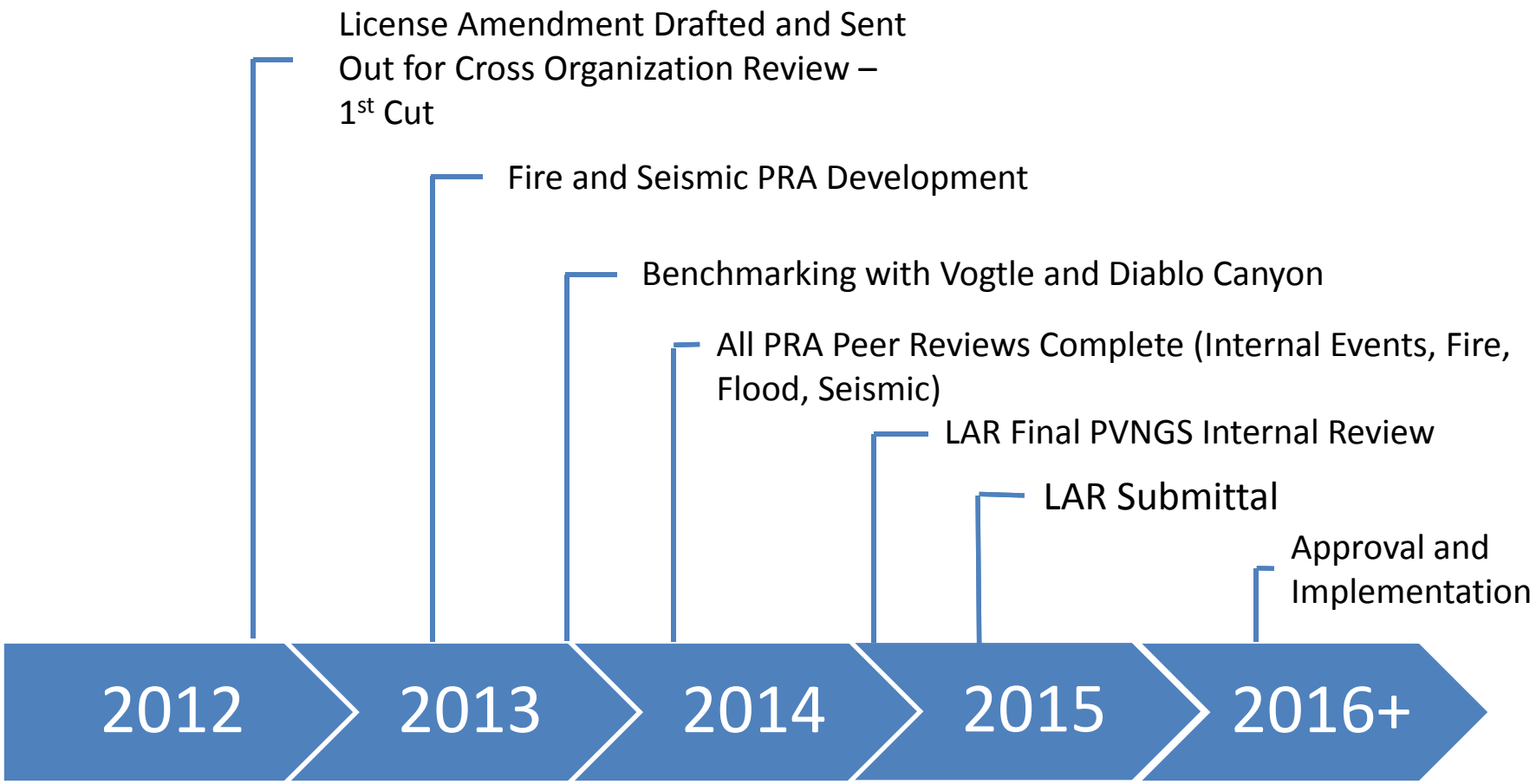
Tom Romay
Shift Manager
Senior Reactor Operator

DRAFT

Palo Verde Design Features

- Three identical, separate Units, minimal shared SSCs
- No pressurizer PORVs
- Low leakage RCP seals on loss of seal cooling
- Four channels of class instrumentation (two trains w/2 channels each)
- Four AC vital buses and DC buses
- Demonstrated capability to feed SG with no AC/DC power

RICT Timeline



DRAFT

License Amendment Request

Thomas Weber
Department Leader
Nuclear Regulatory Affairs

DRAFT

PVNGS LAR Content

- Based on TSTF 505-A & NEI 06-09-A
  - Scope includes components modeled in PRA
  - 25 LCOs
  - Mode 1 and 2 only
  - New TS Section 5.5 Program
  - Variances from TSTF 505 addressed in LAR and include:
    - RICT added to two LCOs not in TSTF 505
    - Miscellaneous variances described in LAR

TS 3.4.12, Pressurizer Vents

- NOT in TSTF 505 or NUREG 1432
- In PV Safety Analysis
- Modeled in PRA
- RICT added to Two Required Actions
  - Note added to preclude voluntary entry with with all pressurizer vent paths inoperable

TS 3.7.3, MFIVs

- Not in TSTF 505 but is in NUREG 1432
- LAR adds restoration action
- MFIVs modeled in PRA
- RICT added to Two Required Actions
  - Note added to preclude voluntary entry with both MFIVs in same flow path INOP

Miscellaneous Variances

- TS 3.7.2, MSIVs
  - Did not add RICT for some restoration conditions
- TS 3.7.4, ADV
  - Added note to preclude voluntary entry with all ADVs INOP
- TS 3.7.9, UHS
  - Added restoration condition
  - Added note to preclude voluntary entry
- TS 3.8.7, Inverters
  - Revised note since PVNGS Design has two inverters per train supporting 4 channels of vital instruments

Summary

- TSTF 439 in progress
- Minimizing other LARs at PVNGS that have changes to TSTF 505 LCOs
- Communicating with other Utilities
- Participating in Industry Committees
- Monitoring TSTF 505 RAIs

PRA Models

Everett DePue
Senior Engineer
PRA Lead for TSTF-505

DRAFT

PALO VERDE

Summary of PRA Models

- PRA models developed and peer reviewed
  - Internal events
  - Internal flood
  - Internal fire
  - Seismic
- RG 1.200 Rev. 2 hazards screened and peer reviewed
- Total CDF/LERF meet RG1.174 Rev. 2 limits
- Internal events and internal flood risk very low
- CDF/LERF dominated by internal fire and seismic hazards

Internal Events PRA

- Peer review by CEOG conducted in 1999
- Self-assessment performed against entire RA-Sa-2009 in 2015
- RA-Sa-2009 Supporting Requirements met to Capability Category II except:
  - Some sub-elements of SY-C1, SY-C2 System Notebook Documentation need completion
    - To be completed prior to RICT Program implementation

Internal Flood PRA

- Industry Peer Review conducted in 2010
- All ASME/ANS PRA requirements met to Capability Category II after peer review findings addressed

Internal Fire PRA

- PVNGS is not NFPA-805 plant,
  - Complies with methods in NUREG/CR-6850
- Industry Peer Review conducted in 2012
- Follow-up Industry Peer Review conducted in 2014 - addressed 2012 findings
- All ASME/ANS requirements met to Capability Category II after peer review findings addressed

Seismic PRA

- Industry peer review conducted in 2013
- All ASME/ANS requirements met to Capability Category II after peer review findings addressed except
  - SPR B7 Complementary Success Logic
    - Meets CC II for ASME/ANS RA-Sb-2013

Plant-Specific Modeling

- RICT CRMP model will be either:
  - Real time risk model as currently used for existing Technical Specification CRMP

    OR
  - Pre-solved solutions (STP approach)

Plant Modifications

- PRA models rely on installation of modifications or taking compensatory measures
- RICT Program will not be implemented until modifications complete or compensatory measures in place
- FLEX strategies not yet reflected in the PRA models – conservatism

Implementation Plan

Tom Romay
Shift Manager
Senior Reactor Operator

DRAFT

Implementation Plan

- Engineering coordinate RICT implementation
- Cross organization team supporting implementation
- RICT implemented in Modes 1 and 2 only
- CRMP tool PRA Models will include Internal Events, Internal Flooding, Fire, and Seismic
- Procedure changes, training, and qualifications will support RICT CRMP capability
  - Extensive use of industry participation & benchmarking to develop program, procedures, training

Procedures

- Revise 40DP-9RS01, Operations Department Online Nuclear Risk Management Mode 1 and 2, to include RICT, RMAT, and RMA determinations

- New RICT Program Procedure

Training

- Licensed Operators
  - Hands-on training on RICT calculations
  - Classroom training to address how RICT impacts Station Operations
- Station Management
  - Affected managers trained on process, expectations, limitations
- Engineering, Work Management

Communications

- Industry peers via TSTF-505 task force
- Site-wide Articles at Station
  - While submittal under review
  - Once submittal is approved
- Leader Alignment Meetings
- Department All Hands Meetings

Credited Modifications

- DC ammeter circuits
- Non-class 1E DC motor circuits
- Replace RCP control cables with fire rated cables
- Install new permanently staged Steam Generator (SG) makeup pump that utilizes FLEX connections
- Breaker coordination on risk significant non-class 1E motor control centers/panels

Path Forward
and
Closing Comments

Bryan Thiele
Department Leader
Nuclear Engineering

DRAFT

Path Forward

- Address Fire PRA peer review comments
- Submit LAR in June
- Finalize scope and install modifications
- Complete procedures, software and training in parallel with NRC review
- Implement in late 2016

We SAFELY and *efficiently* generate electricity for the *long term*

DRAFT