

# **Turkey Point Unit 3 and Unit 4**

## **Reactor Protection System Engineered Safety Feature Actuation System Nuclear Instrumentation System Replacements**

**Safety System Replacement Project LAR**  
**NRC Presubmittal Meeting Telecon**  
**December 9, 2020**



# Agenda – Open Portion

- **Introductions**
- **Purpose of Meeting**
- **Overview Safety System Replacement Project**
- **Use of ISG-06 Rev. 2 Alternate Review Process (ARP)**
  - Vendor Oversight Plan
  - Basis for Using the ARP Process
- **Human System Interface (HSI) concepts and Human Factors Engineering (HFE)**
- **Regulatory communication during development and review**
- **U.S. Nuclear Regulatory Commission (NRC) Feedback Opportunity**
- **Key Takeaways**

# Introductions – Project Team

- **FPL Nuclear Licensing**
  - Steve Catron – Licensing Fleet Manager
  - Jarrett Mack – Fleet Licensing Lead
  - David Stoia – Turkey Point Licensing Lead
  - Bill Maher – Improved Technical Specification Project Director
- **FPL Nuclear Engineering**
  - Brian Dunn – Engineering Manager
  - Phil Barnes – Design Manager
  - Warren Busch – Project Engineer
- **Framatome**
  - Ron Legrand – Project Manager
  - Brian Haynes – Licensing Lead
  - Taha Abdelnaeem --- Engineering Lead
  - Ted Quinn – Licensing Engineer
  - Jerry Mauck – Licensing Engineer
  - Ron Jarrett – Licensing Engineer
  - Rick Turk – Licensing Engineer (HFE)
  - Bill Hannaman – Licensing Engineer (HFE)

# Meeting Purpose

- **Present FPL’s intent to submit License Amendment Request (LAR) for replacement safety systems and surveillance reduction**
  - Reactor Protection System (RPS)
  - Engineered Safety Features Actuation System (ESFAS)
  - Nuclear Instrumentation Systems (NIS)
  - Technical Specification required surveillance reduction
- **Discuss licensing approach using ISG-06, Rev. 2, Alternate Review Process**
- **Discuss HSI conceptual changes and approach to HFE**
- **Discuss communication during LAR development and review**
- **Provide an opportunity for NRC feedback, answer questions**

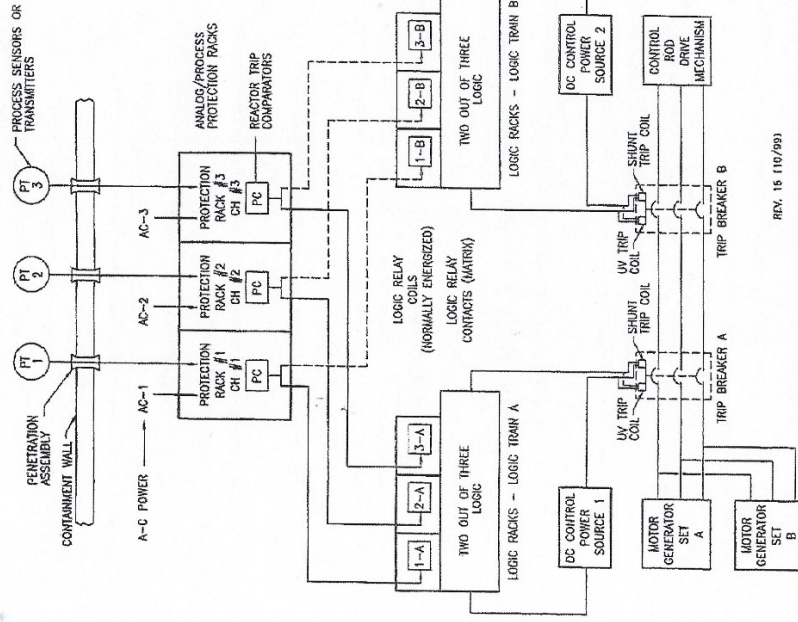
# Safety System Replacement Project Overview

- **Replace existing analog and digital safety systems with modern technology**
  - Mitigate obsolescence
  - Reduce future operating and maintenance costs
- **RPS/ESFAS and NIS replacements require a LAR**
- **FPL Turkey Point license holder, responsible for plant design basis and regulatory commitments and vendor oversight**
- **FPL contracted Framatome for**
  - Engineered replacement system design
  - System Fabrication and Testing
  - LAR development, support of NRC meetings, response to requests
  - Engineering Change Package preparation
  - Installation
  - Risk management under FPL executive oversight

## **FPL Vendor Oversight Plan**

- **QA led audits of Framatome processes and procedures**
- **Review/Approval of project specific plans including**
  - Human Factors Engineering
  - Cyber Security implementation
  - Project Management Plan, including
    - Configuration management for hardware and software design
    - Software Management Plan
    - Software Quality Assurance Plan
    - Software Configuration Management Plan
- **Documentation reviews, witness key activities**
- **Risk tracking, executive oversight of risk mitigation**
- **Third Party independent review for duration of the project**

# Current Plant Architecture – RPS

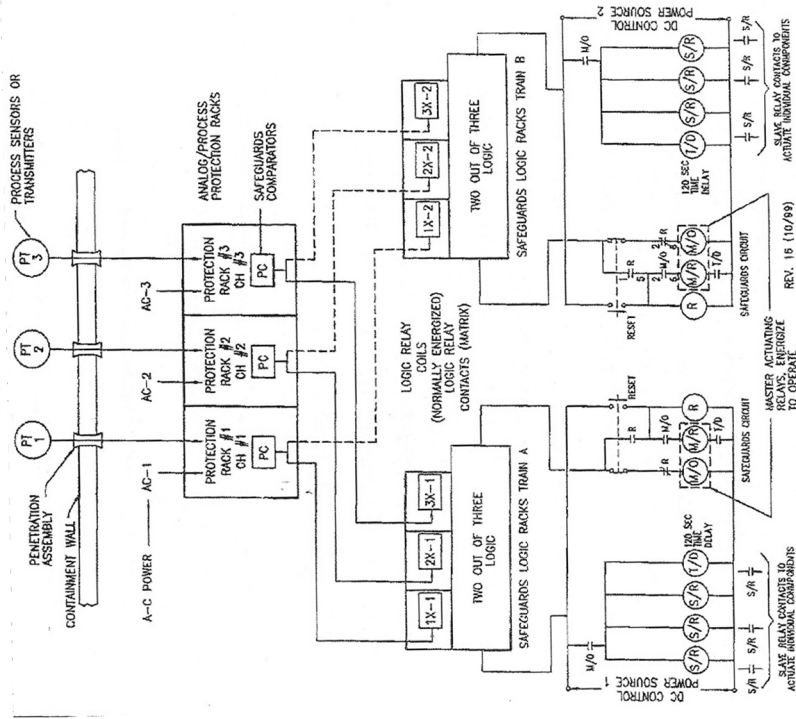


REV. 15 110/793

NOTE: THIS IS A TYPICAL CONFIGURATION FOR ILLUSTRATION ONLY.

FLORIDA POWER & LIGHT COMPANY  
 TURKEY POINT PLANT UNITS 3 & 4  
 REACTOR PROTECTION SYSTEM  
 REDUNDANT CHANNEL SEPARATION  
 DESIGN CONFIGURATION  
 FIGURE 7.2-3A

# Current Plant Architecture – ESFAS



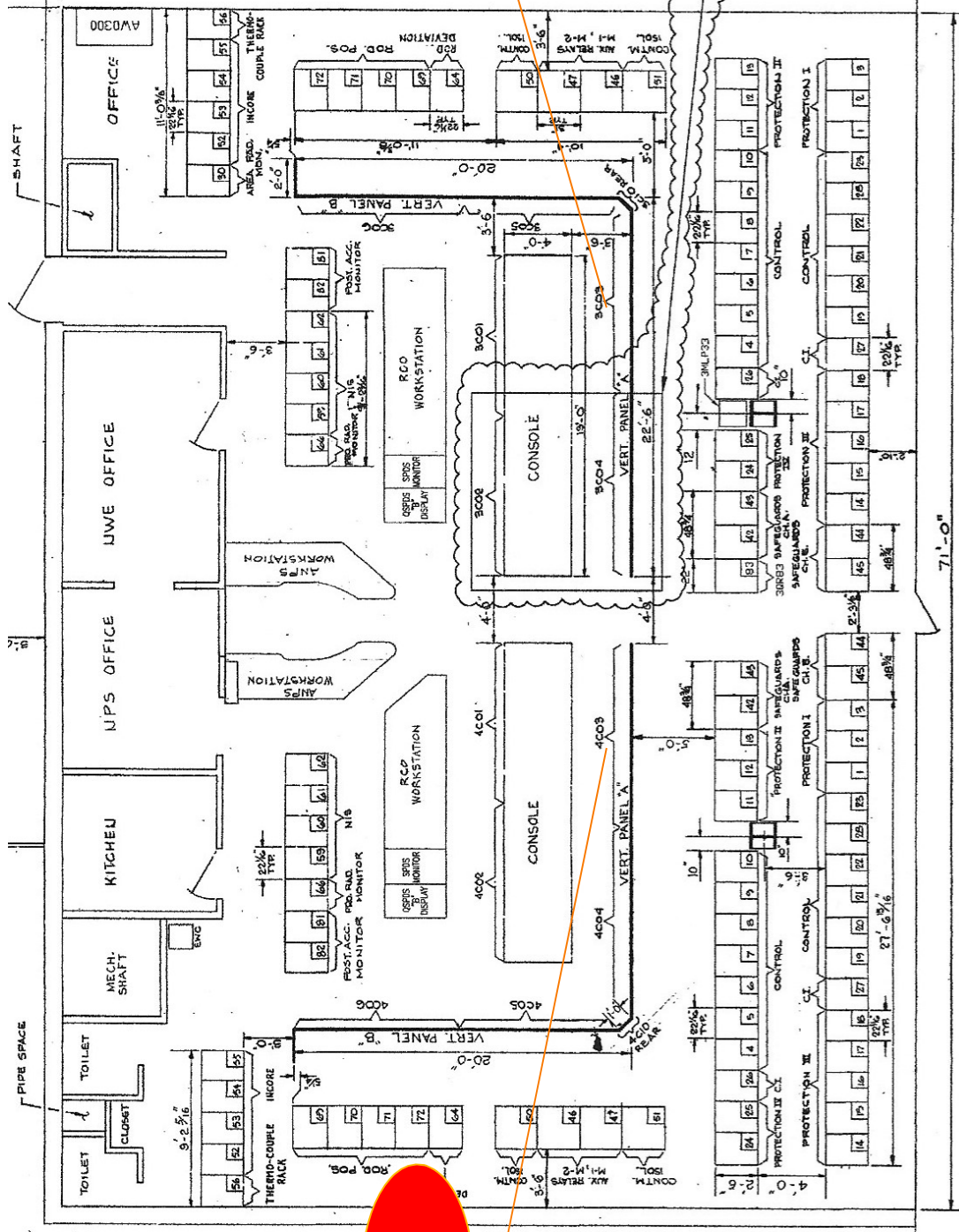
NOTE: THIS IS A TYPICAL CONFIGURATION FOR ILLUSTRATION ONLY.

FLORIDA POWER & LIGHT COMPANY  
 TURKEY POINT PLANT UNITS 3 & 4  
 EFS ACTUATION SYSTEM  
 REDUNDANT CHANNEL SEPARATION  
 DESIGN CONFIGURATION  
 FIGURE 7.2-3B





# Turkey Point Control Room Layout

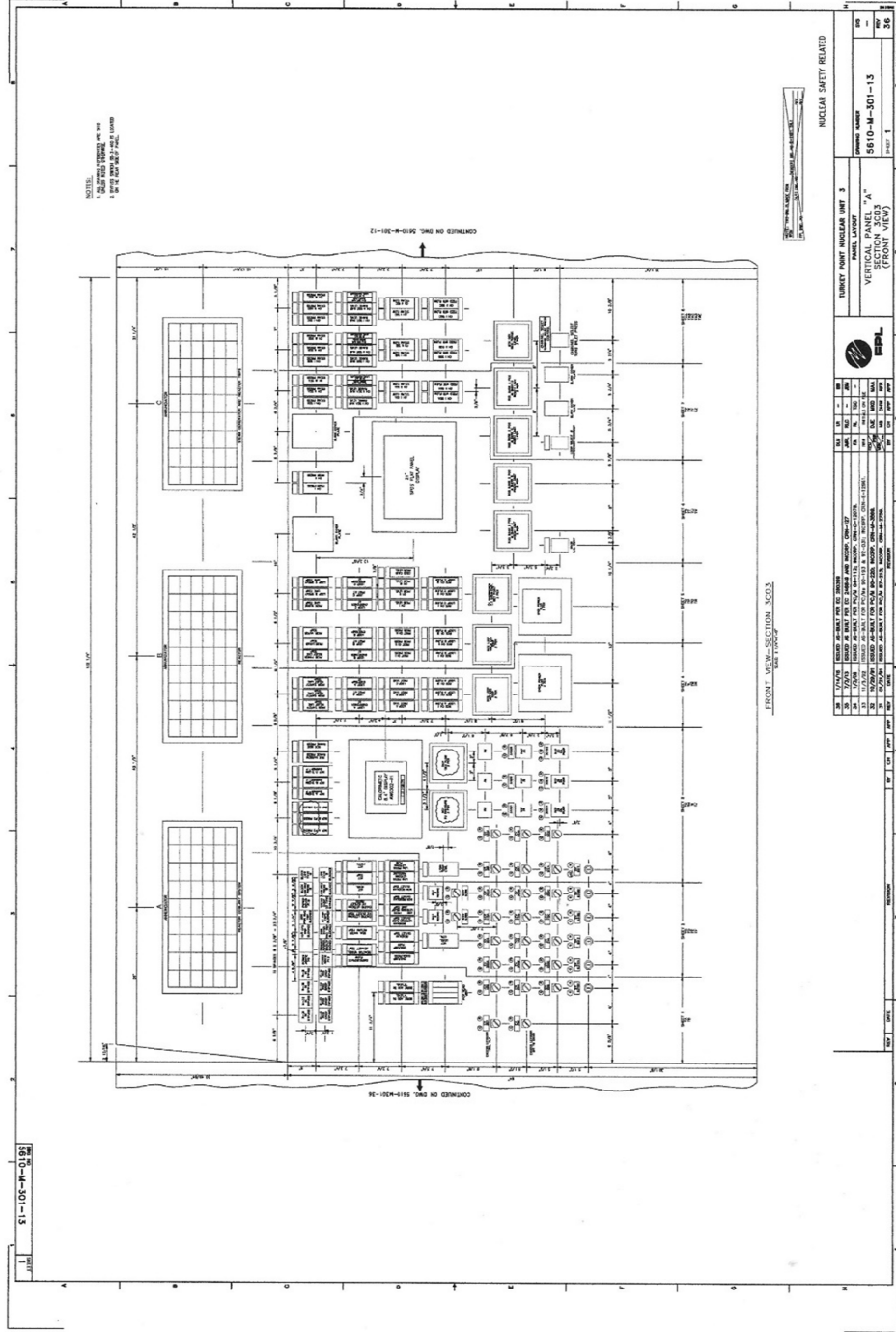


FLOOR PLAN - EL. 42'-0"



Non-proprietary information suitable for public disclosure

# Existing Main Control Room Panel 3C03



Non-proprietary information suitable for public disclosure



# Existing MCR Panel 3C03



Non-proprietary information suitable for public disclosure

# Relevant Design Concepts for RPS/ESFAS/NIS

- **The scope of system replacements is rack components**
  - Existing sensors, actuated components, and cabling remain
  - Measurement, voting, and control logic maintained
- **NRC reviewed Tricon V10 controllers**
  - Used to replace existing Safety Related analog and digital components
  - NRC approved Peer-to-Peer communications used for Safety Related display purposes
  - NRC approved Safety to Non-safety serial interface used for indication, data acquisition, and monitoring of safety systems
- **Division independence maintained**
  - Functions performed in same locations
  - Diverse Actuation System (DAS) planned for common cause failure (CCF) protection, pending defense in depth and diversity analysis
- **Changes to the main control boards**
  - Limited Hybrid control board solution
  - Existing control board indicators migrated into Safety Related and Non-Safety Related flat panel displays



# **Technical Specification (Tech Spec) Impacts and Surv. Interval Extension and Reduction**

- **Utilize Tricon's extensive self diagnostics to replace manual periodic surveillances**
- **Update to applicable Tech Spec Sections and Bases coordinated with Improved Tech Spec Project**
- **Conceptually, no safety function or setpoint changes are anticipated**
- **Conversion of Tech Spec Table 4.3-1 and 4.3-2 RPS/ESFAS/NIS Channel Check from Manual (SFCP) to Automatic on a continuous basis**
- **Extension of the Tech Spec Table 4.3-1 Channel Operational Test from SFCP to refueling interval**

## **LAR Proposed Milestones**

- **Pre-submittal Meetings (as early as mid December 2020)**
- **LAR submitted for NRC review, 2<sup>nd</sup> Quarter of 2021**
- **NRC approval 1<sup>st</sup> Quarter of 2023 to support install**
  - Surveillance reductions may be approved later
- **Turkey Point Unit 3 Spring 2023 outage installation**
- **Turkey Point Unit 4 Fall 2023 outage installation**

## ISG-06 Rev. 2, Alternate Review Process(ARP)

- **Use of existing NRC reviews:**
  - Required NRC approved Tricon platform Topical Report
  - NRC Safety Evaluation Report (SER) for a similar upgrade for Diablo Canyon Plant Protection System
- **The NRC ISG-06 ARP is a newly approved process as part of the NRC Modernization Plant (MP#4) that FPL believes:**
  - reduces licensee’s projects risks, schedules, and costs through better licensee control of the detail design and implementation phases
  - allows for increased efficiency in the NRC review process and resources through reduced documentation supplemented with post LAR inspections
  - ensures required and predefined licensee’s oversight of the project through the Vendor Oversight Plan commitment (i.e., involvement with the vendor activities and support of NRC inspections)
  - immediate use of recent lessons learned from the Waterford pilot project to enhance the FPL implementation of the ARP

# Proposed LAR Content at Submittal

## ISG-06 Rev. 2 Enclosure B

Submittal to include items 1.1 through 1.10 . Notes and list of additional content below.

	Tier			Plant-Specific Information Submitted with License Amendment Request (Phase 1 for Tier 1, Tier 2, and Tier 3)
	A	1	2	
1.1	X			(Summary of) Application Software Planning and Processes (see D.4)
1.2	X			(Summary of) Vendor Oversight Plan (see C.2.2)
1.3	X	X	X	Approved Topical Report Safety Evaluation (see D.5)
1.4	X	X	X	System Description (see D.1)
1.5	X	X	X	System Architecture (see D.2)
1.6	X	X	X	(Summary of) Hardware Equipment Qualification (see D.3)
1.7	X	X	X	Unified Compliance/Conformance Matrix for IEEE Stds 603-1991 and 7-4.3.2-2003 (see D.6)
1.8	X	X	X	(Changes to) Technical Specifications (see D.7)
1.9	X	X	X	Setpoint Methodology and Calculations (see D.7) Provided when technical specification setpoint methodology changes or calculations deviate from or are not addressed in an applicable referenced NRC-approved topical report
1.10	X	X	X	Secure Development and Operational Environment (see D.8)
1.11		X	X	Software Requirements Specification (see D.9.1)
1.12		X	X	Software Design Specification (see D.9.2)
1.13		X	X	Design Analysis Reports for Platform Changes (see D.9.3)
1.14		X	X	System Response Time Analysis Report (see D.9.7)
1.15		X	X	Design Report on Computer Integrity, Test and Calibration, and Fault Detection (see D.9.7)
1.16			X	Commercial-Grade Dedication Plan (see D.9.9)
1.17			X	Quality Assurance Plan for Hardware (see D.9.10)
1.18			X	(Summary of) Hardware Development Process (see D.9.10)

← Including SER identified site specific actions evaluation

← All qualification testing may not be complete

← Included by reference, standalone documents

← Additional included content:

**Surveillance Extension and Reduction Analysis**

Additional included by reference, standalone documents:

**Defense in Depth and Diversity Analysis**

**Response Time Analysis Report**

**Testing including Self-Testing Report**

**ISG-04 Compliance Matrix**



# Human System Interface Change Concepts

- Consolidation of indicator and status lights into safety video display units (SVDU) and non-safety video display units (VDU)
- No changes in the method of operation (e.g. manual or automatic actions)
- Existing Manual Rx trip and ESFAS actuations will be maintained diverse from digital system
- New SVDU display screens developed with input from Operations and consistent with existing non safety VDUs

# Human Factors Engineering

- **Human factors engineering considerations will be applied based on FPL procedures, industry guidance and NRC requirements**
  - HFE as described in Section 7.7 of the UFSAR
  - Evaluate HSI changes to NUREG 0700 Rev. 3, justify departures
- **Framatome to prepare project specific Human Factors Engineering plan for FPL approval**
  - Idaho National Laboratory (INL) in discussion of an advisory role in planning and executing the Human Factors Engineering Plan
  - INL transfer relevant research results and guidance developed based on human factors principals and regulatory requirements
  - HFE program elements identified in NUREG 0711 Rev. 3 guidance
    - 3<sup>rd</sup> party review
- **Procedures and training provide for safe, efficient, and reliable performance of operation, maintenance, test, inspection, and surveillance tasks**

## **Communications with NRC including Electronic Reading Room**

- **Several pre-submittal meetings to be planned to discuss full list of topics provided by NRC and included in ISG-06**
- **FPL will setup an electronic reading room and document tracking lists similar to what was performed for the Diablo Plant Protection System LAR and subsequent SER**
- **FPL will propose bi-weekly telecons with the NRC after the LAR is submitted**

# Potential Future Pre-Submittal Meeting Agenda Items

- Tracing of ISG-06, Rev 2 ARP requirements to the proposed LAR outline and submittals to NRC
- Proposed Architecture
- Defense-In-Depth and Diversity (D3) Overview and proposed functions included in the Diverse Actuation System (DAS)
- Others?

## **Key Take Away Messages – Open Meeting**

- **FPL to submit LAR for RPS/ESFAS/NIS replacement 2<sup>nd</sup> quarter of 2021**
- **Integrated Framatome and FPL team**
  - Framatome providing design, engineering change packages, hardware, software, implementation, licensing support
  - NEE providing vendor oversight with risk-based approach
- **Utilize ISG-06 Rev. 2 Alternate Review process**
- **Replacement with NRC approved Tricon controllers, and surveillance reductions**
- **Pre-submittal meetings and regular communication supported by FPL/Framatome**

**Thank you!**

# **Questions? Comments from NRC?**

## Acronym List

Alternate Review Process	ARP
Common Cause Failure	CCF
Defense-In-Depth and Diversity Evaluation	D3
Diverse Actuation System	DAS
Engineered Safety Features Actuation System	ESFAS
Flat Panel Display – Safety Video Display Unit	SVDU
Florida Power and Light	FPL
Framatome USA	Framatome
Human Factors Engineering	HFE
Human System Interface	HSI
Institute of Electrical and Electronics Engineers	IEEE
Improved Standard Technical Specifications	ISTS
Interim Staff Guidance	ISG
License Amendment Request	LAR



## Acronym List

Main Control Room	MCR
Non-Safety Related	NSR
Nuclear Instrumentation System	NIS
Programmable Logic Controller	PLC
Reactor Protection System	RPS
Safety Evaluation Report	SER
Safety Related	SR
Secure Development and Operational Environment	SDOE
Surveillance Frequency Control Program	SFCP
Technical Specifications	Tech Spec
Tricon PLC	Tricon
Turkey Point Nuclear Plant Units 3 & 4	T.P. 3&4
United States Nuclear Regulator Commission	NRC
Vendor Oversight Plan	VOP
Video Display Unit	VDU



# Agenda – Closed Portion

- RPS/ESFAS/NIS Replacement– High Level Overview
- Applicability of Tricon Topical Report
- Applicability of Diablo Canyon PPS LAR and SER
- HFE/HSI Description
- Action Items: