

Palo Verde Nuclear Generating Station Radiation Protection Department



Radiation Protection Program

DISCUSSION TOPICS

- U1 Refueling Outage Airborne Radioactivity in Containment (Condition Report 16-06578)
- 2016 Results



2016 Unit 1 Refueling Outage Airborne Event

Timeline

- Steam Generator #1 Eddy Current Testing Commenced at 4/19/2016 @ 2023
- Steam Generator #2 Eddy Current Testing Commenced at 4/20/2016 @ 0415
- ~1630 4/20/2016 second individual working secondary side S/G #1 alarmed Radiologically Controlled Area exit monitoring. Both sent for investigative Whole Body Count
- ~1730 Radiation Protection performed survey on Steam Generator HEPA Unit Filters and identified elevated conditions
- 1900 Radiation Protection, Engineering and Westinghouse Leadership meeting to discuss deficient contamination controls associated with ECT probe pushers. Agreement to build containments around probe pushers



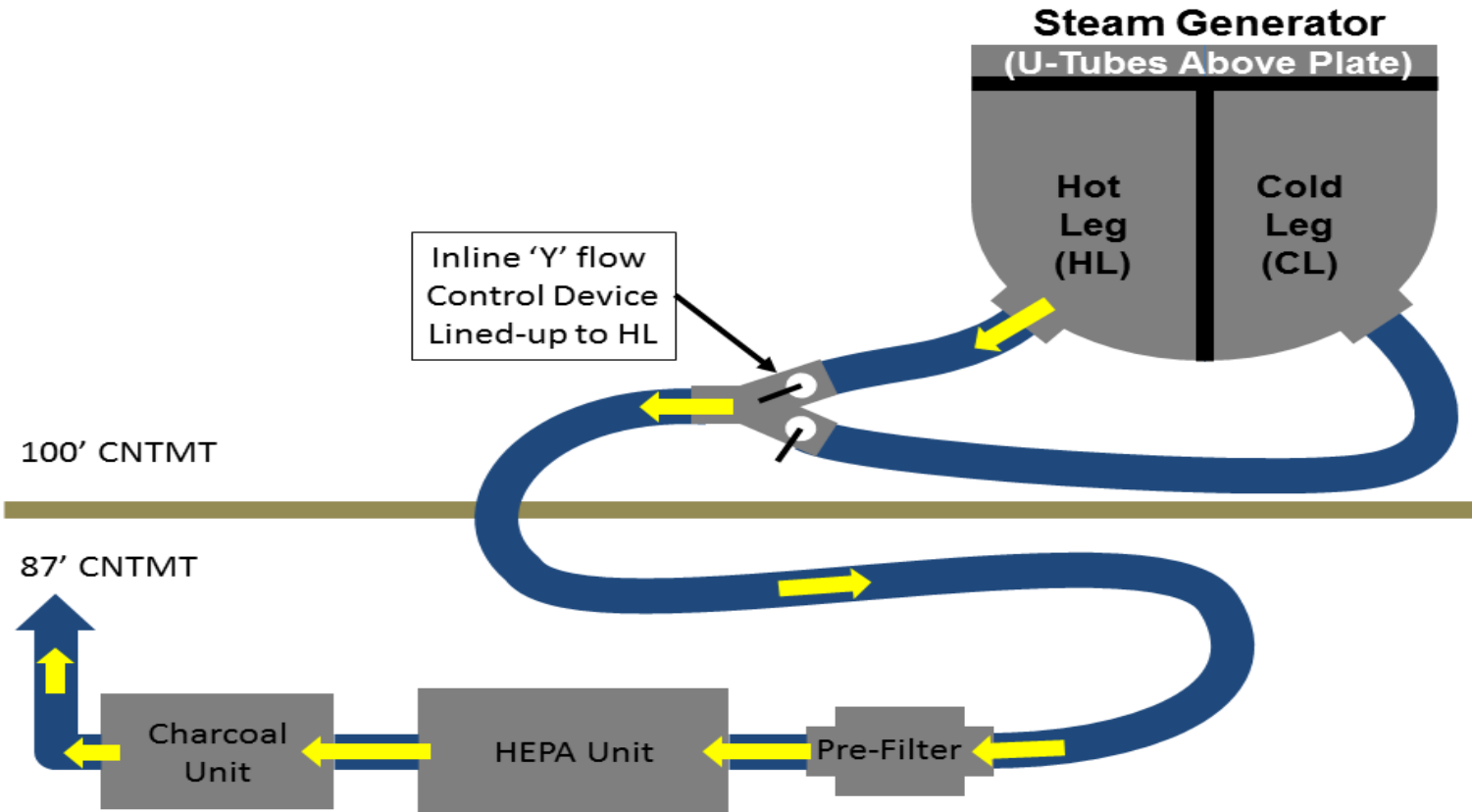
2016 Unit 1 Refueling Outage Airborne Event

Timeline

- ~ 2100 4/20/2016 S/G # 2 HEPA Pre-filter survey revealed LHRA conditions. Area controlled and guarded by Senior Radiation Protection Technicians
- ~2300 4/20/2016 S/G # 2 HEPA Pre-filter changed out.
- Increased airborne activity
- 2330 4/20/2016 ECT testing on both S/G shutdown.
- 2350 RU-143 Plant Vent Alert Set-Point Raised
- 0100 ECT on S/G # recommences
- Increase Airborne Trend in Containment until 0615



2016 Unit 1 Refueling Outage Airborne Event



2016 Unit 1 Refueling Outage Airborne Event

Radiological Risk Activities occurring in CTMT

- Control Element Assembly cut-up and removal
- Safety Injection Isolation Valve SI-651 replacement
- Steam Generator Eddy Current
- Defueled Window Valve Scope

Radiological factors of note

- 3rd use of Zephyr Probe 2nd full scope inspection
 - Observed HEPA pre-filter increases previous outage (lesser magnitude)
- Significant change in radiological conditions in S/G tubes
- Increase Chromium 51 observed



2016 Unit 1 Refueling Outage Airborne Event

- Radiation Safety Impact
 - 9 Nightshift Individuals sent for Whole Body Count on 04/21/2016 due to alarming contamination monitors
 - 6 Additional Nightshift individuals sent for Whole Body Count upon return to work
 - Based on security access and RCA Access records a total of 171 individuals had potential for inhaling airborne radioactivity.
 - 35 of these individuals had measurable radioactivity detected via whole body counting
 - 24 individuals will be assigned >10 millirem Committed Effective Dose Equivalent (CEDE-Internal)



2016 Unit 1 Refueling Outage Airborne Event

DIRECT CAUSE

- The programmatic controls, and radiological monitoring of the portable ventilation system were inadequate to support Steam Generator inspection activities.

CONTRIBUTING CAUSE

- The Radiation Protection Organization did not follow procedures or standards, effectively turnover, effectively communicate, maintain a low threshold for initiating condition reports, and did not process data timely and collectively to get a big picture of containment airborne conditions which allowed the SG ECT work to continue and lead to evacuation of containment due to airborne conditions.
- The set-up, control and monitoring of the portable air filtration system and vacuum system used to control airborne contaminants during Steam Generator #1 and #2 eddy current testing was not commensurate with the radiological conditions encountered during the task.



2016 Unit 1 Refueling Outage Airborne Event

Actions to be taken:

- Process Related
 - Formalize and consolidate Controls for Use of HEPAs, Vacuums and Containment Devices (Continuous use checklist for set-up, maintenance, inspections and demobilization)
 - Formalize Response to Unusual Radiological Occurrence
 - Institutionalize critical radiological parameters to be monitored by RP leaders, staff and OCC personnel
 - Require RP Management and Operation Shift Manager notification for RMS Equipment Set-Point Changes
 - Establish contractual requirements for Vendor responsibilities related to contamination controls for S/G inspections.
 - RP Superintendent Level PJB required upon initiation of Derived Air Concentration (DAC-Hr) (Airborne Condition) tracking sheet.
 - Engineering Validation of Temporary Ventilation Use



2016 Unit 1 Refueling Outage Airborne Event

Actions to be taken:

- Personnel Related
 - OJT/TPE for RPTs related to Set-Up, Maintenance and Use of HEPAs, Vacuums and Containments
 - One on One discussions with RP Leaders
 - Provide Conservative Decision Making Training to RP Leadership and Staff
 - External Peer Support during U3R19 to monitor and mentor professional staff
 - Increase level of RP authority in OCC
 - Perform CASE study with RPTs prior to spring refueling outage
 - Formalize and train technical staff on tracking mechanism for monitored parameters of radiological conditions and communication actions when deviation from norm are observed
 - OCC briefing on Radiation Safety



2016 Results

- U3R19 CRE Approximately 15 Rem
 - Station best performance
 - Result of U1R19 outage corrective actions
 - Includes removal of temp matting from RX Annulus
- 2016 CRE less than 65 Rem



Palo Verde Radiation Protection Program

QUESTIONS?

