



# ENG-033 - CRR - CHIT RESOLUTION REPORT

## Chit Resolution Report for ODH Monitoring

*NSTXU\_1-8-1-1-3\_CRR\_100*

Work Planning #:  
Effective Date: **02/10/2020**  
Prepared By: **Peter Dugan**

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# Chit Resolution Report for Oxygen Deficiency Monitoring Systems

**NSTXU\_1-8-1-1-3\_CRR\_100**

Prepared By: P. Dugan, Cognizant Engineer

Reviewed By: M. Cropper, Responsible Engineer

Reviewed By: Y. Zhai, NSTX-U Project Engineer

Approved By: R. Ellis, Chief Engineer



# Record of Changes

<b>Rev.</b>	<b>Date</b>	<b>Description of Changes</b>
0	January 24, 2020	Initial Release

<b>Review</b>	<b>Chit Number</b>	<b>Status</b>
Vacuum & Fueling Systems DVVR	VFAPS02	Closed
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR10	Closed
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR11	Closed
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR12	Closed
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR13	Closed
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR14	Closed
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR15	Closed
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR16	Closed
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR17	Closed

APPROVED  
PPPL

ll Radiation & 1 Monitoring PDR	TCRADOMPDR18	Closed
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# PDR

Review	ID	Chit
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR10	Consider placement of O2 deficiency detector sampling heads after safety analysis.

Closed: A memo was developed that identifies the proper locations of the ODH monitoring system. This memo is used as a requirement that drove the design presented at the FDR. Memo OSS-191022-SPG-01

Review	ID	Chit
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR11	Add physical lock to device to prevent modification of approved configuration by unauthorized staff.

Closed: The ODH monitors and power supplies are protected from tamper via cages in the North Gallery as defined in the configuration managed safeguards. These safeguards are identified in drawing AE8350. In Addition the monitor case latches can and will be pad locked.

Review	ID	Chit
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR12	Develop periodic maintenance procedure with triggers to service filters at appropriate interval. Does unit signal when filters changes are needed (reduced flow?)



The system auto calibrates and alarms if out of calibration. Standard maintenance processes and procedures post-FDR will be used to maintain the systems. Specifically Preventive maintenance will be conducted to check and replace filters as defined by the manufacturer.

Review	ID	Chit
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR13	The electrical signals from the OD detector(outside test cell) into the test cell horns need 5 kV isolation. The proposed design features to satisfy this requirement should be described.

Closed: 5 kv isolation is not being provided. All annunciators are mounted to the test cell walls and do not contact any items that may be at NSTX-U potential.

Review	ID	Chit
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR14	Add visual indicator to accompany the siren when the O2 monitor has alarmed.

Closed: There are both audible and visual alarms on all 9 of the ODH monitoring annunciators.

Review	ID	Chit
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR15	Incorporate fixtures in your design to protect sampling heads from damage.

Closed: Specific fixtures are not being included in the design. Rather the heads are being placed in locations away from potential access and personnel traffic.

Review	ID	Chit
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Oxygen Monitoring PDR	TCRADOMPDR16	Calibration requires a certified O2 gas for 100% and 21%. The cal gas needs provision for controlled flow, and pressure. Not use of certified gas results in nuisance alarms.
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Closed: The cal-gas solution is being bought from the manufacturer. This will be discussed at the FDR as part of the procurement discussion.

Review	ID	Chit
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR17	Add annunciation (light/sound) to South High Bay. Check/update requirements to include.

Closed: There is a O2 Detector Remote Annunciator in the South High Bay located at 105' elevation as defined in drawing AE9001.

Review	ID	Chit
Test Cell Radiation & Oxygen Monitoring PDR	TCRADOMPDR18	Need a method to alert the Control Room and possibly others (ESU?) if the oxygen monitoring system fails so that any necessary actions can be taken by the appropriate people.

Closed: The ODH signals are sent to the control room via the Torus System Vacuum and Gas PLC. This signal is documented in Drawing EA1500 Sheet 126. The status is displayed as part of the TVPS human machine interface (HMI).

## DVVR

Review	ID	Chit
Vacuum & Fueling Systems DVVR	VFAPS02	The argon system and other gas systems would increase the probability of an oxygen deficiency condition in the cell. An ODH alarm system is an inexpensive improvement in personnel safety



The ODH system was developed and the results of placing Oxygen deficiency monitoring and alarms systems were included and presented at the FDR. Drawing AE9001 provides the components locations and conduit plan.