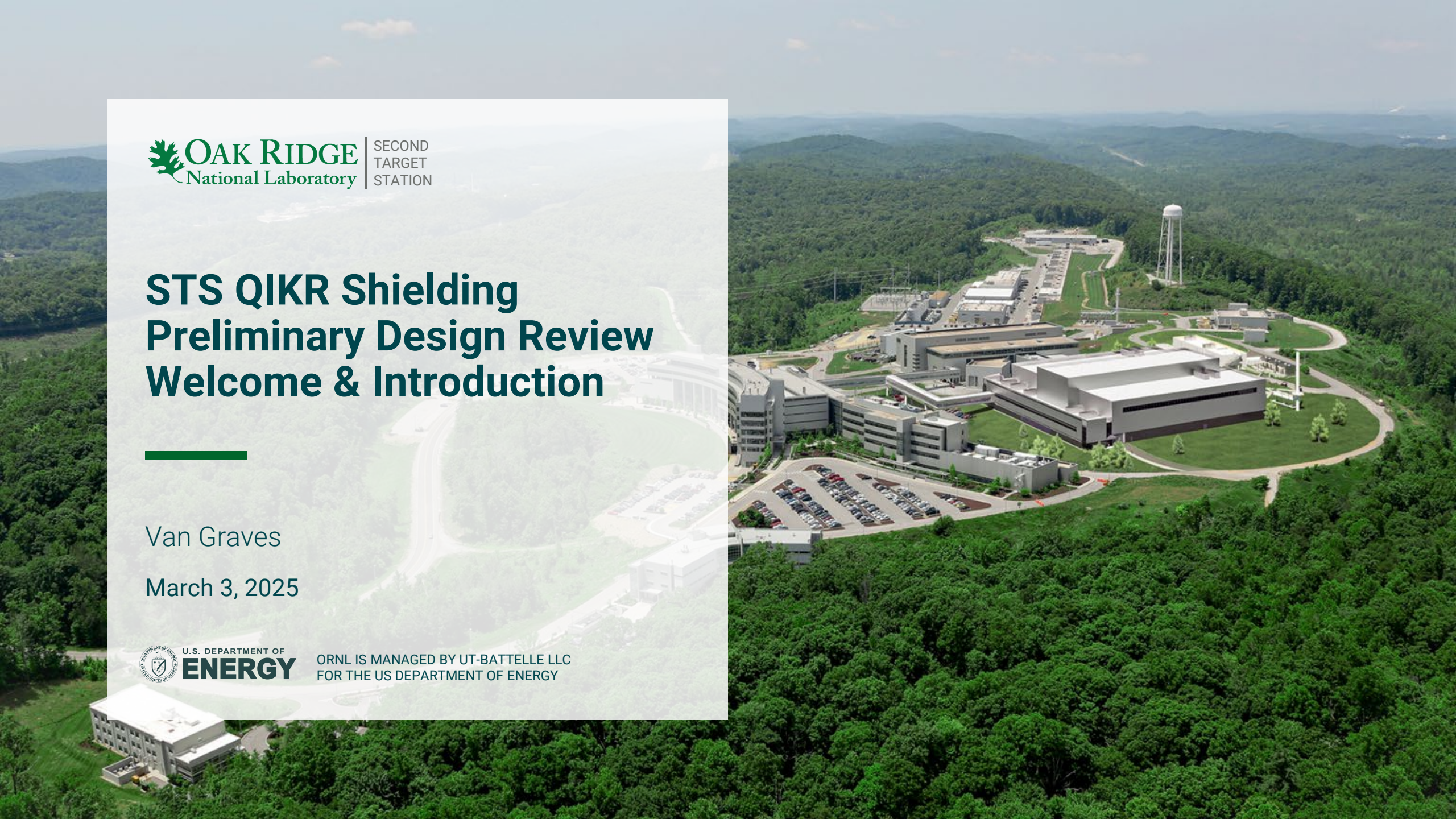
OAK RIDGE National Laboratory | SECOND TARGET STATION

STS QIKR Shielding Preliminary Design Review Welcome & Introduction

Van Graves

March 3, 2025



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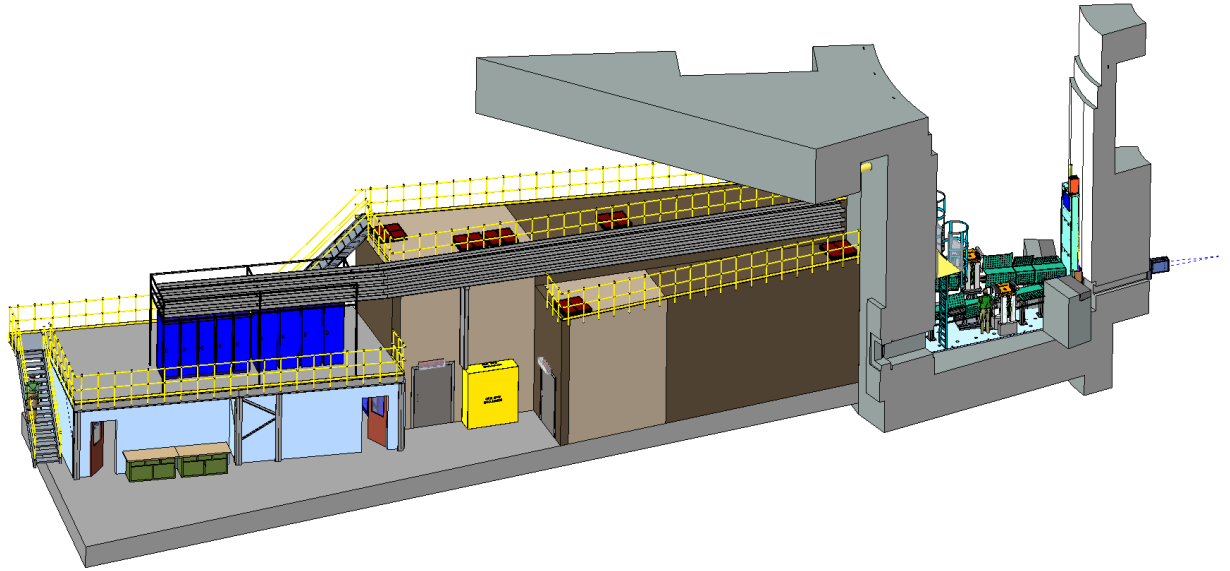
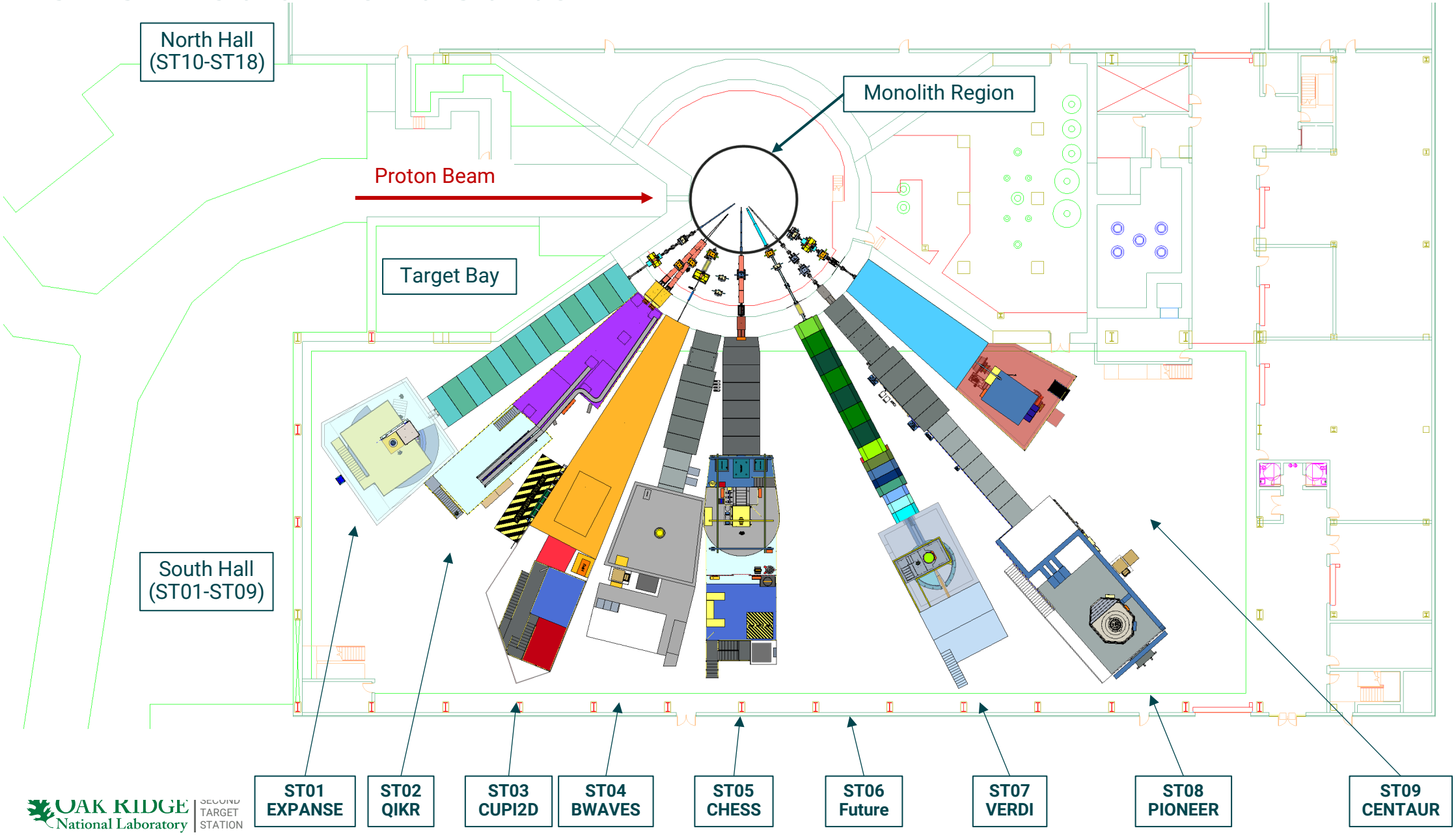
Why are we here?

- Preliminary design review of the Quite Intense Kinetics Reflectometer (QIKR) shielding components and structures
- QIKR is unique among the initial STS instruments in that it has two beam paths from the same source moderator
  - These paths are separated both vertically and horizontally
  - The instrument has two independent end stations within a single cave with an interior dividing wall
  - Two of the beam ports on the north side of the facility will also be capable of supporting two instruments, but they will be horizontally separated only, not vertically
- This is a neutronics-heavy review, but the operation and design of the instrument will be described as they are relevant to the shielding design



STS Instrument Suite



Participants

Presenters:

Danielle Wilson, STS Lead Neutron Beamline Engineer
John Ankner, STS Reflectometer Instrument Developent Scientist
Kersat Bekar, Radiation Transport Senior R&D Staff

Committee:

Jim Eckroth, NE-EMD Performance Design Tech (Chair)
Franz Gallmeier, NTD Neutronics Group Leader
Christi Elam, SNS Rad Safety Officer
Aaron Hostetler, Health & Safety
Tommy Michaelides, STS Lead Safety Systems Engineer

Observers:

Saurabh Kabra, STS Instrument Systems Science & Technology Manager
Van Graves, STS Instrument Systems Engineering Manager
Leighton Coates, STS Instrument Systems Group Leader
Igor Remec, STS Neutronics Group Leader
David Anderson, STS Systems Engineering & Integration Lead
Tim Gregory, STS Quality Representative
Bob Lowrie, STS ESH@Q Subcontractor
Patrick Thornton, Fire Protection Engineer
Tristan Grover, Senior Accelerator Facility Safety Engineer

Supporting Documents

- Requirements Documents
- Radiation Policy and QIKR Cave Acceptable Dose Rates
- Configuration and Quality Level Documents
- Interface Documents and Drawings
- Design, Analyses & Calculations (DAC) info is contained within the presentation material
- Many are released, others are still draft

Supporting Documents

STS Project Interface Sheet for Instrument Bunker Wall Feedthroughs and the Bunker Wall Structure (S01020500-IST10023 R00)

STS Interface Control Drawing Instrument PITS (S04010100-C8U-8800-A10000)

QIKR Cave Acceptable Dose Rates Design Criteria Document (S04080400-DCD10000-R00)

QIKR Requirements Document (S04080100-SRD10000-R02)

QIKR Radiation Shielding Configuration and Quality Level (S04080400-QAI10000-R00)

QIKR Non-Radiation Shielding Configuration and Quality Level (S04080400-QAI10001-R00)

Generation of Beamline Sources- Preliminary Design (S04030200-TRT10002)

Radiation Safety Policy and Plan (S01030100-PN0001)

Interface Sheet for Instrument Bunker Wall Feedthroughs and the Bunker Wall Structure (S01020500-IST10023 R00)

QIKR Shielding FEMA document (S04080400-FMA10000-R00)

Note: for PDRs, STS does not require DACs (including Neutronics) be formal, signed reports

Review Charges

1. Is the scope of the shielding included in this design review clearly defined? (Wilson presentation 1)
2. Are the shielding requirements adequately defined? (Ankner, Wilson 1, Bekar 1)
3. Does the analyzed design of QIKR caves shielding adequately meet the radiation protection requirements and the *Second Target Station (STS) Project Radiation Safety Policy and Plan? (Bekar 1)*
4. Have the radiation source terms against which QIKR shielding must provide protection been adequately defined? (Bekar 1)
5. Are shielding calculations explained and documented in materials available to safety reviewers? (Bekar 1 & 2)
6. Does the committee feel the design changes implemented or proposed in some of the shielding components should be further evaluated during final design? (Bekar 2 & Wilson 2)

Deliverables: close-out presentation with comments and recommendations followed by a written report within 2 weeks.

Agenda

STS Instrument Systems QIKR Shielding PDR

March 3, 2025
Building 8600, Room C-156

Time (EDT)	Event/Activity	Presenting
Monday, March 3, 2025		
8:00am – 8:15am	Welcome and Introduction	Van Graves
8:15am – 9:15am	Science Overview of QIKR and its Shielding Needs	John Ankner
9:15am – 9:30am	Coffee Break, Q&A	
9:30am – 10:30am	QIKR Instrument Design	Danielle Wilson
10:30am – 12:00pm	QIKR Shielding Analyses	Kursat Bekar
12:00pm – 1:00pm	Working Lunch: Neutronics Analyses of Design Optimizations	Kursat Bekar
1:00pm – 2:00pm	QIKR Shielding Design Developments	Danielle Wilson
2:00pm – 4:00pm	Committee deliberations	
4:00pm – 4:30pm	Committee Closeout	
4:30pm	Adjourn	