

WOG TWG K/A Catalog Update Survey

**Valerie Barnes PhD
Charles W. Sawyer**

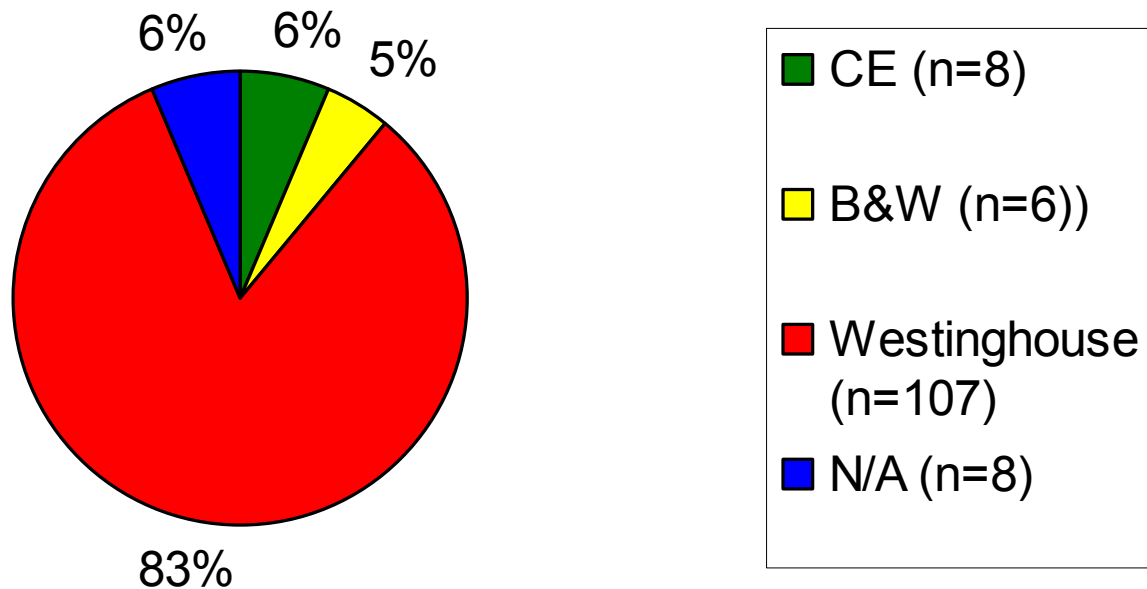
Participating Sites

Beaver Valley (FENOC)	14	McGuire (Duke)	10
Braidwood (Exelon)	4	Oconee (Duke)	6
Callaway (Ameren)	1	Palisades (NMC)	3
Catawba (Duke)	4	Palo Verde (Pinnacle)	4
Comanche Peak (TXU)	2	Prairie Island (NMC)	2
Cook (American Electric)	1	Robinson (Progress)	1
Diablo Canyon (PG&E)	8	Salem (PSEG/Exelon)	3
Farley (Southern Nuclear)	1	South Texas (STP)	17
Ginna (Constellation)	8	VC Summer (SCANA)	4
Harris (Progress Energy)	4	Vogtle (Southern Nuclear)	3
Kewaunee (NMC)	3	Wolf Creek (Wolf Creek)	14
		NRC	11

Total N = 118-129

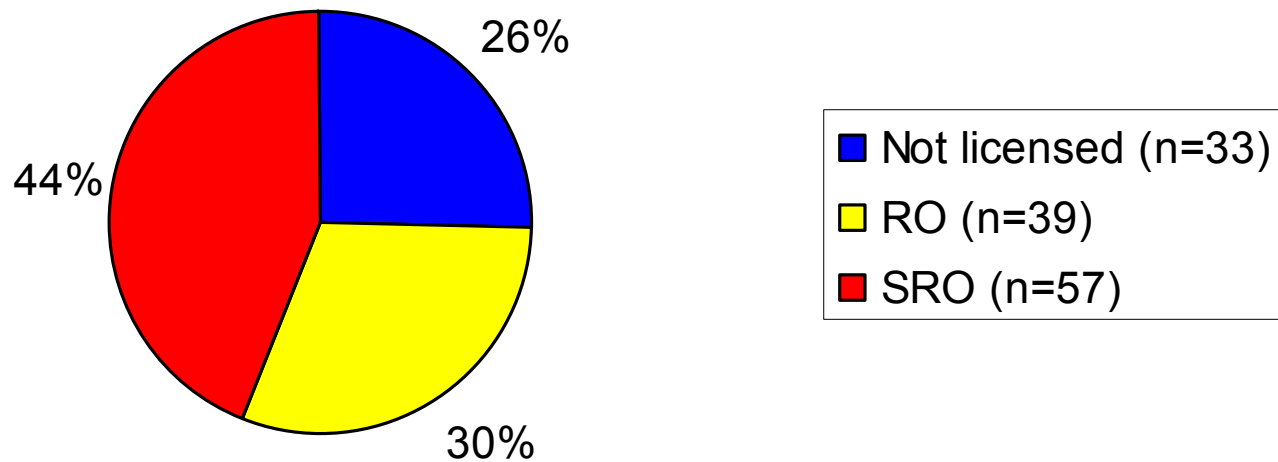
NSSS Vendor Types

Percentage of Participants from each NSSS Vendor Type (N=129)

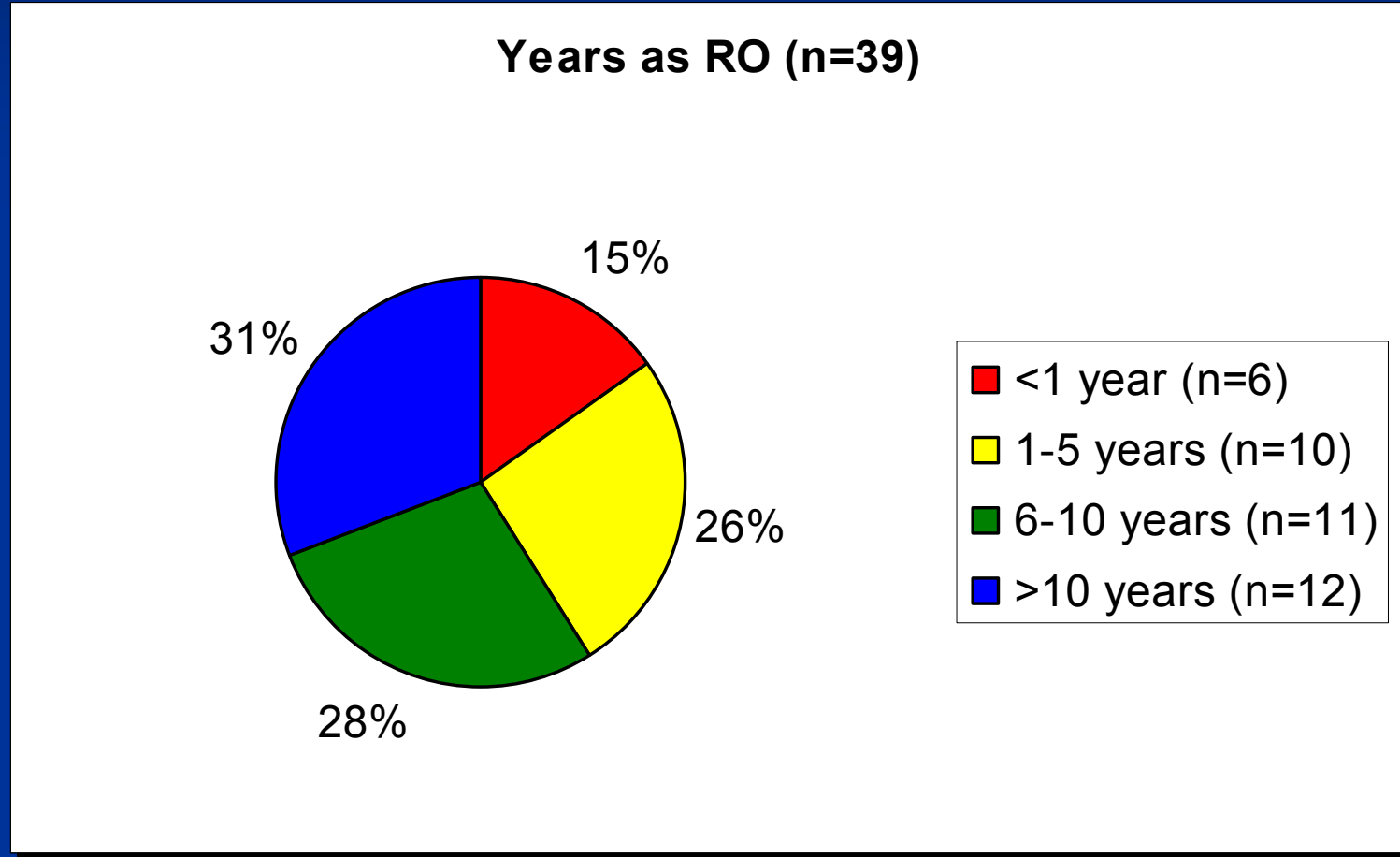


Participants' Current License Status

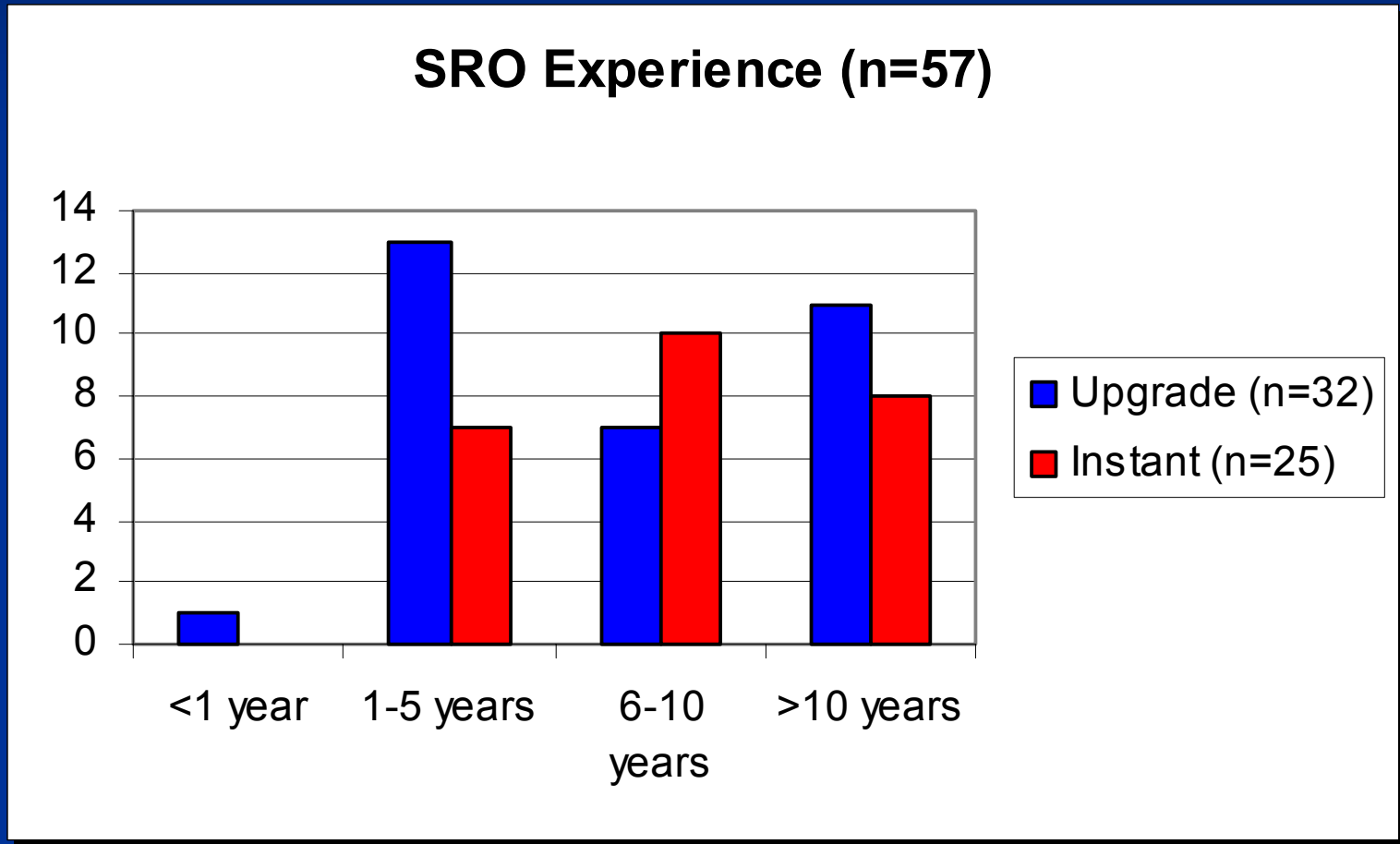
Current License Status (N=129)



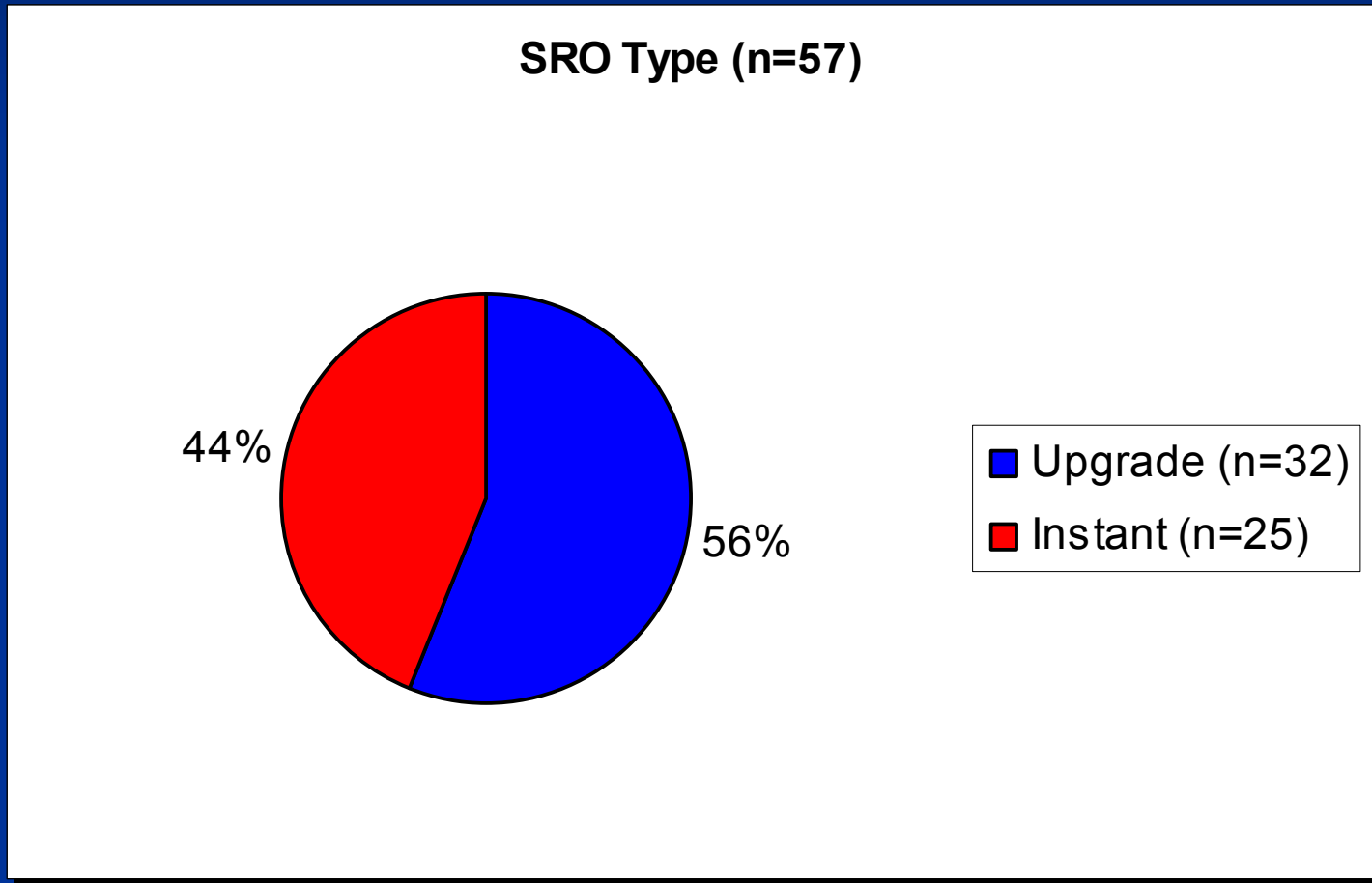
Current ROs' Years of Experience



Current SROs' Years of Experience by Type of SRO License Held

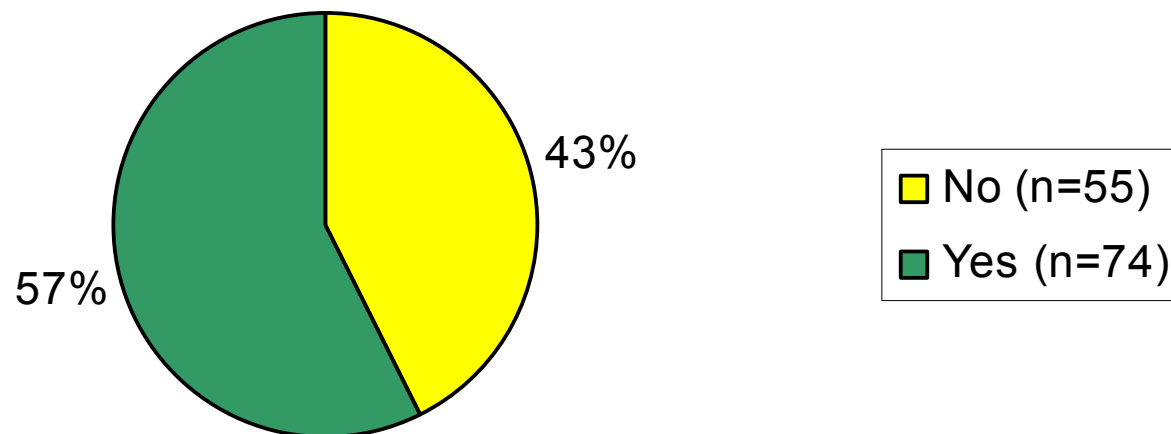


Type of SRO Licenses (Currently licensed only)

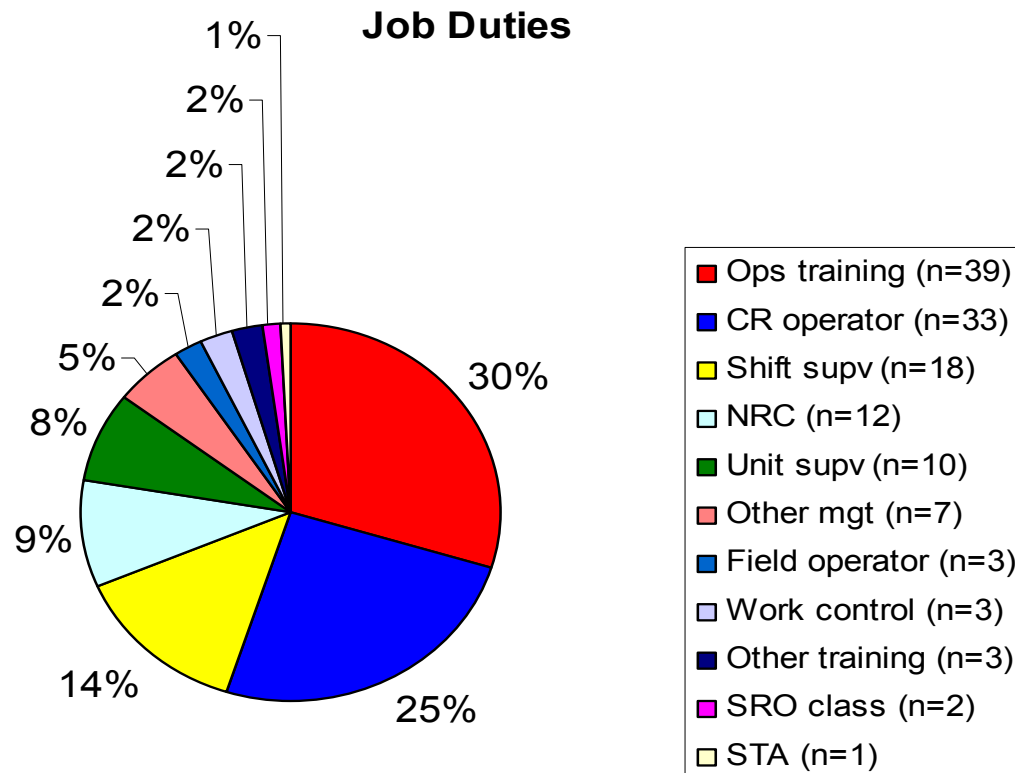


Experience with the Exam Process

Developed or Reviewed an Exam (N=129)

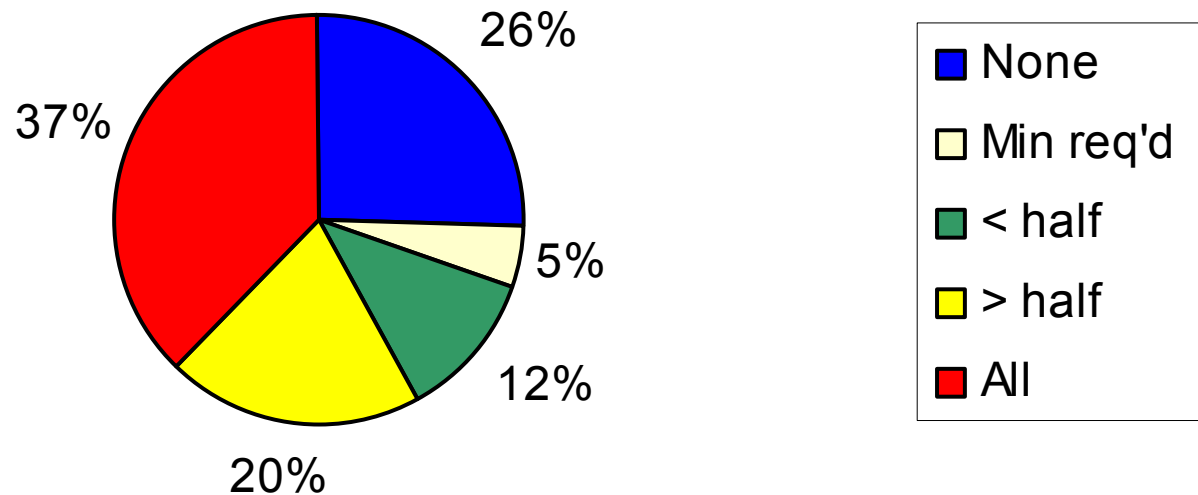


Participants' Current Job Duties



Amount of Time Spent “Standing Watch” in the Past 5 Years

Time on Shift (N=129)



K/A Importance to Safety Rating Scale

- Same scale used for 2 previous surveys (Rev. 0 and Rev. 2 of the K/A Catalog)
- 5-point scale:
 1. Insignificant importance
 2. Of limited importance
 3. Fairly important
 4. Very important
 5. Essential

Data Analyses of “Importance to Safety” Ratings

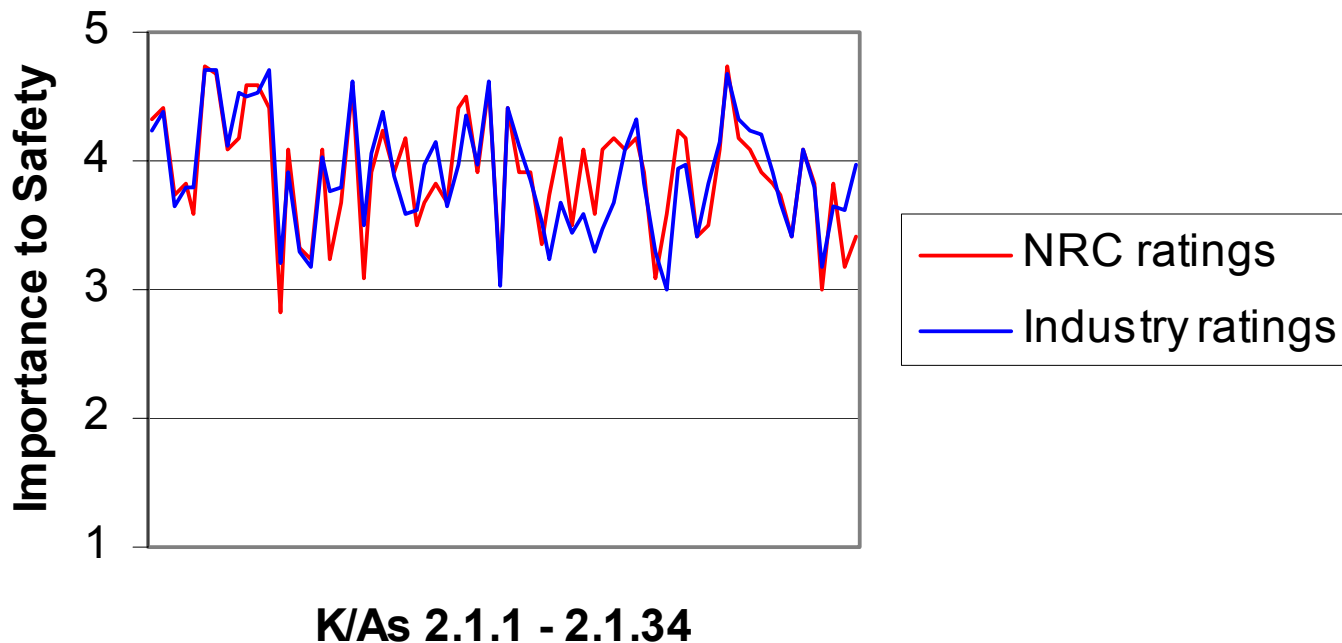
- Compared the importance ratings from different groups of participants
- Calculated average RO and SRO importance ratings for each K/A
- Calculated the standard deviation of the ratings for each K/A (a measure of disagreement among raters)

Overall Results for Importance Ratings

- Different groups of raters gave similar ratings
 - Type of license held (none, RO, SRO) made no difference
 - Familiarity with the exam process made no difference
 - Type of job duties made no difference (trainer vs. NRC examiner vs. operator vs. manager)

NRC Examiners vs. Industry Ratings on the Conduct of Ops K/As

NRC vs. Industry Importance Ratings



$r = .93$ over all ratings

Overall Results for Importance Ratings

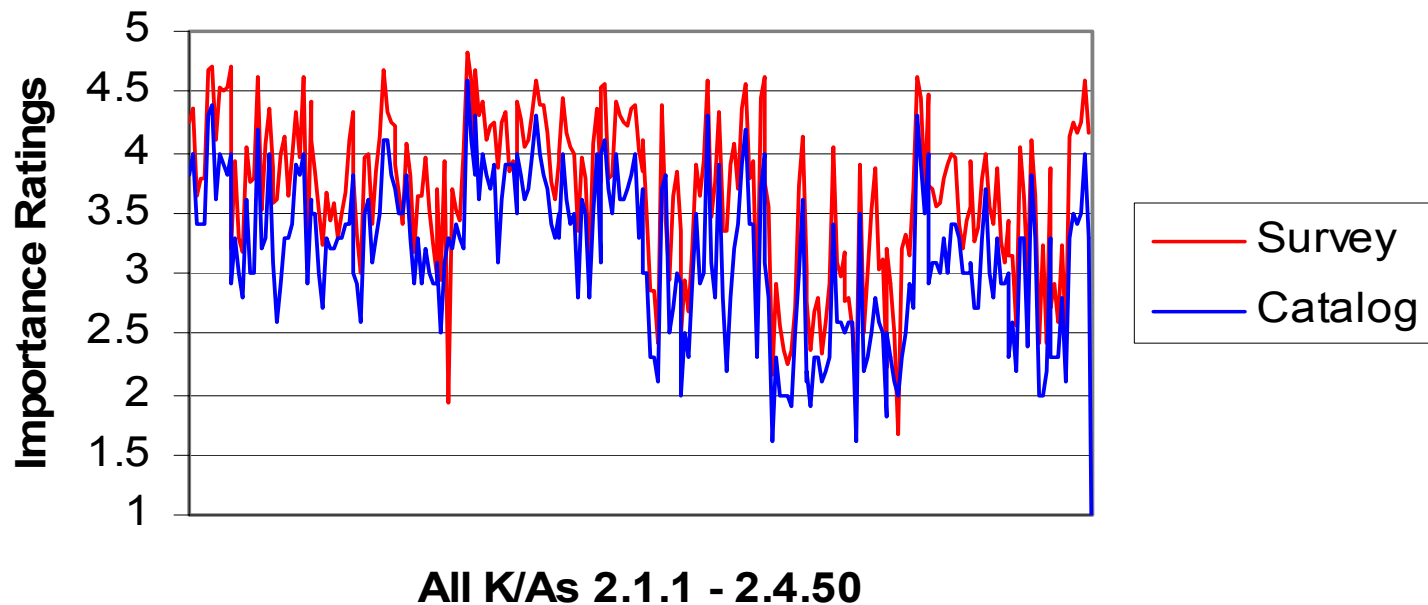
- Only the amount of time the rater had “spent standing watch in the past 5 years” was related to the importance ratings
 - Overall relationship weak ($r=.21$) but statistically significant
 - In general, the more time a rater had spent on-shift in the past 5 years, the higher his/her importance ratings

Overall Results for Importance Ratings

- Different groups of raters gave similar ratings
- Pattern of survey “importance to safety” ratings very similar to ratings in the current K/A Catalog ($r = .91$)

Correlation of Importance Ratings: Survey vs. Catalog ($r = .91$)

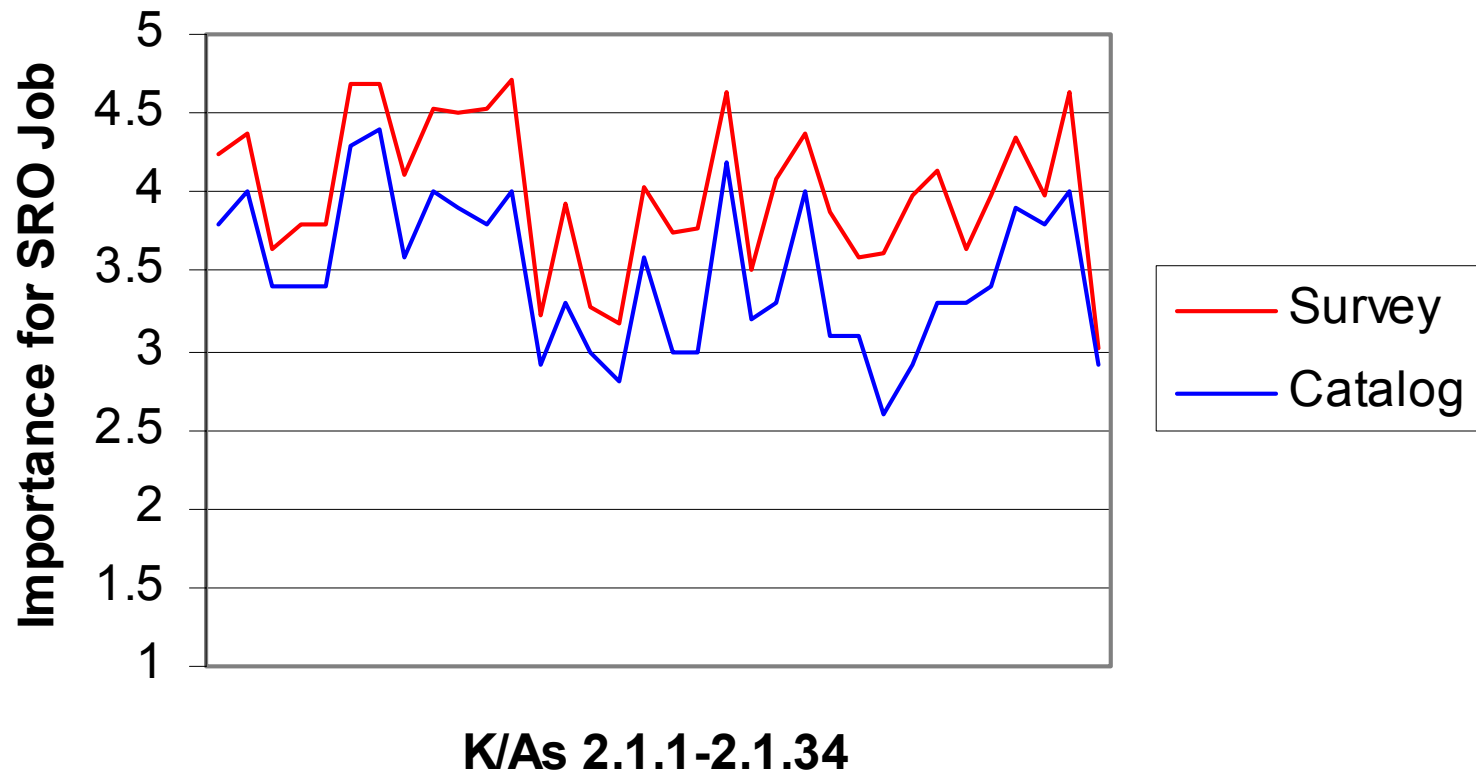
Survey and Catalog Importance Ratings



Overall Results for Importance Ratings

- Different groups of raters gave similar ratings
- Pattern of survey “importance to safety” ratings very similar to ratings in the current K/A Catalog
- Survey importance ratings are higher than those in the Catalog ($p < .001$)

Comparison of Survey and Catalog Importance Ratings for SRO Job



Overall Results for Importance Ratings

- Different groups of raters gave similar ratings
- Pattern of survey “importance to safety” ratings very similar to ratings in the current K/A Catalog
- Survey importance ratings are statistically higher than those in the Catalog
- 38 importance ratings, involving 28 K/As (22%), had standard deviations of 1.0 or greater

Overall Results for Importance Ratings

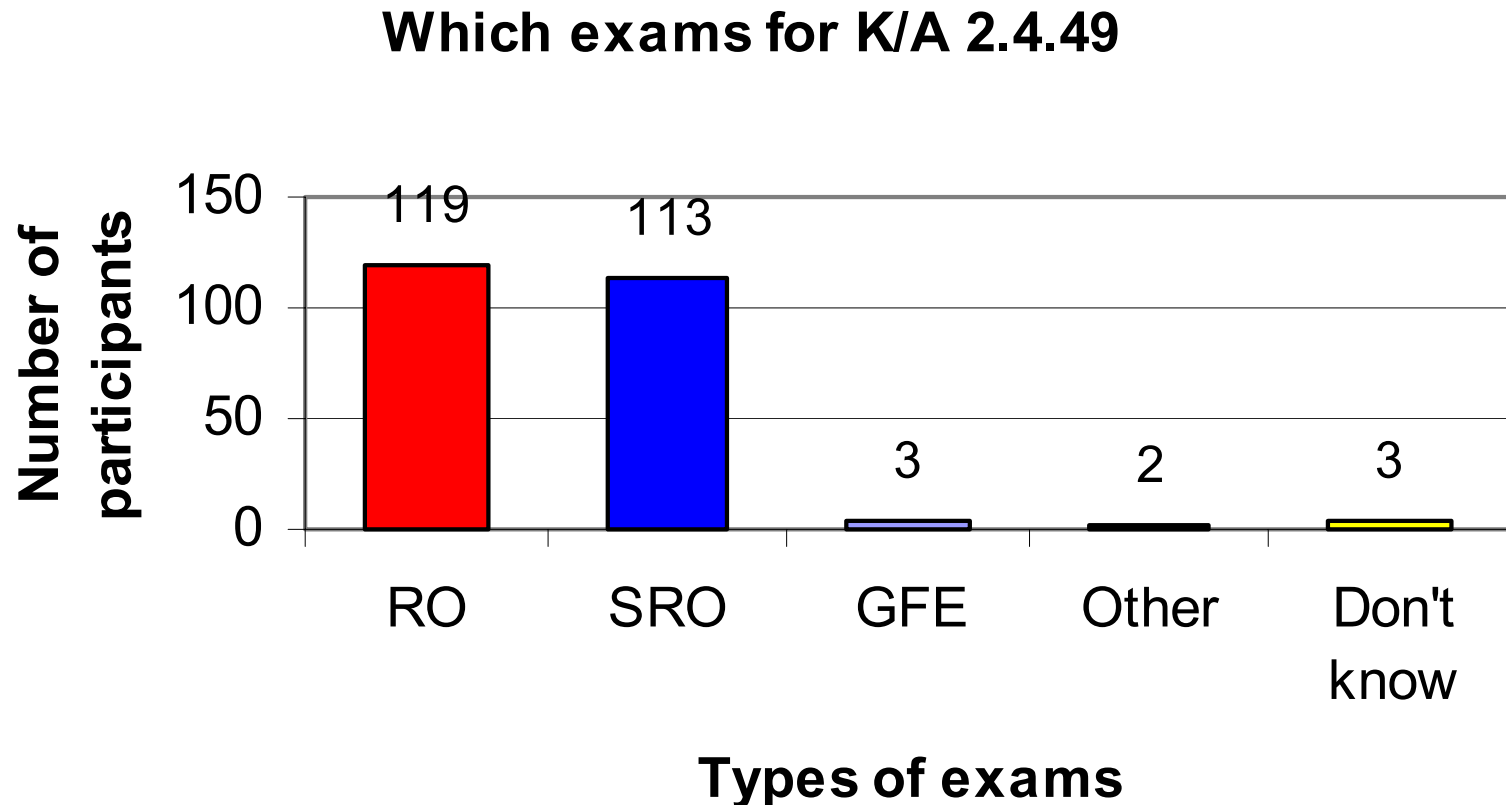
- 38 importance ratings (15%), involving 28 K/As (22%), had standard deviations of 1.0 or greater
 - A standard deviation of 1.0 indicates that about 1/3 of the participants rated the K/A at least 1 rating level higher or lower than the average rating for that K/A
 - Lowest standard deviation was .38, highest was 1.27

Which exam(s) should include questions that test this K/A?

Choices were:

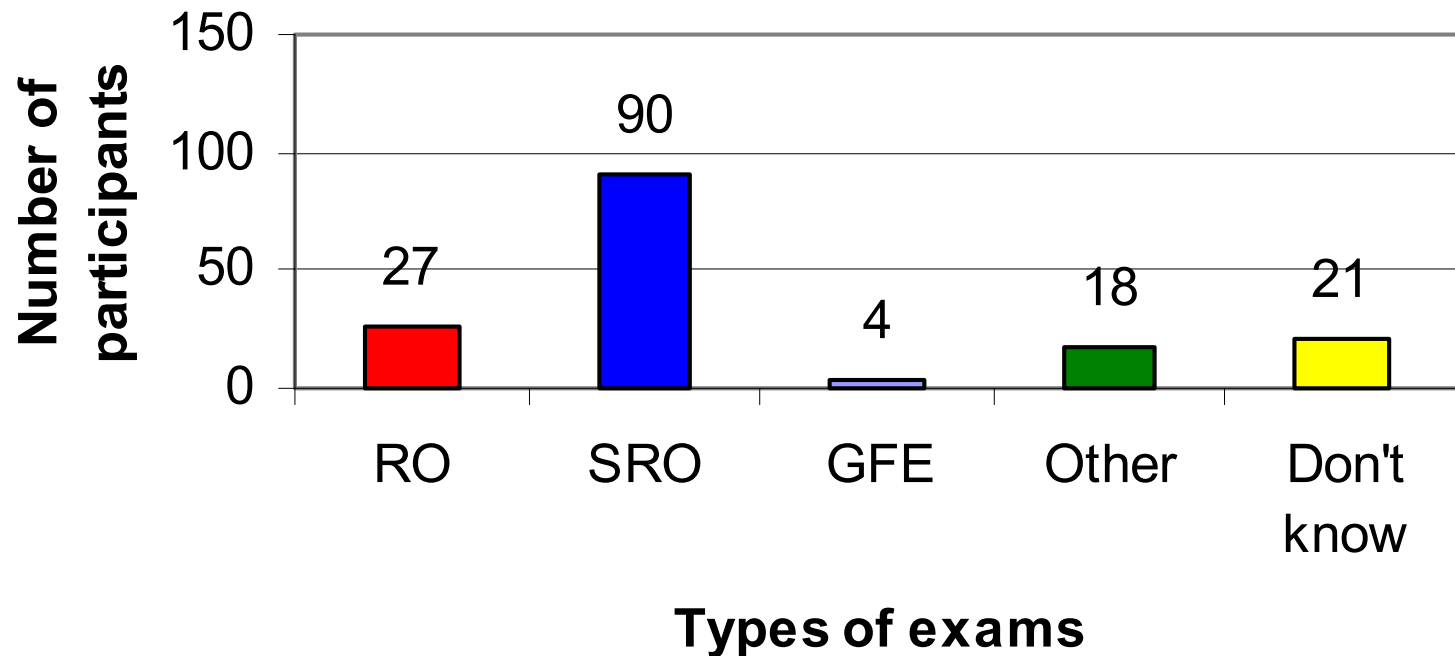
- RO site-specific exam
- SRO site-specific exam
- General Fundamentals Exam
- Other (GET, Rad Worker, etc.)
- Don't know

Example of a K/A acceptable for generating a question for either ROs or SROs

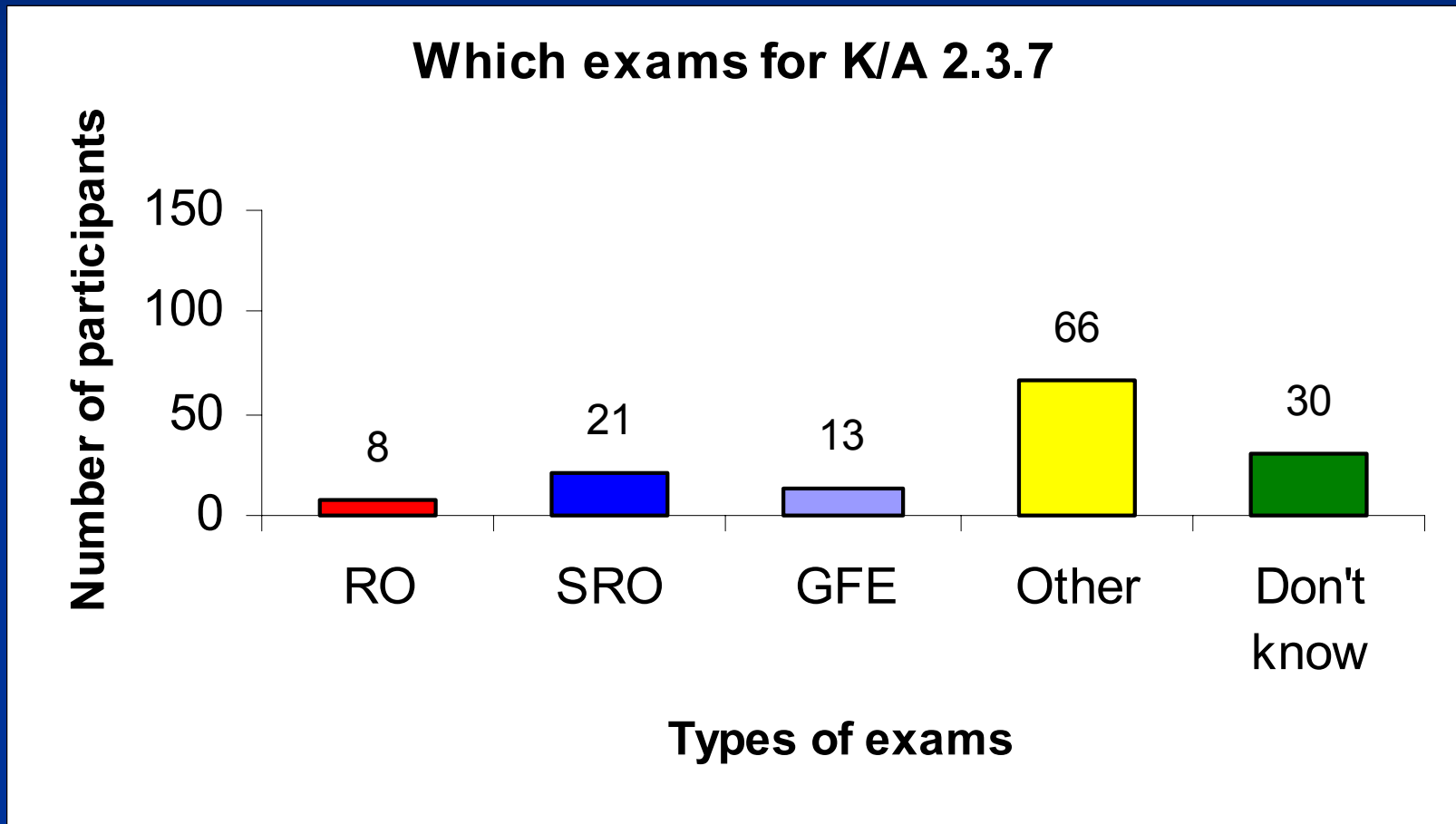


Example of a K/A acceptable for generating an SRO-only question

Which exams for K/A 2.2.8



Example of a K/A to exclude from the RO and SRO exams



Summary of Results from “Which exams” Question

- For 42 K/As (about 33%), the majority of raters voted against including questions to test the K/A on an RO site-specific exam
- For 7 K/As, the majority voted against testing the K/A on an SRO site-specific exam
- For 6 K/As, the majority voted against testing the K/A on either an RO or SRO site-specific exam
 - For 5, the most frequent choice was “other”
 - Most frequent choice was “GFE” for one

Five K/As to be Tested on “Other” Exams

- 2.1.13 - Knowledge of facility requirements for controlling vital / controlled access
- 2.1.16 - Ability to operate plant phone, paging system, and two-way radio
- 2.3.2 - Knowledge of facility ALARA program
- 2.3.5 - Knowledge of use and function of personnel monitoring equipment
- 2.3.7 - Knowledge of the process for preparing a radiation work permit

K/As that should NOT be tested on an RO Exam

- -9/34 in Conduct of Ops
- -19/34 in Equipment Control
- -7/11 in Radiation Protection
- -7/50 in Emergency Procedures/Plan

K/As that should NOT be tested on an SRO Exam

- -3/34 in Conduct of Ops
- -1/34 in Equipment Control
- -3/11 in Radiation Protection
- 0/50 in Emergency Procedures/Plan

How many K/As are “good” for testing in a licensing exam?

- Used the survey data to screen out K/As with the following characteristics:
 - Importance rating < 2.5 from survey
 - Standard deviation 1.0 or greater
 - Majority of participants did not vote for testing it on the RO-level exam
 - Or, majority did not vote for testing it on the SRO-level exam

Results from Combining the Survey Data

- 78 of the K/As (about 60%) would be acceptable for testing in an RO-level exam
- 106 of the K/As (about 82%) would be acceptable for testing in an SRO-level exam

Is the K/A the same for the RO and SRO job?

Response options:

- Yes, the knowledge or ability is the same for the RO and SRO jobs
- No, the knowledge or ability is different
- Don't know

Is the K/A the same for the RO and SRO job?

The raters indicated that the knowledge or ability required for 58 K/As (45%) in Section 2 is different for the RO and SRO jobs

K/As that require a Different Knowledge or Ability for the RO and SRO jobs

- 11/34 (32%) in Conduct of Ops
- 24/34 (71%) in Equipment Control
- 3/11 (27%) in Radiation Protection
- 20/50 (40%) in Emergency Procedures/Plan

Which section of the exam should include questions for this K/A?

Response options:

- Generic
- E/APE
- Systems
- Don't include
- Don't know

Number of K/As that should be in a Different Section of the Exam

- A majority of raters indicated that 83/129 K/As (64%) should be tested in a different section of the exam (other than Section 2)
 - 19/34 in Conduct of Ops
 - 13/34 in Equipment Control
 - 4/11 in Radiation Control
 - 47/50 in Emergency Procedures/Plan

Suggestions for New K/As

- Maintenance Rule and risk assessment
- Operations interface with the site Security Plan/Procedures
- Making operability calls
- Reportability requirements
- Severe accident management/core damage
- “Soft skills” (minimizing control room distractions
human error reduction techniques, team skills)

Summary

- The importance ratings for 22% of the current K/As are questionable
- There are many more K/As that are appropriate for testing in an SRO-level exam than in an RO-level exam
- The knowledge or ability required is different for ROs and SROs in 45% of the K/As
- 64% of the K/As would be better tested in another section of the written exam
- Radiation Protection subsection is particularly problematic

Recommendations for Revisions

- Evaluate the K/As with standard deviations >1.0 based on the comments and revise them for clarity
- Evaluate the K/As in which the knowledge or ability is different for ROs and SROs and develop new K/As for the RO job
- Revise Radiation Protection subsection
- Add suggested new K/As

What did we do with this information

- Two day meeting of a core team to review data from the survey.
- Divided the problematic KA's and evaluated each for deletion or revision.
- Lastly, gave a look to all the KAs in Section 2 to see if any that were not problematic needed revision.

Proposed Changes

- Replace subsection 2.3 with 10 new K/As derived from 10CFR41
- Delete 4 additional K/As because they are adequately addressed in other sections of the catalog.
- Revised 37 K/As to clarify their meaning.
- Moved 7 K/As related to fuel handling from subsection 2.2 to 2.1 for consistency.
- Moved 6 K/As from subsection 2.1 to 2.2.

Proposed Changes

- Moved 2 K/As from subsection 2.4 to 2.2
- Added one new K/A to subsection 2.1 related to reactivity management.

What's Next?

- Report being generated.
- Submit report to the NRC staff.
- Meeting with the NRC to discuss.
- If the NRC staff indicated the proposed changes appear to be acceptable, we will again ask for your help to rate the new and revised K/As.
- Package the new and revised K/As with the new importance rating and then give this to the NRC.