The Alpha Blind Spot and the Implications for Health Physics

13th January 2014

What is a “blind spot” ?

“blind spot”

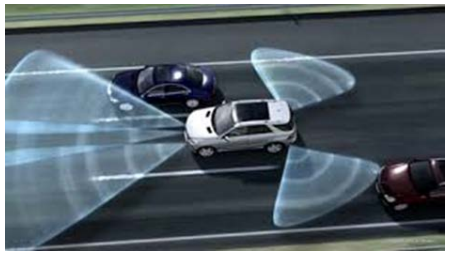
* **1.** an area where a person's view is obstructed.

What is the "Alpha Blind Spot"

* How did/do so many good health physics people "miss" the implications of the presence of alpha contamination in commercial nuclear power operating plants ?
  * Alpha emitters have the lowest ALIs – should have been a red flag to always consider
  * Alpha comes from fuel – didn't we expect it ?
    * Didn't we realize it would be left in the crud layer ?
    * Didn't we understand that it would be shielded/fixed in the system ?
  * In commonly found alpha level II areas, alpha contributes up to 90 % of the dose, yet we didn't routinely monitor for it (contamination, air samples, dosimetry)
  * Alpha resulted in numerous events before it was really taken seriously

So how did we miss it ?

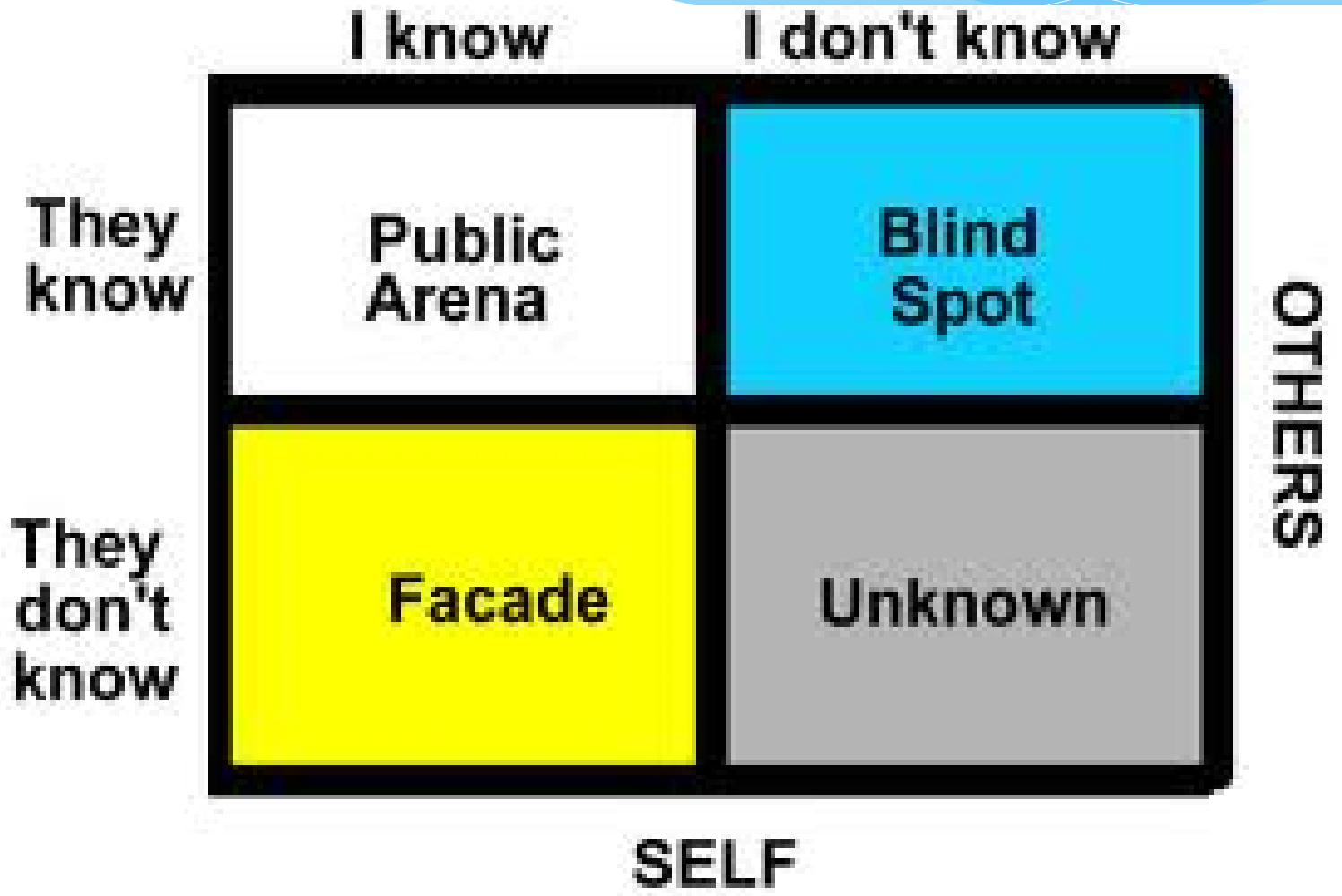
* Traditional ways of doing things (beta program)
* Impact of ICRP reduction/changed recommendations
* Cuts and getting rid of “zeroes” or “inefficient” activities (is alpha monitoring really necessary ?)
* Aging work force (good and bad)
* Regulatory changes
* Lack of fundamental health physics
* Culmination of all these things created a blind spot



If we missed this…..

* What else are we missing ?
* Are there any other blind spots ?
* How do we make sure there are not ?
* The thing about blind spots is that we are blind to them
  * So how would we know ?

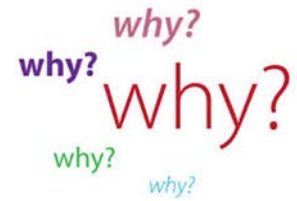
Need to involve those who know



Examining the issues

* ICRP reductions/changed recommendations
  * Are there other reductions we are missing or have missed or do not want to know about/accept ?
    * Eyes ?
    * Whole body dose ?
    * Other radioisotopes changes in ALIs ? (ICRP26 to ICRP60 to ICRP78)
    * Any other dosimetric changes ?
  * What is the technical basis of our RP programs ?
  * Are we keeping the technical basis current/challenging it or justifying that why it should stay the same ?
  * Are we really open to others ? (the international community, other nuclear experience, advanced learnings from events)

Traditional Ways of Doing things



* Tradition is based on experience, but also habit
  * Are we critically examining traditional concepts
    * Keeping the valuable experience, challenging the habit ?
      * How are we doing this ?
  * Our traditional concepts might be out of date, but we might still be using them
    * Do we understand properly why our traditions exist ?
    * Do we know why we do what we do ?
    * Are we willing to change the licensing basis or is it preventing us from learning and growing ?

Cutting the zeroes/inefficiencies

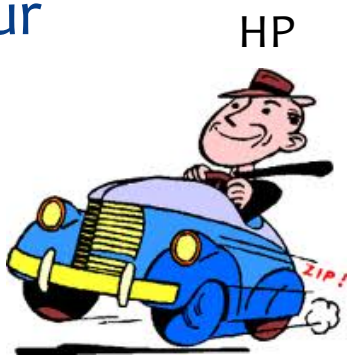
* Who is making the decisions about this ?
  * Does the basis have health physics depth or is it just about business ? (Does the business decision consider ANI?)
  * Are we setting ourselves up for future failures ?
  * Are we weakening health physics ?
* How serious are we about keeping sound health physics and high radiation safety standards ?
  * Can we afford not to ?
  * Are our efforts being put in the right place
    * what is driving our efforts ?

Aging workforce

* Our experience is walking out the door
* There is a large gap between our experienced personnel and the new people
* How are we ensuring that experience is passed on ?
  * How is it being captured?
  * Is it even being captured?
* How are we ensuring that new people are grasping the fundamental health physics issues ?
* How are we challenging the old ?
* Are we systematically training HPs/RP technicians in the program basis - how ?

Regulatory changes

* Are we critically examining regulatory changes (or lack of) to see the implications on our programs ?
* Are we allowing regulatory standards to drive our programs or are our programs driven by health physics (radiation protection) ?
* What is our frame of reference when we review regulatory positions ?
  * Is it to minimize impact or is it to improve/be the best we can be ?



Fundamental health physics

* What was/is missing in the fundamentals of health physics that allowed this to be overlooked ?
  * Do we teach all the fundamentals of health physics in all cases, or are we just teaching the things that we think are relevant ?
    * Physics / Health Physics do not change
  * Are our health physicists/radiation technicians able to adapt to a changing world ?
    * Decommissioning/refurbishment
    * Nuclear disasters and new considerations
    * Changes in ICRP/radiation safety standards
    * New technology

What to do about this ?

* Document our technical basis
  * In such a way it is transparent
  * Be openly critical of it
  * Don't be afraid to challenge it/change it
* Be cognizant of changing ICRP recommendations and review and implement them in a timely fashion
  * Allow the impact of others to be felt
* Train our HPs/RP organizations to understand the technical basis
  * Systematically train them
  * Train them in the rationale for the program
  * Train them to be learners
  * Allow them to see other scenarios/applications to ensure their understanding is full

Review

* If we had:
  * Kept current with implications of the changes in the significance of alpha
  * Maintained or continued programs that monitored for alpha
  * Ensured fundamentals were reinforced (keeping sight of how significant alpha was)
  * Responded quickly when traditions were challenged (events)
  * Listened to others with this expertise

We would not have had a blind spot

Prevention of Blind Spots

* Teach widely
* Teach why
* Be open to challenge
* Allow others to see in
* Allow our profession/knowledge to be the driver – don't be driven
* Healthy debate – advance the profession/knowledge
* Evolve/update our profession into new circumstances as they emerge (nuclear disasters, decommissioning)