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From: Edward Roach *NRD*
Sent: Tuesday, January 27, 2009 7:39 AM
To: Timothy Frye
Cc: Steven Schaffer
Subject: Response to Chinese Questions Chapter 12.doc
Attachments: Response to Chinese Questions Chapter 12.doc

Attached MS Word version of e-mail that I sent yesterday from home.
Ed

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CHPB response to Questions from Chinese delegation on AP1000 Design

Chapter 12, Mr. Chen Xiaoqui

12-1 Response: 10 CFR 20, Standards for Radiation Protection

The ALARA rule imposed by 10 CFR 20.1101 contains a prescriptive directive that licensees (or applicants for licenses under regulatory guides 8.8 & 8.10) are to use procedures and engineering controls to achieve occupational doses and doses to members of the public that are ALARA.

Since the ALARA concept is highly subjective, the ALARA rule uses indefinite, performance terminology that can be developed to be more site-specific by individual licensees. Sound radiation procedures must be used to the extent practicable.

Average site exposure for US nuclear Pressurized Light Water Reactors is approximately 70 Person Rem.

Most operating radiation protection programs at PWR/BWRs establish significant controls to keep exposures ALARA.

12-2 Response:

Since I am unable to review and compare the Chinese standards mentioned in the question 12-2, I'll provide a summary of US controls

Again 10 CFR 20 defines the areas for the various controls,

- a) Site Boundary- area of the site under the control of the licensee.
- b) Controlled Area - Area outside of restricted area, but within the site boundary that the licensee can control access to limit risk due to industrial hazards.
- c) Restricted Area - Area limited by the licensee to minimize undue risk from radiation and radioactive materials.

Typically within the Restricted Area, the licensee establishes a Radiologically Controlled Area (RCA) where most radioactive materials are held and sources of radiation exist. Access controls exist for any entry to the RCA (log in or out, whole body monitoring, exit survey for contamination, etc.,)

Areas are posted in accordance with 10 CFR 20 as radiation areas (greater than or equal to 5 mrem/h); high radiation areas (greater than or equal to 100 mrem/h); very high radiation areas (greater than or equal to 500 Rads); airborne activity area; contaminated area. Although an area or building may be posted as a radiation area, High Radiation Areas (HRA) may be posted inside at the entrance to that area. Additional controls and administrative rules apply to the HRA. Sub-areas are established and posted as necessary or required by regulation.

New reactor applicants must commit to the establishment of the appropriate operational radiation protection program and its procedures. These commitments are captured as a "License Condition".

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We will provide a copy of 10 CFR20 at the meeting.

To address the difference in the dose limitation between USA and China, I believe that it is based on the difference between the bases of the regulatory guidance. The USA regulation is based on ICRP 26 and 30. China is committed to a later version of ICRP.

12-3 Response:

Zone II and III are generally areas that are posted as a Radiation Area. In a USA facility, access control and exposure monitoring are normally required in those areas. The entrance/egress point to the RCA mentioned in the response to question 12-2 is designed as a Zone I, II, or III area.

Usually a Zone II, or III area don't require special controls, but the workers who enter must be trained in accordance with 10 CFR 19.

The risks of a Zone II or III area are not significant. However, in keeping exposures ALARA, all work in the RCA is tightly controlled to minimize unnecessary exposure.