$$P + 2S \leq 0.5$$

For doses below 1 rem, ICRP 35 recommends that the uncertainties not exceed 100% at the 95% confidence level. Mathematically, this is expressed as:

$$P + 2S \leq 1.0$$

The following table shows the relationship between the ANSI and ICRP standards for the simple case where P=0 (i.e. systematic bias is zero):

Dose Range (rem)	ANSI	ICRP
0-1.0	$S < 0.5$	$S \leq 0.5$
1.0-5.0	$S < 0.5$	*
5.0-10.0	$S < 0.5$	$S \leq 0.25$
10-500	$S < 0.3$	$S \leq 0.25$

*ICRP does not clearly address this dose range.

As the table shows, there is relatively good overall agreement between ANSI and ICRP under the simple case when P=0, especially at the dose levels which are most common in practice (doses less than 1 rem).

When P > 0, as is usually the case, the comparison of the ANSI and ICRP standards becomes more complex. For the most common dose range (less than one 1 rem), ANSI becomes more restrictive than ICRP. For doses between 5 and 10 rem ICRP is more restrictive. For doses above 10 rem, the standard which is more restrictive depends on the actual values for P and S.

The following examples illustrate that ANSI is more restrictive than ICRP for doses less than 1 rem.

-11-

essentially equivalent to the ANSI criterion of $P+S < 0.5$, as I

1 previously explained in response to question 17. Although the

2 Board's interpretation that accuracy should be within 50% for

3 doses of a few rem is appropriate for doses of 5 rem or

4 greater, in my opinion it is not appropriate or consistent with

5 ICRP or ANSI recommendations for doses of 1 rem or less, which

6 constitute the majority of actual exposures received.

7 Q.25 Do the TLDs to be used at the Harris Plant nonethe-

8 less comply with an accuracy requirement of 50% at the 95% con-

9 fidence level as suggested by the Board?

10 A.25 Yes. As previously shown, $P+2S$ was less than 0.5 for

11 all categories during the 1982 and 1984 tests.

12 Q.26 The Board also suggested that acceptable performance

13 could be achieved by limiting bias and variability to 10 to

14 20%. Do the TLDs to be issued at the Harris Plant meet this

15 criterion?

16 A.26 Yes. During the 1984 ANSI tests, no individual cate-

17 gory had either bias or standard deviation greater than 20%.

18 During the 1982 ANSI tests, no individual category had a stan-

19 dard deviation greater than 20%, and only one category had a

20 bias greater than 20% (beta--24%). During both the 1982 and

21 1984 tests, the average bias and standard deviation for all

22 categories was less than 10%. A table setting forth the bias

23 and standard deviation as separate values has been prepared and

24 is attached to this testimony as Attachment C. As the table

25 shows, the results achieved by CP&L more than meet the Board's

26 performance criteria.