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REPOSITORY INEL

COLLECTION SNAPTRAN
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SNAPTRAN 2/10A-1 APPROVAL

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HSHP:RPB

FOLDER SNAPTRAN 2/10A-1 approval

Problem

On July 1, verbal comments were requested by Don Six on an internal PPCo letter presenting the radiological analysis for a revised Snaptran 2/10A-1 SAR. At that time, I checked the meteorological parameters used, the method of calculation, the presentation of data, and a couple of values for ball-park accuracy. I am in agreement with the essential results of the analysis. In summary, the planned destructive test under controlled meteorological conditions presents no radiological hazard to the general public. However, the analysis for the accident situation yields an exposure, at the nearest site boundary, of about one rem thyroid dose from iodine inhalation. This exposure calculation includes a cloud depletion factor of five, which is believed to be reasonably realistic by the Weather Bureau. The exposure value exceeds the present standard of 0.5 rem.

The question is therefore raised as to whether ID can authorize, under IAD8400-4, the Snaptran 2/10A-1 experiment on the basis of the present radiological analysis (assuming some rewriting and editing is first accomplished). In the following paragraphs, five alternatives are briefly discussed. My conclusions then follow.

Alternatives

1. Reconsider the accident nuclear energy release for credibility.

2. Assign a meteorological probability to the accident situation.

3. Require meteorological control of the Snaptran experiment.

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4. Reconsider the interpretation of IAD 8400-4 and/or AECM 0524.

5. Request experiment approval from the Division of Reactor Development.

Alternative 1, to reconsider the accident magnitude, was discussed in a brief meeting on July 1 by STEP and AEC personnel. The nuclear energy release assumed for both the planned test and the accident is 50 Mwatt-seconds-the maximum available from the Snaptran 2/10A-1 machine. In addition, a slight residual fission product inventory was assumed from testing prior to an accident. A discussion of how such an accident is postulated led to the stand PPCo has taken: The Snaptran 2/10A-1 machine is designed for a 50 Mwatt-second excursion and therefore an accident of this magnitude is possible. The events leading to such an accident have not been studied. Although a reduction factor of two might be gained by postulating an accident sequence, the particular sequence could be argued and perhaps could not be justified to everyone's satisfaction.

Alternative 2 would assign a probability to the accident meteorology, that is, strong inversion with winds blowing toward the northeast site boundary. The low accident probability coupled with the low meteorological probability might discredit the accident situation that results in a one rem inhalation dose. However, this approach has not been used before and is not an accepted practice in considering the credibility of accidents. Worst meteorological conditions are always assumed in order to maximize the consequences.

Alternative 3 would require that Snaptran testing is not permitted during strong inversion with southwest winds. The immediate reaction of PPCo to this suggestion (on July 1) was not receptive. Any program restrictions are not desirable. However, it can be shown that an accident under slight inversion is acceptable. Strong inversion during winter occurs about 30% of the time at TAN, slight inversion occurs about 30%, and southwest inversion winds occur about 10% of the time. If we assume equal division of southwest winds between strong and slight inversion, which is probably a conservative assumption, then the unacceptable conditions exist approximately 3% of the time. Therefore, meteorological control does not appear very restrictive for the Snaptran experiment. It is my understanding that ANP experiments at IET were performed with similar controls without much program interference. However, this approach assumes that the idle Snaptran machine

cannot undergo an accident, and that meteorological control of tests and operations precludes the accident under strong inversion with southwest winds. This assumption might be argued by the Nuclear Safety Division.

Alternative 4, to reconsider the interpretation of IAD 8400-4 and/or AECM0524, is basic to the problem and to the other alternatives. The key clause in IAD 8400-4 is: "the release to the atmosphere of the total fission product inventory at any time during the experiment, including any built up as a consequence of possible accident during the experiment, would not be expected to result in exposures off-site exceeding those specified in AECM 0524." My interpretation is, (1) The experiment includes all operations and tests with the particular reactor or core in question, (2) Total release of fission products must be considered for any phase of the experiment, that is, during testing and operating, but not necessarily when the reactor is idle, and (3) The effect of a possible accident (and not just a credible accident) must be included. This interpretation precludes alternatives 1 and 2 but allows alternative 3 if sufficient safeguards are provided to preclude an accident to the idle machine. AECM 0524 defines two exposure limits for a thyroid dose. For the individual, the limit is 1.5 rem/year; and for an average exposure to a suitable population sample the limit is 0.5 rem/year. At present, the 0.5 rem value is applied. This "average" value was established for the situation of large contaminated areas encompassing a large population that cannot be sampled individually. Our present position is that individual sampling of people, in the event of an accident, cannot be accomplished. However, the inhalation dose calculation assumes a child in the worst location and in my opinion constitutes individual "sampling." With further computations, an average exposure over a small sample of the people most affected by an accident could be shown to be less than 0.5 rem.

The FRC Report No. 1, page 27, suggests that "the majority of individual exposures do not vary from the average by a factor greater than three." The PPCo calculations show that no individual exposures are expected to be greater than a factor of three from the average value limit of 0.5 rem.

Alternative 5 would request Headquarters approval (perhaps without requiring a full review by DLR and the ACRS). Such action by ID would point up the present limitations of ID approval authority. However, this action should not be necessary for the Snaptran 2/10A-1 experiment.

Conclusions

With the interpretations given in alternative 4, ID can approve the Snaptran 2/10A-1 experiment. With the interpretation of IAD 8400-4 given in alternative 4, and with observance of minor meteorological control indicated in alternative 3, ID can approve the experiment. Without accepting either interpretation given in alternative 4, experiment approval should be requested from Headquarters.

cc: R. V. Batie
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