UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

OFFICE OF THE
SECRETARY

June 15, 1990

MEMORANDUM FOR: James M. Taylor, Executive Director for Operations

FROM: Samuel J. Chilk, Secretary

SUBJECT: SECY-89-102 - IMPLEMENTATION OF THE SAFETY GOALS

The Commission's objective in publishing the Safety Goal Policy Statement was to define an acceptable level of radiological risk from nuclear power plant operation. The Commission also believed that by establishing a level of safety considered to be safe enough, public understanding of regulatory criteria and public confidence in the safety of operating plants would be enhanced. In formulating the policy, the Commission indicated that it believed that current regulatory practice ensured compliance with the basic statutory standard of adequate protection; but the Commission also believed that current practices could be improved to provide a better means for testing the adequacy of current requirements and the possible need for additional requirements. In establishing this policy, the Commission adopted two qualitative safety goals that are supported by two quantitative health effects objectives for use in the regulatory decision making process. The Commission reaffirms its endorsement of these earlier initiatives. The Commission has approved the following actions relating to the Safety Goal Policy Statement:

1) Probabilistic risk assessment (PRA) is used as a tool to provide measures of plant performance and overall risk to the public. Insights can be drawn from this information to evaluate the consistency of regulations with the safety goals and, to identify possible changes in the regulations that make them more consistent with the safety goals. The result of the several PRA level calculations (i.e., core damage probability, source terms, consequence estimates), as well as the results of the various internal steps within each level, can be compared with certain specific regulatory requirements. This has resulted in the suggestion that the Safety Goals and health objectives be partitioned into further subsidiary objectives. While the Commission believes

NOTE: THIS SRM AND THE SUBJECT SECY PAPER WILL BE MADE PUBLICLY AVAILABLE 10 WORKING DAYS AFTER ISSUANCE OF THE SRM.

that such "partitioned" objectives can be useful in making regulatory decisions and improving regulatory practices, it does not believe it is necessary to specifically incorporate the partitioned objectives into the Safety Goal Policy Statement.

2) In the Safety Goal Policy Statement, the Commission proposed for further staff examination a guideline for general plant performance that the overall mean frequency of a large release of radioactive materials to the environment from a reactor accident should be less than 1 in 1,000,000 per year of reactor operation. The examination of this proposed guideline by the staff has resulted in a conclusion that specifying this frequency as an overall mean value is inherently more conservative than either of the quantitative health effects objectives. However, this more conservative result is within an order of magnitude of the Commission's health objectives and provides a simple goal (which has generally been accepted). The Commission believes that the basic concept of a plant performance objective that focuses on accidental releases from the plant and eliminates site characteristics, as suggested by the ACRS, is appropriate. The staff should evaluate and advise the Commission whether such an objective can be developed and how it would be useful. In conducting this evaluation, the staff should formulate a new definition for large release and supporting rationale consistent with this approach.

(EDO) (SECY Suspense: 9/28/90)

3) The staff, in developing and reviewing regulations and regulatory practices, should routinely consider the safety goals. To achieve this objective, the staff should establish a formal mechanism including documentation for ensuring that future regulatory initiatives are evaluated for conformity with the safety goal. (Recognizing that the state of knowledge is such that the degree to which regulatory issues can be related to the safety goals will vary considerably, the staff's consideration of the safety goals could range anywhere from quantitative risk comparisons involving the safety goals themselves to a deterministic judgment that, in light of the safety goals and available knowledge (or lack thereof), a given issue does or does not warrant a change to the regulations or regulatory practices.)

(EDO) (SECY Suspense: 11/30/90)

4) Implementation of the safety goal may require development and use of "partitioned" objectives. In

general, the additional objectives should not introduce additional conservatisms. The staff should bring its recommendations on the use of each such subsidiary objective to the Commission in the context of the specific issue for which it would be useful and appropriate, and explain its compatibility with the safety goals. Based upon the NRC's review of a sample of plant PRAs, it appears that these plants not only meet the quantitative health effects objectives but exceed them. This may or may not reflect excessive conservatism in regulations. While there have been improvements in PRA techniques, uncertainties in the summary results are still such that quantitative PRA objectives should not be used as licensing standards or requirements.

The Commission believes that the safety goal objectives should be applied to all designs, independent of the size of containment or character of a particular design approach to the release mitigation function. Accordingly, for the purpose of implementation, the staff may establish subsidiary quantitative core damage frequency and containment performance objectives through partitioning of the Large Release Guideline. These subsidiary objectives should anchor, or provide guidance on "minimum" acceptance criteria for prevention (e.g. core damage frequency) and mitigation (e.g. containment or confinement performance) and thus assure an appropriate multi-barrier defense-in-depth balance in design. Such subsidiary objectives should be consistent with the large release guideline, and not introduce additional conservatism so as to create a de facto new Large Release Guideline.

A core damage probability of less than 1 in 10,000 per year of reactor operation appears to be a very useful subsidiary benchmark in making judgements about that portion of our regulations which are directed toward accident prevention.

Containment performance objectives for evolutionary and advanced designs should be submitted to the Commission for approval, together with a justification for the recommended approach. In developing recommendations the staff should assure that:

a) The CCFP objective is not so conservative as to constitute a de facto new "Large Release Guideline."

b) Establishment of a CCFP should be approached in such a manner that additional emphasis on prevention is not discouraged. In this regard, staff should develop appropriate

guidance for establishing CCFPs to address this concern and provide a uniform methodology for implementing such an approach.

c) Recognizing that it is entirely possible that a deterministically-established containment performance objective could achieve the same overall objective as a CCFP, staff should be prepared to review the merits of such an approach (if proposed) and, if workable, accept such an approach as an alternative to a CCFP.

The Commission has no objection to the use of a 10^{-1} CCFP objective for the evolutionary design, as applied in the manner described above.

Within a particular design class (e.g., LWRs, LMRs, HTGRs) the same subsidiary objectives should apply to both current as well as future designs. A specific subsidiary objective might differ from one design class to another design class to account for different mitigating concepts (e.g. confinement instead of containment). However, the Large Release Guideline relates to all current as well as future designs.

<u>These partitioned objectives are not to be imposed as requirements themselves but may be useful as a basis for regulatory guidance.</u>

5) It is important to note that the Commission has made it clear in the advanced plant and severe accident policy statements that it **expects** that advanced designs will reflect the benefits of significant research and development work and experience gained in operating the many power and development reactors, and that vendors will achieve a higher standard of severe accident safety performance than their prior designs. **The industry's goal of designing future reactors to a core damage probability of less than 1 in 100,000 per year** of reactor operation (EPRI for ALWRs and GE for the ABWR) is evidence of industry's commitment to NRC's severe accident policy. The Commission applauds such a commitment. However, <u>the NRC will not use industry's design objectives as the basis to establish new requirements.</u>

6) In order to enhance our regulatory process for the current generations of plants, the Commission believes the staff should strive for a risk level consistent with the safety goals in developing or revising regulations. In developing and applying such new requirements to existing plants, the Backfit Rule should apply.

7) The Commission supports the use of averted on-site costs as an offset against other licensee costs (and not as a benefit) in cost-benefit analyses.

8) Both the staff and ACRS agree that the safety goal objectives and other relevant objectives should be used to identify possible changes in the regulations applicable to nuclear power plants; however, the task of undertaking a total review of the whole body of applicable regulations and regulatory practices appears to be a massive, resource intensive effort. The staff should describe a plan, with specific detail, for assessing the consistency of our regulations with the safety goals and for identifying and possibly eliminating unnecessary requirements, and modifying requirements that may be inadequate. This may fold in current work to review regulations and eliminate unnecessary requirements, and plans to use IPE-PRA information to make comparisons of current regulations with safety goal objectives. The staff should consider whether a trial case of limited scope may be a useful way to proceed with this request.

(EDO) (SECY SUSPENSE: 12/91)

9) In stating that quantitative objectives can be useful in making regulatory decisions to address safety issues, the Commission recognizes the uncertainties associated with the numerical results of PRA. Some issues (e.g., human performance) also do not readily lend themselves to quantitative comparisons.

Therefore, the staff in applying the criteria provided in 10 CFR Part 52 may conclude that additional requirements are needed based on experience with prior designs in order to provide substantial assurance that future designs will meet the level of safety provided in the Safety Goal Policy Statement. The staff should elevate such safety issues to the Commission for consideration and should not be constrained from proposing new requirements where benefits cannot be quantified in terms of risk.

10) The Commission believes that "adequate protection" is a case by case finding based on evaluating a plant and site combination and considering the body of our regulations. Safety goals are to be used in a more generic sense and not to make specific licensing decisions. It is not necessary to create a generic definition of adequate protection, nor is it necessary to amend the Safety Goal Policy Statement in order to provide a direct relationship between the safety goals and the concept of adequate protection.

11) The Commission agrees that it must not depart from or be seen as obscuring the arguments made in court defending the Backfit Rule.

These arguments clearly established that there is a level of safety that is referred to as "adequate protection". This is the level that must be assured without regard to cost and, thus, without invoking the procedures required by the Backfit Rule. 1/ Beyond adequate protection, if the NRC decides to consider enhancements to safety, costs must be considered, and the cost-benefit analysis required by the Backfit Rule must be performed. The Safety Goals, on the other hand, are silent on the issue of cost but do provide a definition of "how safe is safe enough" that should be seen as guidance on how far to go when proposing safety enhancements, including those to be considered under the Backfit Rule.

12) The term "credible" is used in Part 100 and has in some instances been given a probabilistic interpretation or definition by the staff which is more stringent than the Large Release Guideline. This lack of uniformity should be addressed by the staff in conjunction with the staff's efforts on siting.

13) All Commissioners agree that how well a plant is operated is a vital component of plant safety. In order to improve communication to the public, ACRS has recommended that this fact be given more prominence in the Safety Goal Policy Statement as a major element

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1/ On a related point, the presumption is that compliance with our regulations provides adequate protection. The converse, however, is not true, i.e. adequate protection does not necessarily require compliance with the body of our regulations. The Commission can and does grant exemptions to specific requirements in our regulations as long as we assure adequate protection is achieved by other means. Moreover, we also have regulations which go beyond adequate protection and have been issued to enhance safety e.g. the Station Blackout Rule. Thus, if an "enhancement" passes the tests of the Backfit Rule, there is nothing to prohibit its imposition other than the guidance provided by the Safety Goals policy.

of uncertainty, recognizing that it is not quantifiable in a fashion similar to the other objectives. The current wording of the policy statement contains such a message implicitly; therefore, the Commission does not believe a change is necessary. The staff should, however, recognize this as a major element of uncertainty when referring to the safety goals in making regulatory decisions.

cc: Chairman Carr
Commissioner Roberts
Commissioner Rogers
Commissioner Curtiss
Commissioner Remick
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