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

Oct.
~~Aug~~ 29 1981

MEMORANDUM FOR: Robert B. Minogue, Director
Office of Nuclear Regulatory Research

FROM: Harold R. Denton, Director
Office of Nuclear Reactor Regulation

SUBJECT: DRAFT REPORT OF NRC FUEL TESTING TASK FORCE (JULY 30, 1981)

We have reviewed the July 30, 1981 draft report of the NRC Fuel Testing Task Force. Our general and overall impression of the Severe Fuel Damage (SFD) program described in the draft report is that the program is comprehensive and well structured, that it represents a consensus of some of the most experienced fuel experts in the U.S., and that it is as specific and realistic as it can be considering the current state of knowledge, and the existing uncertainties and limitations.

We believe the SFD program constitutes an important part of the overall research program in support of the degraded core cooling (DCC) rulemaking. Our specific comments are provided in the enclosure. We consider the following three comments to be particularly significant.

The first is that the SFD program should be oriented primarily toward the needs of the DCC rulemaking, and therefore, the specific end-product needs for this rulemaking should be identified, to the extent possible, in the very near future. We believe that those portions of the program that are not required for the rulemaking should be justified as confirmatory needs.

Second, we would remove the statement of the "ultimate goal" on page 1-4. This goal would direct the program toward "accident management analysis codes," which we believe are of greater scope and therefore not within the proper domain of the SFD program.

Our third major comment is in support of the Task Force's recommendation pertaining to accelerating the TMI-2 core inspection. This inspection will provide invaluable guidance and support for refining the broad portions of the SFD program and the associated rulemakings. We recommend that RES consider preparation of a Commission Paper describing the scope, costs and benefits of the TMI-2 core inspection program and recommending steps the Commission might take to seek DOE and Congressional support for expediting such an inspection program. This document should be coordinated with the TMI Program Office.

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We believe that the relationship of the SFD program to the DCC rulemaking is the deciding factor for scheduling the program. There are very important decisions that need to be made about the timing of the DCC rulemaking that would, depending on how they come out, significantly alter the course of SFD research. For example, if a decision is made to accelerate and conclude the rulemaking in the FY83 (proposed rule) FY84 (final rule) time frame, then only those SFD results available before about the end of FY83 would enter the process, unless they were confirmatory. If the DCC rulemaking is delayed to FY85 and beyond, then the SFD work might be of a more searching or developmental nature. We understand the Chairman has asked for discussions next week of these alternatives and their relation to other activities such as the safety goal project and the Indian Point proceeding. We also understand you are preparing an options paper on the DCC rulemaking for transmittal to the Commission in December. The SFD program and other parts of NRR and RES programs will hinge on decisions in these matters. We plan close cooperation with you as these developments unfold.

Harold Denton

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

cc: W. Dircks
ACRS

ENCLOSURE
NRR COMMENTS ON THE DRAFT REPORT OF THE NRC
FUEL TESTING TASK FORCE
JULY 30, 1981
AND THE SEVERE FUEL DAMAGE (SFD) PROGRAM

GENERAL

1. We conclude that the SFD program is comprehensive and well structured, that it represents a consensus of some of the most experienced fuel experts in the U.S., and that it is as specific and realistic as it can be considering the current state of knowledge and the existing uncertainties and limitations.

2. The plan states (page 2-4, third paragraph) that the major focus of the SFD program will be in support of the minimum engineered safety feature (MESF) rulemaking. It appears to us that the degraded core cooling (DCC) rulemaking will have the greater need for the research results. As the development of information for cooling the core with varying degrees of degradation will be the principal thrust of the SFD program, descriptions of core cooling scenarios, degraded core phenomena and accident management consideration developed by the SFD program will be major contributions to the DCC rulemaking process. For example, it might be demonstrated analytically or experimentally that the most probable degraded core scenario could be readily controlled by proper management without additional engineered safety features.

   As we note in our comments on Section 6, "Task Force Findings and Conclusions," the end-product needs of the DCC rulemaking should be identified, to the extent possible, in the near future. These end-product needs should then be the planned research tasks and priorities established within schedule constraints. This process of identification should include which results will, or could, be available before or during the DCC rulemaking process, and which results must fall into the confirmatory category. We agree with the Task Force that the SFD program should be periodically reevaluated, and that a major reevaluation be performed when priority and detailed needs are clarified.

3. In keeping with our recommendation that the SFD program be oriented primarily toward the needs of the DCC rulemaking, we believe that more information should be developed relating the SFD program to research programs pertaining to the consequences of fuel melt. In particular, a discussion should be prepared dealing with the programmatic interfaces pertaining to research that investigates the consequences of, and mitigation features for, failure to provide adequate cooling to core debris within the vessel. A figure similar to Figure 2 of the report would be helpful in this regard.

4. We support the Task Force's recommendation for accelerating the TMI-2 core inspection. The current plan anticipates information from the analysis of the TMI-2 core debris to provide a benchmark for the behavior of severely-damaged fuel and for a general understanding of severe damage to a reactor core. The TMI-2 core represents the only large scale reference point potentially available, and its timely inspection would provide invaluable guidance to the remaining portions of the SFD program, and to the MESF and DCC rulemakings. We recommend, therefore, that RES consider preparation of a Commission Paper describing the scope, costs and benefits of the TMI-2 core inspection program, and recommending steps the Commission might take to seek DOE and Congressional support for expediting such an inspection program.

5. There does not appear to be consideration (other than the reference to the ACRS recommendation on page 2-2) of using available risk assessment techniques to determine the higher probability accident scenarios that lead to degraded core situations. This could be very useful in directing the experimental program to areas of higher payoff in both time and recovery. The SASA program efforts may also contribute in this area. It is our intent that risk assessment studies would add guidance but not cause delay in the SFD program.

6. The Task Force report would benefit from a discussion of the reasons (in addition to the reference to the ACRS recommendation on page 2-2) that the SFD program should be funded primarily by NRC, rather than by DOE or industry. We believe that the accident preventative measures that are being required of industry are reducing the likelihood of occurrence of a severe accident but, in accordance with the findings of the Degraded Core Cooling Steering Group, NRC research and rulemaking activities pertaining to severe accidents, degraded cores and mitigation features are warranted. Because of the low level of perceived risk, however, it will not be determined what will be required of industry until completion of the rulemaking activities. Consequently, until associated rules are established, the SFD program would appear to be the responsibility of the NRC. RES should provide its own discussion of industry and DOE responsibilities regarding the SFD program, however.

INTRODUCTION AND SUMMARY (Section 1.0)

1. The statement on page 1-4 that "The ultimate goal of this work is the development of an analysis and data package which can be used as a nucleus for simplified on-site accident management analysis codes developed for plant-specific, dedicated, on-site computers" should be removed or substantially modified. As stated, this goal exceeds NRC's responsibility and is unnecessary. Such a goal is a responsibility of industry. From NRR view point, the goals of the SFD program are, in-part, to address the three questions on page 1-3. We would augment these goals by adding that the SFD program should:

   (1) develop an understanding of SFD phenomena that are of importance in determining the performance requirements for engineered safety features for severe accident mitigation;

   (2) provide technical support for the rulemaking process; and

   (3) propose the acceptance criteria for use by the staff in reviewing documentation submitted by licensees in meeting the rules.

2. We agree with the objective that the SFD program should develop information pertaining to accident management, including computer codes that would be descriptive of the course of accidents for the development of emergency procedures. We caution the following in this regard, however:

   (a) Since procedures to manage accidents for a given plant will include site and plant specific actions, the SFD program should consider these as practical limitations in its intent to develop general procedures for management of degraded core accidents.

   (b) Computer codes should provide information to permit the operator to make informed decisions pertaining to the accident. Further research in both severe accidents and human factors engineering is needed before we can consider having the computer recommend operator actions, or actually execute such actions.

3. Although the report places heavy emphasis on core coolability, fission product release is not given as much attention (except possibly in terms of the effect of fission product migration on core heating). Yet it is fission product release (to the environment) that is the ultimate safety concern, and thus the study of release rates and modes would seem to warrant considerable attention. We know that RES is already involved in fission product release studies, so perhaps the seeming lack of emphasis in the SFD report is more apparent than real. However, we wish to emphasize that this aspect of the plan should be given high priority

4. The major elements of the SFD program are reasonably balanced considering the limits in available knowledge. However, in order of priority and in the face of continued limited resources, we would rank those elements as follows: (1) examination, characterization, and analysis of the TMI-2 core debris; (2) separate-effects tests (ex-reactor to the extent feasible); (3) integral tests (in-reactor to the extent feasible); (4) analytical model development (SCDAP); and (5) research products in the form of analysis codes (SCDAP).

5. On page 1-9 under Program Action, analysis of SFD sequences to explore governing phenomena sensitivities should be given high priority to aid in planning experiments.

SEVERE FUEL DAMAGE PROGRAM-NRC NEEDS (SECTION 2.0)

1. On page 2-4, second paragraph-the first sentence should be restated for proper context - "The specific rules to which the SFD program results are most applicable are....rules."

2. On page 2-5, item 3 calls for design of engineered safety or mitigation features which are relevant to both early in-vessel and late ex-vessel accident management. At this early stage, this effort should be directed not to the design of the features, but rather to the functional requirements for features and to the acceptance criteria to be used by the staff in reviewing the proposed designs. Later, and in accordance with the ACRS letter of July 17, 1981, design-related studies should be undertaken.

SEVERE FUEL DAMAGE-CURRENT AND NEEDED INFORMATION (SECTION 3.0)

1. On page 3-4, movement of the neutron absorber materials in the core is noted as a safety issue because such movement could conceivably reinitiate local criticality. It is not clear whether RES believes this phenomenon is a potential severe accident worthy of additional investigation in the SFD program.

2. We believe that the various phenomenological stages of SFD have been reasonably well identified, but we agree with the task force that it is not clear that the various aspects of SFD behavior are given balanced emphasis in the program.

CURRENT AND PLANNED NRC PROGRAM ON SFD (SECTION 4.0)

1. PBF Test Series 1 appears justified in terms of its potential for providing scoping information with the use of an existing facility. We believe that it is important to acquire some in-reactor integral test information early in the program for scoping purposes, and for possible use in rulemaking. On the other hand, an over-reliance on early test results may lead to a later test effort that is misdirected and wasteful. A second reason for caution regarding in-reactor integral tests is that ex-reactor, separate effects tests may provide information that would be useful in determining the kind of integral tests that should be conducted. More emphasis should be placed on ex-reactor tests, not only for separate-effects studies, but also for preliminary integral studies.

2. As pointed out in the report, there are some deficiencies with existing test facilities (e.g., PBF can only test 3-foot-long fuel rods), and in some cases modifications will be necessary. To the extent that we have had time to examine some of the proposed modifications, we agree that they appear cost effective.

3. The report recognizes that particle size and distribution are key factors pertaining to debris bed coolability. It would appear that an early ex-reactor test to scope the effect of fuel element height on the debris bed characteristic should be performed to aid in determining if the effect of fuel element height is a priority end-product need. If tests in-reactor on longer fuel bundles are determined to be a necessity, then contingency plans should be available if sufficiently timely fuel damage and melting tests cannot performed at ESSOR due to scheduling or other delays. In this regard, we believe more active efforts should be made to secure Canadian cooperation for potential early use of the NRU facility.

   The ESSOR program (SUPER-SARA) looks attractive because it provides for the examination of separate effects, rather than focusing solely on debris formation, melt-down or other whole-system core effects and because the U.S. appears to be getting a reasonable return on its investment contribution. However, inasmuch as the results appear to be some years away, they will presumably be of little or no use to rulemaking. The program should be worthwhile, however, to provide confirmatory information.

4. With regard to the relative importance of fission product heating versus decay heating, or even non-nuclear heating (electrical or otherwise), the necessity of performing truly prototypic integral proof testing using afterheat (in LOFT or elsewhere) has not been demonstrated

sufficiently. Every effort should be made to obtain better-quantified analytical estimates of the relative importance of fission product redistribution on core cooling and configuration before committing to a large and costly in-reactor integral test program.

5. We agree that the SCDAP code should become a central and coordinating feature of the SFD program. We recommend, however, that the code be developed in modular segments rather than as an overall integral representation. Each of the modules should also be capable of independent review and benchmarking. We also recommend that computer codes from their inception should be in formats that can be readily run by others on different computing machines. Except where justified, "laboratory" programing should be discouraged by the contract.

6. The current program does not address well the question of core melt progression leading to vessel failure. At this stage, however, we do not know if there is an adequate understanding of what new data are needed and how such data should be obtained.

7. The report does an excellent job of reviewing both domestic and foreign research activities directly related to the SFD program. IF RES considers any of these programs vital to the success of SFD program, contingency plans should be prepared in the event any vital program is cancelled or otherwise not satisfactorily performed.

TASK FORCE FINDINGS AND CONCLUSIONS (SECTION 6.0)

1. We agree that the SFD program should be focussed on the end-product needs, but it is not obvious that those end-product needs have been sufficiently identified and called out in the report. It is not easy and may not be possible to identify those needs at this early stage of the program, but the early identification of end-product needs to the extent possible is of fundamental importance.

2. We agree with the judgment of the Task Force that it is too early to tell if SFD proof tests will be needed in LOFT, particularly in view of the large cost of such tests.

3. We agree that a major objective of any in-reactor experiments ought to be the determination of the range of core conditions (if any) for which simple reflood is insufficient to cool the debris and terminate the accident.

4. Two specific benefits of the SFD program could be included in the findings. These are:

(a) The SFD program could contribute significantly to the "Accident Signatures Handbook" being developed by the SASA program.

(b) The SFD program could be beneficial to operator simulator training through utilization of the SCDAP code (Severe Core Damage Analysis Package). If adequately verified, this code could form the basis for training simulator software that would contain an extensive range of severe accident management problems.

ENCLOSURE C

Tabulated below are the RES responses to NRR's comments on the Severe Accident Research Plan. Some comments have been incorporated as noted, and some have not because of differences which are still being discussed between RES and the appropriate NRR staff.

COMMENT	RESPONSE
pg. 1, Item 1 - Cover letter - "Each program element should be planned to meet our identified decision needs for 1984."	It was agreed in a meeting with NRR that they would provide a list of more detailed needs (expand enclosure 1 NRR Summary User needs) in the next couple of months. We will update and refine the plan accordingly.
pg. 1, Item 2 - ....concerned about the lack of systematic means for prioritization....	This subject was discussed in a meeting with NRR and has been expanded upon in SARP. (See pg. 1-10 thru 1-13). Also cost data have been provided in Table 4-2.
pg. 1, Item 2 - ....proposed schedule appears out of phase with the scheduling of various NRR actions...."	Chapter 4 has been rewritten to emphasize those results which will be available in 2 yrs and 4 years. A detailed network of results and timing of those results is in the process of being prepared. NRR will provide RES with information on the timing of their needs in the next couple of months.
pg. 1, Item 2 - "...not all study items included in the proposed program address unknowns and, uncertaines which contribute significantly to severe accident	This comment relates primarily to the Behavior of Damaged Fuel program and one or two other areas which are under discussion with the appropriate staffs.
pg. 2, Item 3 - "...plan does not discuss how it will cope with the differences between PWRs and BWRs and in plant specific containtainment as generic as feasible...issues specific design approaches be dealt with through cooperative activities...."	In discussion with NRR it was noted that the work in SAPP would be as generic as practical. However, in the analysis of certain accidents and proposed mitigation schemes it would be necessary to look at specific containment designs. This approach appears acceptable. Plan rewritten to emphasize industry cooperation.

COMMENT	RESPONSE
pg. 2, Item 4, "..."Behavior of Damaged Fuel" appears to be very expensive and yet has no significant impact on how we vision procedures being developed or risk analysis..."	This program element was discussed in meeting with NRR and is still being discussed. There are a number of issues yet to be resolved. Sections on the Behavior of Damaged Fuel in Chapters 2, 3 and 5 have been rewritten to emphasize other contributions from the program, however, NRR has not endorsed the full scope of the program. Part of the problem relates to unidentified NRR requirements for severe accident analysis and possible procedures.
pg. 2, last paragraph - "We note a need to establish a mechanism for review groups and also for peer review...."	Plans are being made to establish several levels of peer review. (See pg 1-13).
Enclosure 1 - NRR Summary User Needs	This list will be expanded upon by NRR in the next few months. Specific items 4 and 9 were discussed in a meeting between RES and NRR and it was decided to place more emphasis on these items in the plan. All the other items are agreed upon.
Enclosure 2 - Summary and General Comments Items 1, 2, 3, 4, and 5.	Previously discussed above
pg. 3, Item 6, "The most important comment not so far addressed pertains to our support of the Task Force's recommendation for acceleration of the schedule for inspection of the TMI-2 core.	The examination of the TMI-2 core is included in the Behavior of Damaged Fuel program and although the results are important, the utilization of the results of the examination of the core at TMI-2 is somewhat limited because of the lack of information on core uncovery as a function of time.
pg. 3, Item 7 - "...this element in need of substantial revision to recognize (1) coordination needs with industry, (2) the status of current human engineering research...."	The element on Accident Management (Element 5.3) has been rewritten to include the research being done in human engineering and has been phased to present results in 2 yrs and 4 yrs. This element will be coordinated with work being done by IDCOR and other industry efforts. This element will be updated and refined in the next few months.

COMMENT	RESPONSE
pg. 4, Item 8 - "We do not find in any program element a research plan to investigate modes and mechanims of melt through of steel vessels."	Understanding of melt progression to vessel failure is important in understanding the timing and types of failure modes, however research in this area was planned for later in the Behavior of Damaged Fuel program after we had developed an understanding of how the fuel slumps and attacks the vessel. We had anticipated initiating a scoping study in FY 83.
pg. 4 - Items 9 and 10	Previously Discussed
pg. 5, Item 11 "...NUREG 0900 should be complete with cost information and a discussion of dependencies on programs described in Decision Units in the Long	Cost information has been included at the end of Chapter 4. The Long Range Research Plan includes all of the work being done in RES and the SARP (NUREG-0900) is a subset of that work which pertains to severe accidents.
pg. 5, Item 12 - "....identification and discussion of related research programs by NRC, Industry and foreign governments should be strenghtend for many program elements."	This has been done in the current revision and will be streghten more in the final version.
pg. 5, Item 13 - "RES should consider establishing a program element...establish survivability and qualification requirements for the minimum set of instruments and equipment...."	This comment relates to informamation needed for accident management as well as equipment survival. RES agrees and is currently considering what the needs are in this area. SASA will provide some information on the behavior of particular equipment in a severe accident environment.
pg 5 and 6 - Items 14 and 15	RES agrees
pg. 6 Item 16 - "...a task should be established directed at the question of "completeness" of the present containment analysis."	Section 5.7 Containment Analysis does have a subtask addressing completeness (see pg. 5-66)

COMMENT	RESPONSE
pg 6 Item 17 - "...we must not downplay the importance of resolving other issues; pressurized thermal shock, USIs...."	RES agrees.
pg. 7 Item 18	We have combined elements 5.12 and 5.13 in the current revision of the SARP.
Enclosure 3 - Comments by Section	
Program Element 5.1 and Items 1 and 2	RES agrees
Element 5.1, Item 3 - "...this program element plans to establish the contribution to risk orginating in external events and sabotage....Contributors should be included to the extent possible."	More emphasis given in current revisions to SARP (see pg. 5-2)
Element 5.1 Item 4	Using PRA RES is investigating various aspects of the sabotage question and (b) presently included.
pg. 3, 5.2 SASA - Item 1	Acronym ATOG used because of wide acceptance, however, RES can drop if necessary. Awaiting discussion with NRR on coordination of guidelin
p. 3, 5.2 SASA - Item 2 "Mention should be given to the extensive human factors engineering studies underway.	Discussion included in Accident Management Element.
pg. 3, 5.2 SASA - Item 3 - Discussion should be provided on means available to validate the results and conclusions of SASA."	Initial response included (see pg 5-14)
pg. 3, 5.2 SASA - Item 4 "A discussion should be provided....the limitations of SASA.	Initial response included (see pg 5-9).
pg. 4-7, 5.3 Accident Management Items 1-10	Program Element 5.3 has been re-written to include many of these comments. This element represents a new program area in RES and the total scope this program is being developed. We will include NRR's comments and request their assistanc in further developing this program element.
pg. 7 and 8, 5.4 Behavior of Damaged Fuel, Item 1-3.	These comments have been addressed above.

COMMENT	RESPONSE
pg. 8, 5.4 Behavior of Damaged Fuel, Item 4 "Figure 5.4 should be revised in accordance with text for NRU and ESSOR experiments.	The NRU program and schedule are under review. Currently the level of participation in the ESSOR program is under review, however, the results for this program will be very late in terms of timing of needed results.
pg. 8 & 9, - 5.5 Hydrogen Generation and Control - Generic LWR Items 1-9	All of the items listed are included in the Hydrogen Behavior Program, Hydrogen Combustion, Mitigation and prevention Schemes, and in the Fuel-Structure Program Element.
pg. 9, 5.5 - ICE-Condenser Specific Items 1 and 2.	Work is currently planned in these areas. Additional work for specific geometries will be discussed with NRR and industry.
pg. 10, 5.5 - BWR MARK III, Items 1-4	Item 1 is currently being investigated. Item 2 will be discussed further with NRR. Items 2, 3, 4 have been accomodated in revised pla
pg. 10, 5.6 Fuel Structure Interaction, Item 1.	Both analytical and experimental work are being sponsored in this are under the Fuel-Structure Interactior Element. (see pgs. 5-60 & 5-61).
pg. 10, 5.6 Fuel Structure Interaction, Item 2.	We are planning to continue the work on core/water/concrete interactions. Debris-coolant-concrete interactions will be done in FY 83-84 (see pg. 5-
pg. 11, 5.6 Fuel Structure Interaction, Item 3.	RES agrees. Work is focusing on quench interaction and analysis. (see pg. 5-64).
pg. 11, 5.7 - CONTAINMENT ANALYSIS, Items 1 and 2.	Comments have been incorporated in revised draft. (See pgs. 5-60 and 5-62).
pg. 12, 5.7 CONTAINMENT ANALYSIS, Item 3	The CONTAIN code is a generic code and as such would be applicable to BWR containment environments. The response of BWR containment is part of the Containment Failure Mode program.

COMMENT	RESPONSE
pg. 12, 5.7 Containment Analysis, Item 4 "We believe a task should be established pertaining to property damage consequences from liquid pathway models."	Work is planned in this area as part of our program to improve consequence models.
pg. 12, 5.8 Containment Failure Mode, Item 1 "...define a statement defining Containment	RES agrees and we will work with NRR on an acceptable definition.
pg. 12, 5.8 Containment Failure Mode, Item 2	The program includes this issue. The writeup in NUREG-0784 includes more detail on this subject.
pg. 12, 5.8 Containment Failure Mode, Item 3	The relationship between deformation and leakage is an integral part of this program.
pg. 12, 5.8 Containment Failure Mode, Items 4 and 5.	Revision to SARP incorporates change (See pg. 5-71 and 72).
pg. 12 and 13, 5.9 Fission Product Release and Transport Item 1 - Completeness	We will discuss these areas with the appropriate NRC staff to assess a priority and timing for this work.
pg. 15, 5.9 Fission Product Release and Transport Item 2 - Emphasis on Aerosol Testing	We disagree. Potential retention of aerosols/fission products in the PCS represent a significant factor in the assessment of source term. The planned work will help to validate the TRAP-MELT code. RES is providing input on instrumentation and the types of tests to be performed in Marviken in order to improve the program.
pg. 15, 5.9 Fission Product Release and Transport Item 3, Schedule of Fission Product Control Program	We will discuss this program with NRR in the review of priorities and see if an acceleration of this program can be accomodated.
pg. 16, 5.9 Fission Product Release and Transport Item 4, "...placement, survivability, and qualification requirements for instrumentation to assist the management of severe accidents...."	RES is currently in the process of assessing the qualification requirements of equipment in terms of severe accidents. Some work is planned in the SASA program in this area. We will discuss this subject with NRR to better define the scope of work.
pg. 16, 5.10 Risk Code Development, Item 2	Work to address these concerns is included in 5.1 and 5.13 (see item 2 Sect. 13.1).

COMMENT	RESPONSE
pg. 16, 5.10 Risk Code Development, Item 3	This is consistent with current schedule.
pg. 17, 5.10 Risk Code Development, Item 4	Some of these items are included in the current program and more are planned in the DRA program formulation for FY 83.
pg. 17, 5.10 Risk Code Development, Item 5	Some of these areas will be reasonably quantified by early 1984, however, others such as meltdown progress may not be available until latter.
pg. 17, 5.10 Risk Code Development, Item 6	Parts of MELCOR will be benchmarked against available determistic codes and data, however, other models will be validated and updated as data is available.
pg. 17, 5.10 Risk Code Development, Item 7	It is intended to make MELCOR modula in structure. (see pg. 5-88)
pg. 17, 5.10 Risk Code Development, Item 8	RES agrees
pg. 17, 5.11 Accident Consequence and Risk Evaluation, Item 1	This element will be closely coordinated with 5.1 and 5.10, however, this work is significantly enough to stand alone.
pg. 17, 5.11 Accident Consequence and Risk Evaluation, Item 2.	RES will in the next few months discuss this area in detail in order to determine what is needed.
pg. 18, 5.11 Accident Consequence and Risk Evaluation, Item 3	We need to discuss this area in detail with NRR in order to determin what is needed.
pg. 18, 5.13, Evaluation of Accident Migigation System, Item 1	Done
pg. 18, 5.13, Evaluation of Accident Migigation Systems Item 2	RES agrees
pg. 18, 5.13, Evaluation of Accident Mitigation Systems, Item 3	Analysis of completing risk introduc by mitigation feature or other risk reduction design changes is included in the program. (see pg. 5-97).

COMMENT	RESPONSE
pg. 18, 5.13, Evaluation of Accident Mitigation Item 4.	RES agrees (see Sect. 5.12, Table 5-

As you can note in the above tabulation, we have attempted to accomodate a majority of the NRR comments in the revised plan, however, there are several areas/programs which are going to require an improved dialogue with NRR. It is intended that the SARP will be updated and refined periodically and during these updates we will accomodate further NRR concerns.