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MEMORANDUM FOR: IAEA Distribution

FROM: James A. Norberg, US Member, TRC-Design

SUBJECT: REPORT OF IAEA TRC-DESIGN MEETING IN VIENNA, AUSTRIA FEBRUARY 11-15, 1980

Purpose - The purpose of the meeting was to (1) resolve Member State comments on Safety Guide SG-D6 "Ultimate Heat Sink and Its Directly Associated Heat Transport Systems in Nuclear Power Plants and (2) to develop Scopes for SG-D13, "Reactor Coolant System Design" and SG-D14, "Reactor Core Design."

Summary of Meeting - The TRC completed consideration of Member State comments on SG-D6. The guide was appropriately modified and approved by the TRC for transmittal to SAG with the recommendation for publication by the IAEA. Draft Scopes for SG-D13 and SG-D14 were prepared. The Scientific Secretary for Design will edit the draft Scopes and transmit them to the SAG for their consideration.

A special TRC/Working Group meeting was scheduled for February 18-22, 1980 to complete the TRC consideration of SG-D8, "Safety Related Instrumentation and Control Systems." Mr. E. Wenzinger, TRC-Design and Mr. J. Gallagher, US Member of Working Group participated in this meeting.

A special TRC/Working Group meeting to establish a detailed scope for SG-D11, "Safety Guide on General Design Safety Principles," is tentatively scheduled for May 5-9, 1980 at the NRC/SD offices in Washington, D. C. (Rockville, Md.). Attendance at this meeting is still being formulated; however, the intent is to have the Working Group Members and any interested TRC Members. The US has nominated Mr. James Mallay, B&W (EPRI/NSAC) to be our representative on the Working Group. The US will host this special meeting.

The next regular TRC-Design meeting is scheduled for April 21-25, 1980 in Vienna. The main task will be the first TRC review of SG-D10, "Safety Guide on Fuel Handling and Storage Systems in Nuclear Power Plants."

Discussion - Over 185 Member State Comments were received on SG-D6. All of these comments were considered by the TRC and were either accepted, modified, or rejected. Many of the comments were editorial in nature and did not change the technical thrust of the guide.

While there were many changes made to the draft guide, the overall approach and guidance were not substantially changed. New subsections were added, for example, 3.3.4 to address component malfunctions and operator error and 4.7 to address

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other design considerations such as release of radioactivity and quality assurance. Additional guidance was provided in several areas and in some cases specific Member State practice was noted in footnotes.

Essentially all of the US Member State comments on SG-D6 were accepted or accepted with modification.

The TRC believes that the draft as modified during the subject meeting is acceptable for SAG consideration relative to recommending IAEA publication.

A comparison list of IAEA/IEC definitions (Enclosure 1) for the design area was provided for information and comment. IEC National votes expressed a strong wish for IEC and IAEA to agree on a common terminology for reactor safety systems. IEC Working Group WGA1 developed the enclosed list. In a few cases slight changes have been made to the IAEA working for clarification.

Enclosure 2 is a list of attendees at this Twentieth Meeting of the TRC on Design.

Original Signed by
James A. Norberg

James A. Norberg, Member
IAEA TRC-Design

Enclosures:
1. Comparison list
2. List of attendees

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COMPARISON LIST OF I.A.E.A. / I.E.C. DEFINITIONS

I. GENERAL DEFINITIONS

I.A.E.A. Definitions	I.E.C. Definitions
1	2
1. ACCIDENT CONDITIONS (50-C-D) Substantial deviations from Operational States which are expected to be infrequent, and which could lead to release of unacceptable quantities of radioactive materials if the relevant engineered safety features did not function as per design intent.* * A substantial deviation may be a major fuel failure, a Loss of Coolant Accident (LOCA), etc. Examples of engineered safety features are: an Emergency Core Cooling System (ECCS), and containment.	1. ACCIDENT CONDITIONS Substantial deviations from any operational state which are expected to be infrequent and which could lead to release of unacceptable quantities of radioactive materials if the relevant engineered safety features did not function as per design intent. Note: A substantial deviation may be a major fuel failure, a loss of coolant accident (LOCA*), etc. Examples of engineered safety features are an Emergency Core Cooling System (ECCS), and containment.
2. ANTICIPATED OPERATIONAL OCCURRENCES (50-C-D) All operational processes deviating from Normal Operation which are expected to occur once or several times during the life of the plant and which, in view of appropriate design provisions, do not cause any significant damage to Items Important to Safety nor lead to Accident Conditions*(see Operational States). * Examples of Anticipated Operational Occurrences are loss of normal electric power and faults such as a turbine trip, malfunction of individual items of a normally running plant, failure to function of individual items of control equipment, loss of power to main coolant pump.	2. ANTICIPATED OPERATIONAL OCCURRENCES All operational processes deviating from normal operation which are expected to occur once or several times during the operating life of the plant and which, in view of appropriate design provisions, do not cause any significant damage to items important to safety nor lead to accident conditions. (...:...) Note: Examples of anticipated operational occurrences are loss of normal electric power and faults such as a turbine trip, malfunction of individual items of a normally running plant, failure to function of individual items of control equipment, and loss of power to main coolant pump.

1	2
3. ITEMS IMPORTANT TO SAFETY The items which comprise: (1) those structures, systems, and components whose malfunction or failure could lead to undue radiation exposure of the Site Personnel or members of the public;* (2) those structures, systems and components which prevent Anticipated Operational Occurrences from leading to Accident Conditions; (3) those features which are provided to mitigate the consequences of malfunction or failure of structures, systems or components. * This includes successive barriers set up against the release of radioactivity from nuclear facilities.	3. ITEMS IMPORTANT TO SAFETY The items which comprise: (1) Those structures, systems and components whose malfunction or failure could lead to undue radiation exposure of the site personnel or members of the public. Note: This includes successive barriers set up against the release of radioactivity from nuclear facilitie (2) Those structures, systems and components that prevent anticipated operational occurrences from leading to accident conditions. (3) Those features that are provided to mitigate the consequen of malfunction or failure of structures, systems, or components. Note: Items Important to Safety include the Safety Syste and other items important to safety. These other items important to safety are all those items which if they were to fail to act, or act when not requir to act, may result in the need for action to prev undue radiation exposure of the plant personnal or members of the public. (TAKEN FROM 50-SG-D3)
4. NORMAL OPERATION (50-C-D) Operation of a Nuclear Power Plant within specified Operational Limits and Conditions including shut-down, power operation, shutting down, starting up, maintenance, testing and refuelling (see Operational States).	4. NORMAL OPERATION Operation of a nuclear power plant within specified operating limits and conditions including shut-down, power operation, shutting down, starting up, maintenance, testing and refuelling (see Operational States).
5. OPERATIONAL STATES (50-C-D) no difference	5. OPERATIONAL STATES no difference

1	2
6. PHYSICAL SEPARATION (50-C-D) (1) Separation by geometry (distance, orientation, etc.), or (2) Separation by appropriate barriers, or (3) Separation by a combination thereof.	6. PHYSICAL SEPARATION 1) Separation by geometry (distance, orientation, etc.) 2) Separation by appropriate barriers, or 3) Separation by a combination thereof.
7. PROTECTION SYSTEM (50- A system which encompasses all electrical and mechanical devices and circuitry, from sensors to actuation device input terminals, involved in generating those signals associated with the protective function. Note: The signals associated with the protective tasks are those output signals needed to initiate, manually or automatically, the actions of the safety actuation systems and the safety system support features. The protection system terminates at the input terminals of the safety actuation system and the input terminals of the safety system support features.	7. PROTECTION SYSTEM A system which encompasses all electrical and mechanical device and circuitry, from sensors to the input terminals of the safety actuating system, involved in generating the necessary signals associated with the protective tasks. Note: The signals associated with the protective tasks are those output signals needed to initiate, manually or automatically, the actions of the safety actuation systems and the safety system support features. (TAKEN FROM 50-SG-D3)
8. SAFETY SYSTEMS Systems important to Safety, provided to assure, in any condition, the safe shut-down of the reactor and the heat removal from the core, and/or to limit the consequences of Anticipated Operational Occurrences and Accident Conditions (see Anticipated Operational Occurrences and Accident Conditions). Note: Safety systems consist of the protection system, the safety actuation systems, and the safety system support features. Component of safety systems may be provided solely to perform safety functions or may perform safety functions in some plant operating states and non-safety functions in other plant operating states.	8. SAFETY SYSTEM Systems important to safety provided to assure, in any condition the safe shutdown of the reactor and the heat removal from the core and/or the limit the consequences of anticipated operational occurrences and accident conditions (see Accident Conditions and Anticipated Operational Occurrences). Note: Safety systems consist of the protection system, the safety actuation systems, and the safety system support features. Components of safety systems may be provided solely to perform safety functions or may perform safety functions in some plant operating states and non-safety functions in other plant operation states. (TAKEN FROM SG-D3)

1	2
9. SINGLE FAILURE CRITERION I.A.E.A. has no definition yet	9. SINGLE FAILURE CRITERION A Criterion applied to a system such that it is capable of performing its safety task in the presence of any single feature. (see I.E.C. publication for more complete definition)

II. SPECIFIC DEFINITIONS

10. ACTUATED EQUIPMENT (50-SG-D3) No difference	10. ACTUATED EQUIPMENT No difference
11. ACTUATION DEVICE (50-SG-D3) No difference	11. ACTUATION DEVICE No difference
12. CHANNEL (50-SG-D3) An arrangement of interconnected components within the protection system that initiates a single output signal when required by a plant condition. A channel loses its identity where single output signals are combined.	12. CHANNEL An arrangement of interconnected components within the safety system that initiates a single output, i.e. A channel loses its identity where single output signals are combined with other channels, e.g. monitoring channel, safety actuation channel.
13. COMMON CAUSE FAILURE (50-SG-D3) No difference	13. COMMON CAUSE FAILURE No difference
14. DRIVEN EQUIPMENT (50-SG-D3) No difference	14. DRIVEN DEVICE (EQUIPMENT) No difference

1	2
15. INDEPENDENT EQUIPMENT (50-SG-D3) Equipment that is independent possesses both of the following characteristics: (1) The ability to perform its required function is unaffected by the operation or failure of other equipment. (2) The ability to perform its function is unaffected by the presence of the effects resulting from the postulated initiating event for which it is required to function.	15. INDEPENDENT EQUIPMENT Equipment that is independent possess both of the following characteristics: (1) The ability to perform its required function is unaffected by the operation or failure of other <u>specified</u> equipment. (2) The ability to perform its function is unaffected by the presence of the effects resulting from the postulated initiating event for which it is required to function.
16. MAINTENANCE BYPASS (50-SG-D3) No difference	16. MAINTENANCE BYPASS No difference
17. OPERATIONAL BYPASS (50-SG-D3) An approved action or device which renders inoperable certain protective actions when they are not necessary in a particular mode of plant operation. Note: An operational bypass may be used when the protective action prevents, or might prevent reliable operation in the required mode.	17. OPERATIONAL BYPASS An approved action or a device which renders inoperable certain protective actions when they are not necessary in a particular mode of plant operation. (NO NOTE)
18. POSTULATED INITIATING EVENTS (50-SG-D2 & 50-SG-D3) Events that lead to anticipated operational occurrences and accident conditions, their credible causal failure effects and their credible combinations.* * The primary causes of postulated initiating events may be credible equipment failures and operator errors (both within and external to the nuclear power plant), Design Basis Natural Events and Design Basis External Man-Induced Events. Specification of the postulated initiating events is to be acceptable to the Regulatory Body for the nuclear power plant.	18. POSTULATED INITIATING EVENTS <u>Events such as equipment failures, operator errors, earthquakes and their consequences which are postulated as part of the design basis and which could lead to anticipated operational occurrences or accident conditions.</u>

1	2
19. PROTECTIVE ACTION (50-SG-D3)	19. PROTECTIVE ACTION
No difference	No difference
20. PROTECTIVE TASK (50-SG-D3)	20. PROTECTIVE TASK
No difference	No difference
21. SAFETY ACTION (50-SG-D3)	21. SAFETY ACTION
A single action taken by a safety actuation system.*	A single action taken by a safety actuation system e.g. insertion of control rods, or closing containment valves or operation of safety injection pumps.
* Such as insertion of control rod, closing containment valves, and operation of safety injection pumps, etc.	
22. SAFETY ACTUATION SYSTEM (50-SG-D3)	22. SAFETY ACTUATION SYSTEM
The collection of equipment required to accomplish the required safety actions when initiated by the protection system.	The collection of equipment required to accomplish the required safety actions when initiated by the protection.
23. SAFETY FUNCTION (50-SG-D3)	23. SAFETY FUNCTION
A specific purpose that must be accomplished for safety.* A list of safety functions is given in SG-D1.	A specific function of the safety systems of the type listed in SG-D1 (I.A.E.A.), "Safety Guide on Safety Functions and Component Classification for BWR, PWR and PHR" e.g. to shut down the reactor to remove residual heat. Mitigation of the consequences of each postulated initiating may require that one or more safety functions be accomplished by the protection system, the safety actuation systems, and the safety system support features.
24. SAFETY GROUP	24. SAFETY GROUP
The assembly of equipment designated to perform all actions required for a particular postulated initiating event in order that the limits specified in the design basis for the event are not exceeded.	The equipment designated to perform all actions required for a particular postulated initiating event.

1

25. SAFETY SYSTEM SUPPORT FEATURES (50-SG-D3)

The collection of equipment that provides services such as cooling, lubrication, and energy supply required by the protection system and the safety actuation systems.

26. SAFETY TASK (50-SG-D3)

The sensing of one or more variables indicative of a specific postulated initiating event, the signal processing, the initiating and completion of the safety actions required to prevent the limits specified in the design basis from being exceeded and the initiation and completion of certain services from the safety system support features.

Note: Following a postulated initiating event some required safety system support features may be initiated by the Protection System, others may be initiated by the Safety Actuation Systems they serve, while other required safety system support features may not need initiation if they were in operation at the time of the postulated initiating event.

2

25. SAFETY SYSTEMS SUPPORT FEATURES

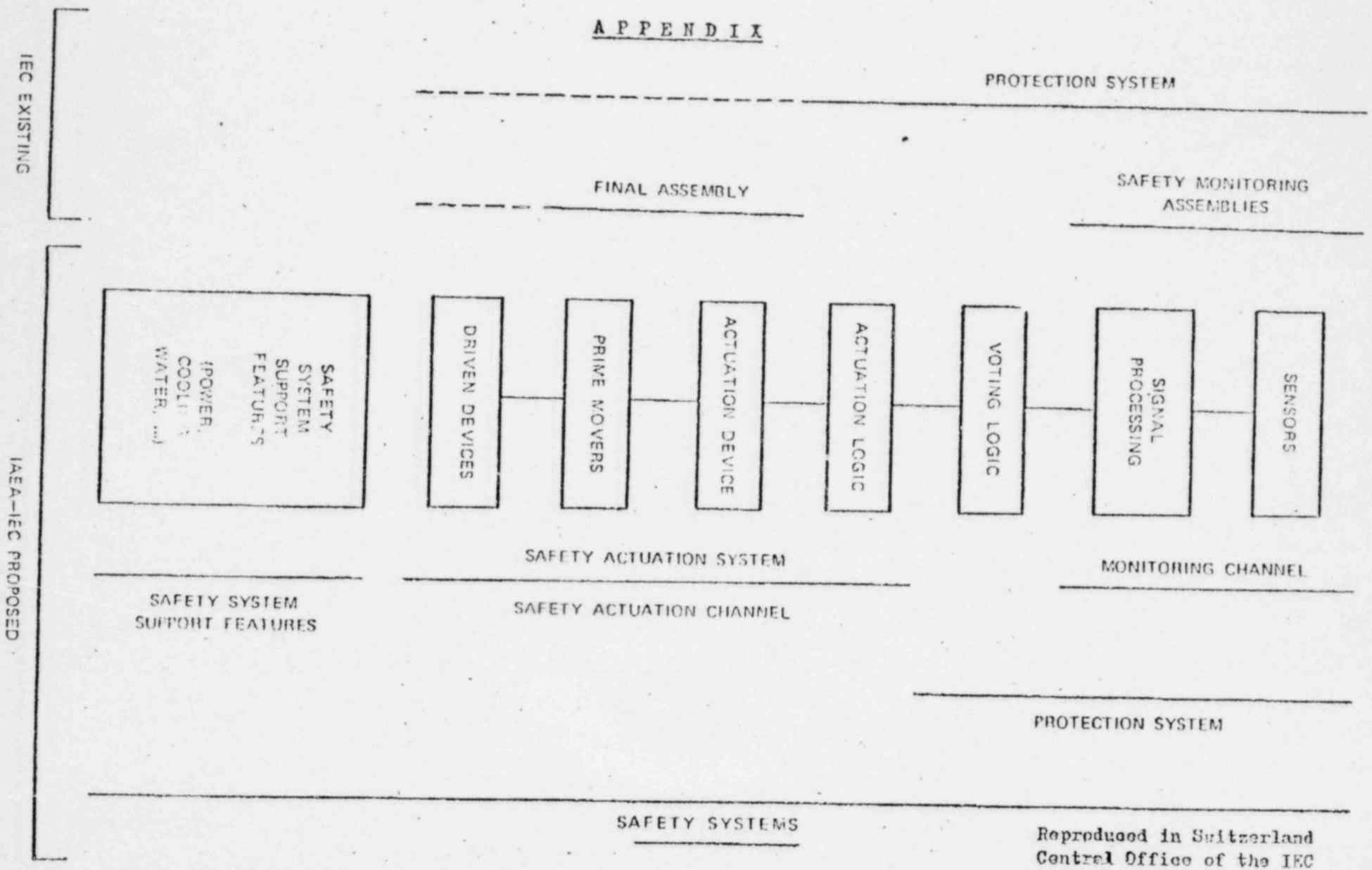
The equipment that provides services such as cooling, lubrication, and energy supply required by the protection system and the safety actuation systems.

26. SAFETY TASK

The sensing of one or more variables indicative of a specific postulated initiating event, the signal processing, the initiating and completion of the safety actions required to prevent the limits specified in the design basis from being exceeded and the initiation and completion of certain services from the safety system support features.

(NO NOTE)

APPENDIX



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Enclosure 2

Division of Nuclear Safety and Environmental Protection

Issue No. 1

TC-343

1980-02-07

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NOTIFICATION OF AN AGENCY SPONSORED MEETING

Title of the Meeting: Twentieth Meeting of the Technical Review Committee on Design

Dates, inclusive: 11 to 15 February 1980

Place: Vienna International Centre, Conference Building, Floor 7, Room VI, Ext. 1361

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