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RESOLVED SAFETY ISSUES SUMMARY

BOOK

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UNRESOLVED SAFETY ISSUES SUMMARY

AQUA BOOK

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U.S. NUCLEAR REGULATORY COMMISSION
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FOREWORD

THE "UNRESOLVED SAFETY ISSUES" SUMMARY IS DESIGNED TO PROVIDE THE MANAGEMENT OF THE NUCLEAR REGULATORY COMMISSION WITH A QUARTERLY OVERVIEW OF THE PROGRESS AND PLANS FOR COMPLETION OF GENERIC TASKS ADDRESSING "UNRESOLVED SAFETY ISSUES" REPORTED TO CONGRESS PURSUANT TO SECTION 210 OF THE ENERGY REORGANIZATION ACT OF 1974 AS AMENDED. THIS SUMMARY UTILIZES DATA COLLECTED FROM THE OFFICE OF NUCLEAR REACTOR REGULATION, OFFICE OF NUCLEAR REGULATORY RESEARCH, AND THE NATIONAL LABORATORIES AND IS PREPARED BY THE OFFICE OF RESOURCE MANAGEMENT.

THE DEFINITION OF WHAT CONSTITUTES COMPLETION OF AN UNRESOLVED SAFETY ISSUE (USI) HAS RECENTLY BEEN EXPANDED TO INCLUDE THE IMPLEMENTATION OF THE TECHNICAL RESOLUTION. THIS IS IN ACKNOWLEDGEMENT OF THE FACT THAT REAL SAFETY BENEFITS OCCUR ONLY AFTER THE IMPLEMENTATION HAS TAKEN PLACE. IMPORTANT ELEMENTS OF THIS IMPLEMENTATION PHASE ARE:

1. THE PROVISION OF A PUBLIC COMMENT PERIOD FOLLOWING THE ISSUANCE OF A DRAFT NUREG REPORT INCORPORATING THE STAFF'S TECHNICAL RESOLUTION FOLLOWED BY A DISCUSSION AND DISPOSITION OF THE COMMENTS RECEIVED IN A FINAL NUREG REPORT.
2. THE PROVISION FOR INCORPORATION OF THE TECHNICAL RESOLUTION INTO THE NRC'S REGULATIONS, STANDARD REVIEW PLAN, REGULATORY GUIDES, OR OTHER NRC OFFICIAL GUIDANCE OR REQUIREMENTS AS APPROPRIATE.
3. THE PROVISION FOR APPLICATION OF THE TECHNICAL RESOLUTION TO INDIVIDUAL OPERATING PLANTS IN THE FORM OF HARDWARE OR DESIGN CHANGES, TECHNICAL SPECIFICATION CHANGE, AND/OR CHANGE TO OPERATING PROCEDURES AS APPROPRIATE.

THE SCHEDULES IN THIS BOOK INCLUDE A MILESTONE AT THE END OF EACH ACTION PLAN WHICH REPRESENTS THE INITIATION OF THE IMPLEMENTATION PROCESS BOTH WITH RESPECT TO INCORPORATION OF THE TECHNICAL RESOLUTION IN THE NRC OFFICIAL GUIDANCE OR REQUIREMENTS AND ALSO THE APPLICATION OF CHANGES TO INDIVIDUAL OPERATING PLANTS. THE SCHEDULE FOR IMPLEMENTATION WILL NOT NORMALLY BE INCLUDED IN THE TASK ACTION PLAN(S) FOR THE RESOLUTION OF A USI SINCE THE NATURE AND EXTENT OF THE ACTIVITIES NECESSARY TO ACCOMPLISH THE IMPLEMENTATION CANNOT NORMALLY BE REASONABLY DETERMINED PRIOR TO THE DETERMINATION OF A TECHNICAL RESOLUTION. THE PROGRESS AND STATUS FOR IMPLEMENTATION OF UNRESOLVED SAFETY ISSUES FOR WHICH A TECHNICAL RESOLUTION HAS BEEN COMPLETED ARE REPORTED SPECIFICALLY IN A SEPARATE TABLE PROVIDED IN THIS SUMMARY.

KARL KNIEL, CHIEF OF THE GENERIC ISSUES BRANCH, DIVISION OF SAFETY TECHNOLOGY/NRR, IS RESPONSIBLE FOR MANAGING THE GENERIC TASKS INCLUDED IN THIS SUMMARY.

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ABBREVIATIONS

AAB:	Accident Analysis Branch (Former NRR Branch)	EEB:	Environmental Engineering Branch, Division of Engineering (NRR)
AB:	Administration Branch, Training and Administration Staff (IE)	EFPY:	Effective Full-Power Years
AC:	Alternating Current	EG&G:	Edgerton, Germeshausen & Grier
ACRS:	Advisory Committee on Reactor Safeguards	EP:	Emergency Preparedness
AD:	Assistant Director	EPRI:	Electric Power Research Institute
ADB:	Analysis and Development Branch, Division of Reactor Safety Research (RES)	EQB:	Equipment Qualification Branch, Division of Engineering (NRR)
AEB:	Accident Evaluation Branch, Division of Systems Integration (NRR)	FIN:	Financial
AEOD:	Office of the Analysis and Evaluation of Operational Data	FIRL:	Franklin Institute Research Laboratories
AIF:	Atomic Industrial Forum	FSI:	Fluid Structure Interaction
AFTS:	Action Plan Tracking System	FSTF:	Full-Scale Test Facility
ARL:	Alden Research Laboratory	FW:	Feedwater
ASB:	Auxiliary Systems Branch, Division of Systems Integration (NRR)	GB:	Geosciences Branch, Division of Engineering (NRR)
ASME:	American Society of Mechanical Engineers	GE:	General Electric
ASTM:	American Society of Testing Materials	GIB:	Generic Issues Branch, Division of Safety Technology (NRR)
ATWS:	Anticipated Transient Without Scram	HFEB:	Human Factors Engineering Branch, Division of Health, Siting and Waste Mgmt. (RES)
B&W:	Babcock and Wilco. Company	HFS:	Division of Human Factors Safety (NRR)
BNC:	Brookhaven National Conservatory	HSST:	Heavy Section Steel Technology
BNL:	Brookhaven National Laboratory	ICBR:	Instrumentation and Control Branch, Division of Facility Operations (RES)
BOP:	Balance of Plant	ICSB:	Instrumentation and Control Systems Branch, Division of Systems Integration (NRR)
BWR:	Boiling Water Reactor	IE:	Office of Inspection and Enforcement
CE:	Combustion Engineering, Incorporated	IEEE:	Institute of Electrical and Electronics Engineers
CEB:	Chemical Engineering Branch, Division of Engineering (NRR)	INEL:	Idaho Nuclear Engineering Laboratory
CFR:	Code of Federal Regulations	IREP:	Integrated Reliability Evaluation Program
CO:	Condensation Isolation	ISI:	In-Service Inspection
CP:	Construction Permit	LER:	Licensee Event Report
CPB:	Core Performance Branch, Division of Systems Integration (NRR)	LGB:	Licensing Guidance Branch, Division of Safety Technology (NRR)
CR:	Contractor Report	LLL:	Lawrence Livermore Laboratory
CRGR:	Committee for Review of Generic Requirements	LOCA:	Loss-of-Coolant Accident
CSB:	Containment Systems Branch, Division of Systems Integration (NRR)	LPP:	Lead Plant Program
DC:	Direct Current	LTP:	Long Term Program
DE:	Division of Engineering (NRR)	LWR:	Light-Water Reactor
DFO:	Division of Facility Operations (RES)	MARK I-III:	Containment Types for Boiling Water Reactors
DHFS:	Division of Human Factors Safety (NRR)	MEB:	Mechanical Engineering Branch, Division of Engineering (NRR)
DHRS:	Duquoy Heat Removal System	MEBR:	Materials Engineering Branch, Division of Engineering Technology (RES)
DL:	Division of Licensing (NRR)	MIT:	Massachusetts Institute of Technology
DOE:	U. S. Department of Energy	MMRB:	Metallurgy and Materials Branch, Division of Reactor Safety Research (RES)
DOR:	Division of Operating Reactors (Former NRR Division)	MSLB:	Main Steam Line Break
DRA:	Division of Risk Analysis (RES)	MTEB:	Materials Engineering Branch, Division of Engineering (NRR)
DSI:	Division of Systems Integration (NRR)	NDE:	Non-Destructive Examination
DSS:	Division of Systems Safety (Former NRR Division)	NREP:	Neutron Resonance Escape Probability
DST:	Division of Safety Technology (NRR)	NRL:	Naval Research Laboratory
E:	Engineering	NRR:	Office of Nuclear Reactor Regulation
EB:	Enforcement Branch, Enforcement and Investigations Staff (IE)	NSS:	Nuclear Steam System
ECC:	Emergency Core Cooling	NUREG:	Nuclear Regulation

PROGRAM OVERVIEW
PROJECTED DATES FOR ISSUING NRC STAFF REPORTS

Key:
 (1) LPP - Lead Plant Program
 (2) LTP - Long Term Program
 N/S - Not Scheduled

USI NO.	TITLE	MAY 21, 1982 AQUA BOOK	CURRENT	REMARKS
A-1,	Water Hammer	August 1, 1983	August 1, 1983	NUREG/CR-2781 was issued in July 1982. Development of a technical findings NUREG is underway. This NUREG will be used to develop recommendations to CRGR for resolution.
A-3, A-4, A-5,	Steam Generator Tube Integrity	March 30, 1983	March 30, 1983	The draft NUREG report has been reviewed by the technical branches and their comments incorporated. The report is being prepared for management review and then will be issued for public comment. The NRC has formed a Task Force to prepare proposed requirements.
A-7,	Mark I Long Term Program	Supplement- June 1, 1982	Supplement- August, 1982	This issue is considered complete since the final NUREG was issued July 1982 and confirmatory orders implementing the findings in NUREG 0661 were issued on January 13, 1981 for 22 operating BWRs with Mark I containments. However, BNL has reviewed three confirmatory issues for an SER supplement and issued a draft report for NRR review. The NRR supplement was issued August, 1982.
A-11,	Reactor Vessel Materials Toughness	October 15, 1982	October 15, 1982	NUREG-0774, Rev. 1, was completed and submitted for review. This revision addresses public comments received on the For Comment report. Issuance is expected in September 1982 thereby resolving this Unresolved Safety Issue.

PROGRAM OVERVIEW
PROJECTED DATES FOR ISSUING NRC STAFF REPORTS

USI NO.	TITLE	MAY 21, 1982 <u>AQUA BOOK</u>	<u>CURRENT</u>	<u>REMARKS</u>
A-44,	Station Blackout	October 15, 1983	October 15, 1983	Technical Assistance Contracts with ORNL and Sandia have been issued. A request for information on Diesel Generator reliability was sent to all licensees in July 1981; responses from licensees have been received. Draft contractor technical reports were provided in May 1982.
A-45,	Shutdown Decay Heat Removal Requirements	September 30, 1985	October 30, 1985	A Task Action Plan was issued on October 7, 1981, and revised on June 2, 1982. A technical assistance contract package was approved on April 9, 1982 and implemented with Sandia on May 10, 1982.
A-46,	Seismic Qualification of Equipment in Operating Plants	May 1, 1985	May 1, 1984	This program was redirected to be made compatible with the Equipment Qualification Program Plan. The final Task Action Plan has been issued. Work has been initiated on all tasks with all contractors well into their subtasks.
A-47,	Safety Implications of Control Systems	N/S	N/S	A revised draft Task Action Plan was issued in April 1982 for staff concurrence and approval. Management approval of the Task Action Plan is expected by Sept. 1982. Technical Assistance contracts have been established with ORNL and IMEL.
A-48,	Hydrogen Control Measures and Hydrogen Burns on Safety Equipment	N/S	N/S	A Task Manager has been selected. A draft Task Action Plan was issued on April 2, 1982 for NRC comments. Work has been suspended pending management decision on the scope of the TAP.
A-49,	Pressurized Thermal Shock	May 30, 1983	N/S	A-49 was designated by the Commission as an USI on December 28, 1981. The Task Action Plan was approved and issued on March 26, 1982. The draft short term position is under preparation and will be completed in September 1982.

USI'S FOR WHICH TECHNICAL RESOLUTION IS COMPLETE

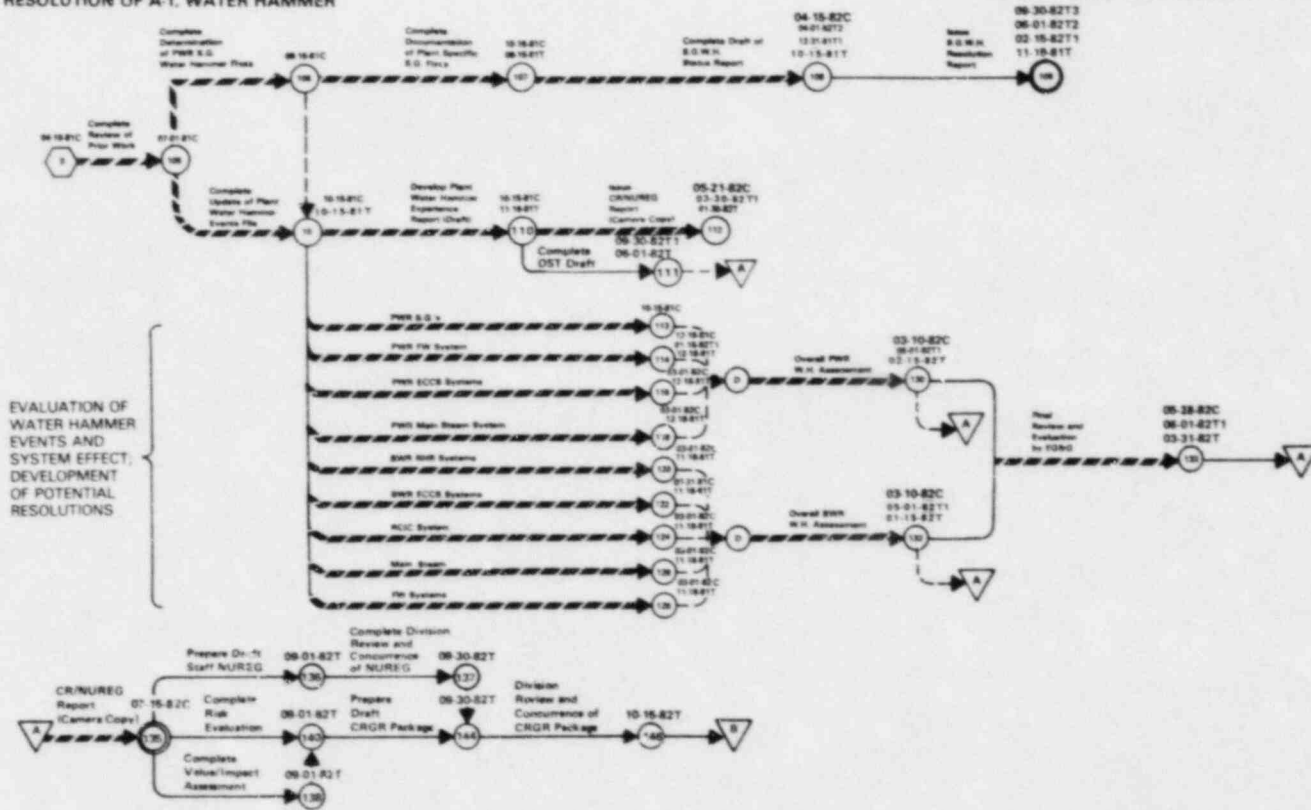
<u>USI NO.</u>	<u>TITLE</u>	<u>DATE COMPLETED</u>	<u>REPORTS PUBLISHED</u>	<u>IMPLEMENTATION STATUS</u>	<u>IMPLEMENTATION TASK MANAGER/ TELEPHONE</u>
A-7,	MARK I LONG TERM PROGRAM	JULY 1980 AUGUST 1982	NUREG-0661 NUREG-0661, SUPPL. No. 1	LICENSEES ARE IN THE PROCESS OF DESIGNING AND INSTALLING MODIFICATIONS TO MEET THE COMMISSION'S ORDER DATE FOR EACH OPERATING PLANT. THE LICENSEES ARE IN THE PROCESS OF PREPARING PLANT-UNIQUE ANALYSIS FOR SUBMITTAL TO THE STAFF FOR POST IMPLEMENTATION AUDIT REVIEW FOR COMPLIANCE WITH THE ACCEPTANCE CRITERIA CONTAINED IN APPENDIX A TO NUREG-0661. THREE LICENSEES/APPLICANTS HAVE SUBMITTED THEIR PLANT UNIQUE ANALYSIS TO DATE.	BYRON SIEGEL 492-7534
A-8,	MARK II CONTAINMENT POOL DYNAMIC LOADS	AUGUST 1981	NUREG-0808	THE REQUIREMENTS RECOMMENDED IN NUREG-0808 ARE BEING IMPLEMENTED DURING THE OPERATING LICENSE REVIEW FOR EACH PLANT WITH A MARK II CONTAINMENT. THESE REQUIREMENTS WILL ALSO BE INCLUDED AS AN ADDITION TO THE APPROPRIATE SECTION OF THE STANDARD REVIEW PLAN.	
A-9,	ATWS	SEPT. 1980	NUREG 0460, VOL. 4 46FR57521	TWO VERSIONS OF THE PROPOSED ATWS RULE HAVE BEEN ISSUED FOR COMMENT; THE STAFF VERSION AND AN ALTERNATE VERSION OF THE RULE PREPARED AT THE DIRECTION OF COMMISSIONER HENDRIE. FOLLOWING THE COMMENT PERIOD AND CONSIDERATION OF PUBLIC COMMENTS, A FINAL RULE WILL BE PREPARED FOR COMMISSION CONSIDERATION. A TASK FORCE HAS BEEN ASSIGNED TO FORM A BASIS FOR THE FINAL RULE.	DAVID PYATT, RES 443-5960

USI'S FOR WHICH TECHNICAL RESOLUTION IS COMPLETE

<u>USI NO.</u>	<u>TITLE</u>	<u>DATE COMPLETED</u>	<u>REPORTS PUBLISHED</u>	<u>IMPLEMENTATION STATUS</u>	<u>IMPLEMENTATION TASK MANAGER/ TELEPHONE</u>
A-31.	RESIDUAL HEAT REMOVAL REQUIREMENTS	1978	NO FORMAL REPORT SRP 5.4.7 REVISION	RRRC APPROVED IMPLEMENTATION PLAN JANUARY 31, 1978. IMPLEMENTATION FOR OPERATING REACTORS NOT COMPLETE.	TOM NOVAK 492-7817
A-36.	CONTROL OF HEAVY LOADS NEAR SPENT FUEL	JULY 1980	NUREG-0612	IMPLEMENTATION REQUIREMENTS WERE ISSUED TO ALL LICENSEES BY LETTER DATED DECEMBER 22, 1980. THE LETTER REQUESTED: INTERIM ACTIONS TO BE COMPLETED IN 90 DAYS, A PHASE I ACTION (REPORT, CONFIRMATION AND JUSTIFICATION) IN SIX MONTHS AND PHASE II (SPECIFIC REQUIREMENTS) IN NINE MONTHS. MOST LICENSEES HAVE RESPONDED TO THE DECEMBER 22, 1980 GENERIC LETTER AND THEIR RESPONSES ARE BEING EVALUATED. ABOUT NINE PLANTS HAVE REQUESTED EXTENSIONS TO THE SEPTEMBER 22, 1981 RESPONSE DATE. SEVERAL PLANTS HAVE NOT YET ADEQUATELY RESPONDED TO THE EXTENT THAT AN EVALUATION MAY BE COMPLETED.	BUD REQUA 492-7877
A-42.	PIPE CRACKS IN BOILING WATER REACTORS	JULY 1980	NUREG-0313 REV. 1	IN FEBRUARY 1981, NUREG-0313, REV. 1 WAS ISSUED TO ALL HOLDERS OF BWR OPERATING LICENSES OR CONSTRUCTION PERMITS AND TO ALL APPLICANTS FOR OPERATING LICENSES. BY JULY 1, 1981, THE APPLICANTS/LICENSEES WERE TO PROVIDE THEIR PROGRAM FOR REPLACEMENT OF SERVICE SENSITIVE LINES AND WELDS, THEIR PROGRAM FOR AUGMENTED INSERVICE INSPECTION, THEIR PROGRAM FOR IMPROVING THE WATER CHEMISTRY ENVIRONMENT AND INCORPORATION OF ADEQUATE LEAK DETECTION CAPABILITY. ALL LICENSEES BUT ONE HAVE RESPONDED AND THEIR REPLIES ARE BEING EVALUATED BY A TECHNICAL SUPPORT CONTRACTOR (INEL). INITIAL TESTS ARE SCHEDULED TO BE COMPLETED IN THE FIRST AND SECOND QUARTERS OF FY83.	DICK CLARK 492-7162

**TASK 2.0
RESOLUTION OF A-1. WATER HAMMER**

WATER HAMMER (A-1)



WATER HAMMER (A-1) Continued



TASK 1 REPORTS

NUREG-0682, "Water Hammer in Nuclear Power Plants" #July 1979
 Chapman, R.L., "Water Hammer Studies," EG&G Interim Rpt., CAAP-TR-063 (Rev. 1), August 1980 (Prepared for NRC Use)
 #NUREG/CR-2058, "Comparative Analysis of Actual and Suspected Water Hammer Events in Nuclear Power Plants," May 1982.

TASK 2 REPORT

#NUREG/CR-2781, "Evaluation of Water Hammer Events in Light Water Reactor Plants," July 1982.

TASK 4.1 REPORT

Chapman, R.L., et al., "Review and Evaluation of Actual and Potential Water Hammer Events in Nuclear Plants," EG&G Interim Rpt., CAAP-TR-042 (Rev. 1), September 1979 (Prepared for NRC Use)

TASK 4.2 REPORT

Watkins, J.C., Berry, R.A., "A State-of-the-Art Literature Review of Water Hammer," EG&G Interim Rpt., RE-A-79-044, April 1979 (Prepared for NRC Use)

TASK 4.3 REPORT

Saha, P., et al., "An Evaluation of Condensation-Induced Water Hammer in Pressurized Steam Generators," NUREG/CR-1606, September 1980

TASK 4.4 REPORTS

Williamson, R.L., "An Analysis Tool for Predicting the Transient Hydrodynamics Resulting from the Rapid Filling of Vented Piping Systems," EG&G Interim Rpt., RE-E-79-009, February 1979 (Prepared for NRC Internal Use)

Morton, D.K., "An Analytical Procedure for Performing Structural Analyses of Nuclear Piping Systems Subjected to Fluid Transients," EG&G Interim Rpt., RE-E-79-013, February (Prepared for NRC Internal Use)

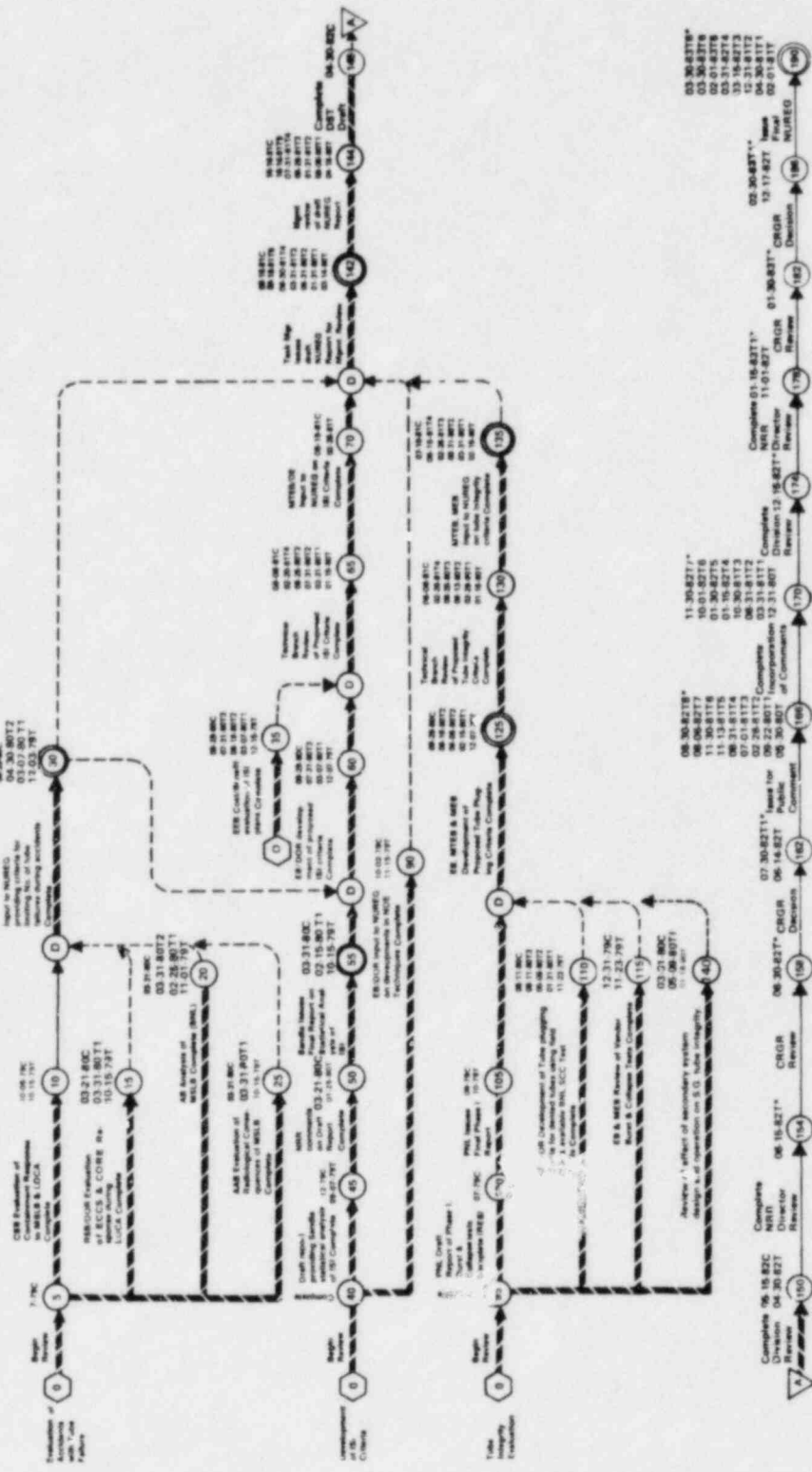
Dennis, P.N., "An Investigation of the Steam Void Collapse Water Hammer Initiating Mechanism," EG&G Interim Rpt., RE-A-79-229, February 1979 (Prepared for NRC Internal Use)

Berry, R.A., "An Analysis Tool for Predicting Transient Hydrodynamics in Nuclear Piping Systems Containing Swing Check Valves," EG&G Rpt., RE-A-79-261 (Rev. 2), September 1979 (Prepared for NRC Internal Use)

TASK 4.5 REPORT

Saffell, S.F., "Supplemental Water Hammer Analysis and System Review," EG&G preliminary Rpt., EGG-CAAP-5133, July 1982 (Prepared for NRC for Use as a Preliminary or Working Document)

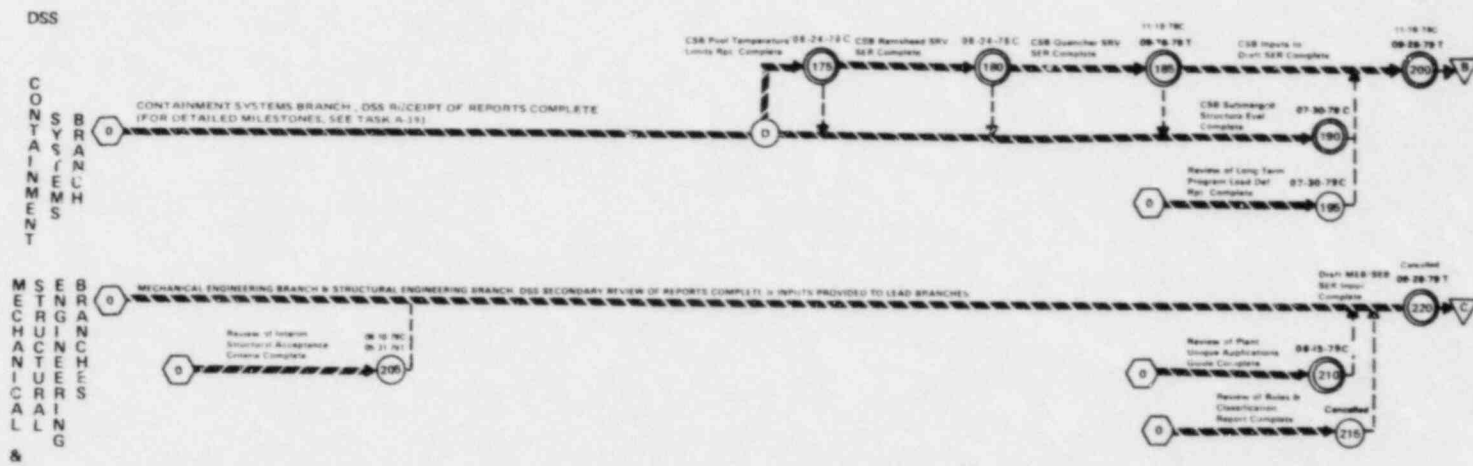
WEST.. CE & B&W STEAM GENERATOR TUBE INTEGRITY (A-3, A-4, & A-5)



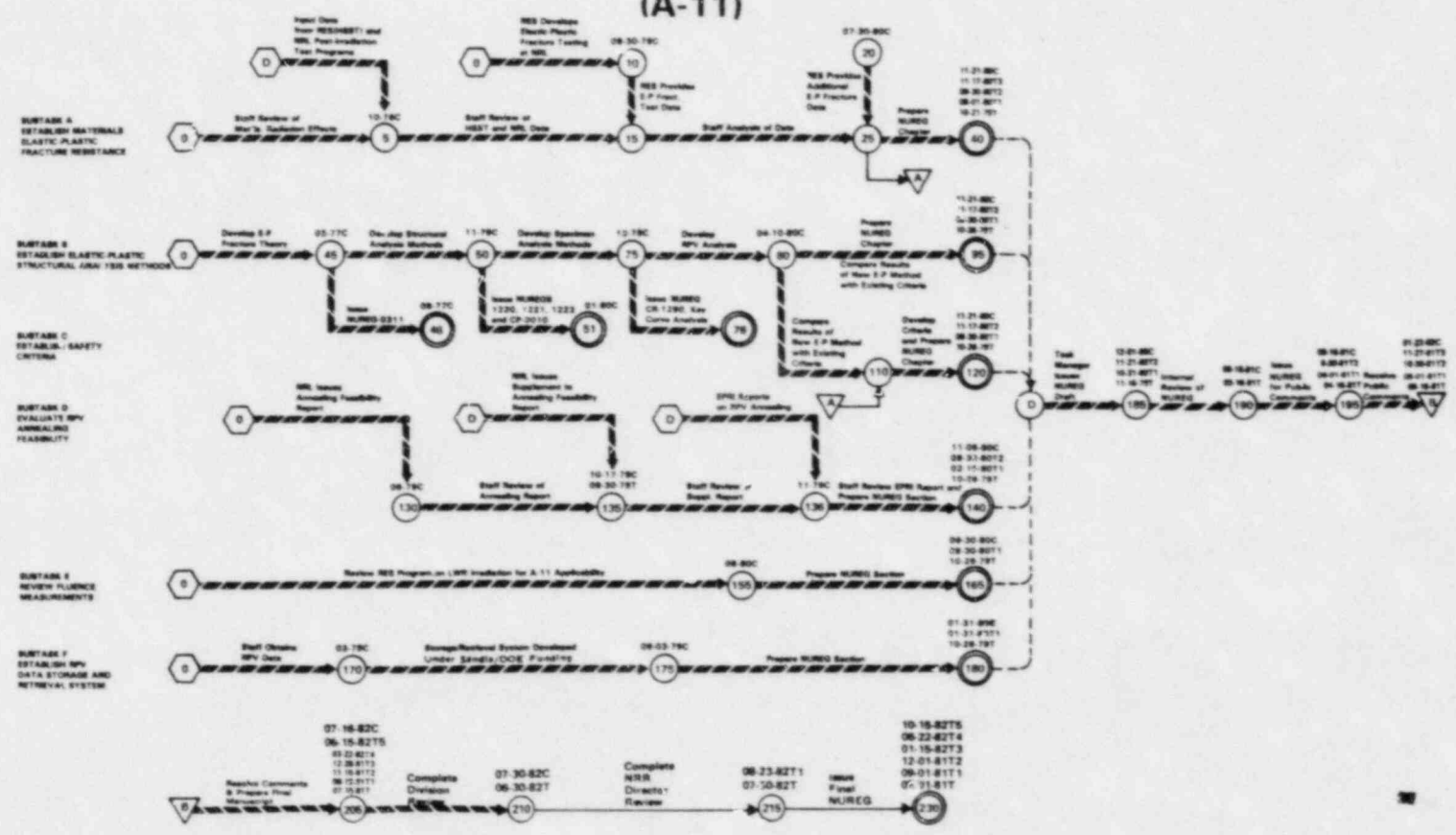
*SUCCEEDED BY TASK FORCE REPORT - SEE STATUS SUMMARY

MARK I CONTAINMENT LONG-TERM PROGRAM (A-7)

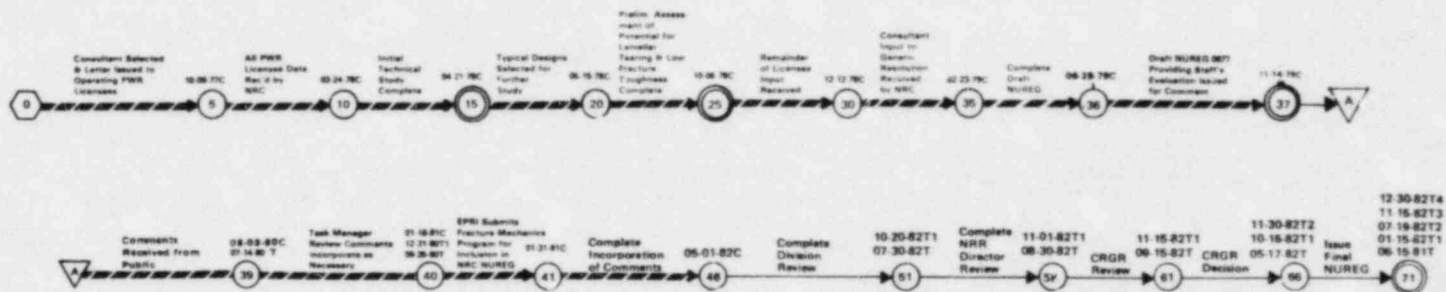
Page 3



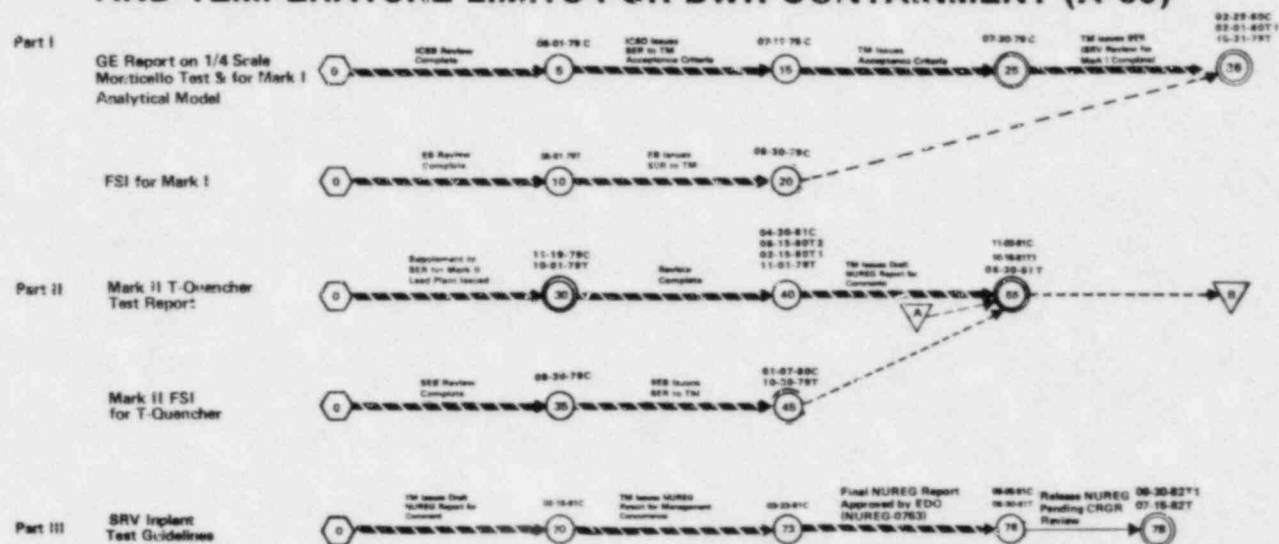
REACTOR VESSEL MATERIALS TOUGHNESS (A-11)



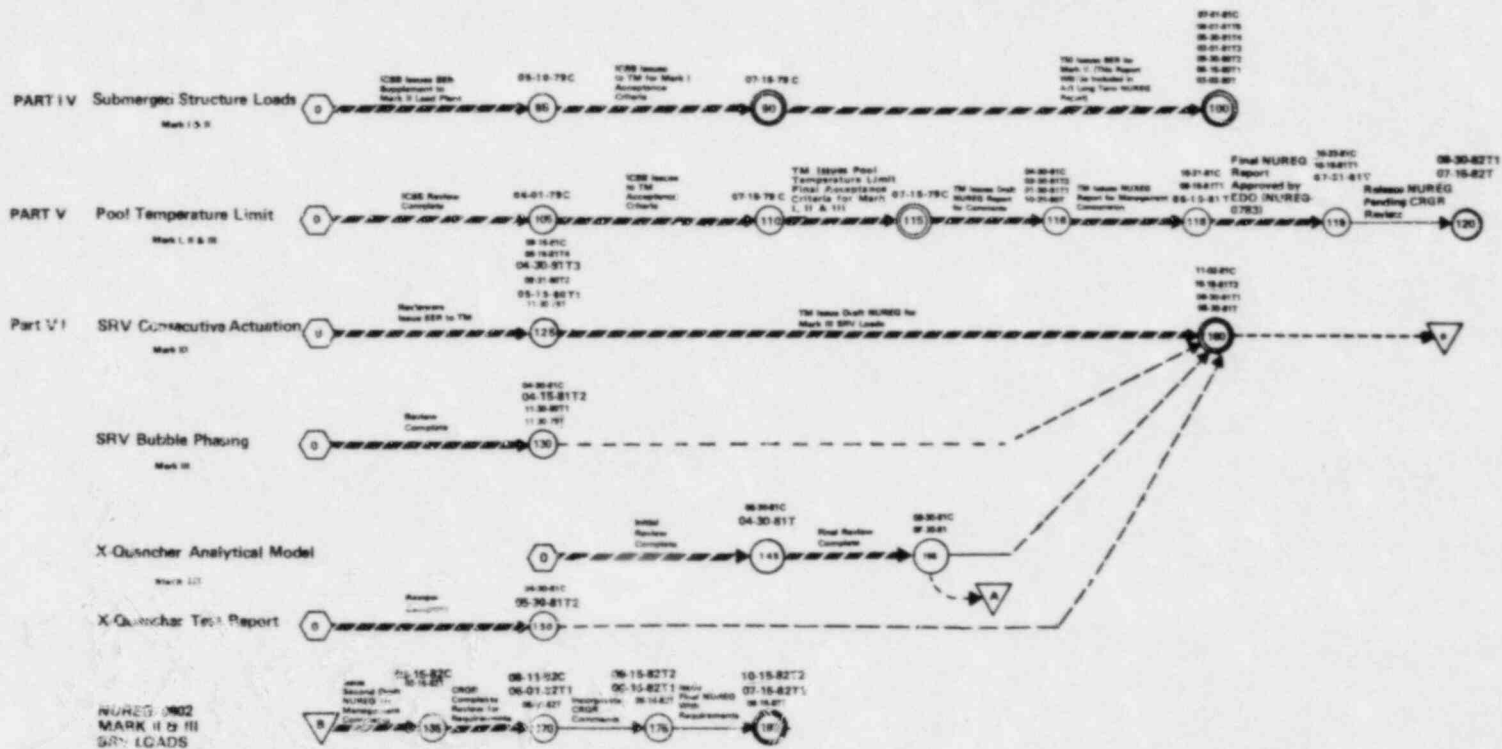
FRACTURE TOUGHNESS OF STEAM GENERATOR AND REACTOR COOLANT PUMP SUPPORTS (A-12)



DETERMINATION OF SAFETY RELIEF VALVE (SRV) PCOL DYNAMIC LOADS AND TEMPERATURE LIMITS FOR BWR CONTAINMENT (A-39)

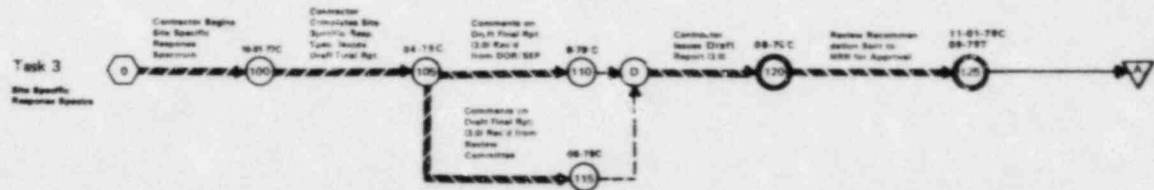
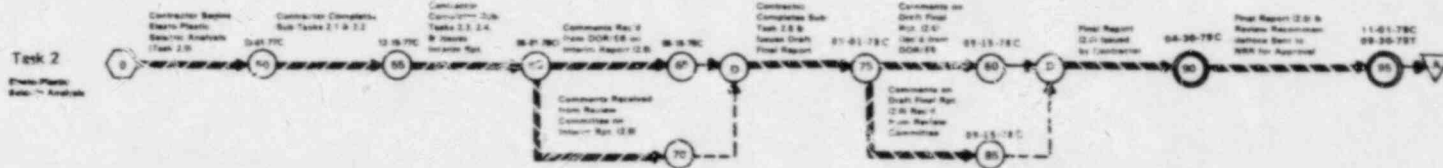
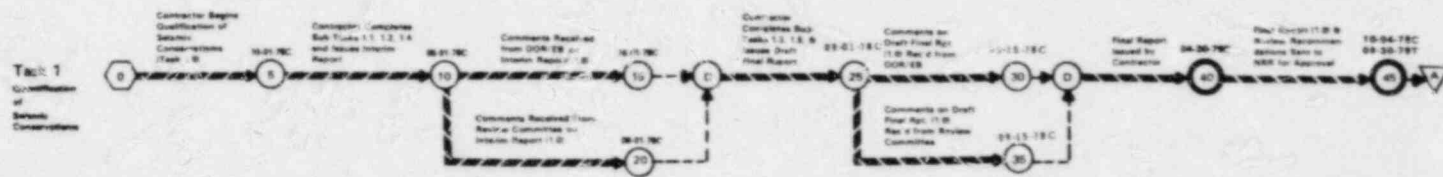


DETERMINATION OF SAFETY RELIEF VALVE (SRV) POOL DYNAMICS LOADS AND TEMPERATURE LIMITS FOR BWR CONTAINMENT (A-39) Continued



SEISMIC DESIGN CRITERIA - SHORT TERM PROGRAM (A-40)

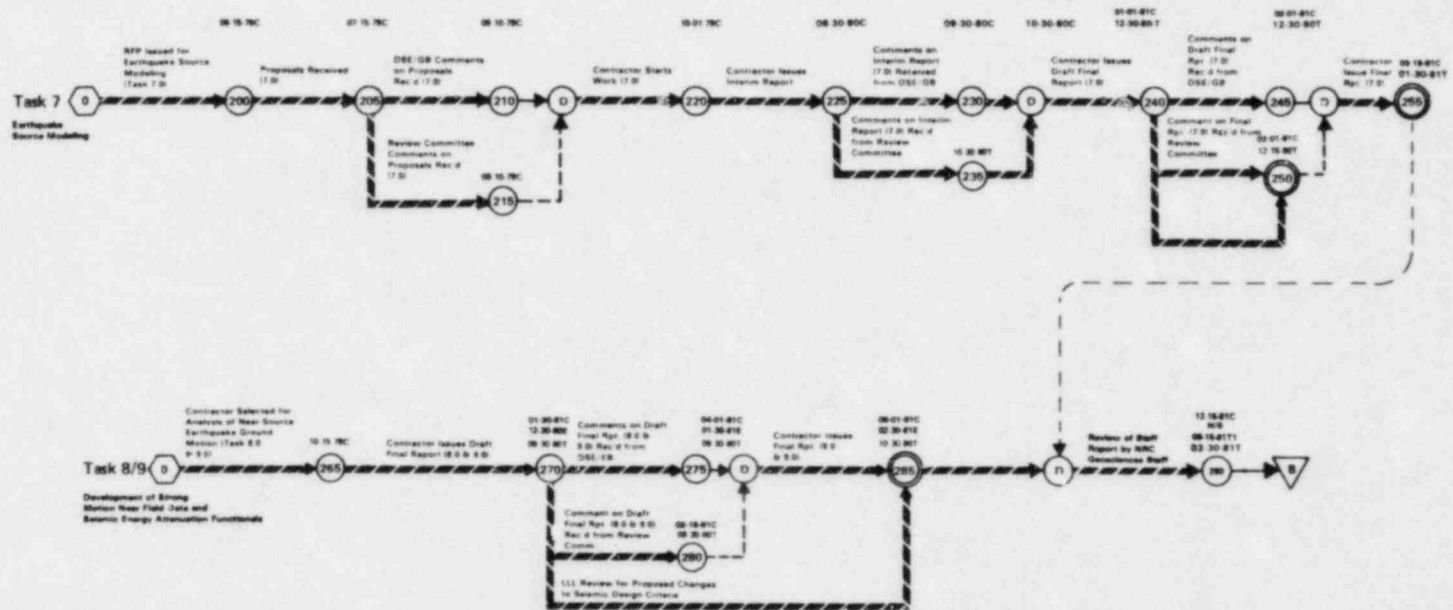
Phase 1



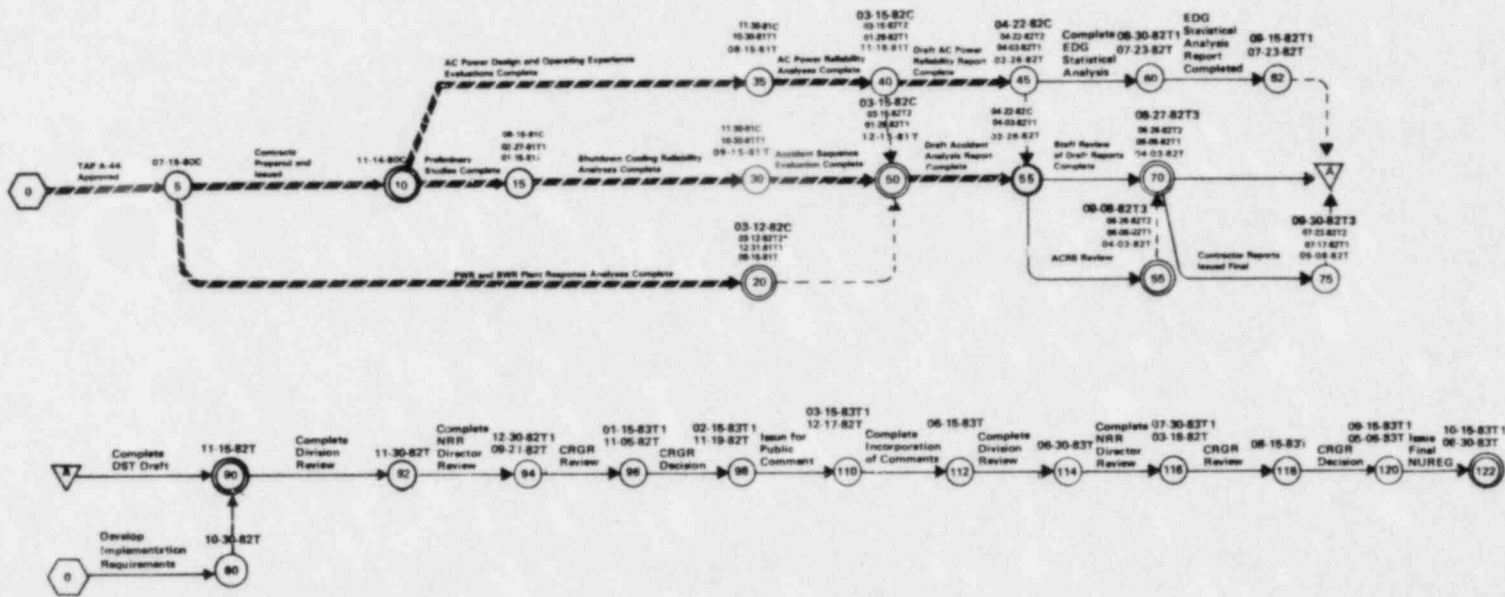
Task 4 Deleted
Seismic After Shock

Phase 2

SEISMIC DESIGN CRITERIA - SHORT TERM PROGRAM (A-40)

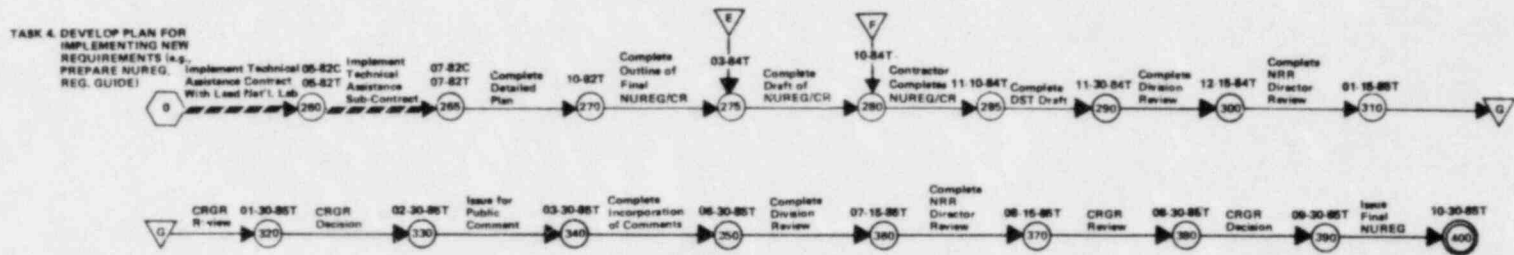


STATION BLACKOUT (A-44)

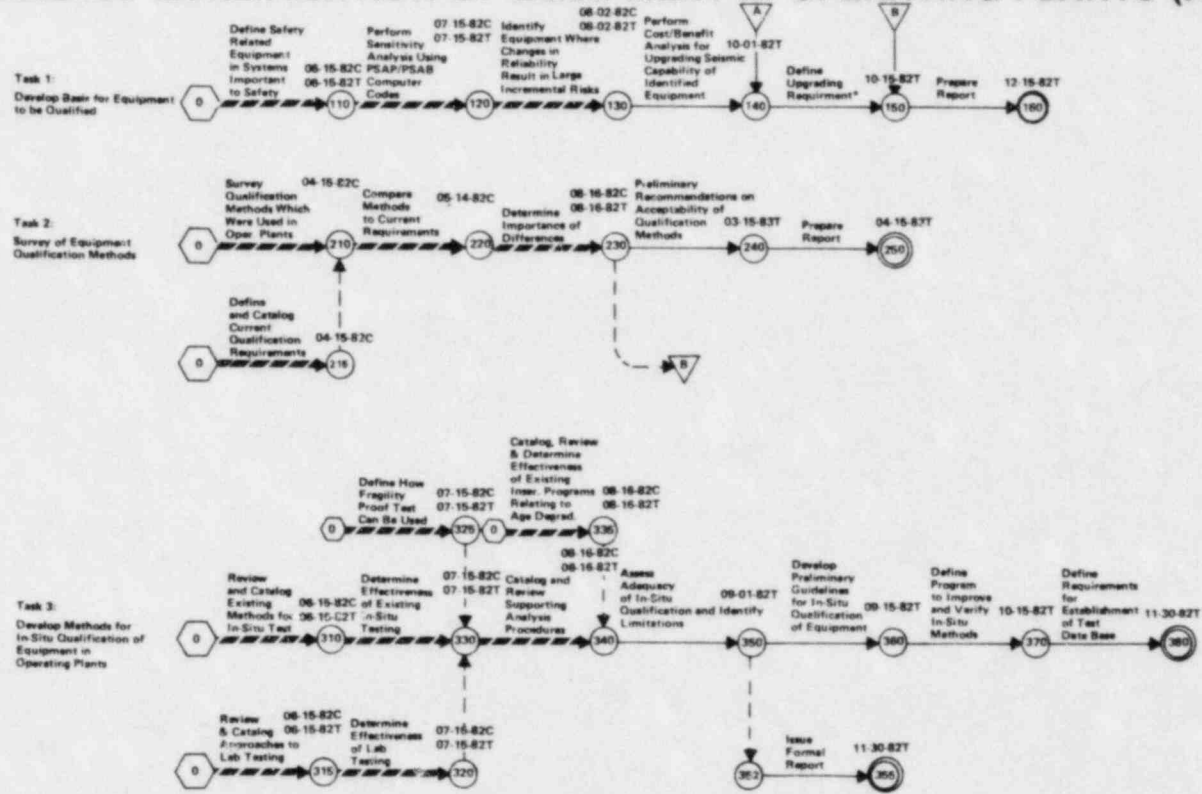


*Preliminary analysis completed 8/81

SHUTDOWN DECAY HEAT REMOVAL REQUIREMENTS (A-45) (CONTINUED) PRELIMINARY NETWORK

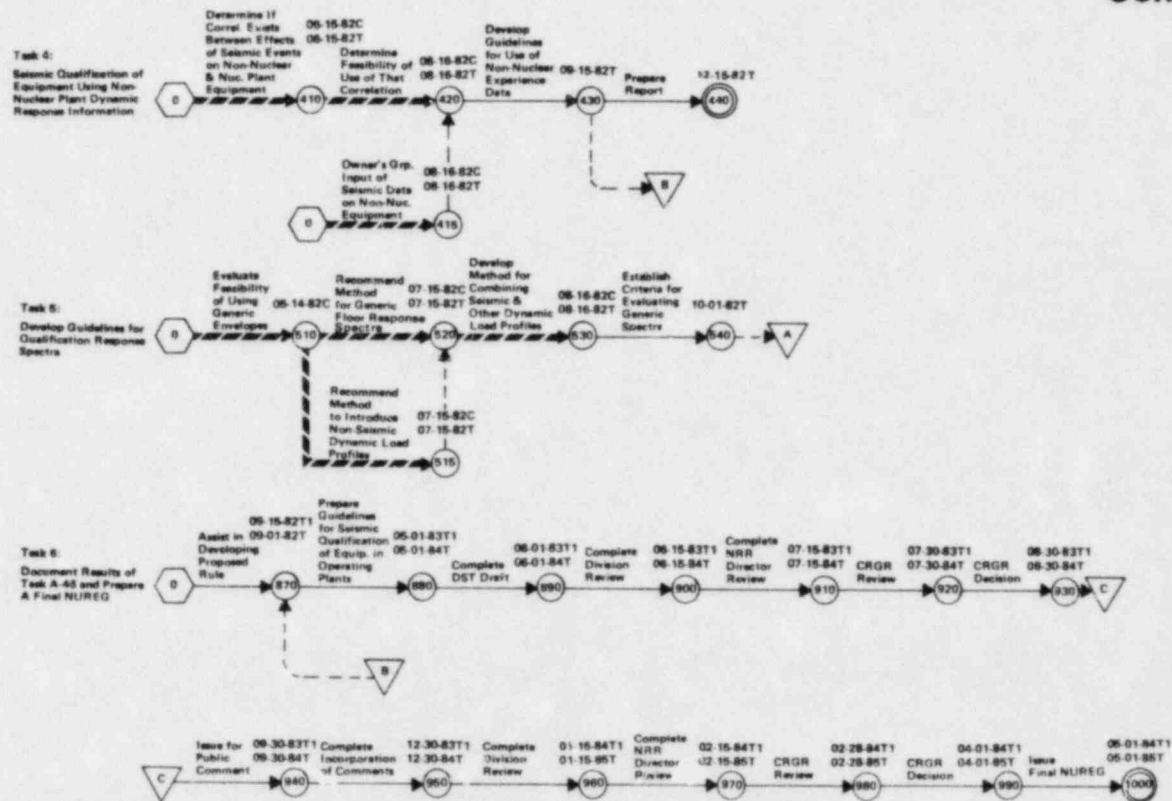


SEISMIC QUALIFICATION OF EQUIPMENT IN OPERATING PLANTS (A-46)

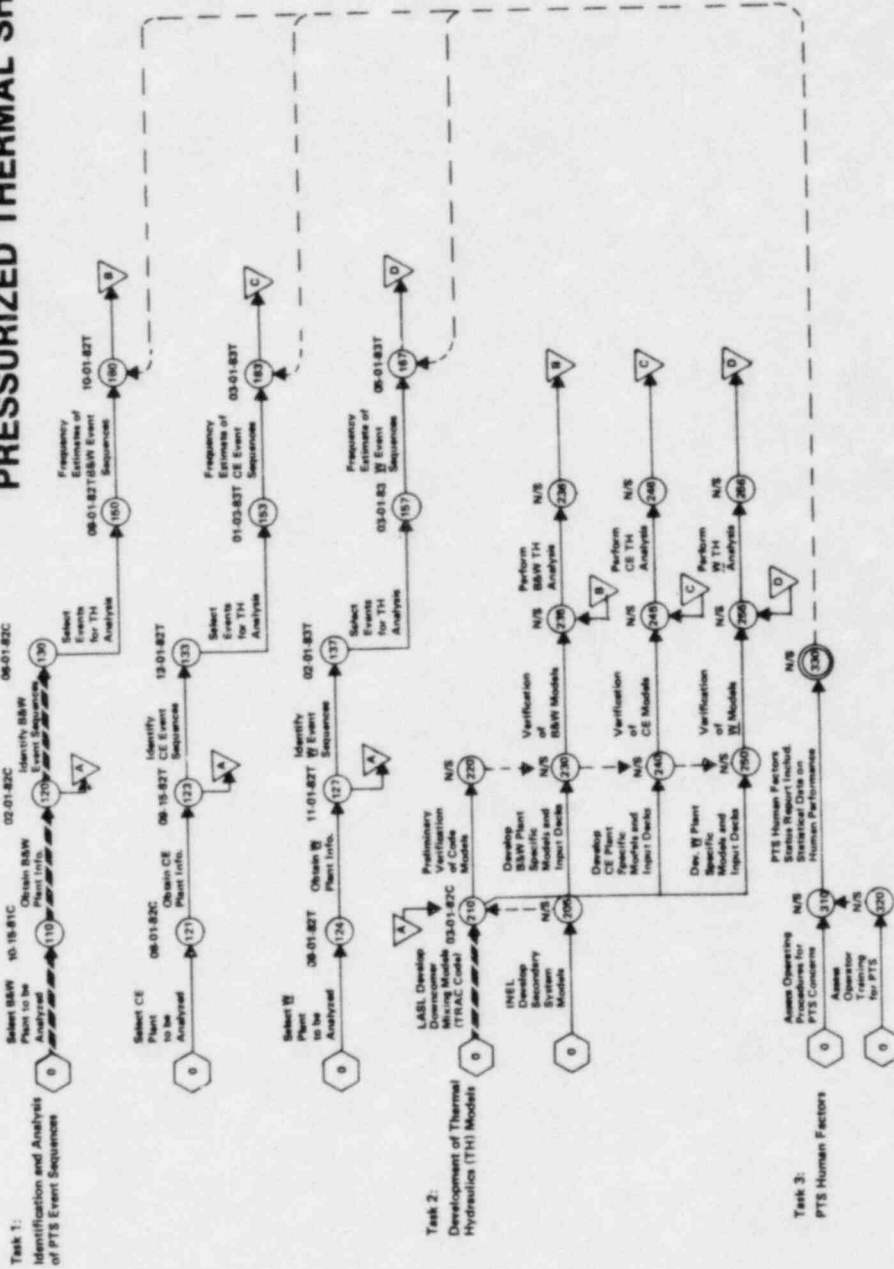


*Required Upgrading: (1) Upgrade None, (2) Upgrade High Risk Only, (3) Upgrade All.

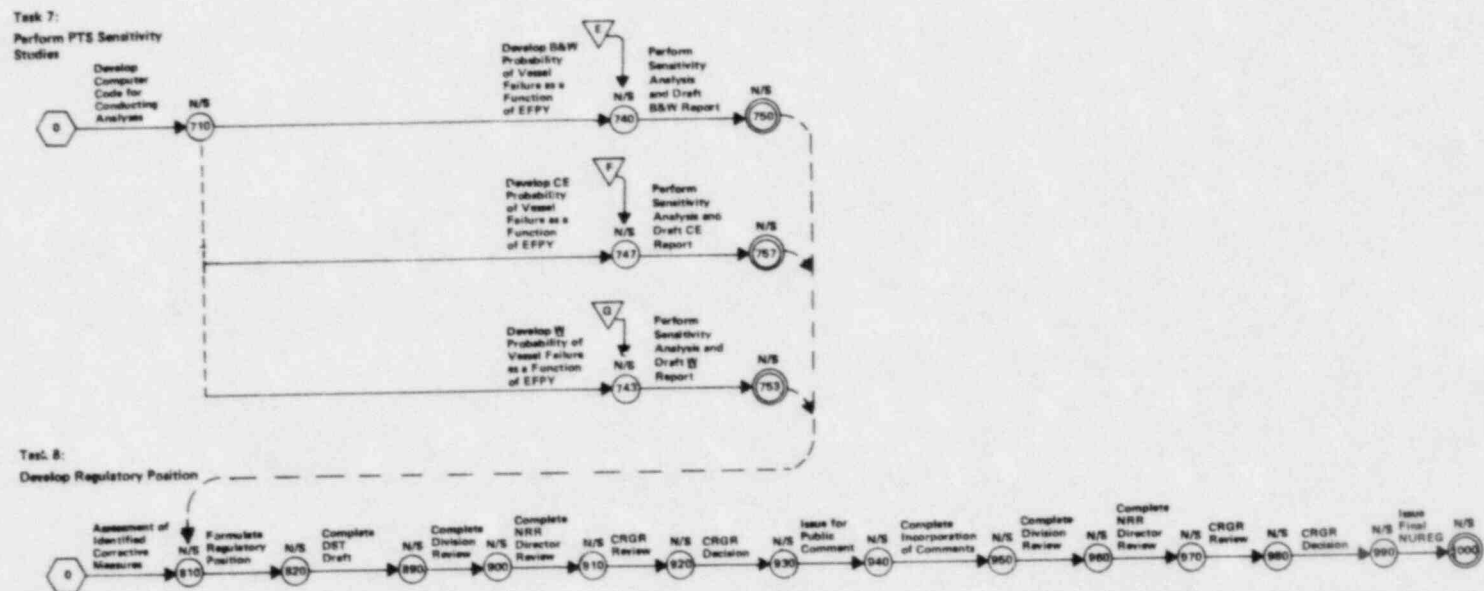
SEISMIC QUALIFICATION OF EQUIPMENT IN OPERATING PLANTS (A-46) Continued



PRESSURIZED THERMAL SHOCK (A-49)



PRESSURIZED THERMAL SHOCK (A-49) Continued



NRC FORM 335 <small>(2-77)</small> U.S. NUCLEAR REGULATORY COMMISSION BIBLIOGRAPHIC DATA SHEET		1. REPORT NUMBER (Assigned by DDC) NUREG-0605, Vol. 4, No. 3	
4. TITLE AND SUBTITLE (Add Volume No., if appropriate) Unresolved Safety Issues Summary (Aqua Book)		2. (Leave blank)	
7. AUTHOR(S)		3. RECIPIENT'S ACCESSION NO.	
9. PERFORMING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code) Office of Resource Management Management Information Branch U. S. Nuclear Regulatory Commission Washington, D.C. 20555		5. DATE REPORT COMPLETED MONTH YEAR August 1982	
12. SPONSORING ORGANIZATION NAME AND MAILING ADDRESS (Include Zip Code) Office of Resource Management Management Information Branch U. S. Nuclear Regulatory Commission Washington, D.C. 20555		6. (Leave blank)	
13. TYPE OF REPORT		7. DATE REPORT ISSUED MONTH YEAR September 1982	
PERIOD COVERED (Inclusive dates) May 21, 1982 - August 20, 1982		8. (Leave blank)	
15. SUPPLEMENTARY NOTES		10. PROJECT TASK WORK UNIT NO.	
16. ABSTRACT (200 words or less) Provide an overview of the status of the progress and plans for resolution of the generic tasks addressing "Unresolved Safety Issues" as reported to Congress.		11. CONTRACT NO.	
17. KEY WORDS AND DOCUMENT ANALYSIS		14. (Leave blank)	
17a. IDENTIFIERS OPEN ENDED TERMS		17b. DESCRIPTORS	
18. AVAILABILITY STATEMENT Unlimited		Unclassified	
		Unclassified	