



HTGR



LICENSING PLAN FOR THE STANDARD HTGR

AUTHORS/CONTRACTORS

BECHTEL GROUP, INC.
COMBUSTION ENGINEERING, INC.
DEPARTMENT OF ENERGY
GA TECHNOLOGIES, INC.
GAS-COOLED REACTOR ASSOCIATES
GENERAL ELECTRIC COMPANY
OAK RIDGE NATIONAL LABORATORY
STONE & WEBSTER ENGINEERING CORP.

ISSUED BY GAS-COOLED REACTOR ASSOCIATES
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LICENSING PLAN

for the

STANDARD HTGR

DRAFT

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LIST OF ACRONYMS

ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
BOP	BALANCE OF PLANT
CFR	CODE OF FEDERAL REGULATIONS
COL	COMBINED CONSTRUCTION/OPERATING LICENSE
DOE	DEPARTMENT OF ENERGY
DEIS	DRAFT ENVIRONMENTAL IMPACT STATEMENT
ER	ENVIRONMENTAL REPORT
FDA	FINAL DESIGN APPROVAL
FEIS	FINAL ENVIRONMENTAL IMPACT STATEMENT
FSSAR	FINAL STANDARD SAFETY ANALYSIS REPORT
GCRA	GAS-COOLED REACTOR ASSOCIATES
HTGR	HIGH TEMPERATURE GAS COOLED REACTOR
IEEE	INSTITUTE OF ELECTRICAL ELECTRONICS ENGINEERS
INPO	INSTITUTE FOR NUCLEAR POWER OPERATORS
LBE	LICENSING BASIS EVENT
LWA	LIMITED WORK AUTHORIZATION
LWR	LIGHT WATER REACTOR
NRC	NUCLEAR REGULATORY COMMISSION
NSSS	NUCLEAR STEAM SUPPLY SYSTEM
NUREG	NUCLEAR REGULATORY DOCUMENT
OPDS	OVERALL PLANT DESIGN SPECIFICATION
PDA	PRELIMINARY DESIGN APPROVAL
PRA	PROBABILISTIC RISK ASSESSMENT
PSID	PRELIMINARY SAFETY INFORMATION DOCUMENT
PSSAR	PRELIMINARY STANDARD SAFETY ANALYSIS REPORT
SER	SAFETY EVALUATION REPORT
SDD	SYSTEM DESIGN DESCRIPTION
SSC	SYSTEMS, STRUCTURES AND COMPONENTS

1.0 INTRODUCTION

The purpose of the HTGR Licensing Plan, herein referred to as the Plan, is to identify the licensing related activities, administrative process, organizational responsibilities, and schedule necessary to support a U. S. Nuclear Regulatory Commission (NRC) review and approval of an advanced Standard HTGR Design. The overall Plan objective, scope, approach and activities are summarized below.

1.1 OBJECTIVE

The objective of this Plan is to assure that necessary licensing activities are identified, planned and executed to a degree sufficient for the NRC to formally issue a Final Design Approval and publication of a rule for the Standard HTGR Design.

1.2 SCOPE

The scope of the Plan is limited to those licensing activities which result in the issuance of a Standard HTGR Design Approval and publication of a rule by the U.S. NRC; it does not include activities which are primarily related to the licensing of a specific HTGR power plant or power plant site. The scope excludes licensing activities related to the Fort St. Vrain HTGR plant owned and operated by the Public Service Company of Colorado. However, the plan will include

utilization of pertinent operating experience and lessons learned from Fort St. Vrain, LWRs and foreign gas-cooled reactors in the identification and proposed resolution of safety issues.

The temporal scope of the Plan therefore includes activities commencing with GFY 1985 and concluding with the receipt of a Final Design Approval and publication of a rule.

1.3 APPROACH

The overall approach of the Plan is to deal with both the procedural and technical requirements related to HTGR licensing consistent with the scope of section 1.2 above and as identified below.

1.3.1 Procedural Approach

During the preapplication period (which concludes with the completion of the conceptual design phase of the HTGR Program), the procedural approach will be guided by the Advanced Reactor Policy statement (1) under consideration by NRC. In general, this guidance "encourages the earliest possible applicant, vendor and NRC interaction to provide for more effective regulation of advanced reactors."

During the application period (which will follow after the completion of the conceptual design), the administrative and procedural

requirements identified in Title 10 to the Code of Federal Regulations (CFRs) will be followed. Licensing experience resulting from the NRC review of Fort St. Vrain, the proposed Summit and Fulton plants, the gas-cooled breeder reactor conceptual design and, more specifically, standard design reviews via the GASSAR (a standard HTGR design proposed by GA), CESSAR (a standard PWR design proposed by CE), GESSAR (a standard BWR design proposed by GE) and the Floating Nuclear Plant application (a standard barge mounted PWR design proposed by Westinghouse-Offshore Power Systems) will be utilized as appropriate.

1.3.2 Technical Approach

The technical approach to the licensing of the advanced HTGR design will be consistent with the following goal:

Operation of the plant, including mishaps, will not restrict the normal day-to-day activities of the surrounding public. Risks from any mishaps will be less than those occurring at commonly accepted industrial activities.

Requirements consistent with the above goal will be developed using the "Integrated Approach" (2). The Integrated Approach will be used to provide a systematic ordering of the functions and requirements necessary to achieve four comprehensive goals which are:

- 1) Maintain Safe Plant Operation
- 2) Maintain Plant Protection

- 3) Maintain Control of Radionuclide Release
- 4) Maintain Emergency Preparedness

The Integrated Approach provides a comprehensive, systematic method for the design of safe, reliable nuclear power plants. This approach will be utilized for the HTGR and will, as the first step, provide the starting point for regulatory discussions and evaluations. The second step in the Licensing Approach is the specification of and agreement on top-level regulatory criteria. Examples of top-level criteria are the dose criteria of 10CFR100 and the NRC's Interim Safety Goals. The third step is the development of a bridging method, between the top-level criteria, the Integrated Approach, and plant licensing bases. Such "bridging" methods will be identified and scheduled as part of the Plan.

1.4 LICENSING ACTIVITIES

For planning purposes, all licensing activities within the scope of this Plan will be accomplished within two periods, namely the Preapplication and Application periods.

1.4.1 Preapplication Activities

Preapplication period licensing activities will start in GFY 1985 and have as an objective the issuance of an NRC Licensability Statement on the Standard HTGR Design.

1.4.2 Application Activities

Application period activities will begin with the preparation of a Standard Safety Analysis Report (SSAR) and have as an objective the issue of a Final Design Approval and publishing of a rule for the Standard HTGR Design.

1.5 SCHEDULE

Figure 1-1 displays the overall licensing schedule against U.S. government fiscal years for the Plan and identifies logical interfaces to the HTGR Program schedule. The top two bars in the figure display the major elements of this Plan. The bottom bar displays critical program milestones. Major interfaces and dates assumed for planning purposes between the two are listed below:

Licensing Plan

Date

Milestone

Program

Milestone

PSID Submittal

Complete Design to Support 9/86

PSID Submittal

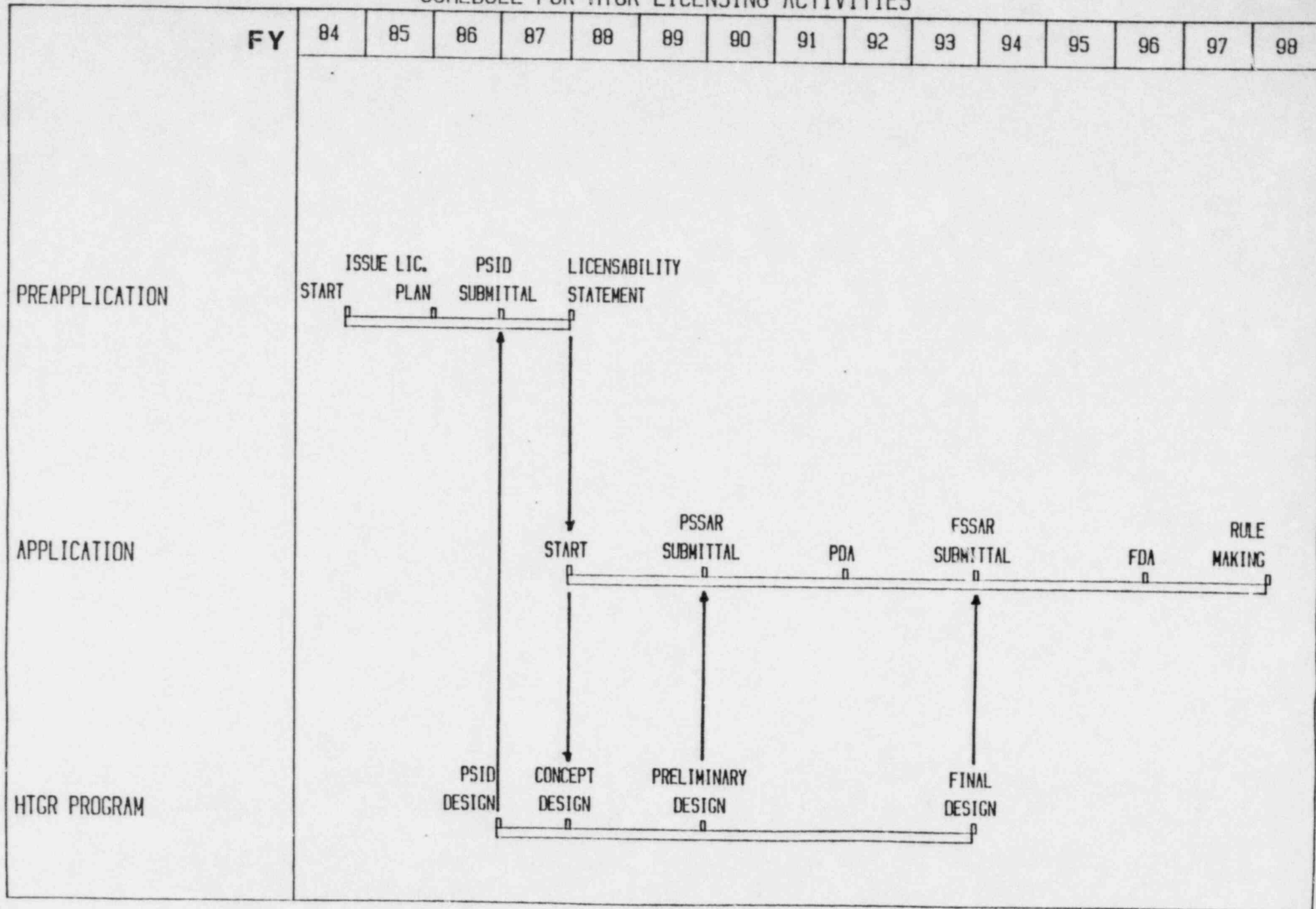
NRC Licensability

Conceptual Design Complete 9/87

Statement

FIGURE 1-1

SCHEDULE FOR HTGR LICENSING ACTIVITIES



<u>Licensing Plan</u>	<u>Program</u>	<u>Date</u>
<u>Milestone</u>	<u>Milestone</u>	
PSSAR Submittal	Preliminary Design	9/89
	Completion	
FSSAR Submittal	Final Design Completion	9/93

Rulemaking is scheduled so as to support a commercial HTGR market by the beginning of the next century. The schedule, therefore, shown in Fig. 1-1 supports that objective. If, however, a specific project were authorized in the near term, the licensing schedule would be such that the construction permit and the operating license would be coincident with the PDA(1991) and FDA(1995) milestones shown in Fig. 1-1, and the PSAR(1989) and FSAR(1993) would be specific rather than generalized.

2.0 PREAPPLICATION ACTIVITY

This section describes the plan for implementing the early interaction with the NRC and the approach that lays the groundwork for the following Application activity during which an application for design approval of an HTGR standard plant would be submitted and approved.

2.1 OBJECTIVE

The objective of the Preapplication activity is to develop a more detailed licensing plan for the HTGR Program and the NRC to ensure timely and successful completion of the licensing activities. This objective is consistent with the NRC's Proposed Regulatory Policy for Advanced Reactors ⁽¹⁾ which "encourages the earliest possible applicant, vendor and NRC interaction to provide for more effective regulation of advanced reactors." The proposed Policy also states that "the Commission would like to encourage those who plan to apply for a permit to construct nuclear power plants utilizing advanced reactors to submit technical information on their designs and interact with NRC staff on criteria and requirements as far in advance of an application as practicable.

2.2 SCOPE

The Preapplication activity encompasses the following areas of interaction between the HTGR Program and the NRC:

1. A procedural approach which addresses the manner in which the Preapplication activity is to be conducted, establishes the licensing process to be adopted during the Application period, and identifies the format and content for the PSID and SAR, respectively.
2. A technical approach having individual elements which define the details of the interactions, namely:
 - a. Licensing approach, which covers the methodologies including bridging to be employed for utilizing the Integrated Approach and risk assessment methods for selecting regulatory criteria and licensing basis events (LBE) and identifying safety related systems, structures, and components.
 - b. Selection of top-level regulatory criteria and use of the approach described in 2a, above, to select lower-level criteria.

c. A Technology Plan describing the major research and development activities derived from a systematic study of safety and licensing data needs for the Standard HTGR Design.

d. Design description and safety assessment.

3. Agreement on the procedural and technical approaches described in 1 and 2 above.

The elements of the Preapplication activity address all licensing tasks commencing with GFY 1985 and concluding with issuance of the NRC licensability statement described in Section 2.5.3.

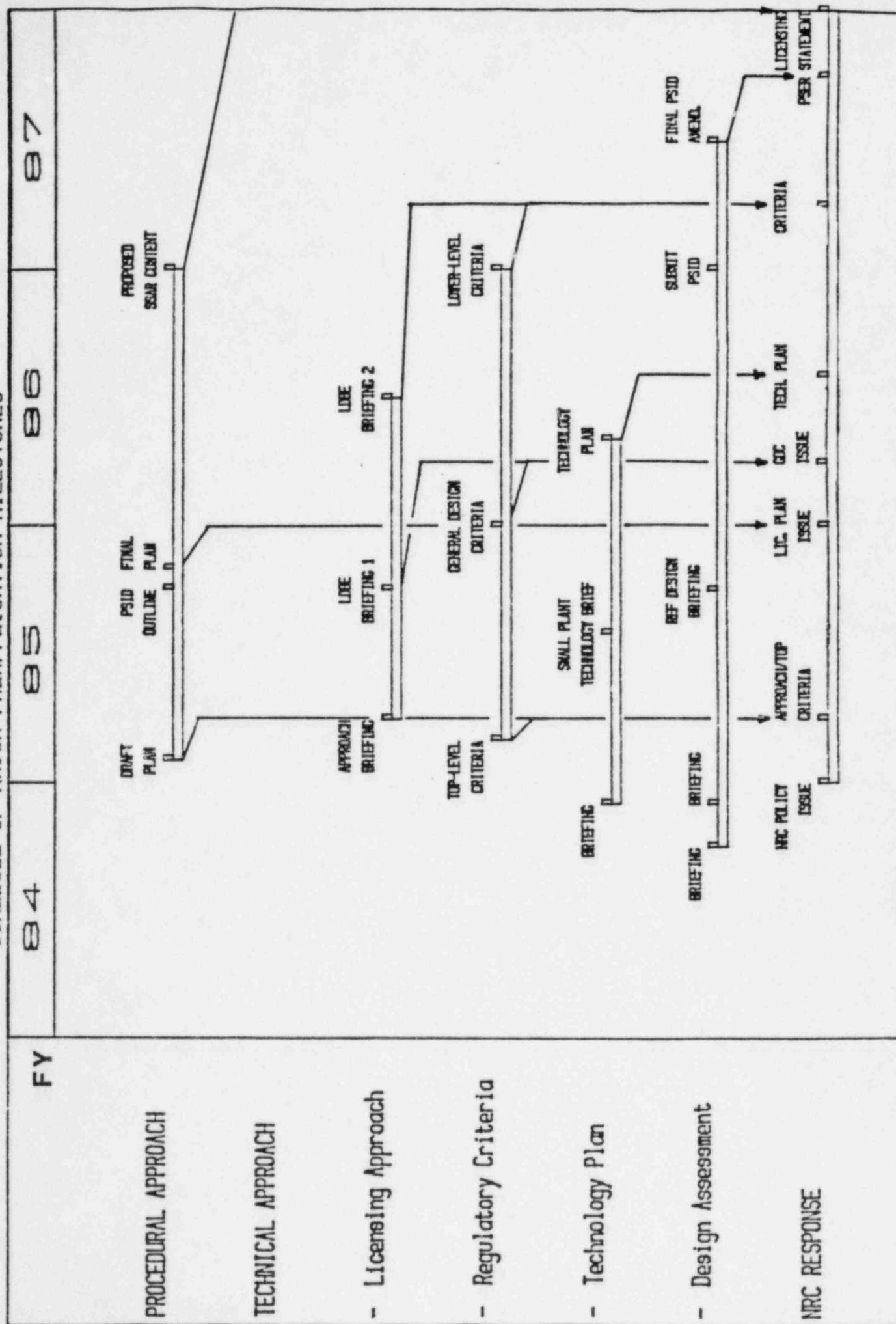
Figure 2-1 shows the major milestones for the procedural and technical approaches. Details are provided in the following subsections.

2.3 PROCEDURAL APPROACH

The scope of the Procedural Approach defines the procedures for interaction between the HTGR program and the NRC. The Procedural Approach considers activities during the Preapplication period and development of those required for the Application period.

FIGURE 2-1

SCHEDULE OF MAJOR PREAPPLICATION MILESTONES



2.3.1 Interaction Process

The Preapplication interaction between the HTGR Program and the NRC will consist of briefing of the NRC Commissioners, staff, and ACRS, submittal of information documents, and submittal of documents with requests for specific responses. While the degree of formality of the submittals and the NRC responses will be subject to joint agreement, it is important that a record be established to document the progress toward meeting the objective of an early and effective interaction. The process to be followed during the Application period will be defined. (Although Section 3 of this Plan assumes a two-step Standard Design Approval licensing process in accordance with 10CFR50 Appendix O, alternative processes may be investigated.)

2.3.2 Document Development

A PSID will be written to a format consistent with the intent of Regulatory Guide 1.70 (³), but which will be revised to be compatible with design features and the safety criteria developed for the Standard HTGR Design. The PSID will emphasize those features and issues having the potential for major impact upon the licensability of the design.

The SSAR content and format will also be developed and agreed upon in the Preapplication period.

2.4 TECHNICAL APPROACH

The technical approach will be to meet the law while appropriately considering the characteristics of advanced HTGRs ⁽⁴⁾ as well as actual HTGR operating experience.

The elements of the technical approach are:

- 1) Licensing Approach,
- 2) Regulatory Criteria,
- 3) HTGR Technology Development, and
- 4) Design Assessment.

2.4.1 Licensing Approach

In the Licensing Approach, a method for establishing criteria will be developed which includes the following steps for the selection of licensing basis events and safety-related systems, structures and components.

The licensing bases that are anticipated to be most affected are: (1) the choice of licensing basis events, which are those events customarily found in Chapter 15 of Safety Analysis Reports and

appendices that deal with the most severe accidents and the siting event, (2) the identification of safety-related systems, structures and components, (3) portions of 10CFR which are design related, such as 10CFR50, Appendix A, General Design Criteria, and (4) the regulatory guidance which supports and implements the requirements from 10CFR.

2.4.2 Regulatory Criteria

A first step in the development of regulatory criteria for HTGRs will be the specification and agreement on top-level regulatory criteria. Examples of top-level criteria are the dose guidelines of 10CFR100 and NRC's Interim Safety Goals. Next, the approach and methods developed in the Licensing Approach will be applied to determine appropriate lower-level criteria. For purposes of this Plan, regulatory criteria contained in 10CFR, exclusive of those adopted in the top-level criteria, are considered to be lower-level regulatory criteria. The three types are: (1) those applicable to all reactor types, (2) those specific to LWRs and which require no counterpart for the HTGR, and (3) those written ostensibly for LWRs but the intent of which can be applied to the HTGR. The relevant portions of 10CFR will be examined to determine which will or will not be applied to the HTGR plant. Modifications will be proposed as appropriate.

Since some of the criteria will be design specific, the development

and acceptance of these lower-level criteria will necessitate several iterations related directly to the design stages. The Preapplication activity includes submittals of lower-level criteria at the end of FY1985 and FY1986, with corresponding NRC responses in January of 1986 and January 1987.

As part of the effort to develop the lower-level criteria, Sections 1 through 3 of the PSID (lower-level criteria) will be prepared and submitted for NRC review in September 1985. These sections of the document will include a description of a site parameter envelope applicable to 80% of the sites in the U. S. and the approach to the design of systems, structures, and components. The classification system (e.g., seismic, Quality Group, Safety Class) and the methodology for its application will be described, and systems, structures and major components will be classified. The approach to seismic design and qualification will also be included, as will other topics that may be particularly dependent upon the plant design or application of the Integrated Approach.

NRC guidance documents, notably regulatory guides and the Standard Review Plan ⁽⁵⁾, define methods acceptable to the NRC for implementing various requirements in 10CFR or for resolving generic safety issues. These guidance documents are to a large extent directed to LWRs. These documents will be evaluated for application to the HTGR plant to the extent warranted.

2.4.3 Design Assessment

The Design Assessment activity consists of three closely related elements: briefings on HTGR standard design concept, briefings on design safety considerations, and completion of a PSID.

The PSID, being based on a conceptual design, will not be as detailed as a PSAR, but attention will be given to those HTGR design features and characteristics that govern safety performance. The significant licensing design basis accidents will be analysed and a preliminary probabilistic risk assessment will be provided.

2.4.4 HTGR Technology Development

The HTGR Technology Program will be developed consistent with and in support of the Standard HTGR Design and the application of the Integrated Approach to licensing. The technology activities submitted to the NRC for review will include those required to demonstrate that the licensing bases have been met. Relevant research being conducted by NRC, DOE, U.S. industry, and foreign countries will be identified. A Licensing Technology Plan will be submitted in January 1986.

2.5 NRC RESPONSE

For each of the major activities described in Section 2.3 and 2.4 on the Procedural and Technical Approaches, a corresponding response by the NRC is scheduled. This section describes each of these time-phased responses grouped by procedural or technical category and then outlines the NRC Licensibility Statement desired at the completion of the Preapplication period. Table 2-1 in Subsection 2.6 lists the various activities and the proposed schedule. In each of these areas interaction with NRC staff is proposed. Briefings to the ACRS and soliciting their feedback will also be scheduled as interaction with the NRC staff proceeds.

2.5.1 Procedural Approach Response

It is proposed that in November and December of 1984, discussions be held with NRR on the preliminary HTGR licensing plan with the intent of leading to an NRR letter confirming the actions requested in the preliminary plan. Further discussions and exchanges of information on the many details of the final DOE and NRC Licensing Plan would then take place prior to its issuance in September 1985.

2.5.2 Technical Approach Response

The Technical Approach includes four elements described in Subsection 2.4. NRC responses for each are outlined below and proposed

completion dates are shown in Table 2-1.

Licensing Approach. The NRC and DOE in discussions and information exchanges agree on and issue the Licensing Plan for the Standard HTGR Design. Initially, agreement will be reached on the methods for selecting licensing basis events, for selecting safety-related systems, structures and components, and for developing regulatory criteria. As the methods are applied, the NRC will be provided with descriptions of the LBES and safety-related items for review.

Regulatory Criteria. Early acceptance by the NRC of the top-level regulatory criteria is a major objective. From this agreement and by use of the methodology from the Licensing Approach, the HTGR Program will proceed with the development of the lower-level regulatory criteria which will be submitted to the NRC for review. Since the lower-level criteria will be in part design specific, these criteria will be developed over a time frame consistent with the design evolution. The NRC will, therefore, respond to criteria at increasing levels of design detail.

Technology Plan The Technology Plan which addresses research and development efforts required to support licensing efforts will be prepared and submitted to the NRC for review and comment.

Design Assessment. Briefings on the selected HTGR standard design concept and safety considerations will be held for NRC information

and informal responses. At the end of FY1986, a PSID will be submitted formally for NRC review and for which an NRC Preliminary Safety Evaluation Report will be prepared.

2.5.3 Licensability Statement

At the conclusion of the Preapplication activity, the NRC will issue a definitive statement, along with a letter from the ACRS, regarding the licensability of the Standard HTGR Design concept. It is recognized that the NRC's statement would also be consistent with the development of the Policy for Advanced Reactors and any pending or adopted rules impacting future standard design applications.

Conditioned on the conceptual stage of the Standard HTGR Design, the overall licensability statement should reach conclusions on the following questions:

1. Is the Standard HTGR Design reactor concept licensable?
2. Are the top-level regulatory criteria acceptable and can they remain valid through Final Design Approval?
3. Is the methodology for proceeding from top-level goals through functional analysis and assessment to the deterministic licensing bases acceptable and can it remain valid through Final Design Approval?
4. Is the approach for emergency planning acceptable?
5. Is the technology development program proposed for the Standard HTGR Final Design Approval adequate?

6. Are the SSAR content and format and the proposed application procedure acceptable?

This will provide a clear path and methodology for licensing an advanced Standard HTGR Design, and the NRC staff will have reasonable assurance that the proposed design and its method of development and implementation will be successful.

2.6 SCHEDULE

Table 2-1 shows the detailed schedule of the interactions between the HTGR Program and the NRC for each of the Preapplication activities discussed in Subsections 2.1 through 2.5. Briefings, submittals, and principal NRC responses are identified. Table 2-2 provides a chronological listing of the same schedule, specifically focusing on the required NRC actions.

TABLE 2-1
DETAILED SCHEDULE OF PREAPPLICATION LICENSING ACTIVITIES

HTGR Program Action/Deliverable		NRC Action/Deliverable	
PROCEDURAL APPROACH			
1a. Brief NRC and submit draft Licensing Plan	10/84	1a. Provide comments on Draft Licensing Plan	11/84
1b. Submit draft licensing plan for concurrence.	12/84	1b. Provide written comments on Draft Licensing Plan	1/85
2. Submit outline for PSID	6/85	2. Provide written comments on on PSID outline	8/85
3. Complete response to NRC comments on Licensing Plan and issue final Licensing Plan	8/85	3. Approval of Licensing Plan	9/85
4. Submit SSAR format and content	3/87	4. Provide written comments on SSAR format and content	6/87
TECHNICAL APPROACH			
<u>Licensing Approach</u>			
1. Brief NRC on licensing approach including bridging method and LBE selection	12/84	1. Provide comments on licensing approach and LBE selection	12/84
2. Brief NRC on bridging method for criteria development	2/85	2. Provide comments on criteria development method	2/85
3. Issue bridging methods	4/85	3a. Issue evaluation of methods for LBE selection	7/85
		3b. Issue evaluation of method for criteria development	8/85

TABLE 2-1 (Contd.)

HTGR Program Action/Deliverable		NRC Action/Deliverable	
4. Brief NRC on plant level functional analysis	4/85	4. Provide comments on plant level functional analysis	4/85
5. Brief NRC and provide submittal on LBES and safety systems, structures & components for reference design	7/85	5. Issue evaluation of LBES and safety systems, structures and components for candidate design	8/85
6. Brief NRC and provide submittal on LBES and safety systems, structures & components for reference design	3/86	6. Issue evaluation of LBES and safety systems, structures and components for reference design	4/86
<u>Development of Regulatory Criteria</u>			
1. Brief NRC and provide submittal of top-level criteria	12/84	1. Issue evaluation of top-level criteria	2/85
2. Brief NRC on lower-level criteria examples including GDCs based on functional analysis	7/85	2. Provide comments on lower-level criteria examples	7/85
3. Submit General Design Criteria for HTGRs	9/85	3. Issue evaluation of General Design Criteria for HTGRs	1/86
4. Submit lower-level criteria for reference design	9/86	4. Issue evaluation of lower-level criteria for reference design	1/87
<u>Design Assessment</u>			
1. Completed briefing of NRC on advanced HTGR concepts	6/84	1. Provided comments on advanced HTGR concepts	6/84
2. Brief NRC on concept selection	7/85	2. Provide comments.	7/85

TABLE 2-1 (Contd.)

HTGR Program Action/Deliverable		NRC Action/Deliverable	
3. Submit PSID for reference design including a preliminary risk assessment	9/86	3. Provide written comments	3/87
4. Issue final amendment to PSID	4/87	4. Issue Preliminary Safety Evaluation Report	6/87
		5. Issue Licensability Statement	9/87
<u>Technology Plan</u>			
1. Completed briefing of NRC on 2240 MW(t) plant Design Data Needs	8/84	1. Provided comments on 2240 MW(t) plant Design Data Needs	8/84
2. Brief NRC on Technology Plan for fission product release	4/85	2. Provide comments on Technology Plan for fission product release	4/85
3. Brief NRC on Technology Plan	9/85	3. Provide comments on Technology Plan	9/85
4. Submit Technology Plan	1/86	4. Issue evaluation of Technology Plan	4/86

TABLE 2-2
CHRONOLOGICAL LISTING OF NRC ACTION

ITEM	ADV. MAT'L SIZE	SUBMITTAL DATE	BRIEFING PROVIDED	NRC ACTION REQUESTED	NRC DUE DATE
<u>FY'85</u>					
• Submit Draft Licensing Plan	30 Pgs.	12/84	Yes	Approval/ Concurrence	1/85
• Briefing on Licensing Approach, Criteria Bridging, LBE's	--	12/84	Yes	Informal Feedback	--
• Submittal of Top Level Criteria	20 Pgs.	12/84	Yes	Concurrence	2/85
• Briefing on Bridging Method for Criteria Development	--	2/85	Yes	Informal Feedback	--
• Submit Bridging Methods Document	40 Pgs.	4/85	No	Concurrence on Methods for LBE Selection and Criteria Development	7/85-8/85
• Briefing on Plant Level Functional Analysis	--	4/85	Yes	Informal Feedback	--
• Briefing on Tech Plan for Fission Product Release	--	4/85	Yes	Informal Feedback	--
• Submit Outline for PSID	30 Pgs.	6/85	No	Formal Comments	8/85

TABLE 2-2
CHRONOLOGICAL LISTING OF NRC ACTION

ITEM	ADV. MAT'L SIZE	SUBMITTAL DATE	BRIEFING PROVIDED	NRC ACTION REQUESTED	NRC DUE DATE
<u>FY'85</u>					
• Briefing on LBES and Safety Systems, Structures and Components for Candidate Design	--	7/85	Yes	Evaluation of LBES, Safety Systems, Structures and Components	8/85
• Briefing on Lower-Level Criteria, Including GDCs	--	7/85	Yes	Informal Feedback	--
• Briefing on Concept Selection	--	7/85	Yes	Informal Feedback	
• Issue Final Licensing Plan	30 Pgs.	8/85	No	NRC Approval	9/85
• Submit General Design Criteria for HTGRs	70 Pgs.	9/85	Yes-7/85	NRC Concurrence	1/86
• Briefing on Tech Plan	--	9/85	Yes	Informal Feedback	--
<u>FY'86</u>					
• Submit Technology Plan	120 Pgs.	1/86	No	NRC Concurrence	4/86
• Briefing and submittal on LBES, Safety Systems, Structures and Components for Reference Design	100 Pgs.	3/86	Yes	Evaluation of LBES, Safety Systems, Structures and Components	4/86

TABLE 2-2
CHRONOLOGICAL LISTING OF NRC ACTION

ITEM	ADV. MAT'L SIZE	SUBMITTAL DATE	BRIEFING PROVIDED	NRC ACTION REQUESTED	NRC DUE DATE
<u>FY'86</u>					
• Submit Lower-Level Criteria for Reference Design	90 Pgs.	9/86	Yes-7/85	NRC Concurrence	1/87
• Submit PSID for Reference Design	1000 Pgs.	9/86	No	NRC Review and Comment	3/87
• Submit PRA for Reference Design	500 Pgs.	9/86	No	NRC Review and Comment	3/87
<u>FY87</u>					
• Submit SSAR Format and Content	100 Pgs.	3/87	No	NRC Review and Comment	6/87
• Issue Final Amendment to PSID	400 Pgs.	4/87	No	NRC SER Licensibility Statement	6/87 9/87

3.0 APPLICATION ACTIVITY

This section describes the plan for obtaining a design approval of a Standard HTGR Design, based upon the preapplication phase accomplishments.

3.1 OBJECTIVE

The objective of the Application activity is to prepare and submit to NRC a formal licensing document describing the Standard HTGR Design and its safety features and support NRC review of the document sufficiently for NRC to issue a Final Design Approval and publish a rule.

3.2 SCOPE

The Application activity encompasses both procedural and technical areas pertinent to the receipt of an NRC standard design approval. The procedural area addresses the manner in which the Application activity is to be conducted and identifies the format and content of licensing submittals. The procedural approach will largely be identified in detail at the conclusion of the Preapplication Activity. The technical area develops the necessary licensing submittals and associated safety assessments.

The temporal scope of the Application activity extends from the completion of the Preapplication activity to the receipt of a Final Design Approval and publication of a rule.

3.3 PROCEDURAL APPROACH

It is an objective of the Preapplication activity to identify the specific procedural approach to be employed during the Application activity. For planning purposes, however, it is assumed that the procedural and administrative approach of the Application period will be guided by the existing NRC policies and regulations.

Specifically, it is assumed that the NRC's "reference" concept consistent with NRC's standardization policy and 10CFR50, Appendix O will be followed. Further, a two-stage licensing review process for the standard design is assumed. On this basis the following procedural steps will be followed:

1. PSSAR - A Preliminary Standard Safety Analysis Report (PSSAR) will be prepared (see Section 3.4 for discussion of PSSAR contents).
2. Review Questions - Subsequent to "docketing" of the PSSAR by the NRC, a detailed review of the application will commence. A series of questions normally are submitted by

NRC to request further details and/or clarification of the design. Timely responses to these questions will be sequentially submitted to NRC as well as periodic amendments to the PSSAR.

3. Safety Evaluation Report - The NRC's review and technical acceptance of the design will be documented in its Safety Evaluation Report (SER). The SER will be issued in several stages. Upon resolution of major open issues, the final SER, which will form the technical base for the NRC Staff's approval of the design, will be issued.
4. ACRS Review - The formal design application will be referred to the Advisory Committee on Reactor Safeguards (ACRS) for a review and issuance of a letter report to the Commission on the acceptability of the HTGR design.
5. Preliminary Design Approval - Ultimate NRC Staff approval of a standard design will be granted in the form of a Preliminary Design Approval (PDA).
6. FSSAR - Following the successful initial review of the standard design, a similar, more detailed process (Steps 1-4) will occur when near-final design information becomes available. A Final Standard Safety Analysis Report (FSSAR)

will be prepared similar in format to the PSSAR but containing more detailed, final design and analysis information.

7. Final Design Approval

A NRC review process, similar to that associated with the PSSAR, will be conducted and conclude with the NRC Staff's issuance of a Final Design Approval (FDA).

8. Rulemaking

The additional rulemaking process provided by 10CFR50, Appendix O, Section 7 will be pursued, including the establishment of a formal licensing board and adjudicatory proceedings.

3.4 TECHNICAL APPROACH

Individual technical elements of the Application activity would be developed as described below.

The focal point of the Application technical activity will be the development and submittal to the NRC, for formal approval, of the HTGR Standard Safety Analysis Report (SSAR) on the Standard HTGR Design. The SSAR development will be consistent with the format and content guidelines developed during the Preapplication activity.

Based upon previous experiences with the preparation of LWR standard

designs, it is assumed that 10-30 percent of the detailed engineering and design must be completed at the time of PSSAR submittal. The standard design will include all safety systems, structures and components. Systems and structures which are not directly or indirectly connected to nor support, the safe operation and control of the design need not be included. Client and site specific parameters and requirements will be enveloped and reflected in the overall standard design.

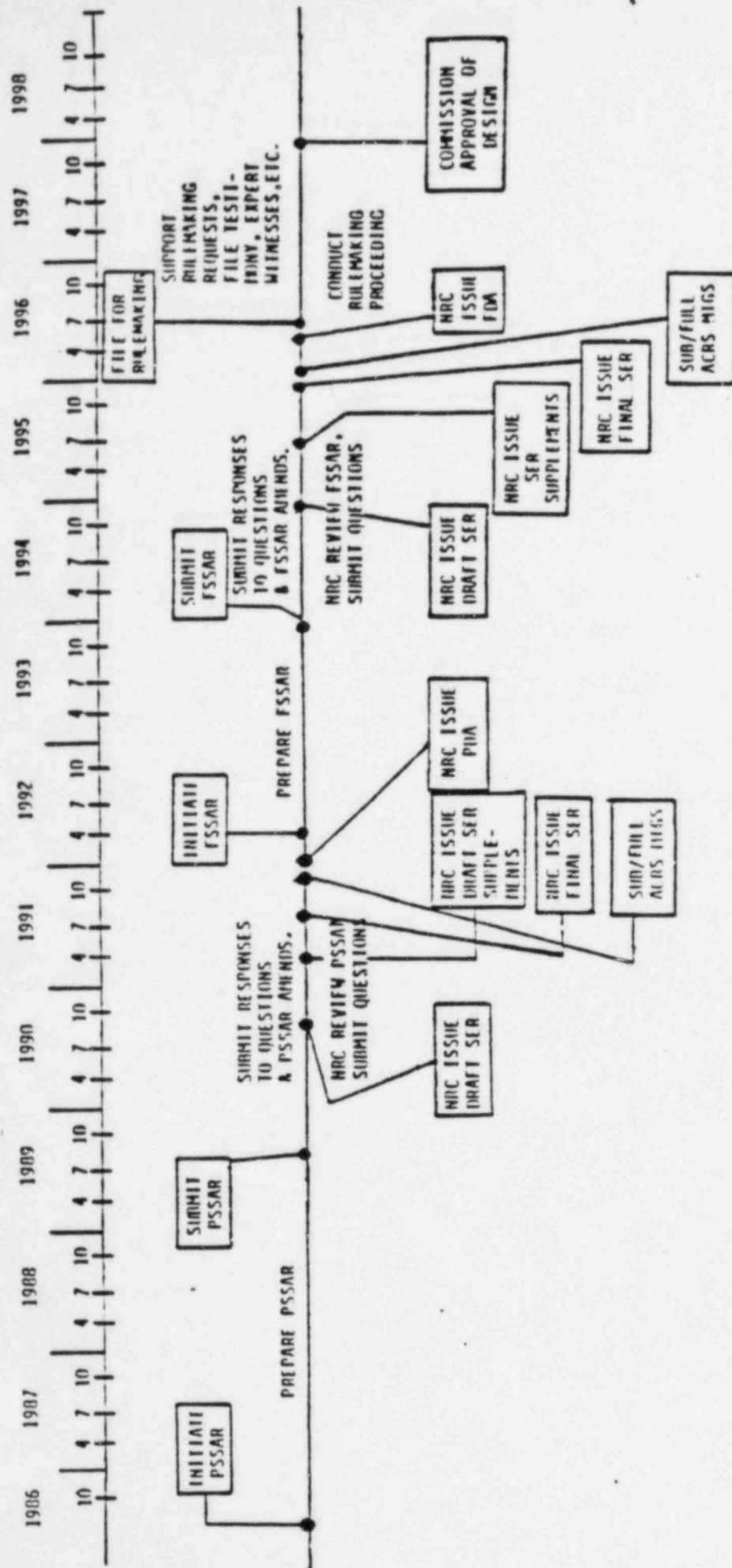
Compliance with NRC's regulations would be demonstrated in the SSAR for the Standard HTGR Design. In support of the preparation of the PSSAR and FSSAR, selected safety assessments would be conducted and documented to support compliance of the selected HTGR design with all applicable criteria as discussed in Section 3.4.2. Additional safety assessments will be prepared as necessary to supplement the PSSAR and FSSAR, for example, a probabilistic risk assessment (PRA) will be performed and submitted to the NRC at the time of the PSSAR submittal.

3.5 Schedule

All activities and milestones associated with the Application activity are scheduled as shown on Figure 3-1.

FIGURE 3-1

SCHEDULE OF APPLICATION MILESTONES



NOTES:

- PSSAR - PRELIMINARY STANDARD SAFETY ANALYSIS REPORT
- FSSAR - FINAL STANDARD SAFETY ANALYSIS REPORT
- SER - SAFETY EVALUATION REPORT
- PDR - PRELIMINARY DESIGN APPROVAL
- FDR - FINAL DESIGN APPROVAL
- ACRS - ADVISORY COMMITTEE ON REACTOR SAFETY
- APPLICANT ACTIVITIES ARE DENOTED ABOVE THE ACTIVITY LINE
- NRC ACTIVITIES ARE DENOTED BELOW THE ACTIVITY LINE

.0 REFERENCES

- . NRC Proposed Policy for Regulation of Advanced Nuclear Power Plants, (DRAFT), March 30, 1983.
- . "HTGR Steam Cycle/Cogeneration 2240 MW(t) Lead Plant Overall Plant Design Specification," GCRA HCS-20100 Rev. 1, September 1984 (Appendix A).
- . Regulatory Guide 1.70, Rev. 3, Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition), November 1978.
- . Letter, S. T. Brewer (DOE) to H. R. Denton (NRC), July 11, 1984.
- . NUREG-0800, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR Edition), July 1981.
- . NRC statement on Standardization of Nuclear Power Plants, 43FR38954, August 31, 1978.