

ACRS MEMBER GUIDANCE

The remainder of this document includes guidance to assist Advisory Committee on Reactor Safeguards (ACRS) members. Guidance is provided on the following topics:

- (I) **Subcommittee Meeting Conduct;**
- (II) **Letter Writing;** and
- (III) **Design-Centered Reviews.**

This guidance is a living accumulation of lessons-learned and best practices. As new experience is gained, it will be updated and modified as necessary to achieve up-to-date information.

I. SUBCOMMITTEE MEETING CONDUCT

Subcommittee meetings are conducted for various purposes. Subcommittee chairs have found guidance listed in Table 1 helpful.

Table 1. Subcommittee Chair Guidance

Prior to the Meeting

- Have ACRS staff ask if Nuclear Regulatory Commission (NRC) staff needs a letter
- If warranted, meet with NRC staff (with Designated Federal Officer (DFO) present) to clarify meeting expectations

Opening Meeting Comments

- Focus at the outset on the fundamental issues
- Recall the history of the problem or issue
- Place the matter in clear perspective

During Meeting

- Call attention to points in dispute or uncertainties
- Control the discussions that ensue within ACRS
- Summarize the discussions from time to time

Closing Meeting Activities

- Request public comments (control length of time per stakeholder; if warranted, remind stakeholder that members do not respond to questions but consider comments)
- Poll members for final comments and whether the topic should be referred to the full committee and key points for consideration.

After the Meeting

- If warranted (e.g., when the decision regarding a letter has changed, etc.), inform the Full Committee and provide recommendations for future actions.

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II. LETTER AND LETTER REPORT PREPARATION

Writing letters and reports is one of the key duties of ACRS members. The Committee only expresses its opinions through these documents. This writeup shares some guidance for preparing these documents with the objective of making the process as efficient as possible.

For each topic presented to the ACRS, a technical lead is assigned to facilitate the meeting and ultimately support the Full Committee by drafting a letter or letter report on a topic. The topics vary widely, including Topical Reports and associated Staff Safety Evaluations, Regulatory Guides, Rulemaking, and other topics having the potential to affect nuclear facility safety. Most Committee work is accomplished via Subcommittees, and Subcommittee chairs lead efforts to prepare letters/letter reports for Full Committee consideration. In cases where the subcommittee scope is broad or one member has specific expertise, the ACRS Chair, or the Subcommittee chair in consultation with the ACRS Chair, may ask another ACRS member to take the lead in running the meeting and drafting the letter.

The approach for developing a first draft of a letter/letter report varies by member and topic. Some members produce a first draft based on the written material provided and the input gained during the ACRS briefing. They then provide the first draft to other Subcommittee members for review and comment prior to Full Committee deliberation. Other members solicit input from all Subcommittee members and compose a first draft based on this input. In either case, soliciting member and consultant comments following a Subcommittee meeting is the first important step of the committee's deliberation and resolution process to gain consensus. It is important to note that consultants may only provide input at the draft stage of the letter report. Once the consultant comments are considered by the lead ACRS member and accepted, the lead members "owns" this input.

ACRS letters/letter reports typically follow a common structure:

Introduction: What was reviewed, when was it reviewed, what additional information was used.

Conclusions and Recommendations: Key conclusions and recommendations that ACRS wants to convey.

Background: The purpose and supporting information of the letter is presented.

Discussion: Outlines/summarizes the important technical safety points of the topic and any important findings.

Summary: Repeat from the earlier section. In the case of a long set of conclusions and recommendations in the front of the letter, a shorter summary is often provided.

Response Need: Because the NRC will formally respond to each letter, a sentence is added if a response is NOT required to help reduce unnecessary effort at the agency.

The overall length of the letter/letter report varies but is usually between 200 and 350 lines. Letters are addressed to the NRC Executive Director for Operations (EDO), and letter reports to the Chair of the Commission. The selected addressee depends on the regulatory importance and our statutory obligation regarding the subject. The audience for our letters/letter reports extends beyond the NRC staff and the Commission. It includes the applicant and informed members of the public. Hence, it is critical that letters be written in a manner that is "easy-to-understand."

To be as efficient as possible, synthesis and integration of the information gleaned from the written documentation and oral presentations is critical to good letter writing. Too much detail can obscure the message. Letters should be succinct and written in a high level "executive summary" style. It is often helpful to start the paragraph with the main point and then expand upon it in the paragraph instead of the more scientific approach of identifying all the evidence and then drawing the conclusion. This is especially true when the letter is basically agreeing with staff findings.

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For letter reports covering a larger scope, such as applications for a design certification, a construction permit or an operating license, an outline (and supporting subheadings in the letter/letter report) can be helpful to establish the main points to be conveyed and facilitate reader understanding. Although taking statements directly out of staff or applicant documents may appear to be a good practice, the context is different in our document. Hence, this practice often requires extensive editing by ACRS members in our 'line-by-line' review of this document.

In many cases, a draft is provided to the applicant, prior to presentation at a Full Committee meeting, to assure there is no proprietary information in the letter. If possible, changes are made to allow the draft to be read in an open meeting. At that point, the draft is read by the lead author into the record during the Full Committee meeting. Major comments are then sought from the members. If major changes are required, the member will revise the draft prior to reconsideration. Once completed (or if there are not major comments), the document is shown on the screen and edited 'line by line' by the committee as a whole. The line-by-line process is time consuming and arduous, but the goal is to get consensus of the committee. 'Soft' votes can be taken during the process to get major agreement on phraseology and keep the process from being bogged down. If a member does not agree with a major point, they can write 'added comments' that will be attached to the letter. During this process, the staff and applicant (if appropriate) are available to provide factual accuracy corrections and answer factual corrections, if necessary. However, to assure the independence of ACRS opinions, the staff and applicant role is limited to factual corrections.

The ACRS usually produces between two and four letters during a Full Committee meeting. Well written succinct drafts go a long way toward helping expedite our work during the Full Committee meeting.

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III. DESIGN-CENTERED SUBCOMMITTEE REVIEWS

(This guidance is a living accumulation of lessons-learned and best practices. As new experience is gained, it will be updated and modified as necessary to achieve up-to-date information.)

1. Purpose

- 1.1. This information is focused on the ACRS reviews of new reactor design applications, including those submitted under Part 50 and Part 52 (and future Part 53 applications). ACRS Members (Members) developed this information as a proactive measure to increase the effectiveness and efficiency of ACRS reviews and set staff and applicant expectations for ACRS reviews.
- 1.2. When a new technology or reactor configuration is being reviewed, the expansive nature of the review needs to be organized and arranged for optimum results and efficiency.
- 1.3. This information is expected to promote efficiency and consistency in ACRS reviews. It can be used for any type of licensing application submitted and should be tailored for each specific case.
- 1.4. This information is being provided for use in subcommittee reviews and can be amended, revised, or used at the discretion of the Members as lessons are learned through each reactor review. It is a nonbinding approach that is used as appropriate.
- 1.5. Construction permit applications are often of lesser detail than the operating license permit. Therefore, a graded approach to the review and letter report preparation is an appropriate way of working through the pertinent safety information efficiently.

2. Key Documents

- 2.1. Regulatory Engagement Plans: Reactor applicants typically will provide the staff a Regulatory Engagement Plan (REP) that provides an overall schedule for submittal of white papers, topical reports, and application documentation. At times, they are formal submittals; and other times, it may be a more informal communique.
 - 2.1.1. Typically, the REP is proprietary due to business objectives and is often changed as an application progresses. It is very important that Members be given access to the REP.
 - 2.1.2. It informs the Committee what topical reports are planned and, the level of detail and changes in planning provide insights regarding the applicant's level of readiness, maturity of design documentation, and experience in engaging the NRC regulatory process.
 - 2.1.3. The REP also provides insights regarding how many times a topical report/technical report/white paper on a topic will be reviewed by the NRR staff.
 - 2.1.4. The lead Member and lead ACRS staff engineer should first discuss the REP and what supporting documents should be reviewed by ACRS. It should be clear that this is a decision made by the lead ACRS Member.
- 2.2. White Papers (WPs): The Committee, typically, does not formally review white papers. These documents are typically submitted early in the pre-application process and used

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to inform the NRC and provide some level of alignment between the staff and applicant on specific approaches and regulatory topics.

- 2.2.1. There are times when the lead Member may decide the white paper and the subsequent conclusion(s) by the staff are significant enough or have a significant impact on the Committee's position on the technology/topic that a Committee review is warranted. This decision should be judicious and well thought out given that many WPs are very early in the process.
 - 2.2.2. As WPs are issued, the lead Member for the design should maintain awareness of the progression of the regulatory schedule and design activities.
 - 2.2.3. The lead Member should be mindful of new technologies or novel design approaches and features, and the need to allow time to educate members. WPs are a good way to gauge the amount of time required through early Member contact with technical information.
 - 2.2.4. Content of the white papers should inform the lead Member of the technology, regulatory approach, and progress, often leading to submission of the more formal topical reports (TRs).
- 2.3. Technical Reports (TkR): TkRs are often submitted to supplement and provide additional detail and references of varying degrees in the Safety Analysis Report (SARs) chapters. These are also sometimes mentioned in the staff Safety Evaluation Reports (SERs) in support of their finding for the specific chapters.
- 2.3.1. NRR staff audits often look at these reports in detail to ensure they support the conclusions being made. The TkRs may be governed under Title 10 of the *Code of Federal Regulations* (10 CFR) 50.59 (or like process) if there is a tie to the Preliminary Safety Analysis Report (PSAR)/Final Safety Analysis Report (FSAR) and a change is warranted.
 - 2.3.2. Member reviews and potential informational briefings on TkRs should be based on the level of reliance and reference in the respective SAR chapter.
 - 2.3.3. Committee review of TkRs should be based on the importance to the overall chapter conclusion and level of reliance on the information in the TkR.
 - 2.3.4. The SAR is the statement of the current licensing basis (CLB) at the time of the application and may be supplemented by references to the TkRs as appropriate. This reference makes the TkRs a part of the respective SAR.
- 2.4. Topical Reports (TR): TRs get a SER from the staff, and the decision for Committee review is based on the topic and importance to the overall design.

Specifically, the decision should:

- 2.4.1. Primarily be concerned with the safety of the reactor, core/fuel integrity, risk to reactor accidents, occupational safety, and health and safety of the public, especially for novel concepts and new technologies.
- 2.4.2. Consider the risk, when reviewing the PSAR or SAR, the ACRS may have safety concerns about approaches that were previously approved by the staff in earlier topical report safety evaluations. This would result in schedule and/or resource challenges in the NRC review process that could have been avoided if the ACRS had raised its issues during the specific topical report review.

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For example: A new type of fuel may have a qualification TR submitted and warrant Committee review. However, a Plant Initiating Event TR may not warrant Committee review if it closely follows a defined process, such as Regulatory Guide (RG) 1.233 or NUREG-0800, for which there is sufficient experience that ACRS insights are not likely to reveal new items of safety significance.

- 2.4.3. As a default, it should be assumed that all TRs identified in the REP¹ are to be reviewed by the Committee. This allows the staff to ensure adequate schedule and resources for the review. A later decision to not review a TR allows improving schedule.
 - 2.4.4. After the TR is received and staff have accepted it for review, they will ask the ACRS staff whether the Committee wants to review it. This decision is made by the lead Member with consultation, where necessary, with other experts on the Committee.
 - 2.4.5. The decision will be reviewed by the Full Committee at the Planning and Procedures (P&P) portion of the full committee meeting, generally within the three months following acceptance of the TR for review by NRR. The process follows the long-standing process used for Regulatory Guides where the SME provides a preliminary decision at P&P.
 - 2.4.6. A brief explanation is supplied as part of Section 3 of the P&P agenda, now labeled “Regulatory Guides, Technical Reports, and Topical Reports”.
 - 2.4.7. It is not necessary to provide a comprehensive description of the TR, only a brief abstract and reason for the decision. The Full Committee (FC) will consider the recommendation coupled with the Member’s discussion/questions as part of the P&P process.
 - 2.4.8. Critical methodology topical reports that support the establishment of the technical safety case for the technology, design basis, and safety analyses should be considered as early in the process as possible because new reactor designs, especially non-LWRs, will generally be more dependent on analytical methods for understanding the safety response of the system.
- 2.5. Construction Permit Application (CP): The CP is submitted with a PSAR. It usually contains all of the chapters expected in the FSAR submitted with the operating license application. For Combined Construction and Operating License (COL) applications under Part 52, the FSAR is submitted with the application.
- 2.5.1. The PSAR is submitted with much less technical detail than the FSAR. Therefore, a graded approach to the review should be considered to allow for more expeditious reviews.
 - 2.5.2. The review can be focused on the safety aspects of the facility rather than the less important, but interesting, portions of the plant.
- 2.6. Early Site Permits (ESPs), Standard Design Applications (SDAs) and Design Certification Applications (DCAs): For the type or phase of applications being reviewed (e.g., standard design, early site permit, etc.), the depth and breadth of the review is commensurate with the purpose of the application. For example, the review for an early

¹ Important to remember that not all projects have a Regulatory Engagement Plan (REP). Hence, TRs may be listed in the Committee Engagement Plan (CEP) or just tracked by the NRR project manager (PM). In any event, the TRs for Advance Reactor Projects should be listed in the CEP when the ACRS Staff engineer is made aware.

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site permit will not involve the design and system operation details that would be required in an operating license application.

2.6.1. Committee review should be graded and commensurate with the safety significance of the information provided.

2.7. Operating License Application (OL): The OL (or COL) applications are often the most time intensive reviews the Committee performs. The documentation usually takes the form of an FSAR, draft staff SER and associated analyses. This safety review is a statutory requirement and must be completed efficiently and effectively; hence, it must be carefully planned. ACRS staff should maintain frequent contact with the cognizant NRR Project Manager to ensure no gaps in the time between when the SER is ready for review and Committee meetings are scheduled.

2.8. Reference Material: The ACRS staff engineer should ensure SharePoint is kept up to date with all the pertinent documents (REP, TRs, TkrRs, White Papers, RAIs, Audit Reports, FSAR or PSAR, and SER). A well-organized folder in the "Reference Material" folder should be the place of comprehensive document storage. Each Subcommittee (SC) meeting folder can be updated with the specific documents that are the subject of that SC. However, SC folders in themselves should not be relied upon to store documents that may be needed for future reference or review.

2.8.1. When proprietary documents are available, these should be posted to the same SharePoint folder. The titles of the documents should be descriptive enough to ensure there is clear distinction between the public version and proprietary version.

2.9. Delta-Reviews of Evolutionary, Incremental, and Nth-of-a-Kind Applications

2.9.1. At times, when developing incremental designs applications where a new application closely duplicates a previous applications (such as the Kairos Hermes and Kairos-2 reactor plants) a "delta" document of the PSARs (or SARs) should be obtained by the ACRS Staff Engineer.

2.9.2. At times, the applicant has developed such a document through annotating the changes in the PSAR of the incremental reactor. This greatly enhances the ability of the ACRS to expeditiously review the new and novel portions of the new design without having to return to reviewing original material.

3. Committee Engagement Plan (see Exhibit 1 for example)

3.1. Committee Engagement Plan (CEP): The CEP is a tool to be used by the ACRS Staff engineer to keep track of the status of advanced reactor design review documents and applications. It is used to help populate the Rainbow Chart (near-term Committee meeting schedule) when the review activity or activities enter the window of the timeframe depicted on the Rainbow Chart.

3.2. The lead ACRS staff engineer should develop a CEP in concert with the NRR PM and factor in available information from pre-application engagement (scheduling) with the staff and applicant.

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- 3.2.1. This tool should be reviewed at informal logistics meetings with the NRR PM periodically.
- 3.3. The lead Member should review and be aware of the CEP, especially if there is a change.
- 3.4. Each document should have dates entered if possible (or leave blank). Best guesses based on agency procedures and metrics should be made.
 - 3.4.1. This information does not constitute a formal commitment by the Committee.
 - 3.4.2. It is understood the farther out the date, the more variability and uncertainty is introduced.
 - 3.4.3. This variability and uncertainty should not deter the ACRS Staff and NRR PM from making an educated guess on a date of engagement.
- 3.5. The CEPs should be combined into a single integrated spreadsheet to establish a “picture” of the Committee’s work landscape and to assist the ACRS Leadership and TSBC in developing the Rainbow Chart.
 - 3.5.1. It is important to complete the spreadsheet with the same columns and date formats as the base depicted in the CEP reference folder.
- 3.6. ACRS staff should save the most recent CEP on the SharePoint site: ACRS Meeting Documents > Reference Materials > Committee Engagement Plans.
 - 3.6.1. Only the most current CEP should be kept on the SharePoint. If it is desired to keep old files, then maintain them in a separate location. The Comments/Notes section is the record of past revisions if necessary.
 - 3.6.2. The file name should follow the convention {CEP-“Plant/Project Shorthand”-“date revised/saved”}. For example: CEP-TEUSA-7-1-2023 or CEP-NuScale-6-28-2023.
- 3.7. It is not necessary to review the CEP with the FC unless there is a significant change or impact. This is at the discretion of the Lead Member.
 - 3.7.1. Each P&P session should contain a time when the Lead Member can update the Committee on significant changes as warranted.
 - 3.7.2. Caution must be taken to ensure any presentation of the CEP is non-proprietary, or is done in a closed session
- 3.8. Logistics (Informal) Meetings: The lead Member and ACRS staff should continuously consider the need for an informal logistics meetings with the NRR project manager. Logistics meetings between the ACRS staff, NRR staff, and committee lead are valuable to maintain alignment on schedule and topics for committee review valuable for scheduling purposes. This alignment (focused on the CEP) is essential to ensure the official ACRS meeting schedule is optimized to enable a prompt and efficient review.

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- 3.8.1. During the Logistics Meetings, NRR Project Manager, the ACRS staff and the Member should align on a decision as to whether the SER will be reviewed by the Committee.
 - 3.8.2. Logistics Meetings are not to discuss resolution technical issues. These meetings are for scheduling Committee engagement, document delivery, and ACRS and NRR staff resources.
 - 3.8.3. With advance planning, the timing of Committee engagement should not delay issuance of the advanced SER or the final report.
- 3.9. Informational briefings: An informational briefing on the technology should be considered prior to any formal review of the TRs or applications. These meetings may be held during the FC meetings or as a separate SC meeting. They are often both open and closed to the public given the proprietary nature of some of the preliminary information and design/business considerations (especially for newer technologies) and should be carefully planned.
- 3.9.1. Consideration of the amount of time should be based on the applicant's schedule for submittals, staff time to be familiar with the technology, and the complexity and novel nature of the technology. It is very important not to get out in front of the NRR staff, to impede them or unduly influence the NRR docketing and review process. Briefings should be held in-person whenever possible.
 - 3.9.2. A briefing held too early may cover design information that could change as the design progresses, hence may reduce the effectiveness of reviewing topical reports (i.e., ACRS membership may change or Members may not have been present for the subcommittee). Approximately two months prior to formal committee engagement is an appropriate interval for an informational briefing at a SC or FC meeting.
 - 3.9.3. The focus of the informational briefing should be on the information most needed to ensure the efficient and independent review of the upcoming documents and to understand the whole application of the technology from a safety perspective.

4. Timeline of Reviews

- 4.1. Topical Reports: If Committee review is desired, the NRR staff and ACRS staff should align on the proposed schedule and inform the lead Member when an approximate review will need to take place. Involving the lead Member in early discussions will assist in developing the timeline.
 - 4.1.1. This should be added to the CEP with the projected dates. If a letter report will be issued by the Committee, there will be a subcommittee meeting followed by a full Committee meeting upon completion of the draft SER.
 - 4.1.2. The TR and draft SER should be disseminated to the subcommittee no less than 4 weeks (in accordance with ACRS-EDO Memorandum of Understanding) in advance of the subcommittee. Providing the TR to the Committee Members early is desirable, especially for large TRs.
 - 4.1.3. Multiple topical reports may be submitted. As they are submitted, the ACRS staff should update the CEP for review by the lead Member. The NRR staff will focus on each of these and reach out to the ACRS staff to inquire if a Committee review of the TR and draft SER is desired. The ACRS staff will consult with the

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lead Member on the specific committee schedule based on the CEP and Rainbow Chart (near-term ACRS meeting schedule).

- 4.2. Exceptions: Exceptions to this schedule may be possible if the lead Member and other cognizant Members for the topic are notified in advance and agree that the reduced review time will not affect their ability to complete a thorough review.
- 4.3. Application Submittal Packages: At some point, the preliminary documents will have been submitted and the applicant will submit the final application documentation for NRR review. Depending on the phase of application, the important documentation will consist of chapters of a PSAR or FSAR as appropriate.
 - 4.3.1. The ACRS staff and lead Member should monitor the schedule of issuance of the chapter's draft SERs and ensure enough review time is afforded to the Committee. Sections 3 and 4 of this paper should be consulted for good practices for scheduling meetings.
 - 4.3.2. The lead Member will decide and assign, as appropriate, focus or cross-cutting areas (FCCAs) based on expert Member availability, technology, and application.
 - 4.3.3. The CEP should be updated, and subcommittee meetings should be added to the Rainbow Chart when within its range of forecast. The CEP maintains the awareness of those meetings that may extend beyond the horizon of the issued Rainbow Chart.
- 4.4. Chapter Reviews: Once the final draft SER has been provided, the lead chapter/area Member will construct internal ACRS memorandums detailing the result of the chapter reviews. A template of these internal memos is provided in Exhibit 2. This is meant to provide typical sections and detail but should not constrain the writer to a specific format or level of detail.
- 4.5. Subcommittee Presentations: When scheduling the SC, consider the sequence of applicant presentation, staff presentation of draft SER, and memo review.
 - 4.5.1. Consideration should be given to ensuring the applicant and staff are able to support the sequence without undue burden.
 - 4.5.2. The SC meetings are transcribed, but the chapter memo deliberation is not. Accordingly, consider the court reporter and how he/she will be utilized throughout the day(s) of the SC meetings.
- 4.6. SC Scheduling: At times, the applicant or staff, due to either unforeseen circumstances, inability to respond/review responses to RAIs, or key design changes, may cancel meetings that were scheduled with the Committee. The lead Member, ACRS staff and NRR staff should always try to avoid upsetting the ACRS meeting schedules due to potentially wasting time and delaying the ACRS review. The CEP is key in ensuring alignment on schedules by the applicant, staff, and the Committee.

5. Assignment of Review Areas

- 5.1. Topical Reports (TRs): TRs are typically assigned to the entire design-centered subcommittee.

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- 5.1.1. Since these are very specific and highly technical at times, the lead Member should ensure the Member with the necessary expertise is available to review and provide comments on the TR.
 - 5.1.2. Consultants should be engaged as necessary (the lead ACRS Member should notify the ACRS staff engineer if consultant participation is desired). If warranted, letter reports will be developed following the ACRS process of SC meeting followed by FC meeting.
 - 5.1.3. Applicant/staff schedule should be considered in the scheduling of SC meetings to optimize the timeline of providing the final NRC approval.
- 5.2. Focus or Cross-Cutting Areas (FCCA): In developing the overall strategy for review, the lead Member and ACRS staff should consider the need for assigning FCCAs for review. This would involve starting with the safety-significant and design-specific topics rather than a serial chapter-by-chapter review. Typical focus and cross-cutting areas may include:

Source term	Generation of mixed waste
Structural materials	ALARA
Use of concrete	Criticality safety
Worker safety	Chemical processing
Human Reliability	Administrative programs credited

An example of a cross reference table is provided in Exhibit 3.

- 5.3. Matters for Future Review: The ACRS staff should identify if there is an “Appendix A” to the draft SER for early CP reviews of the PSAR. This appendix to the draft SER identifies follow-up items for further review in more detail during the OL application phase. This appendix should be catalogued in the Reference Material.
- 5.4. Assignment of Chapters: It would be useful, if possible, to group the chapter reviews based on complexity, length, and similarity so some of the less risk intensive areas can be covered in single SC meetings.
- 5.4.1. The NRR Staff will often group chapters in low, medium, and high effort categories. This is useful guideline in scheduling the applicant and staff.
 - 5.4.2. Another example for grouping is the use of three groups of chapters. Group 1 can be the miscellaneous chapters dealing with site characterization, financial qualifications, decommissioning, and facility descriptions. These are easily covered in one SC meeting or not even covered at all due to their simplicity, lack of safety implications, or length.
 - 5.4.3. An example of a chapter assignment table is shown in Exhibit 4.
 - 5.4.4. The lead Member will assign chapters based on Member expertise, past experience in reactor design reviews, and preference/availability of the Members. In addition, Member growth in technical expertise and use of consultants can be factors in making specific assignments.
 - 5.4.5. An example of grouping of chapters is shown in Exhibit 5.

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6. Member Review Expectations

- 6.1. Technical Review: In reviewing the technical content of chapters, particularly matters that concern safety or are of safety significance, it is important to provide information useful to preparing the final letter report. Exhibit 6 is the outline of information that may be considered by the lead Member for a construction permit review; it can be easily adapted for an operating license review.
- 6.2. Letter Report Preparation: This information will be condensed and collated into the final letter report. As the technical review proceeds, it is important the chapter memos contain the necessary information and conclusions of the expected information.
- 6.3. The lead Member receives each chapter/FCCA memo and converts the necessary verbiage into the draft committee letter report. Open items may necessitate further discussion during the FC presentation by the staff or applicant. 6.2.2
- 6.4. See Exhibit 6 for important areas to consider and potentially address in the overall draft SC letter report draft.
- 6.5. It is expected the draft letter report will be disseminated to Members prior to the FC meeting with enough time to formulate comments for at least one round of revisions. The first round of comments should not focus on personal preference of grammar and wording, but substantive issues dealing with the safety of the design.
- 6.6. Also see guidance for ACRS Letter Reports in the ACRS Bylaws, Sections 4 and 5, other guidance in the Subcommittee Structure document, and the ACRS-EDO MOU.

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Exhibit 1 – Typical Level 1 Committee Engagement Plan (section 3)

(Over time, this spreadsheet may be enhanced and revised, as long as all CEPs are of the same format, there is not restriction on how the columns and rows can be formatted.)

Design Center	Document Description TRs	Planned Submittal Dates	Formal Review of TR/SER Y/N	Date draft SER in SP	Date of SC Mtg	Date of FC Mtg	In ACRS SP? Y/N	Notes/Comments
PLANT XYZ	Regulatory Engagement Plan							
PLANT XYZ	Principal Design Criteria		Y	1/21/24	2/21/24	3/2/24	y	
PLANT XYZ	Methodology and Selection of Postulated Initiating	8/1/23						
PLANT XYZ	Methodology and Safety Classification of SSCs	12/1/23						
PLANT XYZ	Risk-informed Methodology and PRA applications	12/1/23						
PLANT XYZ	Defense in Depth Evaluation Methodology"	3/1/24						
PLANT XYZ	Graphite Qualification	5/1/24						
PLANT XYZ	Source Term Evaluation Methodology	6/1/24						
PLANT XYZ	Reactor Pressure Vessel Boundary	6/1/24						
PLANT XYZ	Quality Assurance Plan	8/1/24						
PLANT XYZ	Thermal Hydraulics Codes and Methods	8/1/24		TBD	TBD	TBD		
PLANT XYZ	Reactivity Control and Core Physics Codes and Methods	8/1/24		TBD	TBD	TBD		
PLANT XYZ	Fuel Qualification	8/1/24		TBD	TBD	TBD		
PLANT XYZ	Interface Requirements and Acceptance Criteria	8/1/24		TBD	TBD	TBD		

- Note 1: Ensure proprietary documents are posted to SharePoint when available.
- Note 2: Consider key expert member availability when scheduling SC meetings.
- Note 3: The listing of documents should be as comprehensive as practical. TkrRs and White Papers should be listed even though many are not reviewed by the committee (i.e. Formal Review is "N"). This will ensure a comprehensive listing is available for any Member doing research/review on the technology.

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Exhibit 2 – Chapter Memo Template (section 4.4)



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001**

{DATE}

MEMORANDUM TO: {MEMBER}, Lead
{APPLICANT} License Application Review Subcommittee
Advisory Committee on Reactor Safeguards

FROM: {ASSIGNED MEMBER}, Member
Advisory Committee on Reactor Safeguards

SUBJECT: INPUT FOR ACRS REVIEW OF {TYPE OF LICNESE} – SAFETY
EVALUATION FOR CHAPTER {CHAPTER NUMBER}, {CHAPTER
TITLE}

In response to the Subcommittee's request, I have reviewed the NRC staff's draft safety evaluation report (SER) with {NO} open items and the associated Applicant's documentation for Chapter {CHAPTER NUMBER}, "{CHAPTER TITLE}." The following is my recommended course of action concerning further review of this chapter and the staff's associated SER.

Background

{BRIEF BACKGROUND OF CHAPTER}

SER Summary

Chapter {CHAPTER NUMBER} of the applicant's {F}SAR was found to be of sufficient detail to provide confidence in a comprehensive evaluation of site characteristics with the exceptions detailed below:

1. *{Provide a brief description of exceptions or issues found during the review. Key RAIs should be briefly mentioned if they resolved a significant issue. Add additional line numbers as required.}*

Discussion

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{This section contains the most important insights and learnings gained during the review. If any concerns arise, they should be succinctly described (most concerns will result in a recommendation below). Consider the final ACRS letter report information in Exhibit 5 and section 7 for the respective topic and ensure the description contains the necessary verbiage for inclusion in the final letter report.}

Recommendation(s)

{This is the lead member's (and any input from other members and consultants) suggestions on how to resolve any significant concerns described above. Resolution can be to bring additional information or for the NRR staff to provide resolution through their process.}

References

{REFERENCES TO BE ADDED IN BY ACRS STAFF IN CONSULTATION WITH MEMBER}

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Exhibit 3 – Focus and Cross-Cutting Areas (FCCAs) (section 5.4)

Potential Focus Areas	Related-Chapter Numbers								Assigned Member
	1	2	3	4	5	6	7	8...	
Criticality Safety	✓		✓			✓			Member 1
HRA Design and Layout	✓		✓				✓		Member 2
Chemical Processing		✓		✓	✓			✓	Member 3

✓ Denotes a need to review attributes in associated chapter to ensure cross-cutting area does not pose any undue risk or safety implications and does not conflict with information in other chapters.

Exhibit 4 – Chapter Assignments (section 5.5)

Chapter	Topic (include draft SERs with no open items)	Expected Subcommittee Date *	Assigned Member
Overall Design	This is a look at the entire, overall design and the final letter report for the committee		<i>Lead Member</i>
1	The Facility	3/23/2024 ** 5/17/2024	{ <i>member 1</i> }
2	Site Characteristics		{ <i>member 2</i> }
3	Design of Structures, Systems and Components		{ <i>member 3</i> }
4.....	<i>Remaining chapters.....</i>		{ <i>member 4...</i> }

* From Exhibit 1

** Denotes a change in dates. Maintain strikeouts to track delays and changes.

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Exhibit 5 – Grouping of Chapters (section 5.5)

<p><u>Group 1 Overview and Miscellaneous Chapters (ACRS meeting {DATE})</u></p> <ul style="list-style-type: none"> • Chapter 1, The Facility • Chapter 10, Experimental Facilities • Chapter 15, Financial Qualifications • Chapter 16, Other License Considerations • Chapter 17, Decommissioning and Possession-Only Amendments • Chapter 18, Highly Enriched to LEU Conversion <p><i>(example of potentially low effort)</i></p>	<p><u>Group 3 Reactor, safety analysis, remaining chapters, and Cross Cutting topics (ACRS meeting {DATES})</u></p> <ul style="list-style-type: none"> • Chapter 5, Reactor Coolant System • Chapter 6, Engineered Safety Features • Chapter 7, I&C • Chapter 8, Electrical Power • Chapter 11, Radiation Protection Program and Waste Management • Chapter 12, Conduct of Operations • Chapter 13, Accident Analyses <p><i>(example of potentially high effort)</i></p>
<p><u>Group 2 Reactor Systems (ACRS meeting {DATES})</u></p> <ul style="list-style-type: none"> • Chapter 2, Site Characteristics • Chapter 3, Design of SSCs • Chapter 4, Reactor Description • Chapter 9, Auxiliary Systems <p>Chapter 14, Tech Specs</p> <p><i>(example of potentially medium effort)</i></p>	

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Exhibit 6 – Generic Outline - Letter Report for Advance Reactor Design Review Construction Application (section 6.0)

1. Background
 - Describe facility, thermal power level, fuel, coolant, moderator and power conversion system
2. Other Novel or Unique Aspects (examples below)
 - Use of ASME Sec III Div 5
 - Remote operation
 - Autonomous operation
 - Heat pipes
 - Use of ceramic composites instead of metallic materials for structural functions
 - Novel fuel (not TRISO or metallic fuel or LWR fuel)
 - Dissolved fuel
 - Gas cooled fast reactor fuel
 - Nitride fuels
 - Ceramic-Metal (Cermet)? Ceramic-Ceramic (Cercer)?
 - Mixed waste generation (salt+uranium+fission products (fps))
3. Relevant previous Operating Experience
4. Principle Safety Function: Limit Release of Radionuclides
 - Containment Approach
 - Traditional or
 - Functional Containment Approach: multiple barriers (TRISO + salt)
 - Source Term (why so very low)
5. Supporting Safety Function: Control heat removal
 - Describe how it is accomplished
 - How is its behavior/operation confirmed?
6. Supporting Safety Function: Control reactivity
 - Describe how it is accomplished
 - How is its behavior/operation confirmed?
7. Support Safety Function: other
 - Maintain structural integrity?
 - Maintain coolant in liquid state (salts and lead)?
 - Prevent chemical attack
8. Principle design criteria and defense in depth
 - Summary of principal design criteria (PDCs) and how they were derived
 - Indicate areas where defense-in-depth (DiD) is explicitly used in the design to accommodate uncertainty
9. Accident Selection, Analysis Results and Safety Margin
 - Describe process for establishing maximum hypothetical accident (or licensing basis events)
 - Has the search for the maximum hypothetical accident been broad enough to provide a convincing case that no other scenario could have more severe consequences in aggregate and for the most affected individual? Has the search considered the possible ranges of uncertainty with respect to nuclear source

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- term (including chemical effects), energetic effects, mechanical failure modes, external insults, human response (expected and possible), and dependencies
- Analysis methodology
 - i. Key models
 - ii. Level of V&V
 - Summary of key analysis results
 - Uncertainties
 - i. Confirmatory calculations necessary?
 - ii. Is there a need to perform tests in the reactor to demonstrate overall integrated safety behavior (e.g., negative temperature coefficient)?
 - iii. Demonstrate margin in fuel temperatures, structural temperatures, releases versus dose limits
10. Worker Safety and Operational Reliability
- Are there specific aspects of the reactor design that result in uncertainties that can only be resolved via operation (such as in a test reactor)
 - Technology Development
 - Key data anticipated prior to OL for the reactor design
 - Fuel, moderator, and structural material testing
 - Integrated thermal testing?
 - Instrumentation
 - Validation of codes
 - Emergency Planning
 - Others?

What key insights should carry forward into the Operating License review when more detailed information is submitted.

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ACRONYMS

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ACRS	Advisory Committee on Reactor Safeguards
CEP	Committee Engagement Plan
CLB	Current Licensing Basis
COL	Combined License
CP	Construction Permit
DC	Design Certification
DCA	Design Certification Application
DFO	Designated Federal Officer
EDO	Executive Director for Operations
ESP	Early Site Permit
FC	Full Committee
FCCA	Focus or Cross-Cutting Areas
FSAR	Final Safety Analysis Report
ITAAC	Inspections, Tests, Analyses, and Acceptance Criteria
NRC	Nuclear Regulatory Commission
OL	Operating License
P&P	Planning and Procedures
PRA	Probabilistic Risk Assessment
PSAR	Preliminary Safety Analysis Report
REP	Regulatory Engagement Plan
RES	Office of Research
RG	Regulatory Guide
SAR	Safety Analysis Report
SDA	Standard Design Approval
SER	Safety Evaluation Report
SC	Subcommittee
SDA	Standard Design Approval
TkR	Technical Reports
TR	Topical Reports
WP	White Paper