

### C.IV.1. Combined License Application Acceptance Review Checklist

The application must contain a final safety analysis report that describes the facility, presents the design bases and the limits on its operation, and presents a safety analysis of the structures, systems, and components of the facility as a whole. The final safety analysis report shall include the following information, at a level of information sufficient to enable the Commission to reach a final conclusion on all safety matters that must be resolved by the Commission before issuance of a combined license. [Excerpted from proposed 10 CFR 52.79.]

The NRC staff will perform a review of a combined license (COL) application to determine its acceptability for docketing. During its acceptance review of a COL application, the staff will use the following checklists as guides to ensure that the application addresses the technical information required by proposed Title 10, Sections 52.79 and 52.80, of the *Code of Federal Regulations* (10 CFR 52.79 and 52.80). For any items listed below that are not included in the COL application, the applicant must include a request for exemption, in accordance with *proposed* 10 CFR 52.7. The staffs intent in using these checklists is to ensure that the application submitted for review is complete. The acceptance review focuses on whether there is sufficient information for the staff to perform a complete review. That is, acceptance review confirms that there is no missing information and there are no applicable regulatory requirements that have not been addressed. Upon docketing, the staff will perform a review of the application to determine the adequacy of the information submitted to resolve all safety issues. Sufficient information in the context of acceptance review is not interchangeable with adequate and acceptable information necessary for the staff to make a reasonable assurance finding. Therefore, the staff assumes that completing its review of the application may necessitate requests for additional information.

The acceptance review checklist does not include the information in proposed 10 CFR 52.79(e) for a COL applicant that references use of one or more manufactured nuclear power reactors licensed under 10 CFR 52, Subpart F.

#### ***Technical Information in Final Safety Analysis Report (10 CFR 52.79)***

The COL application must include the following technical information required by proposed 10 CFR 52.79:

Item	Information Required in COL Application 10 CFR 52.79(a)	FSAR Section	Yes	No
1	The application contains the following technical information:			
1(i)	The boundaries of the site	2.1		
1(ii)	The proposed location of each facility on the site	1.1, 2.1		
1(iii)	The <b>seismic</b> characteristics of the proposed site with appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area and with sufficient margin for the limited accuracy, quantity, and time in which the historical data have been accumulated	2.5		
1(iii)	The <b>meteorological</b> characteristics of the proposed site with appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area and with sufficient margin for the limited accuracy, quantity, and time in which the historical data have been accumulated	2.3		

Item	Information Required in COL Application 10 CFR 52.79(a)	FSAR Section	Yes	No
1(iii)	The <b>hydrologic</b> characteristics of the proposed site with appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area and with sufficient margin for the limited accuracy, quantity, and time in which the historical data have been accumulated	2.4		
1(iii)	The <b>geologic</b> characteristics of the proposed site with appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area and with sufficient margin for the limited accuracy, quantity, and time in which the historical data have been accumulated	2.5		
1(iv)	The location and description of any nearby industrial, military, or transportation facilities and routes	2.2		
1(v)	The existing and projected future population profile of the area surrounding the site	2.1.3		
1(vi)	A description and safety assessment of the site on which the facility is to be located:			
1(vi)	<ul style="list-style-type: none"> <li>The assessment assumes a fission product release from the core into the containment assuming the facility is operated at the ultimate power level contemplated.</li> </ul>	Ch. 15		
1(vi)	<ul style="list-style-type: none"> <li>The assessment includes an evaluation and analysis of the postulated fission product release using the expected demonstrable containment leak rate and any fission product cleanup systems intended to mitigate the consequences of the accidents, together with the applicable site characteristics, including site meteorology, to evaluate the offsite radiological consequences.</li> </ul>	Ch. 15		
1(vi)	The evaluation concludes that:			
1(vi)	<ul style="list-style-type: none"> <li>An individual located at any point on the boundary of the exclusion area for any 2-hour period following the onset of the postulated fission product release, would not receive a radiation dose in excess of 25 rem total effective dose equivalent (TEDE).</li> </ul>	Ch. 15		
1(vi)	<ul style="list-style-type: none"> <li>An individual located at any point on the outer boundary of the low population zone (LPZ), who is exposed to the radioactive cloud resulting from the postulated fission product release (during the entire period of its passage) would not receive a radiation dose in excess of 25 rem TEDE.</li> </ul>	Ch. 15		

Item	Information Required in COL Application 10 CFR 52.79(a)	FSAR Section	Yes	No
2	The application contains a description and analysis of the structures, systems, and components [SSCs] of the facility with emphasis upon performance requirements, the bases, with technical justification therefore, upon which these [performance] requirements have been established, and the evaluations required to show that the safety functions will be accomplished.	System-related chaps. and/or Ch. 15		
2	The application contains descriptions that are sufficient to permit understanding of the system designs and their relationship to safety evaluations, and include:			
2	• reactor core	Ch. 4		
2	• reactor coolant system	Ch. 5		
2	• instrumentation and control systems	Ch. 7		
2	• electrical systems	Ch. 8		
2	• containment system	6.2		
2	• other engineered safety features	Ch. 6		
2	• auxiliary systems	Ch. 9		
2	• emergency systems	Ch. 6		
2	• power conversion systems	Ch. 10		
2	• radioactive waste handling systems	Ch. 11		
2	• fuel handling systems	9.1		
3	The application identifies the kinds and quantities of radioactive materials expected to be produced in the operation and the means for controlling and limiting radioactive effluents and radiation exposures within the limits of 10 CFR 50.34(a)(1)	Ch. 12		
4	The application contains the design of the facility, including:			
4	• a discussion of the principle design criteria for the facility and conformance with the General Design Criteria of Appendix A to 10 CFR Part 50 [see Attachment 1 to this appendix for a tabulated list of GDC]	3.1		
4	• a discussion of the design bases and their relation to the principal design criteria	Chaps. 2-12 and 15		
4	• information relative to materials of construction, arrangement, and dimensions, sufficient to provide reasonable assurance that the design will conform to the design bases with adequate margin for safety	Chaps. 3-12		

Item	Information Required in COL Application 10 CFR 52.79(a)	FSAR Section	Yes	No
5	The application contains an analysis and evaluation of the design and performance of structures, systems, and components with the objective of assessing the risk to the public health and safety resulting from operation of the facility and including determination of the margins of safety during normal operations and transient conditions anticipated during the life of the facility, and the adequacy of SSCs provided for the prevention of accidents and the mitigation of the consequences of accidents.	Chaps. 3–12 and 15		
5	The application contains analysis and evaluation of [emergency core cooling system (ECCS)] cooling performance and the need for high-point vents following a postulated loss-of-coolant accident [LOCA] in accordance with the requirements of 10 CFR 50.46 and 50.46a.	5.4.12, 6.2, 6.3		
6	The application contains a description and analysis of the fire protection design features for the reactor necessary to comply with 10 CFR Part 50, Appendix A, GDC 3, and 10 CFR 50.48.	9.5.1		
7	The application contains a description of protection provided against pressurized thermal shock events, including projected values of the reference temperature for reactor vessel beltline materials as defined in 10 CFR 50.60 and 10 CFR 50.61(b)(1) and (b)(2).	5.3.2		
8	The application contains the analyses and descriptions of the equipment and systems required by 10 CFR 50.44 for combustible gas control.	6.2.5		
9	The application contains the coping analyses required, and any necessary design features necessary to address station blackout, as described in 10 CFR 50.63.	8.4		
10	The application contains a description of the program required by 10 CFR 50.49(a) for the environmental qualification of electrical equipment important to safety and the list of electrical equipment important to safety that is required by 10 CFR 50.49(d).	3.11		
11	The application contains a description of the program(s) necessary to ensure that the systems and components meet the requirements of the [American Society of Mechanical Engineers (ASME)] Boiler and Pressure Vessel Code in accordance with 10 CFR 50.55a.	3.9		
12	The application contains a description of the primary containment leakage rate testing program necessary to ensure that the containment meets the requirements of Appendix J to 10 CFR Part 50.	6.2.6		
13	The application contains a description of the reactor vessel material surveillance program required by Appendix H to 10 CFR Part 50.	5.3		
14	The application contains a description of the operator training program necessary to meet the requirements of 10 CFR Part 55.	13.2		
15	The application contains a description of the program for monitoring the effectiveness of maintenance necessary to meet the requirements of 10 CFR 50.65.	17.6		

Item	Information Required in COL Application 10 CFR 52.79(a)	FSAR Section	Yes	No
16	The application contains the information with respect to the design of equipment to maintain control over radioactive materials in gaseous and liquid effluents produced during normal reactor operations, as described in 10 CFR 50.34a(d).	Ch. 11		
17	The application contains the information with respect to compliance with technically relevant positions of the Three Mile Island [TMI] requirements in 10 CFR 50.34(f), with the exception of the combustible gas control requirements of §50.34(f)(1)(xii), (f)(2)(ix), and (f)(3)(v), which have been superseded by 10 CFR 50.44. [See Attachment 2 to this appendix for §50.34(f) requirements.]			
18	The application contains a discussion on whether the applicant seeks to use risk-informed treatment of SSCs in accordance with information required by 10 CFR 50.69(b)(2).	TBD		
19	The application contains information necessary to demonstrate that the SSCs important to safety comply with earthquake engineering criteria in 10 CFR Part 50, Appendix S.	3.7		
20	<p>The application contains proposed technical resolutions to those unresolved safety issues and medium- and high-priority generic safety issues that are identified in the version of NUREG-0933 current on the date 6 months prior to application submittal and that are technically relevant to the design.* (See DG-1145, Section C.IV.8.)</p> <p>* A certified design addresses the design-related generic issues only. If the COL application incorporates by reference a certified design, the COL application must address the procedural issues.</p>	1.9		
21	The application contains emergency plans complying with the requirements of 10 CFR 50.47 and 10 CFR Part 50, Appendix E.	13.3		
22	<p>The application contains all emergency plan certifications that have been obtained from the State and local governmental agencies with emergency planning responsibilities and state that:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> the proposed emergency plans are practicable</li> <li><input type="checkbox"/> these agencies are committed to participating in any further development of the plans, including any required field demonstrations</li> <li><input type="checkbox"/> these agencies are committed to executing their responsibilities under the plans in the event of an emergency</li> </ul> <p>If certifications cannot be obtained after sustained, good faith efforts by the applicant, then the application must contain information, including a utility plan, sufficient to show that the proposed plans provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at the site.</p>	13.3		

Item	Information Required in COL Application 10 CFR 52.79(a)	FSAR Section	Yes	No
23	If the applicant wishes to be able to perform the activities at the site allowed by 10 CFR 50.10(e) before issuance of the combined license, the applicant must identify and describe the activities that are requested and propose a plan for redress of the site in the event that the activities are performed and either construction is abandoned or the combined license is revoked. The application must demonstrate that there is reasonable assurance that redress carried out under the plan will achieve an environmentally stable and aesthetically acceptable site suitable for whatever non-nuclear use may conform with local zoning laws.	TBD		
24	If the application is for a nuclear power reactor design which differs significantly from the light-water reactor designs that were licensed before 1997 or use simplified, inherent, passive, or other innovative means to accomplish their safety functions, the application must describe how the design meets the requirements in §50.43(e) (i.e., demonstration by testing, analysis, and/or prototype).	TBD		
25	The application contains a description of the quality assurance program to be applied to the design, fabrication, construction, and testing of structures, systems, and components of the facility. The description of the quality assurance program for a nuclear power plant shall include a discussion of how the applicable requirements of Appendix B to 10 CFR Part 50 will be satisfied.	Ch. 17		
26	The application contains a description of the organizational structure, allocations or responsibilities and authorities, and personnel qualifications requirements for operation.	13.1, 13.2		
27	The application contains managerial and administrative controls to be used to assure safe operation. The information on the controls to be used for a nuclear power plant should include a discussion of how the applicable requirements of Appendix B to 10 CFR Part 50 will be satisfied.	13.5, Ch. 17		
28	The application contains plans for preoperational testing and initial operations.	14.2		
29	The application contains plans for conduct of normal operations, including maintenance, surveillance, and periodic testing of structures, systems, and components.	13.5		
30	The application contains proposed technical specifications prepared in accordance with the requirements of §50.36 and §50.36a.	Ch. 16		
31	For nuclear power plants to be operated on multi-unit sites, the application contains an evaluation of the potential hazards to the structures, systems, and components important to safety of operating units resulting from construction activities, as well as a description of the managerial and administrative controls to be used to provide assurance that the limiting conditions for operation are not exceeded as a result of construction activities at the multi-unit sites.	TBD		
32	The application contains the technical qualifications of the applicant to engage in the proposed activities.	1.4		
33	The application contains a description of the training program required by 10 CFR 50.120.	13.2		

Item	Information Required in COL Application 10 CFR 52.79(a)	FSAR Section	Yes	No
34	The application contains a description and plans for implementation of an operator requalification program. The information on the operator requalification program should include a discussion of how the requirements of 10 CFR 55.59 will be satisfied.	13.2		
35	The application contains a physical security plan, describing how the applicant will meet the requirements of 10 CFR Part 73 (and 10 CFR Part 11, if applicable, including the identification and description of jobs as required by §11.11(a), at the proposed facility). The plan must list tests, inspections, audits, and other means to be used to demonstrate compliance with the requirements of 10 CFR Parts 11 and 73, if applicable.	13.6		
36	The application contains a safeguards contingency plan in accordance with the criteria set forth in Appendix C to 10 CFR Part 73. The safeguards contingency plan shall include plans for dealing with threats, thefts, and radiological sabotage, as defined in 10 CFR Part 73, relating to the special nuclear material and nuclear facilities licensed under 10 CFR Part 50 or 52 and in the applicant's possession and control. Each application for this type of license shall include the information contained in the applicant's safeguards contingency plan. (Implementing procedures required for this plan need not be included in the application.)	13.6		
36	The application contains provisions for protecting the safeguards contingency plans, or a guard qualification and training plan, and other safeguards information against unauthorized disclosure in accordance with the requirements of 10 CFR 73.21, as appropriate.	13.6		
37	The application contains information which demonstrates how operating experience insights from generic letters and bulletins issued up to 6 months before the docket date of the application, or comparable international operating experience, has been incorporated into the plant design.* (See DG-1145, Section C.IV.8.)  * See note for Item 20.	1.9*		
38	The application contains a description and analysis of design features for the prevention and mitigation of severe accidents (core-melt accidents), including challenges to containment integrity caused by core-concrete interaction, steam explosion, high-pressure core melt ejection, hydrogen detonation, and containment bypass.*  * See note for Item 20.	Ch. 19		
39	The application contains the earliest and latest dates for completion of the construction.	TBD		
40	RESERVED			

Item	Information Required in COL Application 10 CFR 52.79(a)	FSAR Section	Yes	No
41	The application contains an evaluation of the facility against the Standard Review Plan (SRP) in effect 6 months before the docket date of the application. The evaluation required by this section shall include an identification and description of all differences in design features, analytical techniques and procedural measures proposed for a facility and those corresponding features, techniques and measures given in the SRP acceptance criteria. Where a difference exists, the evaluation shall discuss how the proposed alternative provides an acceptable method of complying with the Commission's regulations, or portions thereof, that underlie the corresponding SRP acceptance criteria. The SRP was issued to establish criteria that the NRC staff intends to use in evaluating whether an applicant/licensee meets the Commission's regulations. The SRP is not a substitute for the regulations, and compliance is not a requirement.	1.9*		
42	The application contains information demonstrating how the applicant will comply with requirements for reduction of risk from anticipated transient without scram (ATWS) events in §50.62	4.2, 15.8		
43	The application contains information demonstrating how the applicant will comply with requirements for criticality accidents in §50.68	Ch. 15		

\* COL applicants may chose to incorporate by reference topical reports or separate reports that address these items.

***For a COL Application That References an Early Site Permit (ESP)***

Item	Information Required in COL Application 10 CFR 52.79(b)	FSAR Section	Yes	No
1	The application contains information sufficient to demonstrate that the design of the facility falls within the site design parameters specified in the ESP.	1.8 Ch. 2		
2	If the final safety analysis report does not demonstrate that the design of the facility falls within the site design parameters: The application contains a request for a variance that complies with the requirements of §52.39 and §52.93.	Letter*		
3	The application contains information in the final safety analysis report that demonstrates that all terms and conditions that have been included in the ESP will be satisfied by the date of issuance of the combined license.	TBD		
4	If the ESP approves complete and integrated emergency plans, or major features of emergency plans, the application contains information in the final safety analysis report that includes any new or additional information that updates and corrects the information that was provided under §52.17(b), and discusses whether the new or additional information materially changes the bases for compliance with the applicable requirements.	13.3		



4	If the proposed facility emergency plans incorporate existing emergency plans or major features of emergency plans, the application identifies changes to the emergency plans or major features of emergency plans that have been incorporated into the proposed facility emergency plans and that constitute a decrease in effectiveness under §50.54(q).	13.3		
5	The application does not need to contain new certifications meeting the requirements of §52.79(a)(22) if complete and integrated emergency plans are approved as part of the ESP.	13.3		

\* Requests for variances may be included in the letter transmitting the COL application to the NRC for acceptance and review.

***For a COL Application That References a Standard Design Approval***

Item	Information Required in COL Application 10 CFR 52.79(c)	FSAR Section	Yes	No
1	The final safety analysis report (FSAR) need not contain information or analyses submitted to the Commission in connection with the design approval. The application contains, in addition to the information and analysis otherwise required, information sufficient to demonstrate that the characteristics of the site fall within the site parameters specified in the design approval.	1.8, Ch. 2		
2	The application demonstrates in the FSAR that the interface requirements established for the design under 10 CFR 52.137 have been met.	1.8		
3	The application demonstrates in the FSAR that all terms and conditions that have been included in the final design approval will be satisfied by the date of issuance of the combined license.	TBD		

***For a COL Application That References a Standard Design Certification***

Item	Information Required in COL Application 10 CFR 52.79(d)	FSAR Section	Yes	No
1	The final safety analysis report need not contain information or analyses submitted to the Commission in connection with the design certification. The application contains, in addition to the information and analysis otherwise required, information sufficient to demonstrate that the characteristics of the site fall within the site parameters specified in the design certification.	1.8, Ch. 2		
2	The application demonstrates in the final safety analysis report that the interface requirements established for the design under 10 CFR 52.47 have been met.	1.8		
3	The application demonstrates in the final safety analysis report that all requirements and restrictions set forth in the referenced design certification rule will be satisfied by the date of issuance of the combined license.	TBD		

***Additional Technical Information (10 CFR 52.80)***

The COL application must include the following additional technical information per 10 CFR 52.80:

Item	Information Required in COL Application	FSAR Section	Yes	No
1	The application contains a plant-specific probabilistic risk assessment (PRA). If the application references a standard design certification or standard design approval, or if the application proposes to use a nuclear power reactor manufactured under a manufacturing license under subpart F, the plant-specific PRA must use the PRA for the design certification, design approval, or manufactured reactor, as applicable, and must be updated to account for site-specific design information and any design changes, departures, or variances.	Ch. 19		
2	The application contains the proposed inspections, tests, and analyses, including those applicable to emergency planning, that the licensee shall perform, and the acceptance criteria which are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, the facility has been constructed and will operate in conformity with the combined license, the provisions of the Atomic Energy Act, and the NRC's regulations.	14.3		
2	If the COL application references an early site permit with [inspection, test, analysis, and acceptance criteria (ITAAC)], the early site permit ITAAC apply to those aspects of the COL which are approved in the ESP.	14.3		
2	If the COL application references a standard design certification, the ITAAC contained in the certified design applies to those portions of the facility design which are approved in the design certification.	14.3		
2	If the COL application references an ESP with ITAAC or a standard design certification or both, the application may include a notification that a required inspection, test, or analysis in the ITAAC has been successfully completed and that the corresponding acceptance criterion has been met. <i>The Federal Register</i> notification required by §52.85 must indicate that the application includes this notification.			
3	The application contains a complete environmental report as required by 10 CFR 51.50(c).	TBD		

**Administrative Requirements**

The COL application meets the following administrative requirements:

Item	Requirements	Yes	No
1	The combined license application complies with the relevant sections of 10 CFR 52.3.		
2	The application is addressed to the NRC’s Document Control Desk, with a copy sent to the appropriate Regional Office, and a copy to the appropriate NRC Resident Inspector, if one has been assigned to the site of the facility [10 CFR 52.3(b)(2)].		
3	If the application is on paper, the submission must be the signed original [10 CFR 52.3(b)(2)].		
4	The combined license application is submitted under oath or affirmation [10 CFR 50.30(b)].		
5	Per 10 CFR 52.77, the combined license application contains all information required by 10 CFR 50.33:		
5	(a) Name of applicant;		
5	(b) Address of applicant;		
5	(c) Description of business or occupation of applicant;		
5	(d)(1) If applicant is an individual, citizenship is provided in the application.		
5	(d)(2) If applicant is a partnership, the name, citizenship, and address of each partner and the principal location of where the partnership does business is provided in the application.		
5	(d)(3) If applicant is a corporation or an unincorporated association, the application includes:  <input type="checkbox"/> the state where it is incorporated or organized and the principal location where it does business.  <input type="checkbox"/> the names, addresses, and citizenship of its directors and principal officers.  <input type="checkbox"/> whether it is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government, and, if so, details are provided in the application.		
5	(d)(4) If the applicant is acting as an agent or representative of another person in filing the application, the application identifies the principal and furnishes the information required by paragraph (d) with respect to this principal.		
5	(e) The application provides the class of license applied for, the use to which the facility will be put, the period of time for which the license is sought, and a list of other licenses, except operator’s licenses, issued or applied for in connection with the proposed facility.		
5	(f)(1,2,3) The application provides information that demonstrates that the applicant possesses or has reasonable assurance of obtaining the funds necessary to cover estimated construction costs, related fuel cycle costs, and estimated operation costs for the period of the license. The application contains estimates of the total construction costs of the facility, related fuel cycle costs, estimates for total annual operating costs for each of the first 5 years of the facility. The application shall also indicate the source(s) of funds to cover these costs.		

Item	Requirements	Yes	No
5	(f)(4) If the applicant is a newly-formed entity organized for the primary purpose of constructing and/or operating a facility, the application includes information showing: <ul style="list-style-type: none"> <li data-bbox="300 338 1279 401"><input type="checkbox"/> the legal and financial relationships it has or proposes to have with its stockholders or owners.</li> <li data-bbox="300 422 1279 485"><input type="checkbox"/> the stockholders' or owners' financial ability to meet any contractual obligation to the entity which they have incurred or proposed to incur.</li> <li data-bbox="300 506 1279 569"><input type="checkbox"/> any other information considered necessary by the Commission to enable it to determine the applicant's financial qualification.</li> </ul>		
5	(f)(5) If required by the Commission, the application submitted by an established entity or newly-formed entity contains additional or more detailed information respecting its financial arrangements and status of funds, including information regarding the ability of the licensee to continue to the conduct of activities authorized by the license and to decommission the facility.		
5	(g) The application contains the radiological emergency response plans of State and local governmental entities in the United States that are wholly or partially within the plume exposure pathway emergency planning zone EPZ as well as the plans of State governments wholly or partially within the ingestion pathway EPZ. The plans for the ingestion pathway include such actions as are appropriate to protect the food ingestion pathway.		
5	(h) The application provides the earliest and latest dates for completion of construction of the facility.		
5	(i) The application contains a list of the names and addresses of such regulatory agencies as may have jurisdiction over the rates and services incident to the proposed activity, and a list of trade and news publications which circulate in the area where the proposed activity will be conducted and which are considered appropriate to give reasonable notice of the application to those municipalities, private utilities, public bodies, and cooperatives, which might have a potential interest in the facility.		
5	(j) The application is prepared in such a manner that any restricted data or other defense information is separated from the unclassified information.		
5	(k)(1) The application contains information, in the form of a report, as described in §50.75, indicating how reasonable assurance will be provided that funds will be available to decommission the facility.		

## Attachments

### Attachment 1. Appendix A to 10 CFR Part 50, “General Design Criteria for Nuclear Power Plants”

General Design Criteria for Nuclear Power Plants	Yes	No
<i>I. Overall Requirements:</i>		
1 Quality Standards and Records		
2 Design Bases for Protection Against Natural Phenomena		
3 Fire Protection		
4 Environmental and Dynamic Effects Design Bases		
5 Sharing of Structures, Systems, and Components		
<i>II. Protection by Multiple Fission Product Barriers:</i>		
10 Reactor Design		
11 Reactor Inherent Protection		
12 Suppression of Reactor Power Oscillations		
13 Instrumentation and Control		
14 Reactor Coolant Pressure Boundary		
15 Reactor Coolant System Design		
16 Containment Design		
17 Electric Power Systems		
18 Inspection and Testing of Electric Power Systems		
19 Control Room		
<i>III. Protection and Reactivity Control Systems:</i>		
20 Protection System Functions		
21 Protection System Reliability and Testability		
22 Protection System Independence		
23 Protection System Failure Modes		
24 Separation of Protection and Control Systems		
25 Protection System Requirements for Reactivity Control Malfunctions		
26 Reactivity Control System Redundancy and Capability		
27 Combined Reactivity Control Systems Capability		
28 Reactivity Limits		

<b>General Design Criteria for Nuclear Power Plants</b>	<b>Yes</b>	<b>No</b>
29 Protection Against Anticipated Operational Occurrences		
<i>IV. Fluid Systems:</i>		
30 Quality of Reactor Coolant Pressure Boundary		
31 Fracture Prevention of Reactor Coolant Pressure Boundary		
32 Inspection of Reactor Coolant Pressure Boundary		
33 Reactor Coolant Makeup		
34 Residual Heat Removal		
35 Emergency Core Cooling		
36 Inspection of Emergency Core Cooling System		
37 Testing of Emergency Core Cooling System		
38 Containment Heat Removal		
39 Inspection of Containment Heat Removal System		
40 Testing of Containment Heat Removal System		
41 Containment Atmosphere Cleanup		
42 Inspection of Containment Atmosphere Cleanup Systems		
43 Testing of Containment Atmosphere Cleanup Systems		
44 Cooling Water		
45 Inspection of Cooling Water System		
46 Testing of Cooling Water System		
<i>V. Reactor Containment:</i>		
50 Containment Design Basis		
51 Fracture Prevention of Containment Pressure Boundary		
52 Capability for Containment Leakage Rate Testing		
53 Provisions for Containment Testing and Inspection		
54 Systems Penetrating Containment		
55 Reactor Coolant Pressure Boundary Penetrating Containment		
56 Primary Containment Isolation		

<b>General Design Criteria for Nuclear Power Plants</b>	<b>Yes</b>	<b>No</b>
57 Closed Systems Isolation Valves		
<i>VI. Fuel and Radioactivity Control:</i>		
60 Control of Releases of Radioactive Materials to the Environment		
61 Fuel Storage and Handling and Radioactivity Control		
62 Prevention of Criticality in Fuel Storage and Handling		
63 Monitoring Fuel and Waste Storage		
64 Monitoring Radioactivity Releases		

**Attachment 2. 10 CFR 50.34(f), “Additional TMI-Related Requirements”**

*(f) Additional TMI-related requirements. Each applicant for a design certification, design approval, combined license, or manufacturing license under Part 52 of this chapter shall demonstrate compliance with the technically relevant portions of the requirements in (f)(1) through (3) of this section. [Excerpted from proposed 10 CFR Part 52.]*

50.34(f) Item	Requirement	Action Plan Item	N/A	Yes	No
<p>(1) To satisfy the following requirements, the application shall provide sufficient information to describe the nature of the studies, how they are to be conducted, estimated submittal dates, and a program to ensure that the results of such studies are factored into the final design of the facility. For licensees identified in the introduction to paragraph (f) of this section, all studies shall be completed no later than 2 years following issuance of the construction permit or manufacturing license. For all other applicants, the studies must be submitted as part of the final safety analysis report.</p>					
(1)(i)	Perform a plant/site-specific probabilistic risk assessment [PRA], the aim of which is to seek such improvements in the reliability of core and containment heat removal systems as are significant and practical and do not impact excessively on the plant.	II.B.8			
(1)(ii)	Perform an evaluation of the proposed auxiliary feedwater system (AFWS), to include (PWRs only):	II.E.1.1			
	(A) A simplified AFWS reliability analysis using event-tree and fault-tree logic techniques.				
	(B) A design review of AFWS.				
	(C) An evaluation of AFWS flow design bases and criteria.				
(1)(iii)	Perform an evaluation of the potential for and impact of reactor coolant pump seal damage following small-break loss-of-coolant accident (LOCA) with loss of offsite power. If damage cannot be precluded, provide an analysis of the limiting small-break loss-of-coolant accident with subsequent reactor coolant pump seal damage.	II.K.2.16 and II.K.3.25			
(1)(iv)	Perform an analysis of the probability of a small-break loss-of-coolant accident (LOCA) caused by a stuck-open power-operated relief valve (PORV). If this probability is a significant contributor to the probability of small-break LOCAs from all causes, provide a description and evaluation of the effect on small-break LOCA probability of an automatic PORV isolation system that would operate when the reactor coolant system pressure falls after the PORV has opened. (PWRs only)	II.K.3.2			



50.34(f) Item	Requirement	Action Plan Item	N/A	Yes	No
(1)(v)	Perform an evaluation of the safety effectiveness of providing for separation of high-pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) system initiation levels so that the RCIC system initiates at a higher water level than the HPCI system, and providing that both systems restart on low water level. (For plants with high-pressure core spray [HPCS] systems in lieu of high-pressure coolant injection systems, substitute the words, “high-pressure core spray” for “high-pressure coolant injection” and “HPCS” for “HPCI”.) (BWRs only)	II.K.3.13			
(1)(vi)	Perform a study to identify practicable system modifications that would reduce challenges and failures of relief valves, without compromising the performance of the valves or other systems. (BWRs only)	II.K.3.16			
(1)(vii)	Perform a feasibility and risk assessment study to determine the optimum automatic depressurization system (ADS) design modifications that would eliminate the need for manual activation to ensure adequate core cooling. (BWRs only)	II.K.3.18			
(1)(viii)	Perform a study of the effect on all core-cooling modes under accident conditions of designing the core spray and low-pressure coolant injection systems to ensure that the systems will automatically restart on loss of water level, after having been manually stopped, if an initiation signal is still present. (BWRs only)	II.K.3.21			
(1)(ix)	Perform a study to determine the need for additional space cooling to ensure reliable long-term operation of the reactor core isolation cooling (RCIC) and high-pressure coolant injection (HPCI) systems, following a complete loss of offsite power to the plant for at least 2 hours. (For plants with high-pressure core spray [HPCS] systems in lieu of high-pressure coolant injection systems, substitute the words, “high-pressure core spray” for “high-pressure coolant injection” and “HPCS” for “HPCI”.) (BWRs only)	II.K.3.24			
(1)(x)	Perform a study to ensure that the automatic depressurization system, valves, accumulators, and associated equipment and instrumentation will be capable of performing their intended functions during and following an accident situation, taking no credit for non-safety related equipment or instrumentation, and accounting for normal expected air (or nitrogen) leakage through valves. (BWRs only)	II.K.3.28			
(1)(xi)	Provide an evaluation of depressurization methods, other than by full actuation of the automatic depressurization system, that would reduce the possibility of exceeding vessel integrity limits during rapid cooldown. (BWRs only)	II.K.3.45			

50.34(f) Item	Requirement	Action Plan Item	N/A	Yes	No
(2) To satisfy the following requirements, the application shall provide sufficient information to demonstrate that the required actions will be satisfactorily completed by the operating license stage. This information is of the type customarily required to satisfy 10 CFR 50.35(a)(2) or to address unresolved generic safety issues.					
(2)(i)	Provide a simulator capability that correctly models the control room and includes the capability to simulate small-break LOCAs. (CP applicants only; <i>also applies to COL applicants</i> )	I.A.4.2			
(2)(ii)	Establish a program, to begin during construction and follow into operation, for integrating and expanding current efforts to improve plant procedures. The scope of the program shall include emergency procedures, reliability analyses, human factors engineering, crisis management, operator training, and coordination with [the Institute of Nuclear Power Operations (INPO)] and other industry efforts. (CP applicants only; <i>also applies to COL applicants</i> )	I.C.9			
(2)(iii)	Provide, for Commission review, a control room design that reflects state-of-the-art human factors principles prior to committing to fabrication or revision of fabricated control room panels and layouts.	I.D.1			
(2)(iv)	Provide a plant safety parameter display console that will display to operators a minimum set of parameters defining the safety status of the plant, capable of displaying a full range of important plant parameters and data trends on demand, and capable of indicating when process limits are being approached or exceeded.	I.D.2			
(2)(v)	Provide for automatic indication of the bypassed and operable status of safety systems.	I.D.3			
(2)(vi)	Provide the capability of high-point venting of noncondensable gases from the reactor coolant system, and other systems that may be required to maintain adequate core cooling. Systems to achieve this capability shall be capable of being operated from the control room, and their operation shall not lead to an unacceptable increase in the probability of loss-of-coolant accident or an unacceptable challenge to containment integrity.	II.B.1			
(2)(vii)	Perform radiation and shielding design reviews of spaces around systems that may, as a result of an accident, contain accident source term <sup>11</sup> radioactive materials, and design as necessary to permit adequate access to important areas and to protect safety equipment from the radiation environment.	II.B.2			

<sup>11</sup> Footnote 11 in 10 CFR 50.34(f) reads as follows: “The fission product release assumed for these calculations should be based upon a major accident, hypothesized for purposes of site analysis or postulated from considerations of possible accidental events, that would result in potential hazards not exceeded by those considered credible. Such accidents have generally been assumed to result in substantial meltdown of the core with subsequent release of appreciable quantities of fission products.”

50.34(f) Item	Requirement	Action Plan Item	N/A	Yes	No
(2)(viii)	Provide a capability to promptly obtain and analyze samples from the reactor coolant system and containment that may contain accident source term <sup>11</sup> radioactive materials without radiation exposures to any individual exceeding 5 rems to the whole body or 50 rems to the extremities. Materials to be analyzed and quantified include certain radionuclides that are indicators of the degree of core damage (e.g., noble gases, radioiodines and cesiums, and nonvolatile isotopes), hydrogen in the containment atmosphere, dissolved gases, chloride, and boron concentrations.	II.B.3			
(2)(x)	Provide a test program and associated model development, and conduct tests to qualify reactor coolant system relief and safety valves and, for PWRs, PORV block valves, for all fluid conditions expected under operating conditions, transients, and accidents. Consideration of anticipated transient without scram (ATWS) conditions shall be included in the test program. Actual testing under ATWS conditions need not be carried out until subsequent phases of the test program are developed.	II.D.1			
(2)(xi)	Provide direct indication of relief and safety valve position (open or closed) in the control room.	II.D.3			
(2)(xii)	Provide automatic and manual auxiliary feedwater (AFW) system initiation, and provide auxiliary feedwater system flow indication in the control room. (PWRs only)	II.E.1.2			
(2)(xiii)	Provide pressurizer heater power supply and associated motive and control power interfaces sufficient to establish and maintain natural circulation in hot standby conditions with only onsite power available. (PWRs only)	II.E.3.1			
(2)(xiv)	Provide containment isolation systems that:	II.E.4.2			
	(A) Ensure all non-essential systems are isolated automatically by the containment isolation system,				
	(B) For each non-essential penetration (except instrument lines) have two isolation barriers in series,				
	(C) Do not result in reopening of the containment isolation valves on resetting of the isolation signal,				
	(D) Utilize a containment set point pressure for initiating containment isolation as low as is compatible with normal operation,				
	(E) Include automatic closing on a high radiation signal for all systems that provide a path to the environs.				

50.34(f) Item	Requirement	Action Plan Item	N/A	Yes	No
(2)(xv)	Provide a capability for containment purging/venting designed to minimize the purging time consistent with as low as reasonably achievable (ALARA) principles for occupational exposure. Provide and demonstrate high assurance that the purge system will reliably isolate under accident conditions.	II.E.4.4			
(2)(xvi)	Establish a design criterion for the allowable number of actuation cycles of the emergency core cooling system and reactor protection system consistent with the expected occurrence rates of severe overcooling events (considering both anticipated transients and accidents). (B&W designs only)	II.E.5.1			
(2)(xvii)	Provide instrumentation to measure, record, and readout in the control room (A) containment pressure, (B) containment water level, (C) containment hydrogen concentration, (D) containment radiation intensity (high level), and (E) noble gas effluents at all potential, accident release points. Provide for continuous sampling of radioactive iodines and particulates in gaseous effluents from all potential accident release points, and for onsite capability to analyze and measure these samples.	II.F.1			
(2)(xviii)	Provide instruments that provide in the control room an unambiguous indication of inadequate core cooling, such as primary coolant saturation meters in PWRs, and a suitable combination of signals from indicators of coolant level in the reactor vessel and in-core thermocouples in PWRs and BWRs.	II.F.2			
(2)(xix)	Provide instrumentation adequate for monitoring plant conditions following an accident that includes core damage.	II.F.3			
(2)(xx)	Provide power supplies for pressurizer relief valves, block valves, and level indicators such that (A) level indicators are powered from vital buses; (B) motive and control power connections to the emergency power sources are through devices qualified in accordance with requirements applicable to systems important to safety, and (C) electric power is provided from emergency power sources. (PWRs only)	II.G.1			
(2)(xxi)	Design auxiliary heat removal systems such that necessary automatic and manual actions can be taken to ensure proper functioning when the main feedwater system is not operable. (BWRs only)	II.K.1.22			
(2)(xxii)	Perform a failure modes and effects analysis of the integrated control system (ICS) to include consideration of failures and effects of input and output signals to the ICS. (B&W designs only)	II.K.2.9			
(2)(xxiii)	Provide, as part of the reactor protection system, an anticipatory reactor trip that would be actuated on loss of main feedwater and on turbine trip. (B&W designs only)	II.K.2.10			

50.34(f) Item	Requirement	Action Plan Item	N/A	Yes	No
(xxiv)	Provide the capability to record reactor vessel water level in one location on recorders that meet normal post-accident recording requirements. (BWRs only)	II.K.3.23			
(xxv)	Provide an onsite Technical Support Center, an onsite Operational Support Center, and, for construction permit applications only, a near-site Emergency Operations Facility.	III.A.1.2			
(2)(xxvi)	Provide for leakage control and detection in the design of systems outside containment that contain (or might contain) accident source term <sup>11</sup> radioactive materials following an accident. Applicants shall submit a leakage control program, including an initial test program, a schedule for retesting these systems, and the actions to be taken for minimizing leakage from such systems. The goal is to minimize potential exposures to workers and the public, and to provide reasonable assurance that excessive leakage will not prevent the use of systems needed in an emergency.	III.D.1.1			
(2)(xxvii)	Provide for monitoring of in-plant radiation and airborne radioactivity as appropriate for a broad range of routine and accident conditions.	III.D.3.3			
(2) (xxviii)	Evaluate potential pathways for radioactivity and radiation that may lead to control room habitability problems under accident conditions resulting in an accident source term <sup>11</sup> release, and make necessary design provisions to preclude such problems.	III.D.3.4			
(3) To satisfy the following requirements, the application shall provide sufficient information to demonstrate that the requirement has been met. This information is of the type customarily required to satisfy paragraph (a)(1) of this section or to address the applicant's technical qualifications and management structure and competence.					
(3)(i)	Provide administrative procedures for evaluating operating, design, and construction experience and for ensuring that applicable important industry experiences will be provided in a timely manner to those designing and constructing the plant.	I.C.5			
(3)(ii)	Ensure that the quality assurance (QA) list required by Criterion II in Appendix B to 10 CFR Part 50 includes all structures, systems, and components important to safety.	I.F.1			

50.34(f) Item	Requirement	Action Plan Item	N/A	Yes	No
(3)(iii)	Establish a quality assurance (QA) program based on consideration of (A) ensuring independence of the organization performing checking functions from the organization responsible for performing the functions; (B) performing quality assurance/quality control functions at construction sites to the maximum feasible extent; (C) including QA personnel in the documented review of and concurrence in quality related procedures associated with design, construction, and installation; (D) establishing criteria for determining QA programmatic requirements; (E) establishing qualification requirements for QA and [quality control] QC personnel; (F) sizing the QA staff commensurate with its duties and responsibilities; (G) establishing procedures for maintenance of “as-built” documentation; and (H) providing a QA role in design and analysis activities.	I.F.2			
(3)(iv)	Provide one or more dedicated containment penetrations, equivalent in size to a single 3-foot-diameter opening, in order not to preclude future installation of systems to prevent containment failure, such as a filtered vented containment system.	II.B.8			
(3)(vii)	Provide a description of the management plan for design and construction activities, to include: (A) the organizational and management structure singularly responsible for direction of design and construction of the proposed plant; (B) technical resources director by the applicant; (C) details of the interaction of design and construction within the applicant’s organization and the manner by which the applicant will ensure close integration of the architect engineer and the nuclear steam supply vendor; (D) proposed procedures for handling the transition to operation; (E) the degree of top-level management oversight and technical control to be exercised by the applicant during design and construction, including the preparation and implementation of procedures necessary to guide the effort.	II.J.3.1			