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Design Review Checklist Example

The Design Review Checklist example below is intended to serve as a supplement for Design Reviews and is not all inclusive. The examples and criteria are oriented towards mechanical design hazards / criteria but, when the checklist is used, reviewers are strongly encouraged to consider all hazard classes, such as electrical, radiological, pressure/hydraulic, material movement (e.g. critical lift), etc. for a given topic.

DESIGN REVIEW CHECKLIST

Title: _____

Date: _____

DMS Design Review Collection ID: _____

Design Review Chairperson (if applicable): _____

Design Review Team (if applicable): _____

ES&H / QAR Process Oversight: _____

Design Review Type (check one):

☐ Conceptual Design Review ☐ Preliminary Design Review ☐ Final Design Review

Respond to each question by marking the block in front of the question "YES", "NO" or "N/A". Items that are questionable or incomplete should be marked "NO" and explained briefly. Items marked "N/A" should be minimal in number, and reflect lack of relevance or applicability to this particular Design Review. In preliminary versions of the form, you may respond as if all action items are satisfactorily resolved.

Design Objectives	**Yes, No, N/A**
1. Is the Charge suitable for the level and type of review?	
2. Is there a clear statement as to what the design is intended to do or achieve?	
3. Is there a quantitative assessment that shows that the intent of the design is likely to be accomplished?	
4. If any of the motivation for the design is economic (e.g., reduce manufacturing cost), has the design been evaluated to confirm that the increment of improvement is justified by the development cost and/or the potential economic incentive?	
5. Have questions of intellectual property, patentability or patent infringement been considered in developing the design?	
6. Have all action items been suitably addressed and approved by responsible party?	

Functional Requirements	**Yes, No, N/A**
1. Are the functional requirements for the design clearly identified and complete?	

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Functional Requirements	Yes, No, N/A
2. Are assumptions adequately described and reasonable?	
3. Have appropriate regulatory or performance requirements been invoked for the design?	
4. Have pertinent interface requirements been defined / identified?	
5. Has compatibility with other resident components or systems and impact on respective design margins been considered?	
6. Does the design team fully understand the environment in which the product is to operate and how that environment may change over time and the resulting impact on the functional requirements of the design?	

Design Requirements and Design Bases	Yes, No, N/A
1. Are the design requirements and design bases appropriate, complete, and quantitative (e.g., with specific acceptance criteria or limits) including but not limited to: a. Interfaces with other components or systems, especially dimensional interfaces. b. Stress, strain, and load limits for all structural components under normal operating conditions, accident conditions, and shipping and handling conditions. c. Limits on the cumulative effect of cyclic mechanical or thermal loadings (e.g., fatigue) on the structural members. d. Environmentally induced effects on materials or components (e.g., oxidation, hydriding, corrosion, water chemistry) f. Dimensional changes (e.g., bowing, dimensional growth, creep) g. Integrity of encapsulated components considering credible failure mechanisms (e.g., collapse, burst, heat transfer). i. Worst case pneumatic or hydraulic loads under normal operating conditions	

Design Drawings and Documents	Yes, No, N/A
1. Have all necessary drawings, specifications, test reports, etc., been approved and released?	
2. Have all necessary calculations, tests, or analyses been performed and documented?	
3. Has all review and independent verification of design documents been completed?	
4. Have all necessary changes to design manuals or the equivalent been initiated?	

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Design Evaluation	Yes, No, N/A
1. Were appropriate design methods used, and were design inputs correctly incorporated?	
2. Has applicable manufacturing and operating experience been considered?	
3. Have adequate provisions been included for qualifying new materials, suppliers, and manufacturing processes/methods?	
4. Have changes from prior proven designs been justified (e.g., risk versus potential benefit)?	
5. Has design been evaluated against comparable facility or national lab designs?	
6. Have historical problems and the potential for aggravating old problems been considered?	
7. Have reasonable alternatives to the proposed design been adequately evaluated and considered?	
8. Have past performance issues been identified and addressed?	
9. Have any new analytical methods/models been appropriately verified?	
10. Has applicability of old methods/models been appropriately verified?	
11. Has adequate margin been provided to account for uncertainties of tests, measurements, analyses and assumptions?	
12. Are the major risks, uncertainties and development items documented and evaluated?	
13. Have recommendations from previous applicable Design Reviews been addressed?	
14. Do the design criteria satisfy generic functional requirements as opposed to specific operating cycle requirements?	
15. If a technology from a similar design is being applied, were appropriate scaling and other assessments considered and evaluated?	
16. Has a risk assessment been performed for the overall design?	

Testing, Inspection and Surveillance	Yes, No, N/A
1. If any aspects of the design are being verified by test or demo operation, are the proposed tests necessary and sufficient for the intended purpose?	
2. Have unique testing and inspection requirements for any new manufacturing process and/or supplier been considered and documented in the design specification?	

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Testing, Inspection and Surveillance	Yes, No, N/A
3. Has the applicability of existing specifications been reviewed for the design?	
4. Do the tests adequately address variability arising from the drawing tolerances with regard to design criteria/parameters?	
5. Has sufficient testing been performed to verify the consistency or repeatability of complying with design parameters?	
6. Has the need to use calibrated the measurement and test equipment for acceptance testing been determined? (See DOE Criterion 8b)	
7. Have shipping requirements for any new manufacturing process been considered?	
8. Have material handling e.g. hoisting and rigging requirements been considered?	

Quality Assurance	Yes, No, N/A
1. Has the design been created in accordance with appropriate engineering procedures and design standards?	
2. Are records of the design calculations, tests, or analyses being maintained?	
3. Has the adequacy of the design been verified by individuals or groups other than those who created the design?	
4. Have the quality issues from the design reviews been adequately addressed?	
5. Has the accuracy of the measurement and test equipment used to validate the design been established by calibration or other means? (See DOE Criterion 5 d)	
6. Does the procurement include a method for managing design changes after the design has been released for fabrication?	
7. Does the procurement include acceptance criteria that can be validated through inspection, testing, or document reviews?	
8. Have the above questions been considered for software and firmware designs? (See DOE O 414.1D Attachment 1, Section 1b)	

Manufacturing Considerations	Yes, No, N/A
1. Do manufacturing development efforts effectively support the design for any new or unique manufacturing processes needed (e.g., scope, depth, schedule)?	
2. Have any unique material availability problems been adequately considered?	

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Manufacturing Considerations	Yes, No, N/A
3. Is the design complete and acceptable with regard to manufacturing process control?	
4. Has a risk assessment been performed on the manufacturing process?	

Safety Considerations	Yes, No, N/A
1. Have all requisite safety reviews been completed by the responsible committee?	
2. Do the design features or methods avoid increasing the probability of occurrence or consequences of an accident or malfunction?	
3. Have any personnel safety concerns been adequately considered and resolved?	
4. Have interface evaluations been performed by the impacted groups, or has the scope of effort required for specific application been identified? Have generic evaluations been performed, where applicable?	

Change Control	Yes, No, N/A
1. Have core interface features of the design been compared to existing standards and/or limits?	
2. Do new/changed features of the design represent an acceptable departure from existing standards or limits? If so, how are approval of these departures documented?	
3. If the design adds or changes a credited control and the change is not an equivalent change, has an Unreviewed Safety Issue Determination been performed?	

Maintenance / Repairability	Yes, No, N/A
1. Have design features adequately addressed specific functional requirements for repair and maintenance of the product?	
2. Do criteria for repair facilitate simple, economical and prompt correction of product deficiencies?	
3. Are interface organizations which may be ultimately involved in a repair program familiar with the design features?	

Methodology	Yes, No, N/A
1. In case methodology changes or amendments are proposed have they been properly described or reviewed or are they part of the design package?	
2. Has the supporting testing been evaluated and necessary correlations for design purposes been established?	

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Readiness Reviews	Yes, No, N/A
1. Have the type and timing of readiness reviews (Installation Readiness Review, Instrument Readiness Review, Accelerator Readiness Review, Commissioning Readiness Review, etc.) been established for the design?	