

DATA ITEM DESCRIPTION			Form Approved OMB No. 0704-0188 Exp. Date: Jun 30, 1986	
1. TITLE Nuclear Hardness and Survivability Design Analysis Report		2. IDENTIFICATION NUMBER DI-ENVR-80266		
3. DESCRIPTION/PURPOSE This report documents the methodology and results of the contractor's activity to incorporate specified nuclear hardness and survivability (NH&S) requirements into the design of each configuration item (CI) for which he has responsibility, or any of its constitutive elements. This report is used (1) by the procuring agency to evaluate the degree to which the contractor has clearly demonstrated the achievement of NH&S requirements in the design of his CI; and (2) by AFLC, to aid (Continued on page 3)				
4. APPROVAL DATE (YYMMDD) 861201	5. OFFICE OF PRIMARY RESPONSIBILITY (OPR) AF-14	6a. DTIC REQUIRED	6b. GIDEP REQUIRED	
7. APPLICATION / INTERRELATIONSHIP 7.1 This DID contains the format and content requirements for the NH&S Design Analysis Report (NH&S DAR) required in 5.2.4.2 and 5.2.4.2.1 of DOD-STD-1766A. 7.2 This DID is applicable to system development contracts during the full scale development phase, and to equipment development/procurement contracts when contractors are required to conduct an NH&S program. 7.3 This DID and DI-ENVR-80267 supersede DI-S-30554A.				
8. APPROVAL LIMITATION		9a. APPLICABLE FORMS	9b. AMSC NUMBER F4003	
10. PREPARATION INSTRUCTIONS 10.1 <u>Source document.</u> The applicable issue of the documents cited herein, including their approval date, and dates of any applicable amendments and revisions, shall be as reflected in the contract. 10.2 <u>Format.</u> A sectionalized bookform format capable of being changed by inserting change pages shall be used. The cover and title page shall appear as in Figure 1. 10.3 <u>Content.</u> A separate NH&S DAR shall be prepared for each CI. The final design review version of the NH&S DAR shall be revised and modified, as required, for release at the physical configuration audit (PCA) of a version which will support AFLC's implementation of its hardness maintenance responsibilities throughout weapon system operational life. The requirements for both the design review and PCA versions of the NH&S DAR are identified separately below. 10.3.1 <u>Design review version.</u> The versions of the NH&S DAR released prior to the critical design review (CDR) may consist of a preliminary report, followed by up-dating type reports as the design is finalized. The CDR version of the NH&S DAR shall satisfy all requirements identified below. 10.3.1.1 <u>Hardness critical item (HCI) identification and reference.</u> The CDR version of the NH&S DAR shall contain a dedicated section titled "HIC Identification and Reference". This section shall consist of two sub-sections, "HCI Index" and "HCI Reference Documentation". 10.3.1.1.1 <u>HCI Index.</u> This sub-section shall provide, in matrix format, a complete HCI list for the CI under consideration, and, for each HCI listed, the following information: a. Indenture level; b. Part number of item;				

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10. PREPARATION INSTRUCTIONS (Cont'd)

(Date of submittal)

NH&S Design Analysis Report

For

(Identify the Contract Hardware Element by CI Name and Number)

Submitted by

(Identify Contractor)

In Response to

Contract No: _____

CDRL Sequence No: _____

FIGURE 1. Sample NH&S design analysis report front cover and title page.

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3. DESCRIPTION/PURPOSE (Cont'd)

in the evaluation of the hardness impact of planned redesign/modification/upgrade actions, and to support the reprocurement, repair, and maintenance of hardness critical items.

10. PREPARATION INSTRUCTIONS (Cont'd)

- c. Name of item;
- d. Identification of the critical nuclear environment(s) applicable to the HCI;
- e. Identification of the applicable rationale(s) which justify the labeling of the item as an HCI; this identification shall consist of the listing of the identifying number of each applicable rationale, as given in section 3 of DOD-STD-1766;
- f. Identification of all location(s) within the NH&S DAR at which the HCI is discussed;
- g. Identification of the document reference number from the listing in the HCI reference documentation list (see 10.3.1.1.2 below) for all reference documents containing substantive information on the given HCI; this element of information need not be completed in the design review version of the NH&S DAR, but provision for it shall be made in the format of the HCI Index to facilitate its completion in the PCA version of the NH&S DAR.

10.3.1.1.2 HCI reference documentation. This sub-section shall contain a complete listing of all hardness related deliverable documentation generated by the contractor from the beginning of his participation in the weapon system program. Documents may be listed in arbitrary order, and each shall be assigned a reference number in serially ascending order. It is these reference numbers that shall be included, as appropriate, in the HCI Index under item g. The HCI reference documentation sub-section need not be completed in the design review version of the NH&S DAR, but the sub-section heading shall be provided, with the associated statement "To be provided".

10.3.1.2 Text. The body of the text shall include a separate section for each major subdivision of the CI under analysis, and within each such separate section, the content shall be organized by environment. Include the following, as applicable and appropriate, in each section of the text:

- a. Objective of the analysis.
- b. A complete description of the subdivision of the CI analyzed, including functional and physical descriptions and performance requirements. Include adequate drawings, schematics, etc., to support the description.
- c. Identification of the nuclear requirements imposed on the design.
- d. Identification and discussion of hardness design features. Identify and discuss the hardness design features by which the CI is able to adequately withstand the effects of the specified nuclear environments, or provides hardness protection to other hardware items within the system. This discussion shall include identification of all HCIs and hardness critical processes which comprise

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10. PREPARATION INSTRUCTIONS (Cont'd)

the feature or which provide physical or functional support to its hardness function, and shall provide reference to pertinent drawings, schematics, etc.

e. Assumptions imposed on the analysis.

f. Identification of source material used in the analysis. If source material is not in the open literature or in another contract deliverable item, incorporate a copy of the source material as an appendix to the report.

g. Discussion of the analysis/test procedures, methods, and techniques used to establish a hardened design and their attendant accuracy. Provide sample calculations, as appropriate. Provide all design analyses performed for the purpose of verifying that the final design satisfies the specified hardness requirements. Provide reference to all relevant test plans, procedures, and test result reports, so that either by reference or through explicit discussion, all data relevant to verifying that the final design satisfies the specified hardness requirements is presented.

h. Presentation of results and conclusions, including a comparison of predicted and tested performance to the specified hardness requirements. Also present all available data related to pertinent hardness design margins and hardness fragilities.

10.3.2 PCA version. The text shall contain the entire content of the final CDR version, updated, as appropriate, to reflect any design changes made between CDR and PCA which affect hardness. In addition, item g. of the "HCI Index" shall be completed, as well as the "HCI Reference Documentation" sub-section.