

ATTACHMENT # 3

QSPDS

A

FUNCTIONAL DESIGN DESCRIPTION

FOR THE

QUALIFIED SAFETY PARAMETER DISPLAY SYSTEM

FOR

ST. LUCIE UNIT 1

⑦
- copy to Andy

FUNCTIONAL DESIGN DESCRIPTION NUMBER 11181-ICE-3218, REVISION 00

QA Status: Verified

The safety related design information contained in this document has been reviewed and satisfies (where applicable) the items contained on check-list(s) 2, , and of the Quality Assurance of Design Manual. This review is so certified.

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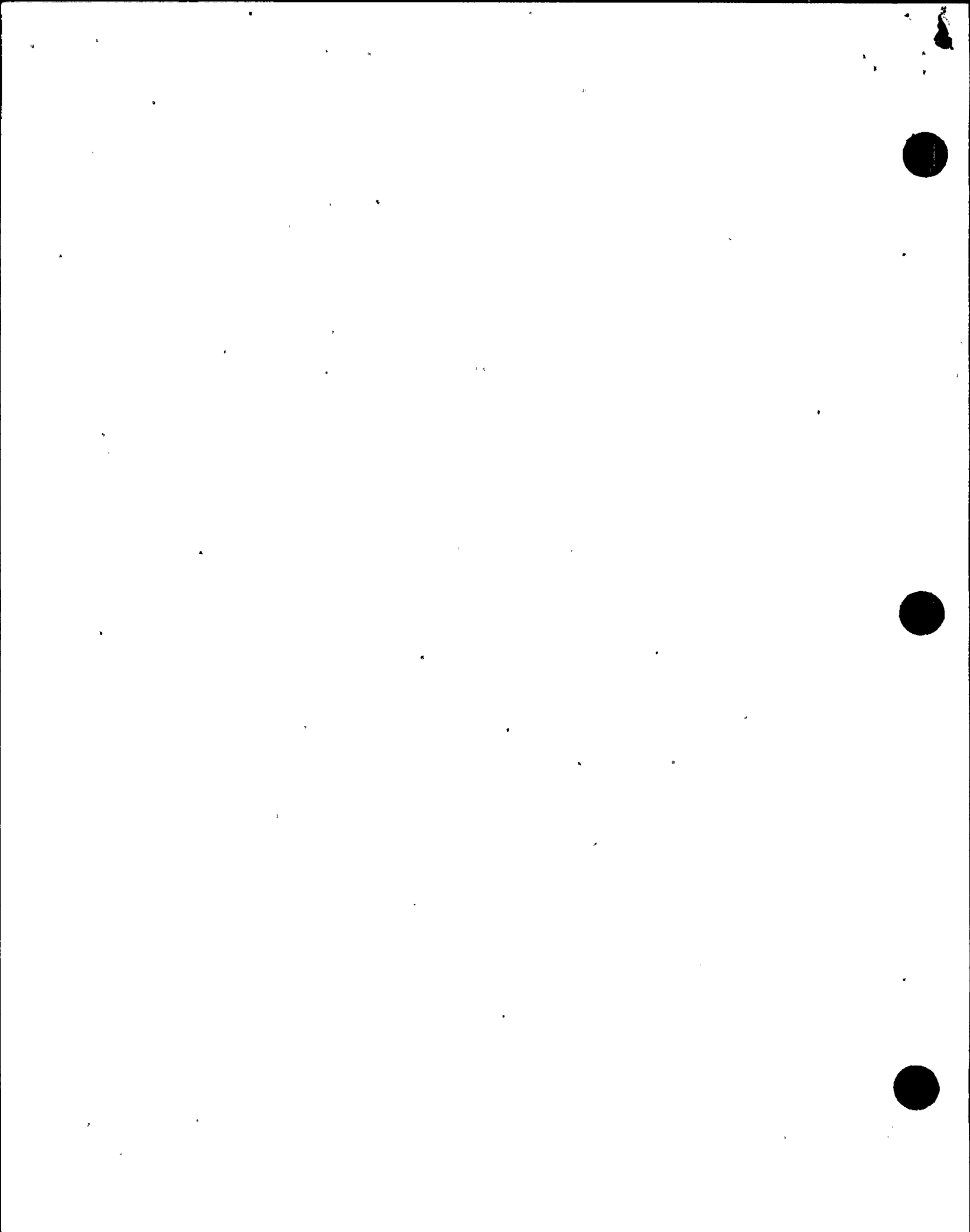
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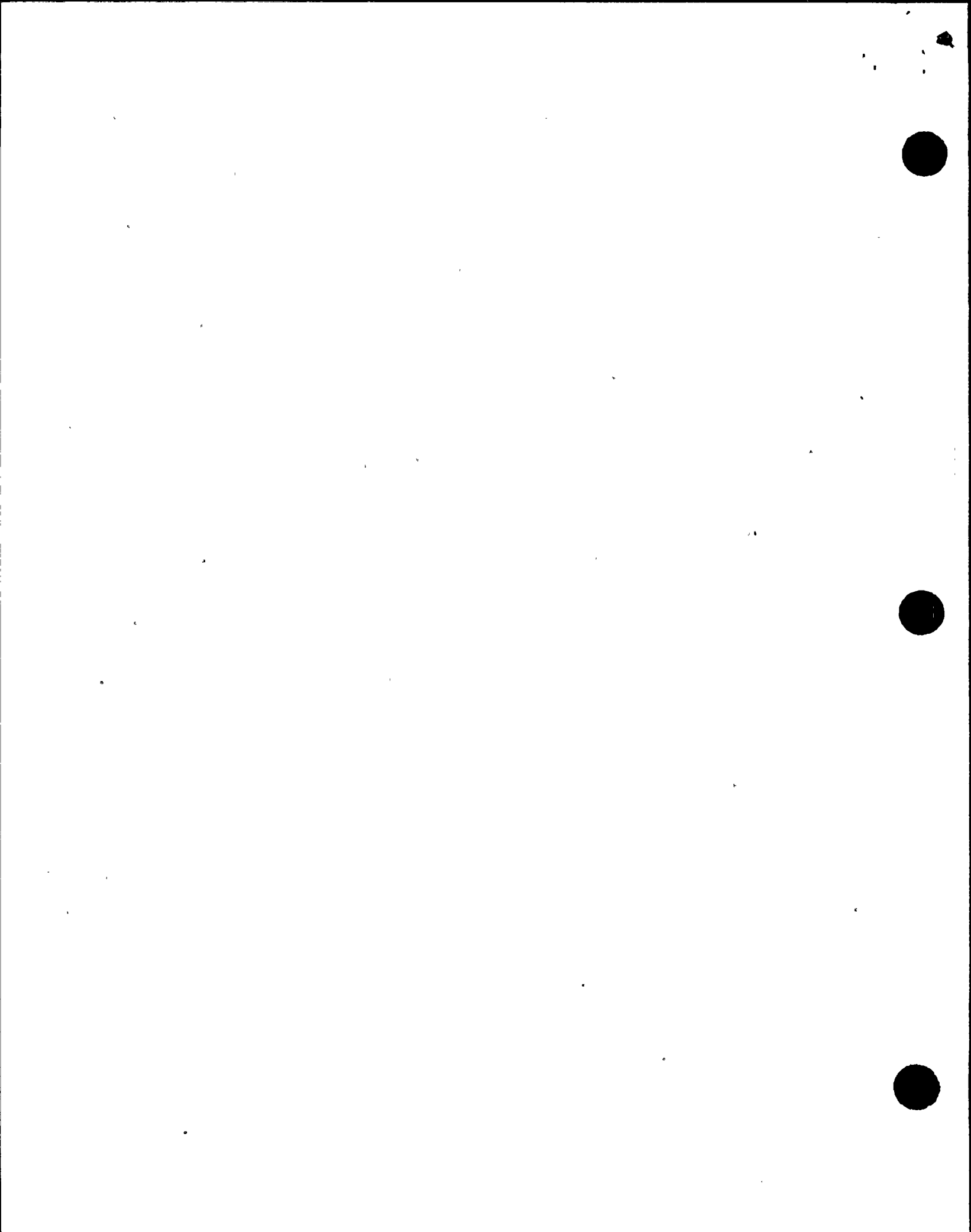
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ABSTRACT

This document specifies the Qualified Safety Parameter Display System functional design for St. Lucie Unit 1. This document is based upon the generic QSPDS functional design specification, NPROD-ICE-3201. Plant specific compliance with the generic functional design specification and plant specific differences are specified.

This document is quality assured according to the QAPD, Revision 16. — — —

TABLE OF CONTENTS

<u>SECTION NUMBER</u>	<u>TITLE</u>	<u>PAGE NUMBER</u>
1.0	Purpose and Scope	5
2.0	References	5
3.0	Design Bases	5
4.0	System Functional Requirements	6
5.0	System Functional Description	6
6.0	System Design Requirements	6

1.0

PURPOSE AND SCOPE

The purpose of this document is to specify the plant specific design bases, functional requirements, and functional design for the QSPDS for St. Lucie Unit 1. This document, in conjunction with the generic QSPDS functional design specification (Reference 1), comprises the functional design specification. Two other documents, the QSPDS data base document (Reference 2) and the QSPDS display design document (Reference 3), describe the plant specific input and data constants and displays.

2.0

REFERENCES

1. Functional Design Specification for a Qualified Safety Parameter Display System, NPROD-ICE-3201, Rev. 00.
2. The QSPDS Data Base Document for St. Lucie Unit 1, 11181-ICE-3219.
3. Functional Design Specification for the QSPDS Displays for St. Lucie Unit 1, 11181-ICE-3220.

3.0

DESIGN BASES

The design bases for the St. Lucie Unit 1 QSPDS are a subset of the design bases of the generic QSPDS functional design specification (Reference 1). Briefly, these functions are:

1. Safety grade processing and display of the ICC variables.
2. Isolation of Class 1E inputs into the non Class 1E Safety Assessment System (SAS) which is not in C-E scope.
3. Human factor engineered display system.

3.1

DESIGN BASIS EVENTS

The St. Lucie Unit 1 design is the same as specified in the generic functional design of Reference 1.



4.0 SYSTEM FUNCTIONAL REQUIREMENTS

St. Lucie Unit 1 incorporates the ICC functional requirements contained in Section 4.1 of Reference 1. The backup SPDS function is not included in the St. Lucie Unit 1 QSPDS design.

5.0 SYSTEM FUNCTIONAL DESCRIPTION

The St. Lucie Unit 1 design is not part of the standard Accident Monitoring System configuration described in Reference 1. The QSPDS equipment is functionally the same as in Reference 1 (although some hardware differences exist). The QSPDS is not connected to the Critical Function Monitoring System as described in Reference 1. The QSPDS does data link the ICC inputs and calculated variables and any other input variables defined by FP&L. The reader must read the functional design documentation for the primary computer system, the Safety Assessment System (SAS) to which the QSPDS is connected, to understand the role of the QSPDS data link outputs.

The QSPDS has a capability of accepting the following types of inputs per channel:

1. 40 high level analogs.
2. 12 high level SMM analog inputs.
3. 31 Type K thermocouple inputs.
4. HJTCS inputs (16 Type K inputs).

6.0 SYSTEM DESIGN REQUIREMENTS

Following are the QSPDS design requirements for St. Lucie Unit 1 as compared to the generic system design requirements in Reference 1.

6.1 OVERALL SYSTEM DESIGN REQUIREMENTS

The St. Lucie Unit 1 design is the same as specified in the generic functional design of Reference 1.

6.2 CODES AND STANDARDS

The St. Lucie Unit 1 design is the same as specified in the generic functional design of Reference 1.

6.3 INPUT REQUIREMENTS

6.3.1 Input List

The actual list of inputs with the numbers of inputs, type of input, range, units, and specific comments are included in the St. Lucie Unit 1 data base document (Reference 2). Following is a description of the types of inputs included in the St. Lucie Unit 1 QSPDS for each channel as compared to the generic functional design specification of Reference 1.

The following change is made to ICC inputs as compared to Reference 1:

Hot leg temperature - 1 added for the other steam generator.

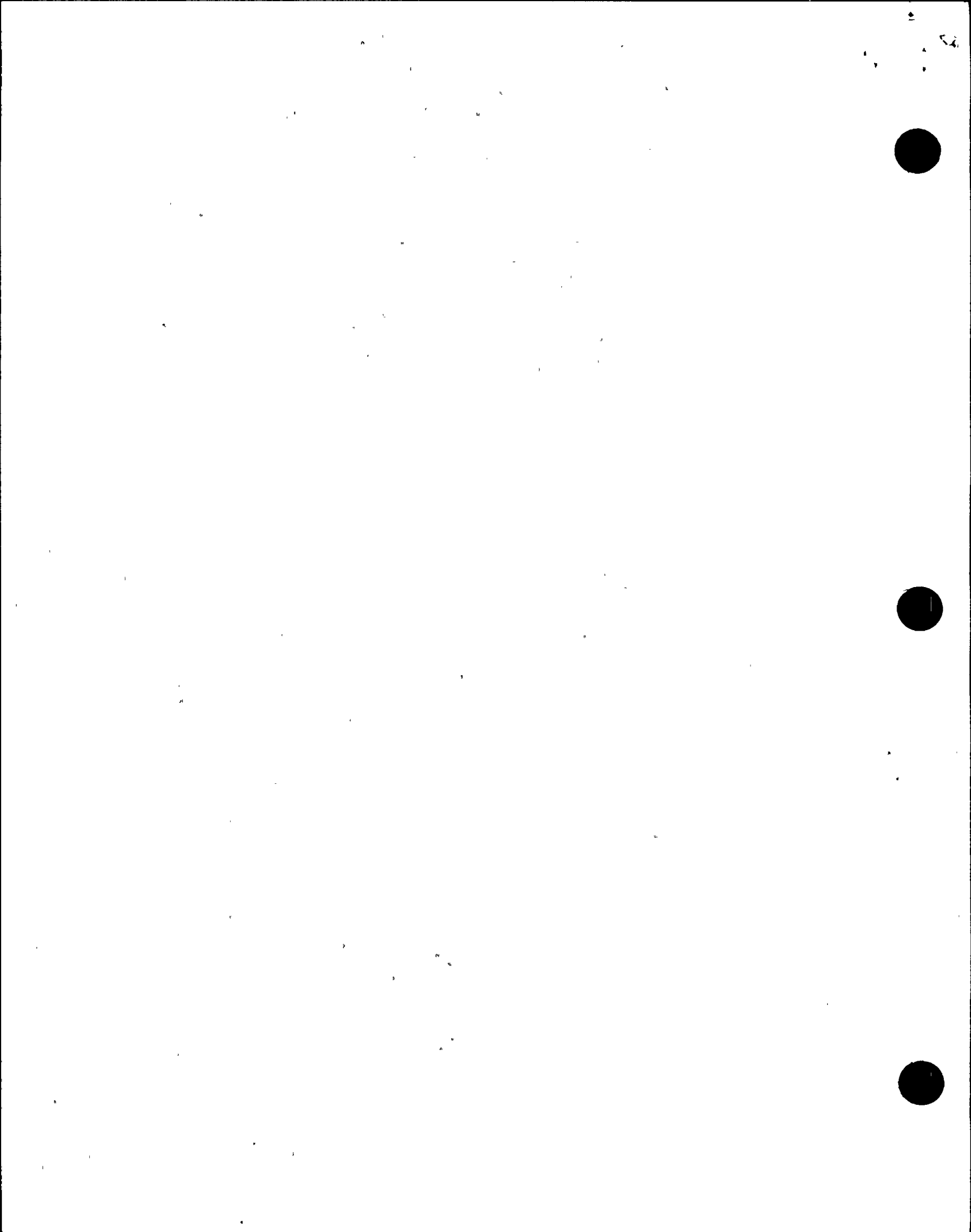
Non ICC variables are not included for St. Lucie Unit 1.

6.3.2 Input Design Requirements

The St. Lucie Unit 1 design is the same as specified in the generic functional design of Reference 1.

6.4 PROCESSING REQUIREMENTS

The St. Lucie Unit 1 design is the same as specified in the generic functional design of Reference 1. The single-probe system with all eight sensors in one probe section will be used.



6.5 DISPLAY REQUIREMENTS

6.5.1 QSPDS Variable Display Information

The St. Lucie Unit 1 design includes the ICC detection information listed in Table 8-5 of Reference 1. Specific ranges and design information for the variables are contained in the data base document (Reference 2):

6.5.2 System Indication

The St. Lucie Unit 1 design is the same as specified in the generic functional design of Reference 1.

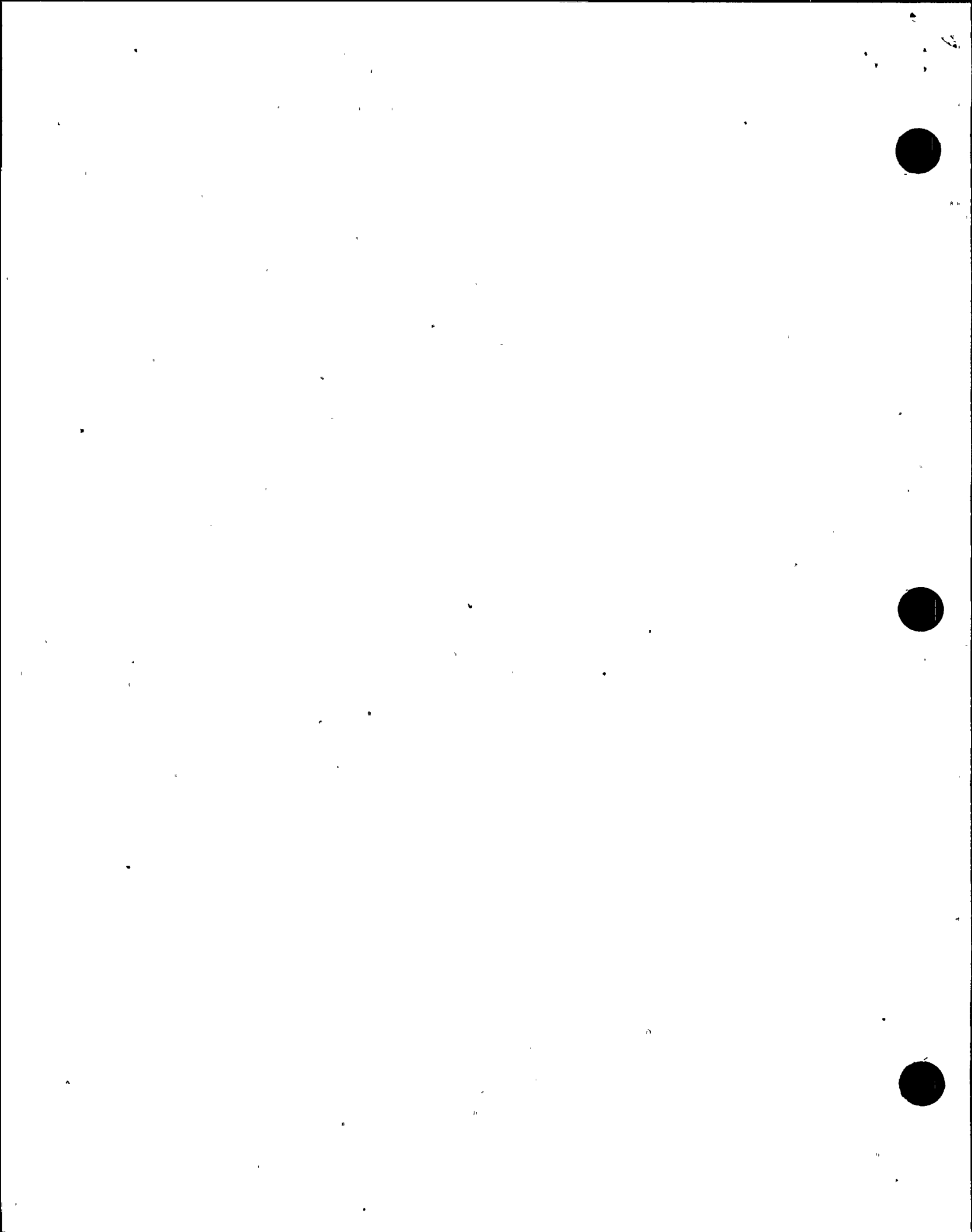
6.5.3 Display Hierarchy

The upper level ICC page will contain the core heat removal variables. The ICC pages remain the same as in Reference 1. A directory page and a diagnostic page are also included in the upper level display pages. The following hierarchy shall be included:

Core Heat Removal

- A. Saturation Margin
- B. Reactor Vessel Level
 - 1. HJTC Temperatures
- C. Core Exit Temperatures
 - 1. Core Map

For more information, refer to the display document, Reference 3.



6.5.4 Alarm Display

The St. Lucie Unit 1 design is the same as specified in the generic functional design of Reference 1.

6.5.5 Display Resolution Requirement

The St. Lucie Unit 1 design is the same as specified in the generic functional design of Reference 1.

6.5.6 Display Update

The St. Lucie Unit 1 design is the same as specified in the generic functional design of Reference 1.

6.6 DATA LINK REQUIREMENTS

The St. Lucie Unit 1 design is the same as specified in the generic functional design of Reference 1, except that the data link does not transmit to the CFMS. The list of inputs and variables to be data linked to the SAS is contained in the data base document, Reference 2. The data link is available for use by FP&L; however, no system test or integration is in the C-E scope.

