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September 5, 1985
Fort St. Vrain
Unit No. 1
P-85309

Regional Administrator
Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76012

Attn: Mr. Dorwin Hunter

Docket No. 50-267

SUBJECT: Safety Parameter
Display System Safety
Analysis Report

REFERENCES:
1) NRC Letter Johnson
To Lee Dated 9/14/84
(G-84355)
2) PSC Letter Warembourg
To Johnson Dated 7/19/84
(P-84372)
3) PSC Letter Warembourg
To Johnson Dated 11/13/84
(P-84487)

Dear Mr. Hunter:

Attached please find test plan used in testing the SPDS Isolation Equipment from interference (i.e. Electrostatic Coupling, EMI, Common Mode And Crosstalk). This letter also provides the action taken in regard to the information needed for staff review discussed in Reference 3, Item 7G.

N.R.C. requested: "with regard to isolation devices between the SPDS and safety systems, provide the following information:"

Item 7.G. A description of the measures taken to protect the safety system from electrical interference (i.e. Electrostatic Coupling, EMI, Common Mode And Crosstalk) that may be generated by the SPDS.

85-808

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To RIV

Item 7.G. is addressed by attachment 1 to this letter. Attachment 1 describes the measures taken to protect the safety systems and test procedure used to verify the ability of the equipment to protect the safety system from electrical interference. The isolation equipment passed the testing for electromagnetic susceptibility test and the results are available for review if it is desired.

This item and PSC's submittal was inadvertently left out of PSC letter Warembourg to Hunter dated 8/26/85 (P-85300).

If you have any questions regarding this matter, please call Mr. M. H. Holmes at (303) 571-8509.

Very truly yours,

D. W. Warembourg

D. W. Warembourg, Manager
Nuclear Engineering Division

Attachment

cc: Mr. E. H. Johnson

DWW/DW/km

ATTACHMENT 1 TO EI LETTER CSO-4152-85

ELECTRICAL INTERFERENCE DESIGN CONSIDERATIONS

The Energy Incorporated isolation system is enclosed in a grounded, 85% coverage, ferrous metal enclosure. Tests to the requirements of SAMA PMC 33.1-1978 "Electromagnetic Susceptibility of Process Control Instrumentation" are scheduled with an independent testing firm. The test is tentatively scheduled for March 1985. The following pages show additional details.

ATTACHMENT 1

SAMA STANDARD

PMC 33.1-1978

ELECTROMAGNETIC SUSCEPTIBILITY OF PROCESS CONTROL INSTRUMENTATION

SCIENTIFIC APPARATUS MAKERS ASSOCIATION

Jordan, E.C., ELECTROMAGNETIC WAVES AND RADIATING SYSTEMS (1950); Prentice-Hall, Englewood Cliffs, NJ 07632

REFERENCE DATA FOR RADIO ENGINEERS, Sixth Edition (1975); Howard W. Sams & Co., Indianapolis, IN

White, D. R. J., HANDBOOK SERIES ON ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY, Volume 2, EMI Test Methods and Procedures (1974); Volume 3, EMI Control Methods and Techniques (1973); Volume 4, EMI Test Instruments and Systems (1971); Don White Consultants, Germantown, MD 20767

4. TEST CLASSIFICATIONS

4.1 The susceptibility tests have been classified according to field strengths and frequency bands. This is to allow the manufacturer or user to describe the susceptibility of instruments more accurately because susceptibility may vary with frequency as well as field strength.

4.2 The classes of field strengths are shown in Table 1; the frequency bands are shown in Table 2.

TABLE 1
CLASS OF FIELD STRENGTHS

Class	Field Strength V/m
1	3
2	10
3	As specified

Class 1 - Low level electromagnetic radiation environments, e.g., local radio/television stations, low power transceivers.

Class 2 - Moderate electromagnetic radiation environments, e.g., portable transceivers or mobile transceivers that can be relatively close to the equipment but not closer than one meter.

Class 3 - Open class for situations involving very severe electromagnetic radiation environments. The level subject to negotiations between the user and vendor, or as defined by the manufacturer.

TABLE 2
FREQUENCY BANDS

Band	Frequency Range MHz
a	20-50
b	50-300
c	300-1000

The identifying nomenclature for the equipment is composed by stating the classes and bands followed by the numerical value of the maximum error of the instrument as shown by figure 1.

Example 1 — 1-c:0.5% Span.
This describes a device that has been tested for only class 1 (3 V/m) and band c (300 to 1000 MHz) and shows an error of not greater than 0.5% span.

Example 2 — 3-bc:1% Reading @ 50 V/m
This describes a device that has been tested for class 3 and bands b and c (50 to 1000 MHz) and shows an error of not greater than 1% of reading at specified level of 50 V/m.

Example 3 — 2-ab:0.75% span; 3-c:0.75% span @ 20 V/m
This describes a device that has been tested for class 2 (10 V/m) at frequencies of 20 to 300 MHz with an error no greater than 0.75% and class 3 at frequencies of 300 to 1000 MHz, with an error of no greater than 0.75% of span at specified level of 20 V/m.

Example 4 - 2-abc: Spec. 7P81.
This describes a device that has been tested for class 2 (10 V/m) over the full frequency range of 20 to 1000 MHz. The effect on the performance must be described in the product (or system) specification number 7P81.

5. TEST METHODS

5.1 TEST SET-UP

5.1.1 The procedure defined herein requires the generation of electromagnetic fields within which the test sample is placed and its operation observed. To generate fields that are useful for simulation of actual (field) conditions may require significant antenna drive power and the resultant high field strength levels. To comply with the Federal Communication Commission's regulations and to prevent "biological" hazards to the testing personnel, it is recommended that these tests be carried out in a shielded enclosure or room.

5.1.2 The use of a shielded enclosure, however, creates difficulties in establishing and maintaining the required field strengths due to reflections of the radiated energy from the walls of the enclosure. These reflections will cause enforcement and cancellation nodes to be established within the room.

5.1.3 The calibrated span and other operational adjustments of the test sample during the testing shall be stated by the manufacturer in his documentation.

5.1.4 All testing on instruments shall be performed in as close to installed conditions as possible. Wiring shall be consistent with the manufacturer's recommended procedures and the instrument shall be in its housing with all covers and access panels in place, unless otherwise stated. If the equipment is designed to be mounted in a panel, rack or cabinet it should be tested in this configuration.

5.1.5 A specific ground plane is not required. When a means is required to support the test sample it should be constructed of non-metallic material. However, grounding of housing or case of the instrument shall be consistent with the manufacturer's installation recommendations.