

Westinghouse Electric Corporation

Power Systems

ATTN. F. LEIDEBACH

February 1, 1977

Mr. C. J. Heltemes, Jr., Chief  
Quality Assurance Branch  
Nuclear Regulatory Commission  
Washington, D.C. 20546

Subject: Westinghouse Position on Regulatory Guide 1.54, "Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants"

Dear Mr. Heltemes:

Westinghouse has reviewed ANSI Standard N101.4 and finds that several of the requirements are not practical to implement. Further, a review of the NRC's Standard Review Plan (Section 6) indicates that in certain circumstances, it may be possible to exclude the application of this Standard. Westinghouse has again reviewed the NSSS scope of supply to determine what items of equipment inside the containment building require special protective coatings. As a result of this review, Westinghouse has developed an alternative approach for satisfying Regulatory Guide 1.54 as described in this letter.

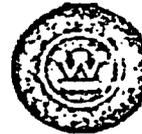
The Westinghouse NSSS equipment located in the containment building is separated into four categories to identify the applicability of this regulatory guide to various types of equipment. These categories of equipment are as follows:

- Category 1 - Large equipment
- Category 2 - Intermediate equipment
- Category 3 - Small equipment
- Category 4 - Insulated/stainless steel equipment

Category 1 - Large Equipment

The Category 1 equipment consists of the following:

- a. Reactor Coolant System Supports



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Free.

Lead OK

Garland

Box 355  
Pittsburgh Pennsylvania 15230

Should be forwarded  
to Proc. Analysis

Keep copy for back up  
& file 1wchp.

All

- b. Reactor Coolant Pumps (motor and motor stand)
- c. Accumulator Tanks
- d. Manipulator Crane

The total exposed surface area for these items is approximately 17,230 square feet.

Since this equipment occupies a large surface area and is procured from only a few vendors, it is possible to implement tight controls over these items.

Westinghouse specifies stringent requirements for protective coatings on this equipment through the use of a painting process specification in our procurement documents. This process specification defines requirements for:

- a. Preparation of vendor procedures.
- b. Use of specific coating systems which are qualified to ARSI M01.2.
- c. Surface preparation.
- d. Application of the coating systems in accordance with the paint manufacturer's instructions.
- e. Inspections and non-destructive examinations.
- f. Exclusion of certain materials.
- g. Identification of all nonconformances
- h. Certifications of compliance.

*No problem with Cat 1*

The vendor's procedures are subject to review by PHRSO Engineering personnel, and the vendor's implementation of the specification requirements is monitored during the Westinghouse QA Surveillance activities.

This system of controls provides assurance that the protective coatings will properly adhere to the base metal during prolonged exposure to a post-accident environment present within the containment building. No loss of paint is anticipated.

#### Category 2 - Intermediate Equipment

The Category 2 equipment consists of the following:

- a. Seismic Platform and Tie Rods
- b. Reactor Internals Lifting Rig
- c. Head Lifting Rig
- d. Electrical Cabinets

The total exposed surface area of these items is approximately 3450 sq. ft. Since these items are procured from a large number of vendors, and individually occupy very small surface areas, it is not practical to enforce the complete set of stringent requirements which were applied to Category 1 items. However, Westinghouse does implement another process specification in our procurement documents. This specification defines to the vendors the requirements for:

- a. Use of specific coating systems which are qualified to ANSI N101.2.
- b. Surface preparation.
- c. Application of the coating systems in accordance with the paint manufacturer's instructions.

*No painting w/ Cat 2*

The vendor's compliance with the requirements is also checked during the Westinghouse QA Surveillance activities in the vendor's plant. Westinghouse believes that these measures of control provide a high degree of assurance that the protective coatings will adhere properly to the base metal and withstand the postulated accident environment within the containment building. However, to be conservative, Westinghouse has not taken credit for this in calculating the amount of paint which might peel or flake off in the post-accident environment.

#### Category 3 - Small Equipment

Category 3 equipment consists of the following:

- a. Transmitters
- b. Alarm Horns
- c. Small Instruments
- d. Valves
- e. Heat Exchanger Supports

These items are procured from several different vendors and are painted by the vendor in accordance with conventional industry practices. Because the total exposed surface area is only 930 sq. ft., Westinghouse does not believe it is necessary to specify further requirements. For purposes of estimating the amount of paint that might peel or flake off, Westinghouse has assumed that all of this material might come off.

#### Category 4 - Insulated or Stainless Steel Equipment

Category 4 equipment consists of the following:

- a. Steam generators - covered with wrapped insulation. ✓
- b. Pressurizer - covered with wrapped insulation. ✓

- c. Reactor Pressure Vessel - covered with rigid reflective insulation. ✓
- d. Reactor Cooling Piping - stainless steel. ✓
- e. Reactor Coolant Pump Casings - stainless steel. ✓

*Not painted equipment*

The wrapped or rigid insulation captures and retains any paint which might come off the equipment surfaces, thereby preventing the paint from blocking the sump drains or interrupting the water flow in the containment spray system.

Estimates of Protective Coating Loss

Westinghouse has closely followed and participated in the activities of the various standards committees and industry work groups associated with protective coatings. We have also conducted a series of chemistry experiments of our own to investigate the various paint manufacturers' products identified as qualified to ANSI N101.2. From these efforts we have reached the following conclusions:

1. Categories 1 and 4 equipment is adequately protected and will not contribute paint debris (no loss of paint). *Agree!*
2. Category 2 equipment has a high probability of retaining the coatings, but for conservatism, Westinghouse has assumed that all of the paint might come off under post-accident conditions. *? Paint in insulation problem*
3. Category 3 equipment might lose all of the paint on its external surfaces under post-accident conditions. *Agree!*
4. The total weight of paint that might be lost from Category 2 and 3 equipment is 144 pounds with a total volume of 1.8 cubic feet. (See Attachment A). ✓
5. The 4350 sq. ft. of HSSS surface area represents slightly more than 1% of the total containment surface area based on a total containment surface area of 417250 sq. ft. (Reference SNESSAR-P1, Table 6.1-6, Amendment 20 dated January 23, 1976. This number represents the containment evaluation parameters for passive heat sink inventory.)

Based on the above information, Westinghouse believes that the described measures provide the necessary control and that 144 lbs (1.8 cu. ft.) of paint debris does not have a deleterious effect on the containment safeguards systems. ✓

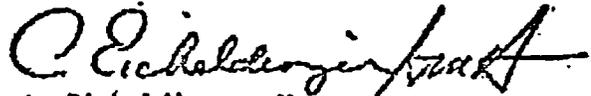
A summary paragraph, describing the Westinghouse position on Regulatory Guide 1.54 for incorporation into HCAP-8370 is presented in Attachment B.

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Westinghouse respectfully requests your concurrence with the alternate position to Regulatory Guide 1.54 as presented in this letter. Since the approval of Revision 8 to WCAP-8370 is contingent upon resolution of this regulatory guide, your prompt attention to this matter would be appreciated. ✓

Very truly yours,

WESTINGHOUSE ELECTRIC CORPORATION



C. Eicheldinger, Manager  
Nuclear Safety

/s/

Attachments A & B

cc: W. H. Harrison, Chief  
Reactor Systems Standards Branch

## ATTACHMENT A

## HEIGHT CALCULATIONS

## Assumptions:

1. 4350 ft<sup>2</sup> of surface area not painted to stringent requirements.
2. 1 gallon of paint contains 4.4 pounds of solids.
3. 1 gallon of paint covers 140 ft<sup>2</sup> of surface area applied at .005 inch thickness.

$$\text{Total weight} = 4350 \text{ ft}^2 \times 4.4 \text{ lbs/gal} \times \frac{1}{140 \text{ ft}^2/\text{gal}}$$

$$\text{Total weight} = 144.44 \text{ pounds}$$

$$\text{Total volume} = 4350 \text{ sq. ft.} \times 144 \frac{\text{sq. in.}}{\text{sq. ft.}} \times .005 \text{ inch}$$

$$\times \frac{1}{1728 \frac{\text{cu. in.}}{\text{cu. ft.}}}$$

$$\text{Total volume} = 1.81 \text{ cu. ft.}$$

## ATTACHMENT B

## CHANGE TO WCAP-8370, REVISION 8

The following paragraph is to be added to Section 17.1.9 at the bottom of page 17.1-64 in WCAP-8370, Draft Revision 8:

Westinghouse specifies stringent requirements for the painting of major HSSS components which are located within the containment building. These requirements are contained in process specifications and specified in the procurement documents. The process specifications require that coating systems which are qualified to meet ANSI N101.2, be used and applied in accordance with the manufacturer's instructions. The specifications also define requirements for surface preparation, use of undercoating and where applicable inspection. These requirements apply to equipment such as, accumulators; RCS supports; RCP motors and stands; manipulator crane; lifting rigs; and electrical cabinets. Other major equipment is either fabricated from stainless steel or covered by insulation (e.g., steam generators, pressurizer and reactor vessel are insulated).

For small items of equipment, conventional industry painting practices are applied. This equipment consists of transmitters, alarm horns, small instruments, valves, and heat exchanger supports.

EWSSAR-P1

NS-CE-1352

TABLE 6.1-6

CONTAINMENT EVALUATION PARAMETERS  
PASSIVE HEAT SINK INVENTORY

| Slab No. | Slab Description                      | No. of Faces | Face Surface Area, Ft <sup>2</sup> | Material                                      | Material Thickness            |
|----------|---------------------------------------|--------------|------------------------------------|---|-------------------------------|
| 1        | Interior Concrete Walls               | 2            | 11,600                             | Painted Concrete                              | 2.0 ft                        |
| 2        | Interior Concrete Walls & Floors      | 2            | 28,200                             | Painted Concrete                              | 3.0 ft                        |
| 3        | Interior Concrete Walls               | 2            | 27,600                             | Painted Concrete                              | 4.0 ft                        |
| 4        | Interior Concrete (Support Pedestals) | 2            | 3,420                              | Painted Concrete                              | 8.0 ft                        |
| 5        | Refueling Cavity (Floor & Walls)      | 1            | 9,880                              | Stainless Steel<br>Painted Concrete           | 0.375 in.<br>4.0 ft           |
| 6        | Containment Dome                      | 1            | 35,400                             | Painted Steel<br>Concrete                     | 0.5 in.<br>2.5 ft.            |
| 7        | Containment Side Walls                | 1            | 79,500                             | Painted Steel<br>Concrete                     | 0.375 in.<br>5.25 ft          |
| 8        | Containment Floor                     | 1            | 14,700                             | Painted Concrete<br>Painted Steel<br>Concrete | 2.0 ft<br>0.25 in.<br>10.0 ft |
| 9        | Ductwork & Cable Trays                | 1            | 05,800                             | Painted Steel                                 | 0.04 in.                      |
| 10       | Grating, Air Coolers, & Filters       | 2            | 35,100                             | Painted Steel                                 | 0.2 in.                       |
| 11       | Box Girder, Hatch covers              | 1            | 3,950                              | Painted Steel                                 | 1.0 in.                       |
| 12       | Crane Box Girder                      | 1            | 0,600                              | Painted Steel                                 | 0.5 in.                       |
| 13       | Core Flooding Tanks                   | 1            | 1,890                              | Stainless Steel                               | 2.0 in.                       |
| 14       | Polar Crane                           | 2            | 20,300                             | Painted Steel                                 | 0.5 in.                       |

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Amendment 20  
8/23/76

TABLE 6.1-6 (CONT)

| <u>Slab No.</u> | <u>Slab Description</u>   | <u>No. of Faces</u> | <u>Face Surface Area, Ft<sup>2</sup></u> | <u>Material</u> | <u>Material Thickness</u> |
|-----------------|---|---------------------|--|-----------------|---------------------------|
| 15              | Polar Crane Bridge, Fuel Handling Bridge Supports                 | 2                   | 25,100                                   | Painted Steel   | 1.0 in.                   |
| 16              | Crane Support Columns, Bridge Girders, Pressurizer Supports       | 2                   | 5,220                                    | Painted Steel   | 2.0 in.                   |
| 17              | Crane Support Columns, Steam Generator Supports                   | 2                   | 9,980                                    | Painted Steel   | 1.5 in.                   |
| 18              | Crane Rail, Main Steam Line Restraints, Pump Legs, Support Plates | 2                   | 1,290                                    | Painted Steel   | 3.0 in.                   |