6.1 Engineered Safety Features Materials

This section provides a description of the materials used in the fabrication of engineered safety features components and of the provisions to avoid material interactions that could potentially impair the operation of the engineered safety features. A list of engineered safety features was given previously in Section 6.0. Reactor coolant system materials, including branch piping connected to the reactor coolant system, are described in subsection 5.2.3.

6.1.1 Metallic Materials

Materials for use in engineered safety features are selected for their compatibility with the reactor coolant system and refueling water.

The edition and addenda of the ASME Code applied in the design and manufacture of each component are the edition and addenda established by the requirements of the Design Certification. The use of editions and addenda issued subsequent to the Design Certification is permitted or required based on the provisions in the Design Certification. The baseline used for the evaluations done to support this safety analysis report and the Design Certification is the 1989 Edition, 1989 Addenda. When material is procured to later editions or addenda, the design of the component is reconciled to the new material properties in accordance with the rules of the ASME Code, provided that the later edition and addenda are authorized in 10 CFR 50.55a or in a specific authorization as provided in 50.55a(a)(3).

6.1.1.1 Specifications for Principal Pressure-Retaining Materials

The pressure-retaining materials in engineered safety features system components comply with the corresponding material specification permitted by the ASME Code, Section III, Division 1. The material specifications used for pressure-retaining valves in contact with reactor coolant are the specifications used for reactor coolant pressure boundary valves and piping. See Table 5.2-1 for a listing of these specifications. The material specifications for pressure-retaining materials in each component of an engineered safety features system meet the requirements of Article NC-2000 of the ASME Code, Section III, Class 2, for Quality Group B; Article ND-2000 of the ASME Code, Section III, Class 3, for Quality Group C components; and Article NE-2000 of the ASME Code, Section III for containment pressure boundary components.

Containment penetration materials meet the requirements of Articles NC-2000 or NE-2000 of the ASME Code, Section III, Division 1. The quality groups assigned to each component are given in Section 3.2. The pressure-retaining materials are indicated in Table 6.1-1. Materials for ASME Class 1 equipment are provided in subsection 5.2.3.

The following subsection provides information on the selection and fabrication of the materials in the engineered safety features of the plant.

Components in contact with borated water are fabricated of, or clad with, austenitic stainless steel or equivalent corrosion-resistant material. The use of nickel-chromium-iron alloy in the engineered safety features is limited to Alloy 690. Alloy 600 may be used for cladding or buttering. Nickel-chromium-iron alloy is used where the corrosion resistance of the alloy is an important consideration and where the use of nickel-chromium-iron alloy is the choice because of the coefficient of thermal expansion.

The material for the air storage tanks in the main control room emergency habitability system is tested for Charpy V-Notch per supplement S3 of material specification SA-372 and has an average of 20 to 25 mills of lateral expansion at the lowest anticipated service temperature. The material is not permitted to be weld repaired.

6.1.1.2 Fabrication Requirements

The welding materials used for joining the ferritic base materials of the pressure-retaining portions of the engineered safety features conform to, or are equivalent to, ASME Material Specifications SFA 5.1, 5.2, 5.5, 5.17, 5.18, and 5.20. The welding materials used for joining nickel-chromium-iron alloy in similar base material combination, and in dissimilar ferritic or austenitic base material combination, conform to ASME Material Specifications SFA 5.11 and 5.14.

The welding materials used for joining the austenitic stainless steel base materials for the pressure-retaining portions of engineered safety features conform to, or are equivalent to, ASME Material Specifications SFA 5.4 and 5.9. These materials are qualified to the requirements of the ASME Code, Section III and Section IX, and are used in procedures qualified to these same rules. The methods used to control delta ferrite content in austenitic stainless steel weldments in engineered safety features components are the same as those for ASME Code Class 1 components, described in subsection 5.2.3.4.

The integrity of the safety-related components of the engineered safety features is maintained during component manufacture. Austenitic stainless steel is used in the final heat-treated condition as required by the respective ASME Code, Section II, material specification for the particular type or grade of alloy. Also, austenitic stainless steel materials used in the engineered safety features components are handled, protected, stored, and cleaned according to recognized and accepted methods designed to minimize contamination, which could lead to stress corrosion cracking. These controls for engineered safety features components are the same as those for ASME Code Class 1 components, discussed in subsection 5.2.3.4. Sensitization avoidance, intergranular attack prevention, and control of cold work for engineered safety features components are the same as the ASME Code Class 1 components discussed in subsection 5.2.3.4. Cold-worked austenitic stainless steels having a minimum specified yield strength greater than 90,000 psi are not used for components of the engineered safety features.

Information is provided in Section 1.9 concerning the degree of conformance with the following Regulatory Guides:

- Regulatory Guide 1.31, Control of Ferrite Content in Stainless Steel Weld Metal
- Regulatory Guide 1.44, Control of the Use of Sensitized Stainless Steel

Lead, antimony, cadmium, indium, mercury, zinc, and tin metals and their alloys are not allowed to come in contact with engineered safety features component parts made of stainless steel or high alloy metals during fabrication or operation. Bearing alloys containing greater than 1 percent of lead, antimony, cadmium, or indium are not used in contact with reactor coolant.

6.1.1.3 Specifications for Nonpressure-Retaining Materials

Materials for nonpressure-retaining portions of engineered safety features in contact with borated water or other fluids may be procured under ASTM designation. The principle examples of these items are the in-containment refueling water storage tank liner and the passive containment cooling system storage tank liner.

The walls of the in-containment refueling water storage tank may be fabricated of ASTM A240 Type XM-29. This is a nitrogen-strengthened austenitic stainless steel with higher ultimate tensile and yield strengths than type 304 and 316 stainless steel. This material can be welded using E240 filler metal by either the shielded metal arc welding or gas tungsten arc welding methods. This material is used for applications where the higher strength allows reductions in weight and material costs. The material has a resistance to intergranular stress corrosion cracking similar to or better than type 304 and 304L stainless steel.

6.1.1.4 Material Compatibility with Reactor Coolant System Coolant and Engineered Safety Features Fluids

Engineered safety features components materials are manufactured primarily of stainless steel or other corrosion-resistant material. Protective coatings are applied on carbon steel structures and equipment located inside the containment, as discussed in subsection 6.1.2.

Austenitic stainless steel plate conforms to ASME SA-240. Austenitic stainless steel is confined to those areas or components which are not subject to post-weld heat treatment. Carbon steel forgings conform to ASME SA-350. Austenitic stainless steel forgings conform to ASME SA-182. Nickel-chromium-iron alloy pipe conforms to ASME SB-167. Carbon steel castings conform to ASME SA-352. Austenitic stainless steel castings conform to ASME SA-351.

Hardfacing material in contact with reactor coolant is a qualified low- or zero-cobalt alloy, equivalent to Stellite-6. The use of cobalt-base alloys is minimized. Low- or zero-cobalt alloys used for hardfacing or other applications where cobalt-base alloys have been previously used are qualified by wear and corrosion tests. The corrosion tests qualify the corrosion resistance of the alloy in reactor coolant. Cobalt-free, wear-resistant alloys considered for this application include those developed and qualified in nuclear industry programs.

In post-accident situations where the containment is flooded with water containing boric acid, pH adjustment is provided by the release of trisodium phosphate into the water. The trisodium phosphate is held in baskets located in the floodable volume that includes the steam generator compartments and contains the reactor coolant loop. The addition of trisodium phosphate to the solution is sufficient to raise the pH of the fluid to above 7.0. This pH is consistent with the guidance of NRC Branch Technical Position MTEB-6.1 for the protection of austenitic stainless steel from chloride-induced stress corrosion cracking. Section 6.3 describes the design of the trisodium phosphate baskets.

In the post-accident environment, both aluminum and zinc surfaces in the containment are subject to chemical attack resulting in the production of hydrogen. The non-flooded surfaces would be wetted by condensing steam but they would not be subjected to the boric acid or trisodium phosphate solutions since there is no containment spray. The hydrogen production analysis described in subsection 6.2.5 includes hydrogen generation due to corrosion processes and conservatively assumes that all surfaces are exposed to the solution.

6.1.1.5 Integrity of Safety-Related Components

The pH adjustment baskets provide for long-term pH control. In the case of inadvertent short-term flooding when the pH adjustment baskets remain above the flood level, the condition of the material in contact with the fluid is evaluated prior to return to operation. Based on previous industry testing and experience, the behavior of austenitic stainless steels in the post-design basis accident environment is acceptable. Cracking is not anticipated, provided that the core cooling pH is maintained at an adequate level.

6.1.1.6 Thermal Insulation

The majority of the engineered safety features insulation used in the AP600 containment is reflective metallic insulation. Fibrous insulation may be used if it is enclosed in stainless steel cans. The selection, procurement, testing, storage, and installation of nonmetallic thermal insulation provides confidence that the leachable concentrations of chloride, fluoride, and silicate are in conformance with Regulatory Guide 1.36. Conformance with Regulatory Guide 1.36 is summarized in Section 1.9.

6.1.1.7 Component and System Cleaning

See subsection 1.9.1 for a discussion on the provisions of Regulatory Guide 1.37 for the cleaning of components and systems.

6.1.2 Organic Materials

6.1.2.1 Protective Coatings

6.1.2.1.1 General

The AP600 is divided into four areas with respect to the use of protective coatings. These four areas are:

- Inside containment
- Exterior surfaces of the containment vessel
- Radiologically controlled areas outside containment
- Remainder of plant.

The considerations for protective coatings differ for these four areas and the coatings selection process accounts for these differing considerations. The AP600 design considers the function of the coatings, their potential failure modes, and their requirements for maintenance. Table 6.1-2 lists different areas and surfaces inside containment and on the containment shell that have coatings, their functions and to what extent their coatings are safety-related.

Coatings used outside containment do not provide safety-related functions except for the coating on the outside of the containment shell. The coating on the outside of the containment above elevation 135' 3" shell supports passive containment cooling system heat transfer and is classified as safety-related.

The coating used on the inside surface of the containment shell, greater than 7' above the operating deck, is not required to support passive containment cooling system heat transfer. However, passive containment cooling system testing and analysis have been performed with a coating. This coating is classified as safety-related.

Coatings used in the vicinity of the containment recirculation screens are classified as safety-related in order to prevent their failure from producing debris that may be transported to the screens. Subsection 6.3.2.2.7.3 defines the area where safety-related coatings are used in the vicinity of the recirculation screens.

Other coatings used inside containment, except for the containment shell, are classified as nonsafety-related because their failure does not prevent functioning of the engineered safety features. If the nonsafety related coatings delaminate, the solid debris they may form will not have a negative impact on the performance of safety-related post-accident cooling systems. See subsection 6.1.2.1.5 for a discussion of the factors including plant design features and low water flows that permit the use of nonsafety-related paint inside containment. Protective coatings are maintained to provide corrosion protection for the containment pressure boundary and for other system components inside containment.

The corrosion protection, good housekeeping and decontamination functions of the coatings are nonsafety-related functions.

For information on coating design features, quality assurance, material and application requirements, and performance monitoring requirements, see subsection 6.1.2.1.6.

6.1.2.1.2 Inside Containment

Carbon Steel

Inorganic zinc primer is the basic coating applied to the containment vessel and structural carbon steel that need coating. Below the operating floor, most of the inorganic zinc primer is top coated with epoxy where enhanced decontamination is desired. The epoxy top coat also extends above the operating floor on structural modules and to a wainscot height of 7 feet above the operating floor on the containment vessel. Where practical, miscellaneous carbon steel items (such as stairs, ceilings, gratings, ladders, railings, conduit, duct, and cable tray) are hot-dip galvanized. Steel surfaces subject to immersion during normal plant operation (such as sumps and gutters) are stainless steel or are coated with epoxy or epoxy phenolic applied directly to the carbon steel without an inorganic zinc primer. Carbon steel structures and equipment are assembled in modules and the modules are coated in the fabrication shop under controlled conditions.

Concrete

Concrete surfaces inside containment are coated primarily to prevent concrete from dusting, to protect it from chemical attack and to enhance decontaminability. In keeping with ALARA goals, the exposed concrete surfaces are made as decontaminable as practical in areas of frequent personnel access and areas subject to liquid spray, splash, spillage or immersion.

Exposed concrete surfaces inside containment are coated with an epoxy sealer to help bind the concrete surface together and reduce dust that can become contaminated and airborne. Concrete floors inside containment are coated with a self-leveling epoxy. Exposed concrete walls inside containment are coated to a minimum height of 7 feet with an epoxy applied over an epoxy surfacer that has been struck flush.

6.1.2.1.3 Exterior of Containment Vessel

The exterior of the containment vessel is coated with the same inorganic zinc as is used inside of the containment. The inorganic zinc coating enhances heat transfer by providing good heat conduction and by enhancing surface wetting of the exterior surface of the containment vessel. The inorganic zinc also provides corrosion protection.

6.1.2.1.4 Radiologically Controlled Areas Outside Containment and Remainder of Plant

The coatings used in the radiologically controlled areas outside containment and in the remainder of the plant are also nonsafety-related. However, coatings are selected, specified and applied in a manner that optimizes performance and standardization. Wherever practical, the same coating systems are used in radiologically controlled areas outside containment as are used inside containment. The ALARA concept is carried through in areas subject to radiation exposure and possible radiological contamination. The remainder of the plant coating systems are commercial grade materials that are selected and applied according to the expected conditions in the specific areas where the coatings are applied.

The coatings used in radiologically controlled areas outside of containment are identified in the following.

Carbon Steel Surfaces

Carbon steel is coated with inorganic zinc. An epoxy top coat is used in areas subject to decontamination such as a 7 foot wainscot in high traffic areas or on surfaces subject to radiologically contaminated liquid spray, splash, or spills.

Concrete Floors

Floors subject to heavy traffic or contaminated liquid spills are coated with self-leveling epoxy. An epoxy top coat is applied a minimum of 1 foot up the wall where liquid spills might splash. Floors subject to light traffic and not subject to contaminated liquid spills are coated with an epoxy top coat. The epoxys applied to the concrete surfaces are the same epoxy used as a top coat for the inorganic zinc-coated steel.

Concrete Walls

A 7-foot wainscot on exposed concrete walls in high-traffic areas and any surfaces of walls subject to spray, splash or spills of contaminated liquids are coated with epoxy top coat applied over an epoxy surfacer that has been struck flush. The epoxys used on concrete surfaces are the same as that used as a top coat for the inorganic zinc-coated steel. Remaining concrete walls are coated with an epoxy sealer to reduce or eliminate dusting.

Concrete Ceilings

Exposed concrete ceilings are coated with an epoxy sealer to reduce dusting.

6.1.2.1.5 Safety Evaluation

This subsection describes the basis for classifying coatings as safety related or nonsafety-related. Table 6.1-2 identifies which coatings are classified as safety-related.

The inorganic zinc coating on the outside of the containment shell above elevation 135' 3" supports passive containment cooling system heat transfer and is classified as safety-related.

The inorganic zinc coating used on the inside surface of the containment shell, greater than 7' above the operating deck, is not required to support passive containment cooling system heat transfer. However, passive containment cooling system testing and analysis have been performed with an inorganic zinc coating. This coating is classified as safety-related.

The AP600 has a number of design features that facilitate the use of nonsafety-related coatings inside containment. These features include a passive safety injection system that provides a long delay time (more than 5 hours) between a LOCA and the time recirculation starts. This time delay provides time for settling of debris. These passive systems also flood the containment to a high level which allows the use of containment recirculation screens that are located well above the floor and are relatively tall. Significant volume is provided for the accumulation of coating debris without affecting screen plugging. These screens are protected by plates located above the screens that extend out in front and to the side of the screens. Coatings used under these plates in the vicinity of the screens are classified as safety-related. The protective plates, together with low recirculation flow, approach velocity and the screen size preclude postulated coating debris above the plates from reaching the screens. Refer to subsection 6.3.2.2.7.3 for additional discussion of these screens, their protective plates and the areas utilizing safety-related coatings.

The recirculation inlets are screened enclosures located near the northwest and southwest corners of the east steam generator compartment (refer to the figures in Section 6.3.2.2.7.3). The enclosure bottoms are located above the surrounding floor which prevent ingress of heavy debris (specific gravity greater than 1.05). Additionally, the screens are oriented vertically and are protected by large plates located above the screens, further enhancing the capability of the screens to function with debris in the water. The screen mesh size and the surface area of the containment recirculation screens in the AP600, in conjunction with the large floor area for debris to settle on, can accommodate failure of coatings inside containment during a design basis accident even though the residue of such a failure is unlikely to be transported to the vicinity of the enclosures.

The AP600 does not have a safety-related containment spray system. The containment spray system provided in the AP600 is only be used in beyond design basis events. This reduces the chance that coatings will peel off surfaces inside containment because the thermal shock of cold spray water on hot surfaces combined with the rapid depressurization following spray initiation are recognized as contributors to coating failure. Parts of the containment below elevation 107′-2″ are flooded and water is recirculated through the passive core cooling system. However, the volume of water moved in this manner is relatively small and the flow velocity is very low.

The coating systems used inside containment also include epoxy coatings. These are applied to concrete substrates, as top coats over the inorganic zinc primer, and directly to steel, as noted in subsection 6.1.2.1.2. The failure modes of these systems could include delamination or peeling if the epoxy coatings are not properly applied (References 1, 2, 3). The epoxys applied to concrete and carbon steel surfaces are sufficiently heavy (dry film density greater than 100 lb/ft^3) so that transport with the low water velocity in the AP600 containment is limited.

Inside containment, there are engineered components coated with various manufacturer's standard coating systems which are also classified as nonsafety-related and may peel or delaminate under design basis accident conditions. The density of these coatings is not limited based on the following considerations:

- The total surface area of low density coatings applied to engineered components is a small percentage of the total area of coatings inside containment.
- The coatings applied to engineered components are less subject to failure during accidents because their dimensions are smaller and their shapes are more complex. Their shapes are complex involving many corners. angles, nuts, bolts, protrusions, holes, etc. For engineered components, temperature changes cause smaller relative expansions and their complex shapes tend to prevent relative movement so that failure of the coating bond is less likely. In addition, even if the coating bond does fail, it is less likely to detach because the complex shapes tend to retain the coating.
- Coatings applied to engineered components are done so in controlled factory conditions so that the quality of application is better than that achieved in the field. Factors contributing to this higher quality include application of coatings in a timely fashion after manufacture, easier control of surface conditions, automated application of coatings and use of personnel that are highly trained.
- Manufacturers have switched to the use of dry powder coatings (polyesters) and water reduced coatings (acrylics). Coatings used on components located inside containment are expected to be dry powder coatings because water reduced coatings are not suitable for use in the harsh containment environment. Dry powder coatings tend to be very tough and defects in application tend to be noticeable. They also have relatively high densities, greater than epoxys, so that even if they did fail they would settle out before reaching the recirculation screens.
- Engineered components are located throughout the containment so that the majority are located where low density coating debris settle out well away from the recirculation screens.
- Even in the unlikely event that some of these coatings fail, delaminate and do not settle out because of their location and low density, the PXS recirculation screens will prevent blockage of the PXS recirculation.

Production of hydrogen as a result of zinc corrosion in design basis accident conditions, including the zinc in paints applied inside containment, is addressed in subsection 6.2.4.3.1.

6.1.2.1.6 Quality Assurance Features

A number of quality assurance features provide confidence that the coating systems inside the containment, on the exterior of the containment vessel and in potentially contaminated areas outside containment will perform as intended. These features enhance the ALARA program and enhance corrosion resistance. The features are discussed in the following paragraphs.

Safety-related coatings

The quality assurance program for safety-related coatings conforms to the requirements of ASME NQA-1-1983 as endorsed in Regulatory Guide 1.28. Safety related coatings meet the pertinent provisions of 10CFR Part 50 Appendix B to 10CFR Part 50. The safety-related coatings are consistent with the positions of Regulatory Guide 1.54, "Quality Assurance Requirements for Protective Coatings Applied to Water-Cooled Nuclear Power Plants". The safety-related coatings used in the AP600 are tested for radiation tolerance and for performance under design basis accident conditions. Where decontaminability is desired, the coatings are evaluated for decontaminability. The coating applicator submits and follows acceptable procedures to control surface preparation, application of coatings and inspection of coatings. The painters are qualified and certified, and the inspectors are qualified and certified.

The safety-related inorganic zinc coating used on the inside and outside surface of the containment shell is inspected using a non-destructive dry film thickness test and a MEK rub test. These inspections are performed after the initial application and after recoating. Long term surveillance of the coating is provided by visual inspections performed during refueling outages. Other inspections are not required.

The procurement, application, and monitoring of safety-related coatings are controlled by a program prepared by the Combined License applicant, (refer to subsection 6.1.3.2).

Refer to Table 6.1-2 for identification of safety-related coating applications in the AP600.

Nonsafety-Related Coatings

The use of nonsafety-related coatings inside containment is based on the use of selected types of coatings and the properties of the coatings. To preclude the use of inappropriate coatings, the procurement of the nonsafety-related coatings used inside containment is considered safety-related.

Appendix B to 10 CFR Part 50 applies to procurement of coatings used inside containment on internal structures, including walls, floor slabs, structural steel, and the polar crane, except for such surfaces located inside the chemical and volume control system room # 11209. Nonsafety-related coatings used in the chemical and volume control system room are not subject to procurement under 10 CFR 50, Appendix B, because the room is connected to the containment in a limited way through a drain line. In addition, the drain line is routed to the waste liquid processing system sump which is located well below and separate from the recirculation screens. The specified nonsafety-related coatings used inside containment are tested for radiation tolerance and for performance under design basis accident conditions. Where decontaminability is desired, the coatings are evaluated for decontaminability.

The application, inspection and monitoring of nonsafety-related coatings used inside containment are not classified as safety-related as shown in Table 6.1-2. The application, inspection and monitoring of nonsafety-related coatings are controlled by a program prepared by the Combined License applicant. This program is not subject to 10 CFR 50, Appendix B, quality assurance requirements.

Due to the use of modularized construction, a significant portion of the containment coatings are shop applied to the containment vessel and to piping, structural and equipment modules. This application of coatings under controlled shop conditions provides additional confidence that the coatings will perform as designed and as expected.

The coatings used in radiologically controlled areas outside containment are tested for radiation resistance and evaluated for decontaminability; they are not specified to be design basis accident tested. Where practical, the same coating materials are used in radiologically controlled areas outside containment as are used inside containment. This provides a high level of quality and optimizes maintenance painting over the life of the plant.

6.1.2.2 Other Organic Materials

A listing of other organic materials in the containment is developed based on the specific type of equipment and the supplier selected to provide it. Materials are evaluated for potential interaction with engineered safety features to provide confidence that the performance of the engineered safety features is not unacceptably affected.

6.1.3 Combined License Information Items

6.1.3.1 Procedure Review

The Combined License applicants referencing the AP600 will address review of vendor fabrication and welding procedures or other quality assurance methods to judge conformance of austenitic stainless steels with Regulatory Guides 1.31 and 1.44.

6.1.3.2 Coating Program

The Combined License applicants referencing the AP600 will provide a program to control procurement, application, and monitoring of safety-related coatings. The program for the control of the use of safety-related coatings will be consistent with subsection 6.1.2.1.6.

6.1.4 References

1. NUREG-0797, "Safety Evaluation Report related to the operation of Comanche Peak Steam Electric Station, Units 1 and 2."

2. Bolt, R. O. and J. G. Carroll, "Radiation Effects on Organic Materials", Academic Press, New York, 1963, Chapter 12.

3. Parkinson, W. W. and O. Sisman, "The Use of Plastics and Elastomers in Nuclear Radiation", Nuclear Engineering and Design 17 (1971), pp 247-280, North-Holland Publishing Co., Amsterdam.

Table 6.1-1

ENGINEERED SAFETY FEATURES PRESSURE-RETAINING MATERIALS

Component	Materials
Core makeup tank	Refer to subsection 5.2.3
Passive residual heat removal heat exchanger	Refer to subsection 5.3.4, Table 5.2-1
In-containment refueling water storage tank	ASTM A240 XM-29 or TP304
Passive containment cooling system (safety-related portion)	
Passive containment cooling system water storage tank	ASTM A240 TP304
Valves	SA-182 TP304L
Piping	SA-312 TP304L
Fittings	SA-182 TP304L
PCS Recirculation Subsystem	
Valves	SA-217 Grade WC6
Piping	SA-335 Grade P11
Fittings	SA-234 Grade WP11
Spargers	
Piping	SA-358 TP304 or TP316 or SA-312 TP304 or TP316
Fittings	SA-182 TP304 or SA-403 WP304 or WP316
Containment vessel and penetrations	Refer to subsection 3.8.2.1
Valves in contact with borated water	Refer to subsection 5.2.3, Table 5.2-1
Main control room emergency habitability system	
Valves	SA-182 Grade F11
Pipe	SA-355 Grade P11
Air storage tanks	SA-372

Table 6.1-2 - AP600 Coated Surfaces, Containment Shell and Surfaces Inside Containment

Surface	Boundary	Surface Material	Coating	Coating Functions / Safety Classifications		Coating Classification (1)
Containment Shell, Outside Surface	Shell surfaces above elevation 135' 3"	Carbon Steel	Inorganic Zinc	1 Promote wettability 2 Heat conduction 3 Nondetatchable 4 Inhibit corrosion	1 Safety 2 Safety 3 Safety 4 Nonsafety	Safety
Containment Shell, Inside Surface	Shell surfaces above 7 feet above operating deck	Carbon Steel	Inorganic Zinc	1 Promote wettability 2 Heat conduction 3 Nondetachable 4 Inhibit corrosion	1 Safety (2) 2 Safety 3 Safety 4 Nonsafety	Safety
Inside Containment	Areas surrounding the containment recirculation screens (3)	Carbon steel	Inorganic Zinc with Epoxy Topcoat	1 Nondetachable 2 Inhibit corrosion 3 Enhance radioactive decontamination	1 Safety 2 Nonsafety 3 Nonsafety	Safety
	Concrete walls, ceilings and floors (4)	Concrete	Epoxy Sealer with Epoxy Topcoat	1 Ensure settling 2 Prevent dusting 3 Protect from chemical attack 4 Enhance radioactive decontamination	1 Safety (5) 2 Nonsafety 3 Nonsafety 4 Nonsafety	Nonsafety (5)
	Steel walls, ceilings, floors, columns, beams, braces, plates (4)	Carbon Steel	Inorganic Zinc	1 Ensure settling 2 Inhibit corrosion	1 Safety (5) 2 Nonsafety	Nonsafety (5)
	Steel walls, ceilings, floors, columns, beams, braces, plates (4)	Carbon Steel	Inorganic Zinc with Epoxy Topcoat	1 Ensure settling 2 Inhibit corrosion 3 Enhance radioactive decontamination	1 Safety (5) 2 Nonsafety 3 Nonsafety	Nonsafety (5)

Table 6.1-2 - AP600 Coated Surfaces, Containment Shell and Surfaces Inside Containment

Notes:

1. The applicability of 10 CFR 50, Appendix B, and other codes and standards to coatings and their application are discussed in DCD subsection 6.1.2.1.6.
2. An inorganic zinc coating on the inside of the containment shell is not required to promote wettability, however it has been included in PCS testing and analysis and as a result is considered safety-related.
3. Areas around PXS recirculation screens that require safety-related coatings are defined in DCD subsection 6.3.2.2.7.3.
4. 10 CFR 50, Appendix B, does not apply to DBA testing and manufacture of coatings in the CVS room inside containment as discussed in DCD subsection 6.1.2.1.6.
5. 10 CFR 50, Appendix B, applies to DBA testing and manufacture of these nonsafety-related coatings as discussed in DCD subsection 6.1.2.1.6.