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Your ref: Project Number 740
Our ref: DCP/NRC1924

June 7, 2007

Subject: AP1000 COL Response to Request for Additional Information (TR #44)

In support of Combined License application pre-application activities, Westinghouse is submitting responses to NRC requests for additional information (RAI) on AP1000 Standard Combined License Technical Report 44, APP-GW-GLR-026, Rev. 0, New Fuel Storage Rack Structural/Seismic Analysis. These RAI responses are submitted as part of the NuStart Bellefonte COL Project (NRC Project Number 740). The information included in the responses is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification.

The responses are provided for Requests for additional information TR44-7, TR44-8, TR44-13, TR44-15, TR44-16, TR44-18, TR44-20, TR44-21, TR44-22, TR44-26, TR44-27, and TR44-28, transmitted in NRC letter dated April 6, 2007 from Steven D. Bloom to Andrea Sterdis, Subject: Westinghouse AP1000 Combined License (COL) Pre-application Technical Report 44 – Request for Additional Information (TAC NO. MD2104).

Pursuant to 10 CFR 50.30(b), the responses to requests for additional information on Technical Report 44 are submitted as Enclosure 1 under the attached Oath of Affirmation.

Questions or requests for additional information related to the content and preparation of this response should be directed to Westinghouse. Please send copies of such questions or requests to the prospective applicants for combined licenses referencing the AP1000 Design Certification. A representative for each applicant is included on the cc: list of this letter.

Very truly yours,

D. J. Hutchings for

A. Sterdis, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

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D079
NRO

/Attachment

1. "Oath of Affirmation," dated June 7, 2007

/Enclosure

1. Response to Requests for Additional Information on Technical Report No. 44

cc:	D. Jaffe	-	U.S. NRC	1E	1A
	E. McKenna	-	U.S. NRC	1E	1A
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	G. Zinke	-	NuStart/Entergy	1E	1A
	J. Iacovino	-	Westinghouse	1E	1A

ATTACHMENT 1

"Oath of Affirmation"

ATTACHMENT 1

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of:)

NuStart Bellefonte COL Project)

NRC Project Number 740)

APPLICATION FOR REVIEW OF
"AP1000 GENERAL COMBINED LICENSE INFORMATION"
FOR COL APPLICATION PRE-APPLICATION REVIEW

W. E. Cummins, being duly sworn, states that he is Vice President, Regulatory Affairs & Standardization, for Westinghouse Electric Company; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission this document; that all statements made and matters set forth therein are true and correct to the best of his knowledge, information and belief.

W E Cummins

W. E. Cummins
Vice President
Regulatory Affairs & Standardization

Subscribed and sworn to
before me this 7th day
of June 2007.

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Debra McCarthy, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires Aug. 31, 2009
Member, Pennsylvania Association of Notaries

Debra McCarthy
Notary Public

ENCLOSURE 1

Responses to Request for Additional Information on Technical Report No. 44

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR44-007
Revision: 0

Question:

Figure 2-9 of this report shows the permanent deformation at the top of a cell wall. The permanent deformation is measured as 10.26 inches, which is smaller than the limit of 14 inches. However, the figure also shows indications of nontrivial hourglassing, which may significantly affect the accuracy of the analysis result. The mesh at the impact location should be locally refined, to ensure convergence with mesh size. Therefore, an additional analysis with a finer mesh at the impact region should be performed to confirm that the model is suitable.

Westinghouse Response:

The general acceptance criterion for the 36 inch fuel assembly drop onto the top of a new fuel storage rack is to maintain the stored fuel assemblies in a subcritical configuration. In measurable terms, the permanent deformation of the rack (measured downward from the top of rack) is limited to 15.27 inches, which is the distance from the top of the rack to the top of the neutron absorber panel. This limit is conservative because the active fuel region begins two inches below the top of the neutron absorber panels. Therefore, more margin exists than Technical Report APP-GW-GLR-026 indicates, and a mesh convergence study is not required.

Reference:

1. APP-GW-GLR-026, Revision 0, "New Fuel Storage Rack Structural/Seismic Analysis," (Technical Report Number 44)

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
Paragraph three, Subsection 2.8.5, Hypothetical Fuel Assembly Drop Accidents will be revised as follows:
For the drop to the top of the AP1000 New fuel Storage Rack, the fuel assembly is assumed to strike the edge of an exterior cell at a speed corresponding to a 36-inch drop in air and to remain vertical as it is brought to a stop by the resisting members of the rack. The objective is to

demonstrate that the extent of permanent damage to the impacted rack does not extend to the beginning of the active fuel region. For the AP1000 fuel, the top of the active fuel begins 17.27 inches below the top of the rack.

Paragraph five, Subsection 2.8.5, Hypothetical Fuel Assembly Drop Accidents will be revised as follows:
The results from the analyses are shown in Figures 2-9 and 2-10. For the drop to the top of the AP1000 New Fuel Storage Rack, the extent of the permanent damage is limited to a depth of 10.26 inches. The tops of the poison panels are located 15.27 inches below the top of the rack. The poison panels overlap the active fuel by two inches at the top and bottom. The top of the active fuel begins 17.27 inches below the top of the rack, therefore, the active fuel region is surrounded by an undamaged cell wall and no further criticality analysis is required.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR44-008
Revision: 0

Question:

As indicated in Table 2-3 of the report and the markup for DCD Table 9.1-1, one of the fuel handling accident loads that need to be considered is uplift force on the rack caused by a postulated stuck fuel assembly. Section 2.8.3 of the report states: "An evaluation of a stuck fuel assembly, leading to an upward load of 2,000 lb has been performed. The results from the evaluation show that this is not a bounding condition because the local stresses do not exceed 2,500 psi." The information provided is not sufficient for the staff to reach a conclusion that this load has been adequately considered. Please provide a detailed description of the assumptions, the analyses conducted, the results obtained, and the basis for the conclusion that this is not a bounding condition.

Westinghouse Response:

A nearly empty rack with one corner cell occupied is subject to an upward load of 2000 lbf, which is assumed to be caused by the fuel sticking while being removed. The ramification of the loading is two-fold:

1) The upward load creates a force and a moment at the base of the rack;

2) The loading induces a local tension in the cell wall.

The following calculation determines the maximum stress in the rack cell structure due to a postulated stuck fuel assembly. The terms p, Nx, Ny, Ixx2, and Iyy2 are defined as the cell pitch, the number of storage cells in the horizontal x-direction, the number of storage cells in the horizontal y-direction, the moment of inertia of the rack cell structure about the x-axis, and the moment of inertia of the rack cell structure about the y-axis, respectively.

Calculation of the Effect of a Stuck Fuel Assembly

$P_{stuck} := 2000 \cdot lbf$ Per Westinghouse design input

Compute maximum stress at base of rack cell structure assuming rack behaves as a cantilever beam

$X := N_x \cdot \frac{p}{2}$ $X = 4.087\,ft$ $I_{xx2} = 6.653 \times 10^4\,in^4$

$Y := N_y \cdot \frac{p}{2}$ $Y = 3.633\,ft$

$\sigma_{grid} := P_{stuck} \cdot \frac{X^2}{I_{xx2}} + P_{stuck} \cdot \frac{Y^2}{I_{yy2}}$ $\sigma_{grid} = 118.032\,psi$

It is clear that the global stress due to a stuck fuel assembly is insignificant. Now, check local stress in cell in tension. Conservatively using the effective width

$A_{celllocal} := 4 \cdot b_e \cdot t_e$ $A_{celllocal} = 0.991\,in^2$

$\sigma_{local} := \frac{P_{stuck}}{A_{celllocal}}$ $\sigma_{local} = 2.018 \times 10^3\,psi$

This local stress is well below the yield stress of the cell wall material (i.e., 30,000 psi per Table 2-5.)

Reference:

1. APP-GW-GLR-026, Revision 0, "New Fuel Storage Rack Structural/Seismic Analysis," (Technical Report Number 44)

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR44-013
Revision: 0

Question:

A number of sections in the report refer to analytical methods in other references, rather than providing sufficient information to explain the approaches used. Therefore, to understand the modeling and analysis approach, provide references 9, 10, and 17.

Westinghouse Response:

References 9 and 17 are provided as attachments 1 and 2 to this RAI response. Reference 10, "The Component Element Method in Dynamics" was viewed by the NRC at the mid-April 2007 NRC Audit.

1. APP-GW-GLR-026, Revision 0, "New Fuel Storage Rack Structural/Seismic Analysis," (Technical Report Number 44)
2. Levy, S. and Wikinson, John, "The Component Element Method in Dynamics," McGraw Hill, 1976.
3. R. Chun, M.Witte and M. Schwartz, "Dynamic Impact Effects on Spent Fuel Assemblies", UCID-21246, Larenece Livermore National Laboratory, October 1987.
4. A. Soler and K. Singh," Seismic Response of A Free Standing Fuel Rack Construction to 3-D Floor Motion", Nuclear Engineering and Design(80), Elsevier Science Publishers B.V., 1984.

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR44-015
Revision: 0

Question:

Section 2.2.2.2 refers to Figure 2-2 for the dynamic beam model of a single rack. The text and figure do not adequately describe the model. Therefore, explain the following:

(a) Define what each series of nodal DOFs correspond to (i.e., nodes 1,2; P1, P2, ...; q4, q5, ..., 1*, 2*, ...). While some of these may be deduced by judgement, the report should clearly define all of these.

(b) Explain whether there are 5 nodes and 4 beams along the rack beam model to coincide with the 5 nodes and 4 elements of the fuel assemblies.

Westinghouse Response:

a. The following table defines the nodal DOFs for the dynamic beam model of a single rack as depicted in Figure 2-2 of the Technical Report.

LOCATION (Node)	DISPLACEMENT			ROTATION		
	U_x	U_y	U_z	θ_x	θ_y	θ_z
1	p_1	p_2	p_3	q_4	q_5	q_6
2	p_7	p_8	p_9	q_{10}	q_{11}	q_{12}
Node 1 is assumed to be attached to the rack at the bottom most point. Node 2 is assumed to be attached to the rack at the top most point. Refer to Figure 2-2 of COLA Technical Report APP-GW-GLR-033 for node identification.						
2*	p_{13}	p_{14}				
3*	p_{15}	p_{16}				
4*	p_{17}	p_{18}				
5*	p_{19}	p_{20}				
1*	p_{21}	p_{22}				
where the relative displacement variables q_i are defined as:						

$$p_i = q_i(t) + U_x(t) \quad i = 1,7,13,15,17,19,21$$
$$= q_i(t) + U_y(t) \quad i = 2,8,14,16,18,20,22$$
$$= q_i(t) + U_z(t) \quad i = 3,9$$
$$= q_i(t) \quad i = 4,5,6,10,11,12$$

p_i denotes absolute displacement (or rotation) with respect to inertial space

q_i denotes relative displacement (or rotation) with respect to the floor slab

* denotes fuel mass nodes

U(t) are the three known earthquake displacements

b. The rack cell structure is modeled as a single beam between two nodes, which are located at the top of the rack and at the baseplate elevation. This is consistent with Holtec's standard model for seismic analysis of spent fuel racks, which has been reviewed and approved by the NRC on numerous dockets. Although there is not a one-to-one correspondence between beam nodes and fuel assembly nodes, fuel-to-cell wall impact loads, which can occur at elevation 0, 0.25H, 0.5H, 0.75H, and H (where H is the height of the cell structure), are properly transmitted to the rack beam in accordance with the methodology outlined in Reference 12 in COLA Technical Report APP-GW-GLR-026 Revision 0.

References:

1. APP-GW-GLR-026, Revision 0, "New Fuel Storage Rack Structural/Seismic Analysis," (Technical Report Number 44)
2. Holtec Computer Code MR216 (multi-rack transient analysis code a.k.a. DYNARACK), Version 2.00. QA documentation contained in Holtec Report HI-92844 (Holtec Proprietary).

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR44-016
Revision: 0

Question:

Explain whether only a full fuel rack is considered in the simulation, or if several scenarios are considered; i. e., different fill ratios, from empty to full. Provide the technical justification if only a full rack is considered.

Westinghouse Response:

The new fuel rack is assumed to be fully loaded with maximum weight fuel assemblies in all three simulations. This scenario bounds any partially loaded configuration since it (1) maximizes the vertical compression and lateral friction loads on the support pedestals and (2) produces the maximum rack displacements and fuel-to-cell wall impacts. The displacements are larger for a fully loaded rack, as opposed to a partially filled rack, because the dynamic model conservatively assumes that all stored fuel assemblies rattle in unison. Hence, the momentum transferred between the rattling fuel mass and the spent fuel rack is maximum for a fully loaded rack. For a partially filled rack, the decrease in rattling fuel mass outstrips the destabilizing effect of an eccentric fuel loading pattern.

Reference:

1. APP-GW-GLR-026, Revision 0, "New Fuel Storage Rack Structural/Seismic Analysis," (Technical Report Number 44)

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR44-018
Revision: 0

Question:

Even though a time history analysis was performed, good engineering practice is to also perform a modal analysis for a fixed base rack, to understand its dynamic characteristics. Was this done and what are the natural frequencies and corresponding mode shapes?

Westinghouse Response:

A modal analysis of a fixed base single rack has not been performed; this type of linear analysis cannot accurately predict the non-linear response of a freestanding rack to seismic excitation. This is why a detailed time history analysis was performed.

Reference:

1. APP-GW-GLR-026, Revision 0, "New Fuel Storage Rack Structural/Seismic Analysis," (Technical Report Number 44)

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR44-020
Revision: 0

Question:

When utilizing ASME Code, Section III, Subsection NF, are all of the applicable provisions in NRC Regulatory Guide, 1.124, Revision 1 also satisfied? This should be clearly stated in the report and the DCD.

Westinghouse Response:

The following statement "The stress analysis of the new fuel rack satisfies all of the applicable provisions in NRC Regulatory Guide 1.124, Revision 1 for component supports designed by the linear elastic analysis method" will be added to Technical Report APP-GW-GLR-026 and the DCD.

References:

1. APP-GW-GLR-026, Revision 0, "New Fuel Storage Rack Structural/Seismic Analysis," (Technical Report Number 44)
2. US NRC Regulatory Guide 1.124, Revision 1, "Service Limits and Loading Combinations for Class 1 Linear-Type Component Supports," January 1978.

Design Control Document (DCD) Revision:
A statement will be added to DCD Subsection 9.1.1.1 stating that the stress analysis of the new fuel rack satisfies all of the applicable provisions in NRC Regulatory Guide 1.124, Revision 1. Table 1.9-1 (Sheet 10 of 15) "Regulatory Guide/DCD Section Cross-References" will be revised for Regulatory Guide 1.124 to include DCD Subsection 9.1.1.1.

PRA Revision:
None

Technical Report (TR) Revision:
A statement will be added to Technical Report Number 44 stating that the stress analysis of the new fuel rack satisfies all of the applicable provisions in NRC Regulatory Guide 1.124, Revision 1.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR44-021
Revision: 0

Question:

Section 2.3.4.3, first paragraph, refers to 304L stainless steel material and uses 70 ksi for ultimate and 25 ksi for yield. Explain why these values are lower than the ultimate and yield strengths given in Table 2-5 for type 304 stainless steel.

Westinghouse Response:

There was a mistake made in the first paragraph of Section 2.3.4.3. Table 2-5 is correct in its reference to Type 304 stainless steel. The revised first paragraph of Section 2.3.4.3. is as follows: SectionF-1334 (ASME Section III, Appendix F [Reference 14]), states that limits for the Level D condition are the smaller of 2 or 1.167 S_u/S_y times the corresponding limits for the Level A condition if $S_u > 1.2\ S_y$ or 1.4 if $S_u < 1.2\ S_y$ except for requirements specifically listed below. S_u and S_y are the properties for 304 stainless steel demonstrate that 1.2 times the yield strength is less than the ultimate strength. Since 1.167* (75,000/30,000) =2.92, the multiplier of 2.0 controls.

Reference:

1. APP-GW-GLR-026, Revision 0, "New Fuel Storage Rack Structural/Seismic Analysis," (Technical Report Number 44)

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
The Technical report will be revised as follows first paragraph of Section 2.3.4.3. SectionF-1334 (ASME Section III, Appendix F [Reference 14]), states that limits for the Level D condition are the smaller of 2 or 1.167 S_u/S_y times the corresponding limits for the Level A condition if $S_u > 1.2\ S_y$ or 1.4 if $S_u < 1.2\ S_y$ except for requirements specifically listed below. S_u and S_y are the properties for 304 stainless steel demonstrate that 1.2 times the yield strength is less than the ultimate strength. Since 1.167* (75,000/30,000) =2.92, the multiplier of 2.0 controls.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR44-022
Revision: 0

Question:

Section 2.3.4.3, 4th bullet, develops the faulted allowable maximum weld stress for the weld material. Why isn't an allowable maximum weld stress based on the base metal also developed? Normally welds are checked for both weld material and base metal, as was done for Levels A and B in Section 2.3.4.1.

Westinghouse Response:

The required capacity evaluation for Level A conditions are presented below using the material properties associated with the material.

Su = ultimate strength of weld material (assumed equal to that of the base metal for purposes of this calculation); Sy= yield strength of base metal

Al = fillet weld leg area; At = fillet weld throat area = 0.707Al

Using the ASME allowable strengths for weld and base metal in Subsection NF, the shear capacities are:

V(base) = (0.4Sy)Al; V(throat) = (0.3Su)(0.707Al) so that

V(throat)/V(base) = 0.2121Su/(0.4Sy) = 0.53025Su/Sy

The above result for Level A conditions shows that the weld throat controls the capacity only if 0.53025Su < Sy. Therefore, for the AP1000 new fuel rack,

Su=66.2 ksi; Sy=21.3 ksi at temperature, so that

V(throat)/V(base) = 1.648 indicating that base shear capacity controls the joint for a Level A event.

For Levels B, C, and D, the joint capacities are simply increased by a factor so that the determination of the governing section remains the same.

Appendix F of the ASME Code does not explicitly require weld calculations for Level D events. If, however, the weld capacity evaluations are performed using material strengths inferred by certain sub-sections of Appendix F, Holtec evaluates the capacity of the weld throat by using the amplifier 1.8 on the Level A capacity to obtain:

V(throat) = 1.8 (0.2121SuAl) = 0.38278SuAl

ASME Code Appendix F contains the following subsections that refer to allowable strengths for shear calculations. Using the 1998 Edition,

F-1331 – Criteria for Components (F-1331.1(d)) – The average primary shear stress across a section loaded in pure shear shall not exceed 0.42Su.

F-1332 – Criteria for Plate and Shell Type Supports (F-1332.4 Pure Shear) - The average primary shear stress across a section loaded in pure shear shall not exceed 0.42Su.

F-1334 – Criteria for Linear Type Supports (F-1334.2 Stresses in Shear) – The shear stress on the gross section shall not exceed the lesser of 0.72Sy and 0.42Su. Gross section shall be determined in accordance with NF-3322.1(b). [Note that Code reference to NB-3322.1(b) is a typo as the referenced NB section has nothing to do with section evaluation.]

F-1341 – Criteria for Components (using Plastic System Analysis) (F-1341.1(d) - The average primary shear across a section loaded in pure shear shall not exceed 0.42Su.

It is stipulated that F-1334.2 is intended for setting limits for the shear stress in the base metal of gross sections associated with steel structural members and should not be applied to any weld calculation (as can be inferred by the title of Subsection NF-3322 – Design Requirements for Structural Steel Members). Even if one accepts that there is an implied requirement in Appendix F to check weld capacity for Level D events, the appropriate base metal shear stress limit should be 0.42Su (viz. F-1331.1(d), F-1332.4, or F-1334.2), which would therefore give the capacity of the base metal as

V(base) = 0.42SuAl

V(throat)/V(base) = 0.911 indicating that weld throat shear capacity always controls the joint for a Level D event independent of the material. This is why only the weld throat is checked when examining welds in the Level D configuration.

Reference:

1. APP-GW-GLR-026, Revision 0, "New Fuel Storage Rack Structural/Seismic Analysis," (Technical Report Number 44)

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR44-026
Revision: 0

Question:

The computer code MR216 (a.k.a. DYNARACK) as well as the other computer analysis codes should have complete validation documentation and should be made available for review of selected package(s) during the audit. If any of the computer codes have been previously reviewed and approved by the staff on other licensing applications, for the same version of the code, these should be identified.

Westinghouse Response:

Computer analysis codes used to perform the seismic analysis of the spent fuel racks have been validated in accordance with Holtec's 10CFR50 Appendix B quality assurance program. The validation documentation will be available for review during the audit. The validation documentation for the computer code MR216 has been previously submitted by Holtec International to the NRC staff for review and approval several times. Most recently it was reviewed by the NRC in 1998 in Docket 50-382 for the Waterford 3 Steam Electric Station.

References:

1. APP-GW-GLR-026, Revision 0, "New Fuel Storage Rack Structural/Seismic Analysis," (Technical Report Number 44)
2. APP-FS02-Z0C-001, Revision 0, "Analysis of AP1000 Fuel Storage Racks Subjected to Fuel Drop Accidents"
3. US NRC, "Amendment No. 144 to Facility Operating License No. NPF-38 for the Waterford Steam Electric Station, Unit 3," July 10, 1998.

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR44-027
Revision: 0

Question:

Explain what provisions are provided for performance of inservice inspection of the rack, in accordance with 10 CFR 50.55a and/or 10 CFR 50.65, as applicable.

Westinghouse Response:

The new fuel rack is passive in nature. There are no moving parts on the new fuel rack, and it does not require any instrumentation. Therefore, there is no compelling need to perform inservice examination of the new fuel rack. Nonetheless, the new fuel rack can be accessed from above by way of an empty storage cell location(s) to enable the performance of inservice examination, as mandated by 10 CFR 50.55a(g)(3) for ASME Class 3 component supports. At the base of each storage cell (except at the four designated lifting locations), there is a 6-inch diameter thru hole in the baseplate, which provides access below the baseplate. The new fuel rack contains new fuel only during a short period prior to refueling. When it does not have new fuel, it could be lifted from the new fuel storage pit for inspection.
In summary, the new fuel rack is designed to provide access to surfaces that may come in contact with new fuel assemblies and to the support pedestals beneath the baseplate to support inservice examinations as needed.

Reference:

1. APP-GW-GLR-026, Revision 0, "New Fuel Storage Rack Structural/Seismic Analysis," (Technical Report Number 44)

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR44-028
Revision: 0

Question:

The treatment of the new fuel storage rack as a safety class/seismic Category I component appears to represent a departure from past practice in the nuclear power industry. The draft update to RG 1.29 (DG-1156) does not identify new fuel storage racks as seismic Category I. Please: (1) describe the technical basis for treating the new fuel storage rack as a safety class/seismic Category I component; and (2) explain how the safety significance of the AP1000 new fuel storage rack differs from prior nuclear power plant designs.

Westinghouse Response:

1) We understand that both Regulatory Guide 1.29 Revision 3 and draft update to RG 1.29 (DG-1156) do not identify new fuel storage racks as seismic Category I. However, Westinghouse decided that all racks in the AP1000 plant would be seismic Category I. Holtec has designed and fabricated new fuel storage racks to seismic Category I. There is no additional analysis or fabrication cost to have the new fuel storage rack as seismic Category I.
2) The safety significance of the AP1000 new fuel storage rack does not differ from prior nuclear power plant designs. It is both Westinghouse's and Holtec's position that the form, fit and function of the AP1000 new fuel storage rack is the same of those new fuel racks in operating PWRs.

Reference:

1. APP-GW-GLR-026, Revision 0, "New Fuel Storage Rack Structural/Seismic Analysis," (Technical Report Number 44)
2. U.S. NRC, Regulatory Guide 1.29, Revision 3, "Seismic Design Classification," September, 1978.
3. U.S. NRC, Regulatory Guide 1.29, Draft Revision 4, "Seismic Design Classification," March 2007.

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None