Southern Nuclear
Operating Company, Inc.
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SOUTHERN COMPANY

MAR 12 2010

Docket Nos.: 52-025
52-026

ND-10-0510

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555-0001

Southern Nuclear Operating Company
Vogtle Electric Generating Plant Units 3 and 4 Combined License Application
New and Significant Evaluation for Rail Transport

Ladies and Gentlemen:

On March 28, 2008, Southern Nuclear Operating Company (SNC) submitted an application for combined licenses (COLs) for proposed Vogtle Electric Generating Plant (VEGP) Units 3 and 4 to the U.S. Nuclear Regulatory Commission (NRC) for two Westinghouse AP1000 reactor plants, in accordance with 10 CFR Part 52. Subsequently, by letter dated December 10, 2009, the NRC provided SNC with a Request for Additional Information (RAI) letter requesting additional information to complete their review of Part 3 of the COL application and to develop the required Supplemental Environmental Impact Statement (SEIS). One of the RAI's requested details of SNC's plan for transportation of large components and equipment to the VEGP site to support construction of VEGP Units 3 and 4. By letter dated February 19, 2010, SNC informed the NRC that a final decision to transport large components and heavy equipment to the VEGP site primarily by rail, instead of using the Savannah River navigation channel, had been made by the Westinghouse-Shaw Consortium responsible for construction of VEGP Units 3 and 4. In that letter, SNC committed to provide the new and significant environmental evaluation for the change to rail transport to the NRC by March 12, 2010. Enclosure 1 to this letter contains the new and significant environmental evaluation for the transportation method change.

In support of the enclosed new and significant evaluation, references identified in the evaluation are also included as attachments to Enclosure 1. Attachment C to Enclosure 1 contains information that is considered proprietary (i.e., trade secrets) to Westinghouse Electric Company, LLC (Westinghouse), thus, a Westinghouse authorization letter, including a supporting affidavit for withholding executed by Westinghouse, is provided in Enclosure 2. The affidavit sets forth the basis upon which this attachment may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR 2.390

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of the Commission's regulations. The information contained in Enclosure 1, Attachment C is proprietary in its entirety; thus, a non-proprietary version is not provided.

Accordingly, it is respectfully requested that Attachment C to Enclosure 1 of this letter, which is proprietary to Westinghouse, be withheld from public disclosure (i.e., non-publicly available) in accordance with 10 CFR 2.390.

Correspondence with respect to the proprietary aspects of Enclosure 1, Attachment C, the supporting Application for Withholding, or the affidavit, should reference Westinghouse letter CAW-10-2775 and be addressed to Mr. Robert B. Sisk, Manager, AP1000 Licensing and Customer Interface, 1000 Westinghouse Drive, Cranberry Township, PA 16066.

If you have any questions regarding this letter, please contact Mr. Tom Moorer at (205) 992-5807 or Mr. Wes Sparkman at (205) 992-5061.

Mr. M. K. Smith states he is the Technical Support Director for Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

Michael K. Smith

Sworn to and subscribed before me this 12th *day of* March, *2010*

Notary Public: Deborah A. Jurovka

My commission expires: October 24, 2012

MKS/BJS/dmw

Enclosures:
1. VEGP Units 3 and 4 COL Application – New and Significant Evaluation for Rail Delivery, Including:
   - Attachment A – Plant Vogtle Railroad Track Inspection Report
   - Attachment B – Plant Vogtle Newberry Creek Railroad Bridge Condition Assessment and Load Rating
   - Attachment C – SVP_SV0_000254, Rail Delivery Mode for AP1000 Major Components to Vogtle Units 3 and 4 **{Withhold from Public Disclosure}**
2. Westinghouse Authorization Letter CAW-10-2775

cc: Southern Nuclear Operating Company
Mr. J. H. Miller, III, President and CEO (w/o enclosures)
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Mr. J. T. Gasser, Executive Vice President, Nuclear Operations (w/o enclosures)
Mr. B. L. Ivey, Vice President, Nuclear Development Support (w/o enclosures)
Mr. D. H. Jones, Site Vice President, Vogtle 3 & 4 (w/o enclosures)
Mr. T. E. Tynan, Vice President – Vogtle (w/o enclosures)
Mr. D. M. Lloyd, Vogtle 3 & 4 Project Support Director (w/o enclosures)
Mr. M. J. Ajluni, Nuclear Licensing Manager
Mr. T. C. Moorer, Manager - Environmental Affairs, Chemistry, & Radiological Services
Mr. J. D. Williams, Vogtle 3 & 4 Site Support Manager
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Ms. A. F. Thornhill, Contract Compliance Manager & Managing Attorney
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Document Services RTYPE: AR01.1053
File AR.01.02.06

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Ms. T. L. Spicher, Project Manager of New Reactors
Ms. M. A. Sutton, Environmental Project Manager
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Mr. L. M. Cain, Senior Resident Inspector of VEGP

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Mr. K. T. Haynes, Director of Contracts and Regulatory Oversight (w/o enclosures)

Municipal Electric Authority of Georgia
Mr. S. M. Jackson, Vice President, Power Supply (w/o enclosures)

Dalton Utilities
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Mr. J. P. Berger, EDF (w/o enclosures)
Mr. M. W. Gettler, FP&L (w/o enclosures)
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Mr. G. D. Miller, PG&N (w/o enclosures)
Mr. N. T. Simms, Duke Energy (w/o enclosures)
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Ms. A. M. Monroe, SCE&G (w/o enclosures)
Mr. T. Beville, DOE/PM (w/o enclosures)

Southern Nuclear Operating Company

ND-10-0510

Enclosure 1

VEGP Units 3 and 4 COL Application –

New and Significant Evaluation for Rail Delivery

Including:

Attachment A – Plant Vogtle Railroad Track Inspection Report

Attachment B – Plant Vogtle Newberry Creek Railroad Bridge Condition Assessment and Load Rating

Attachment C – SVP_SV0_000254, Rail Delivery Mode for AP1000 Major Components to Vogtle Units 3 and 4 {Withhold from Public Disclosure}

NOTE: This enclosure without attachments is three pages in length.

EIS Section	Input/ Problem Statement Number	Key Input or Problem Statement	New Information (Yes/No)	Significant (Yes/No)	Rationale
NA	PS 4	Evaluate the environmental impacts of using rail to transport reactor components and heavy equipment to Plant Vogtle. Potential impacts to wetlands, waterbodies, protected species, critical habitats, and cultural resources were considered.	Yes	No	As indicated in the response to RAI G1 included in ND-10-0023, Response to Request for Additional Information Letter on Environmental Issues, (January 8, 2010) and further explained in Letter ND-10-0261, Large Component Transportation Method Decision, dated February 19, 2010, the transportation of large components and heavy equipment to support the construction of Vogtle Units 3 and 4 will be primarily by rail. The deliveries will be made using the Norfolk Southern track from Savannah, Georgia to Greens Cut (approximately 100 miles) and the 16-mile Vogtle spur from Greens Cut to Plant Vogtle. Based on the Heavy Equipment Transport Options For AP1000 Major Components Assessment and Recommendation Report (SVP_SV0_000254), no major improvements are needed to the rail line between Savannah, Georgia and Waynesboro, Georgia (Greens Cut). There will be no modification of bridges, overpasses, or other structures required to support rail transport. Routine track maintenance such as replacement of crossties and ballast may occur, as necessary, but no activities that would result in environmental impacts subject to National Environmental Policy Act (NEPA) requirements are expected. The inspection of the rail line included a detailed survey of bridges, overpasses, intrusions from vegetation, track curvature, rail yard constraints, signal equipment, sidings, retaining walls, and overhead utilities from Savannah to Waynesboro was completed on October 1, 2009. The survey focused on the following rail line sections: the Savannah- Ardmore (SA Line), Millen (S Line), and Waynesboro-Greens Cut (D Line). The rail spur from Waynesboro (Greens Cut) to VEGP was also evaluated and no major improvements are needed to support the shipments. SNC also evaluated the potential for changes to the onsite rail spur and rail yard that may result from this delivery option and confirmed that all environmental impacts are bounded by the information provided in the Early Site Permit (ESP) Final Environmental Impact Statement (FEIS). Portions of the onsite rail line used for VEGP Units 1 and 2 were removed to support construction activities for

EIS Section	Input/ Problem Statement Number	Key Input or Problem Statement	New Information (Yes/No)	Significant (Yes/No)	Rationale
					VEGP Units 3 and 4. New onsite rail lines will be developed to support the decision to use rail delivery for major components, heavy equipment, and construction materials. The VEGP ESP provides information about the onsite portion of the rail spur and associated sidings and rail yard. Small modifications to the track arrangement in the onsite rail yard will be necessary to support management of heavy components and equipment delivered by rail during the construction process. SNC has reviewed these proposed changes to the onsite rail yard as depicted in the SV0-0000-XR series drawings and determined that the footprint of the rail yard evaluated for the ESP will not be altered by these changes. The rail yard is located in an area previously disturbed during the construction of VEGP Units 1 and 2 and evaluated in the ESP, and the footprint associated with the changes is bounded by the original footprint. Based on the above, the design of the facility continues to fall within the site characteristics and design parameters specified in the VEGP ESP. The16-mile Plant Vogtle railroad track spur from the Norfolk Southern Railroad mainline turnout to the Plant Vogtle yard turnout was inspected in December 2008 (Southern Company 2008). The track does not need upgrading, so there will be no construction impacts or disturbance to the right-of-way, including disturbance of the subsurface. No natural resources will be affected. If the track is to remain in service for an extended period of time, the inspection recommended that the steel components of the bridge over Newberry Creek be coated with a bitumastic (coal tar and epoxy) coating (Southern Company 2009). SNC would follow established procedures and best management practices while performing any necessary spur maintenance. Since the Norfolk Southern rail line and the Vogtle Spur are existing rail lines, with no major improvements needed, there are no additional environmental impacts, beyond those included in the ESP FEIS associated with the decision to use rail as the primary mode of transportation for delivering large components and heavy equipment to Vogtle Units 3 and 4. This would include no impacts to cultural resources, protected species, critical or important habitats, including wetlands, waterbodies and prime farmland. Due to SNC's decision to use rail, the barge slip will not be constructed and SNC

EIS Section	Input/ Problem Statement Number	Key Input or Problem Statement	New Information (Yes/No)	Significant (Yes/No)	Rationale
					will not request US Army Corps of Engineers to conduct maintenance dredging in the Savannah River. This will eliminate environmental impacts that would result from the dredging activities for maintaining the Savannah River Navigation Channel and barge slip construction.

References:

Southern Company 2008. Plant Vogtle Railroad Track Inspection Report. December 18.

Southern Company 2009. Plant Vogtle Newberry Creek Railroad Bridge Condition Assessment and Load Rating. F. J. Crisp, PE. February 25.

SVP_SV0_000254, Heavy Equipment Transport Options For AP1000 Major Components Assessment and Recommendation Report

Southern Nuclear Operating Company

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Enclosure 1 Attachment A

Plant Vogtle Railroad Track Inspection Report

NOTE: This attachment consists of a 7-page report.

Plant Vogtle
Railroad Track Inspection Report

December 18, 2008

SOUTHERN COMPANY

Energy to Serve Your World®

Executive Summary

On December 2nd and 3rd, 2008, Mr. Frank Crisp and Mr. Jeremy Cole, both of Southern Company Generation, E&CS, performed a track inspection of the Plant Vogtle railroad lead track from the Norfolk Southern Railroad mainline turnout to the Plant Vogtle yard turnout. Plant yard tracks were not inspected. The total distance of track inspected was approximately sixteen miles. The majority of the track was inspected using the Plant's hi-rail vehicle, with the assistance of Mr. Greg Lee, SNC. Isolated sections were inspected on foot. An inspection of the plate girder railroad bridge over Newberry Creek was performed by Mr. Crisp, the findings of which will be reported separately from this report.

Overall, the Plant Vogtle track was found in excellent condition. All rails, joint bars, track bolts, tie plates, spikes, and rail anchors were in sound condition. The track cross ties were in remarkably good condition, given the age of the track, and the minimal maintenance attention received. Drainage and flange-way defects were noted at the Cleveland Drive grade crossing (unpaved road). This area requires attention due to standing water in the ditches and excess mud/silt deposited in the track structure. A small kink was noted in a tangent section of track approximately ½ mile east of the Newberry Creek Bridge. This kink appeared to be caused by a machine or off-road vehicle as wheel ruts were noted in the ballast shoulder. This item should be repaired to correct the poor track alignment. Track gage at this location was found to be within tolerance.

The tracks were inspected according to the Federal Railroad Administration standard - Code of Federal Regulations 49 Part 213 - "Track Safety Standards".

General Inspection Notes

Inspectors: Frank J. Crisp, PE; Jeremy E. Cole, PE

Weather: partly cloudy Temperature: ≈ 70 degrees

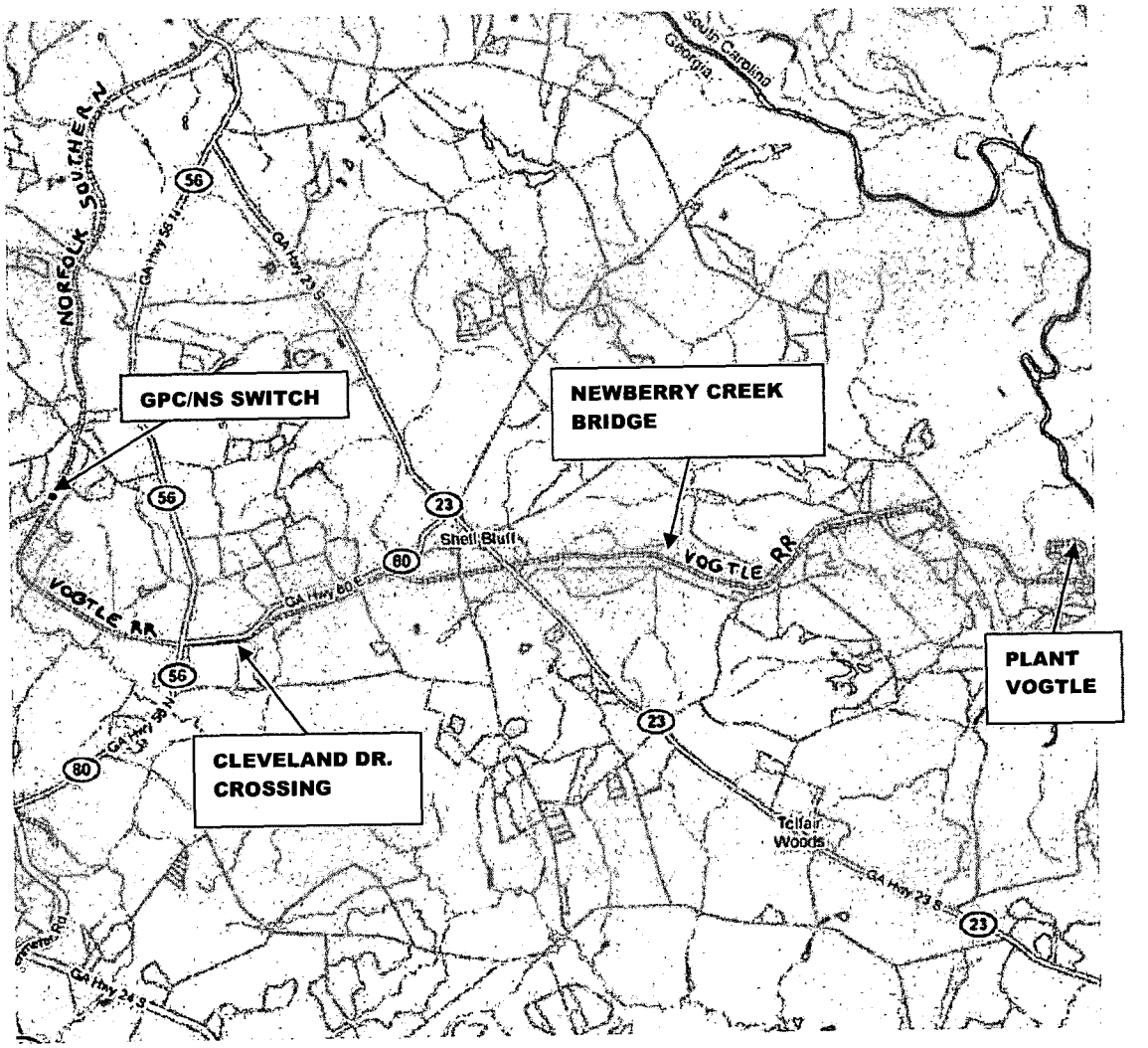
FRA Track Class: excepted _____ 1 _____ 2 X 3 _____

Tie Material: Wood

Rail Size: 100 RE jointed

Tie Plates: Single Shoulder type

GENERAL PLANT TRACK SCHEMATIC



INSPECTION FINDINGS

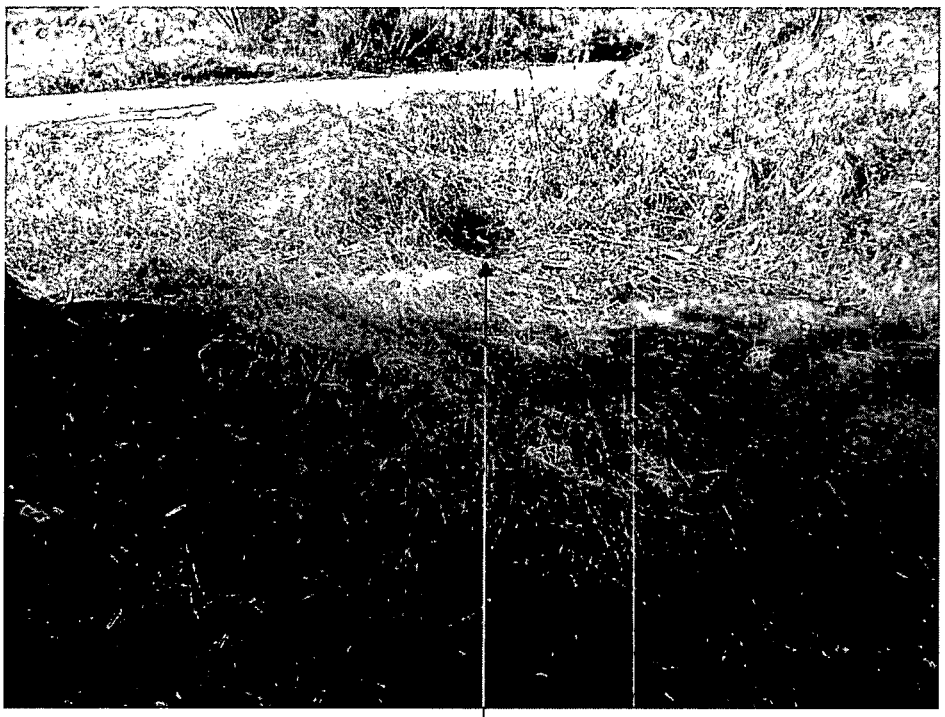
ROADBED

- DRAINAGE:

Ditches	Freely flowing _____	Restricted flow _X__
Culverts	Freely flowing _____	Restricted flow _X__

1. Location of Problem: Cleveland Drive grade crossing

   Notes: The ditches adjacent to the track along with the associated drain pipes under Cleveland Drive are filled with debris and are restricting water flow. See photos below. Water is standing in the ditches and there is evidence that water has been standing in the track structure due to the amount of silt and fines in the ballast and in the grade crossing area. Recommend repairs required to restore the slope and profile of the ditches and to restore normal water flow in the ditches and through the culvert under Cleveland Drive. General cleaning of the track through the grade crossing is also required as flangeways are full of mud and debris.



Clogged culvert under Cleveland Drive

VEGETATION: No Defect _X___ Defect _____

Notes: Ballast section is free of vegetation and in excellent condition.

TRACK GEOMETRY

- GAGE: No Defect __X__ Defect _____

  Notes:

- ALIGNMENT: No Defect __X__ Defect _____

  Location of Problem: approximately ½ mile east of the Newberry Creek Bridge in tangent track

  Notes: A small kink was noted in this section of tangent track. This kink appeared to be caused by a machine or off-road vehicle as wheel ruts were noted in the ballast shoulder of the track. It was apparent that the vehicle's wheels had struck the south rail with significant force, causing both rails and ties in the area to shift to the north. Track gage was measured at this location and remained within tolerance. Alignment appears to be within FRA Track Safety Standards tolerance as well, however, re-alignment of the track is recommended.

- TRACK SURFACE: No Defect __X__ Defect _____

  Location of Problem:
  Notes:

TRACK STRUCTURE

- BALLAST:

  Ballast is Fouled Yes _____ No __X__

  Ballast needs cleaning Yes _____ No __X__

  Track is Pumping Yes _____ No __X__

  Notes: no defects noted

- TIES:

  Plant Lead Track: Overall Good Condition __X__ Poor Condition _____

  Number of Bad Track Ties - Total __< 1%__

- TIE PLATES: Overall Good Condition __X__ Poor Condition _____

  Notes: no defects noted

- RAILS: Overall Good Condition __X__ Poor Condition _____

Fractured/Split Rail	Yes _____	No __X__
Damaged Rail	Yes _____	No __X__
Broken Rail	Yes _____	No __X__
Bolt Hole Crack	Yes _____	No __X__
Defective Weld	Yes _____	No __X__
Rail Head Flow	Yes _____	No __X__

  Notes: All rail was found to be in excellent condition. No problems or defects were noted.

- RAIL JOINTS:

Joint Bars	No Defect __X__	Defect _____
Rail-end Mismatch	No Defect __X__	Defect _____

  Notes:

- TRACK BOLTS: Overall Good Condition __X__ Poor Condition _____

  Notes: no defects noted

- SPIKES: Overall Good Condition __X__ Poor Condition _____

  Notes: no defects noted

- RAIL ANCHORS: Overall Good Condition __X__ Poor Condition _____

  Notes: no defects noted

- TURNOUTS:

  No Plant turnouts were included in the inspection. The inspection concluded at the Plant Vogtle yard turnout near the railroad gate on the west side of the Plant site.

END OF REPORT

Mr. Frank Crisp, PE, and Mr. Jeremy Cole, PE, both of Southern Company Generation performed the detailed inspection and evaluation of the subject track on December 2, 2008.

Southern Nuclear Operating Company

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Enclosure 1 Attachment B

Plant Vogtle Newberry Creek Railroad Bridge Condition Assessment and Load Rating

NOTE: This attachment consists of a 13-page report.

PLANT VOGTLE

NEWBERRY CREEK RAILROAD BRIDGE
CONDITION ASSESSMENT & LOAD RATING

Inspection and Report by

Frank J. Crisp, PE

February 25, 2009

INTRODUCTION

Two inspections were made of the railroad bridge located over Newberry Creek, which is located on the main lead railroad that serves Georgia Power's Plant Vogtle, and ties into the Norfolk-Southern main line switch. The inspections were conducted on 12/02/2008 and 1/13/2009 by Frank Crisp, SCS, with assistance from Greg Lee, Plant Vogtle.
The purpose of the inspections was to obtain member dimensions and evaluate the existing as-built condition of the bridge so that a maximum load rating could be determined for the bridge and its future use regarding the construction of Units 3 & 4 for Plant Vogtle.
Part of the inspection also consisted of evaluating the existing physical location of the bridge relative to grades, tangents, and curvature of the existing trackwork, and other track material that would affect the operation of equipment over the bridge.

BRIDGE DESCRIPTION (Condensed)

The bridge is a 5-span, (simple spans) 2-girder, steel truss type with a timber deck. The steel girders are 60' in length, center to center bearing, and spaced on 6.5' centers. The deck is comprised of 10'x 8"x 10" deep bridge timber ties secured with hook bolts drilled through the ties and secured to the bottom surface of the girder compression flange. To prevent tie skewing, the bridge ties have timber 4"x 8"runners located at each tie end. The substructure supports are concrete caps located on HP piling, 8 per bent. All piling have typical angle bracing located in the lateral and longitudinal directions.
To prevent lateral distortion and diagonal tension in the steel girders, typical transverse stiffeners, struts, lateral bracing and cross bracing are located at proper designated locations. The stiffeners are on 5' centers, 6.5"x .375" plate, lateral top bracing, WT5 x 22.5 members, bottom lateral bracing, 6 x 6 x 3/8 angles, struts, 4 x 4 x 3/8 angles, and interior cross bracing, 4 x 4 x 3/8 angles with 6 x 6 angles for the two (2) exterior cross braces. Miscellaneous 3/8' gusset plates, used throughout, connect the bracing together or to the girder webs. All bracing and stiffeners are welded construction.
The girders are 87" in depth comprised of ½" web, and two (2) top and bottom flanges, 1 5/8 x 15" and have full penetration welds with no backing bars.
It appears that no documentation or drawings exist for the bridge, as an extensive search provided no results. However, based upon close inspection of the steel members, it appears that the steel used for its construction, is ASTM A36 steel and not that of ASTM A588 or ASTM A242 steel. The girders are fracture critical members, (FCM). The railroad tracks constructed circa 1970's.
The bearing stiffeners consist of 1 1/ 8" steel plate, offset 1' from the end of each respective girder end. The bearing plates are typical rocker type steel plates secured to the abutment or concrete cap with 1 ½" diameter anchor bolts. Each opposing girder end has the required 1" gap for expansion purposes.
The track rails and inside guard rails located on the bridge is 100 RE jointed rail with 7.5" x 11" tie plates and 5/8" cut spikes.

BRIDGE LOCATION CONSIDERATIONS

As stated in the **Introduction**, part of the inspection of the bridge also entailed the assessment of the physical location of the bridge relative to nearby existing grades, tangent sections of track, and track curvature and superelevation. This is necessary to determine the possible maximum speed that a train set or a part of a train could obtain while operating on the track located near the bridge and/or on the bridge. Of concern, are the longitudinal and lateral loads induced into the bridge structure or abutments due to the live load traveling across the bridge, or possibly starting or stopping of the train set on the bridge. Thus, the importance in considering the combination of the track curvature and grades while a live load is crossing the bridge.

INITIAL DESIGN & CONSTRUCTION

Based upon the results of the inspection of the bridge construction details, and personal design experience in railroad structures, it is implicit that the original designer used the design specifications per AREA (American Railway Engineering Association), post 1999, AREMA (American Railway Engineering & Maintenance Association). The inspection of the details consisted of assuring proper physical location of all connections, type of connections, and the weld quality in the connections. This was necessary to determine their respective stress category.

The inspection also consisted of performing a structural condition assessment on all weld material, possible cracks, corrosion, or other abnormalities in both the steel members and the weld material.

PRELIMINARY BRIDGE DESIGN DATA & BRIDGE LOCATION DATA

The bridge itself is level, but has a negative 1.5% grade from the in-bound (west) direction. This negative grade extends from the point-of-curvature (PC) of the curve leading to the bridge and is 530' to the front face of the bridge abutment wall. From the east end of the bridge, there is an approximate 1.0% positive grade inbound toward Plant Vogtle.

However, as measured from each end of the bridge, the jointed track has sufficient (approximately each tie) rail anchors throughout the adjacent curves and tangents which terminate at or near the abutment back wall. Therefore, the longitudinal live loading is induced into the abutment walls, thus allowing only residual temperature stresses to transfer across the bridge and into the remaining bearing areas on each bent.

In addition, since the bridge is located in a tangent section, and there is sufficient distance from the west abutment wall and the point-of-curvature of the west curve, centrifugal live loads are not induced into the structure. Therefore, LF = 0 and CF = 0 in the stress and fatigue analysis.

BRIDGE INSPECTION ASSESSMENT

The overall condition of the bridge is in excellent condition, with no deterioration, corrosion, or damage in any of the steel members. No evidence of cracks, notches, nicks, or distortion detected in any steel members. *However, several stiffener and bracing connections will be discussed in the fatigue analysis later in the report.* (See photographs) All lateral bracing, cross

bracing, and intermediate stiffeners meet the current AREMA Specifications for their respective location.
The concrete substructure abutments or pile caps are in excellent condition. Piling at each bent is in excellent condition with no evidence of cracks or damage. All piling appears to have the proper batter and alignment.
The bridge timber ties and runner ties are also in excellent condition. An isolated number of hook bolts have minor skewing under the compression flange of the girders, but are not a concern. Other track material (OTM) is within AREA (AREMA) Specifications.

DESIGN BACKGROUND

As mentioned previously, the initial design of the bridge structure and its details appear to follow the design requirements of the AREA (AREMA) Specifications. The design live load was either the Coopers E72 or E80 loading, but most likely, the E80 loading since the bridge was likely designed in the middle to late 1970's. The Cooper's E80 loading is defined as an equivalent diesel load of four 80-kip axles spaced on 5-foot centers with a trailing load of 8 kips per foot. (*Do not try to read too much into this last statement, as the E80 loading is actually comprised of two "fictitious" diesels with varying axle load and spacing, plus the trailing load.*)
Therefore, the design live load shall consist of that Cooper loading, that will produce a loading effect equivalent to that caused by the heaviest engine or unit "train-load" expected to move over a completed structure during its expected life.
Not withstanding these facts presented, present day design analysis and load rating shall be performed using the Cooper E80 loading and AREMA Specifications, Chapter 15 to determine the equivalent 'E' loading for a particular live load or bridge structure. This is particularly important for long span (>50') steel bridges subjected to strain-fatigue effects.

As described previously, no documentation or drawings were available for the bridge, thus AREMA requires that load-rating analysis shall be performed using minimum yield steel strength of 30 ksi, (ASTM A33). However, due to the period that the bridge was constructed, and the fact that A36 steel was available after 1962, there is complete confidence that the analysis could be performed using a minimum steel stress value of 36 ksi.
In rating a railroad bridge, only tension stresses are the controlling factors. This applies to both the strength (strain) and fatigue values.

(A) Strength (strain) Rating: There are two AREMA 'E' rating categories for strain stresses:

1. Normal at 100% basic allowable tension stress. This includes dead load, live load, impact, centrifugal (CF) forces, ***and*** fatigue considerations.
2. Normal maximum at 125% design allowable tension stress: This includes, dead load, live load, impact, wind load, centrifugal force, longitudinal force, nosing, but ***without*** fatigue considerations. (The nosing load affects the lateral bracing that ties the two girders together. Otherwise, there would be lateral distortion of the bottom girder flanges without the lateral bracing system. The nosing load is due to the "hunting affect" or lateral movement of the axle sets against the gage side of each rail as the train travels across the structure. The nosing dynamics increase as axle loads and train speed increase.)

(B) Fatigue Rating: (Condensed)

1. Where the potential exists for a Class 1 railroad company (such as Norfolk-Southern, CSX, etc.) to operate their equipment on a bridge, the bridges must be rated based upon a maximum car weight that can be used for ***unlimited*** free running of locomotives and cars. Presently, that "car weight" is the 286 Kip (110 tons) car and numerous "overload cars" such as heavy equipment haulers. (However, the existing track structure may also limit weight across a bridge structure.)
2. Impact stresses, due to speed across the bridge structure, affects fatigue stress (structure life) more than stress associated with girder section strength.
3. Fatigue is a progressive progress of capacity reduction created by cycles of load application. ***Additionally, as the speed of the "train" across the bridge increases, the impact stresses increase considerably, sometimes exponentially, thereby increasing fatigue factors.*** (See item 5 below) Speed concerns will be addressed further in the report.
4. Fatigue in railroad bridges occurs at discontinuities in the section, connections, stiffeners, welds, material flaws, corrosion, shop details, and construction details.
5. Out-of-round, or "flat spot" wheels operating at speeds of 25 MPH or greater, increases impact stresses considerably. This is of special concern on steel bridges with rail and timber decks.
6. Fatigue stresses are determined based upon the live load stress range with appropriate speed and impact considerations. Thus, the live load moment and stresses vary from a minimum to a maximum. (Dead load stresses are a constant value.)
7. Fatigue is not necessarily related only to the weight and speed imposed on a bridge, but also has a direct connection with the axle arrangement that dictates the number of cycles. In addition, the car lengths relative to the bridge span length is of special consideration.
8. Note that there has been no mention of shear stresses associated with the rating analysis. This is because fatigue and tension stresses cause crack propagation or failure. The design of girder webs and bearing stiffeners is associated with shear and not influenced by live load dynamics.

RATING ANALYSIS

Due to the close proximity of the bridge relative to the existing track tangents, track curvature, and the plus/minus grades, a train, or "train-car" could travel over the bridge at Class 1 to Class 3 speeds. Thus, the equipment ***could*** operate at speeds varying from 5 MPH to 40 MPH. Additionally, since there are multiple diesel types and overload equipment used in the industry, the total weight and number of axle sets could vary considerably. Again, as described previously, the speed and its associated impact creates considerable concern for fatigue stress and bridge life.

RATING RESULTS

(A) Strength Rating: Based upon the previous information provided in the **Design Background** section and using the Normal Basic allowable equations for dead load, live load, impact, wind load, and other forces, an equivalent 'E' rating was derived for the bridge girders and associated bracing.

(As a reminder, impact stresses relates directly to the speed of the operating weight across the bridge structure.)
For the Normal allowable stresses, there are actually two allowable stresses to consider for the basic allowable stress: (a) design, and (b) the infrequent 'K' overload, using basic allowable tension stress of 0.55Fy and 0.80 Fy respectively. However, the 'K' overload stress value requires careful consideration when high speeds, non-uniform axle patterns, and fatigue are a concern.

Using documented physical dimensions and weights of various diesels and other equipment cars, no less than **22** combinations were investigated to determine the maximum equivalent 'E' loading across each span of the bridge. The combinations consisted of different combinations of diesel types and different car types, such as depressed center cars, bolster cars, bulkhead flat cars. These combinations provide the maximum moment ranges and the number of cycles per car. The combinations had to be determined because main line and independent railroads use 1 to 3 diesels in combination with one, perhaps two or more equipment cars, with varying (non-uniform) weights. But more importantly, it can only be speculated as to what type and number of equipment cars that may be used to transit equipment or materials to Plant Vogtle for the construction of Units 3 & 4.

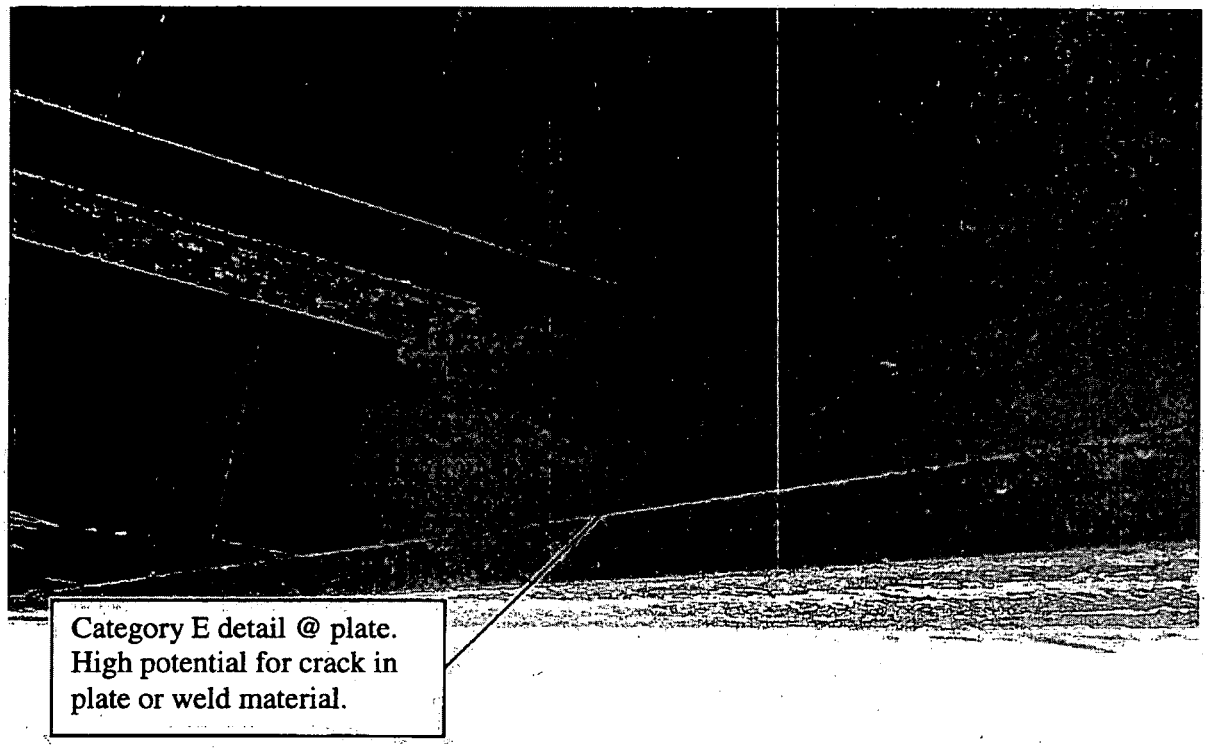
Therefore, using the Cooper E80 as the design live load, the aforementioned equipment combinations, and the forces described herein, the maximum permissible (allowable) equivalent 'E" rating for the bridge structure (per girder) is **E100** with a maximum allowable operating speed of **10 MPH**. If the speed increases to **25 MPH**, the equivalent rating reduces to **E90** and any speed greater than 25 MPH, the 'E' rating decreases considerably. This is detrimental to certain bridge details when considering fatigue factors. (Based upon the 10 MPH speed, the total impact reduction factor for vertical impact and rocking effect is 22%. Thus, explained, impact factors increase substantially as speed increases, greatly affecting the life of the structure.)

(B) Fatigue Rating: (Condensed explanation)

NOTE: Referring to the description above regarding the load combinations, a maximum equivalent 'E' rating was determined for a base line operating value. The worst case loading combination was determined as **E95.** This rating is the result of a non-uniform axle loading that would create the greatest number of load cycles. (Note that the strength rating of E100 is greater than the equipment rating of E95.) (The actual stress range for fatigue is live load + impact.)

The fatigue analysis must consider the number of load cycles and span length, which determines the maximum allowable fatigue stress range for each tension detail. The fatigue analysis considers the maximum allowable operating live load with impact, which, as stated above, was determined as E95 loading. Using an operating speed across the structure as 10 MPH, the E80 design load, and equivalent E95 operating load, a mean impact value was determined for the Normal fatigue rating.
Based upon the results of the inspection bridge details, three (3) stress categories were identified for their respective rating. The three stress categories: B, C, & E.

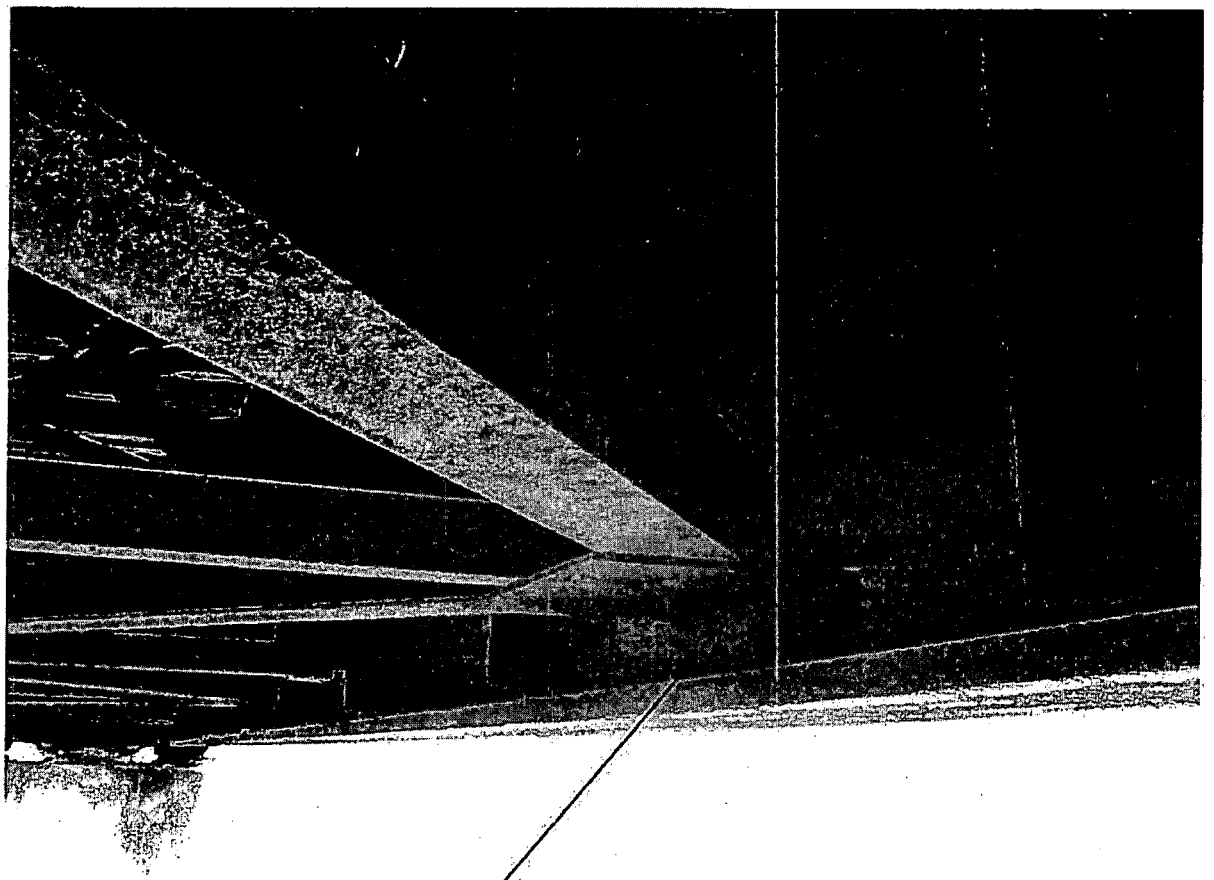
Using the results of the impact values, cycles, and other factors described previously, the maximum allowable fatigue range (RMC, root mean cube) was determined as the basis for comparison for each category. The actual in-service live load fatigue stress range is **15.30 ksi.**
(a) For **Category B**, the allowable tension fatigue stress is **16.00 ksi**. This is at the location of the full penetration weld located in the tension area of the web and bottom flange of the girders.
(b) For **Category C**, the allowable stress for intermediate stiffeners in the bottom tension region varies from **10 to 12 ksi**. (This variance is to allow for the actual variance in the fatigue stress range for varying material thickness and weld type...fillet in our case.) *As can be seen, (15.30 ksi>12.0 ksi) and depending upon the speed and number of cycles, the E95 loading could easily cause fatigue damage.* The inspection revealed that the bottom clearances and welding of the stiffeners meet all AREMA requirements.
(c) For **Category E**, this pertains to the attachment of the cross bracing and lateral bracing to the tension region of the intermediate stiffeners and any welded elements onto the area of web located in the tension region. The allowable fatigue stress range for this type of detail varies from **4.5 ksi to 8 ksi**, depending upon the number of cycles. Several of these attachments could prove troublesome and actually do not meet current design requirements for fatigue stress. One detail actually falls into the **E' (prime) Category**, which, along with Category E, currently, are not permitted on FCM bridges. See the following pages and photographs for clarification.



A Category E detail, lower horizontal girder struts. Plate thickness measured as 3/8". The length of plate was measured (9") to be greater than the allowable 12 x thickness of plate. This is not so much a problem, but because the plate is welded onto the web (direction of stress in plate.) between each welded diagonal tension (transverse) stiffener; this is a potential **fatigue issue** in the plate and/or weld material. Depending upon the traffic/tonnage, cracks can occur in the fillet weld and horizontal plate, (typically occurs in the plate) creating the potential of a bracing failure. This could cause bottom flange distortion during live load transit if there is successive plate cracking or weld failures. The web stresses in this region are extremely high during live load transit.

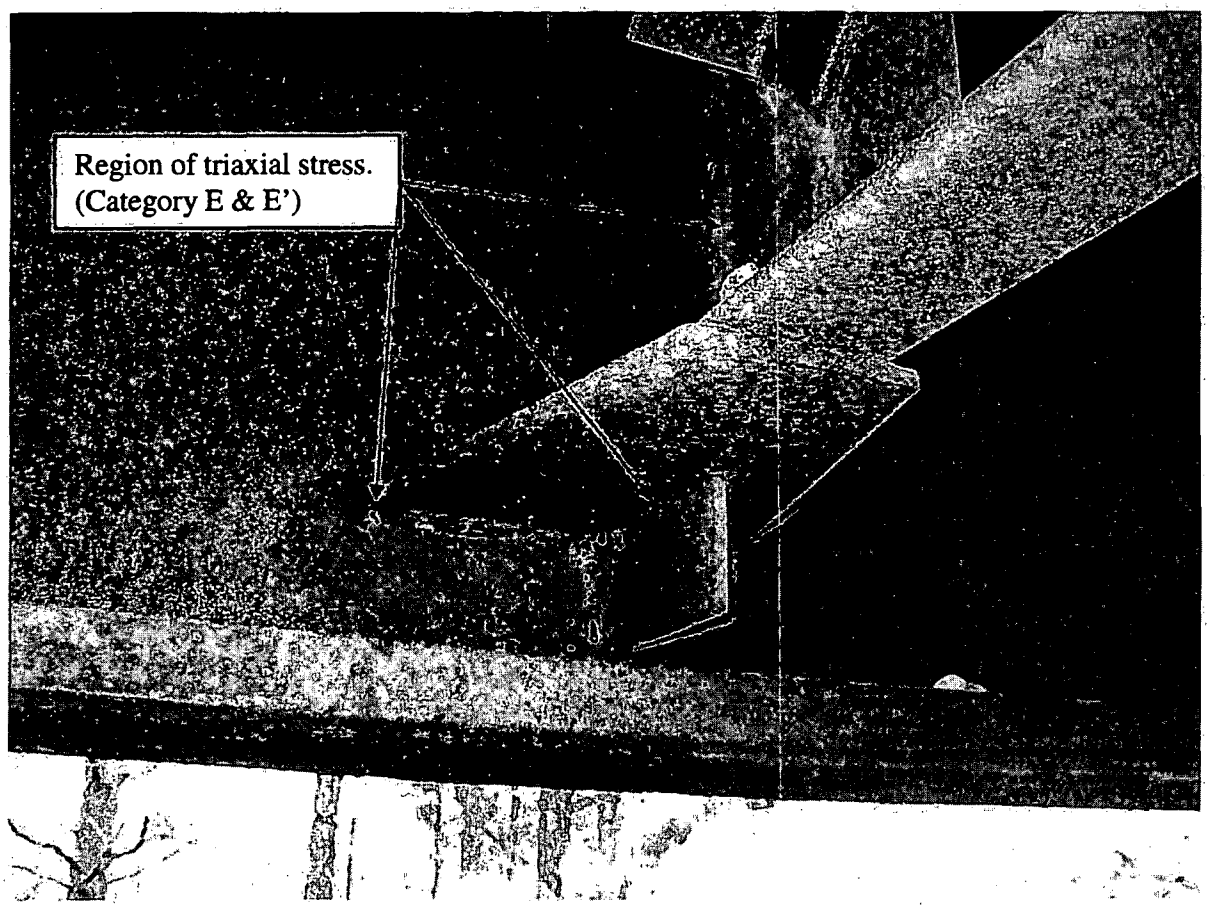
This is an easy fix if cracks should occur in the plate, as a 1" diameter hole drilled through the crack would arrest further migration of the crack. However, depending upon the use of the bridge in the future, subsequent inspections should follow to check such details in lieu of drilling holes.
These details is identified only because there are case histories of Class 1 railroad bridge failures due to a lack of inspection at such details, especially, when there are numerous cracked plates.

NOTE: The 3/8" horizontal plate used for the attachment of the struts could initially been constructed as a Category D by virtue of using a shorter length of horizontal plate.



Category E detail. High potential for plate or weld failure.

Again, another Category E detail, lower lateral bracing for the girders located between the transverse stiffeners. The potential exists for cracking in the plate and weld material. The reason for the high crack potential is due to the minimum and maximum live load stress ranges. See previous detail photograph for nomenclature description.



A troublesome Category E & E' detail. As constructed, the connection detail is both a ***fatigue*** and ***fracture*** concern. The weld of the connection to the transverse stiffener creates a triaxial state of stress in the total connection region. There should actually be a ¼" gap separating the gusset plate that is welded to the leading edge of the transverse stiffener. Additionally, the vertical tab welded to the bottom of the horizontal web plate and girder web is another concern for high stresses. Part of the problem is that the horizontal plate that secures the bracing to the weld is thick as well as being longer in length than necessary. (See previous descriptions.)

Since the bridge is located in a region that does not have severe or extended cold weather, fracture is not of special concern, however, as described previously, fatigue is still a concern. Modifying the details would be expensive. Depending upon the number of live load cycles that the bridge may experience in the future, additional inspections maybe warranted.

ADDITIONAL FATIGUE COMMENTS

In the development of AREMA requirements for fatigue, current research has shown that fatigue stresses are higher than what was determined in the recent past. Consequently, fatigue stresses are more predictable. Since there are no records of the past number of cycles over the Newberry Creek Bridge, the root mean cube (RMC) is not available, that is, there is no record of the number of cycles across the bridge. Therefore, the number of allowable cycles of E95 loading were developed using the constant amplitude stress range fatigue limit (CAFL). The limits were defined for the Category C stresses at the transverse stiffeners.
Typically, RMC results vary from 6 ksi to 9 ksi and predominately pertain to the Category C that is associated with bolted or riveted connections (predominant in railway structures). If the RMC is not defined, AREMA permits the use of the normal rating stress range, or the stress range caused by the heaviest regularly used rail equipment, permitting a mean value for impact reduction.
As stated previously, the stresses to include for fatigue are those only due to live load transit. The concept of two cars is that the trucks of two adjacent cars acting together create the maximum moment, i.e. the spacing of the trucks is closer to the adjacent car than to the other truck on the same car. Minimum moment is when the axles are positioned such that the trucks of the same car are equidistant from the point that is in question. Thus, the moment range occurs as the car or cars keep moving across the structure. The occurrence of the overall maximum moment occurs for one (1) cycle only, no matter how many times it occurs. Thus, the variation in live load moment is of concern regarding fatigue, not the magnitude of the stress. (Moment "ranges" are different for all railroad equipment types.)

With that being said, and using the constant amplitude fatigue limit for **Category C**, the calculated fatigue-moment stress range of **15.3 ksi** (Page 6), **E95** equipment loading, **10 MPH** speed, and a **span length of 60'**, the number of allowable cycles (N) was determined. The cycles calculated do not exceed the allowable AREMA for spans less than 100 feet.

NOTE: N = 2,000,000 cycles based upon a 125 ton car in a 110 car unit train at a frequency of 60 trains per day, operating on a structure with a life of 80 years. Because fatigue is of extreme concern with FCM bridges, the requirements for cyclic loading must be taken seriously. This is because the number of cycles accumulates quickly.

Thus, using the above criteria, the Category C bridge details could sustain one (1) E95 loading per day for the life of the structure. However, this does not include the aforementioned Category E & E' details. These details will require inspections based upon the previous information given.

The infrequent overload factor 'K' or maximum rating greatly influences the fatigue factors and the overall life of the bridge. Use of the bridge should be according to the normal stress values (E80) and E95 operating load. The normal rating must always govern over the maximum load rating (K), and usually is a moot point. The use of the maximum loading (K) requires prior approval by the owner based upon equipment used on the bridge.

MISCELLANEOUS

All shear stresses were within the allowable AREMA stresses for load rating.
The maximum live load and impact deflections for the 60' span were within the allowable AREMA Specifications.
The wind load forces on the bridge and/or operating equipment is less than the basic wind loads for the region where the bridge is located.

COMMENTS & RECOMMENDATIONS

1. The live load rating is based upon the Cooper's E80 loading.
2. The bridge girders have an equivalent E100 capacity rating based upon the section properties. However, this is a moot point, as this rating actually exceeds the maximum infrequent over load rating typically permitted by AREMA.
3. The expected or potential operating equipment has an equivalent E95 load rating. The load rating is based upon using present day railroad equipment in various combinations. Diesels such as the SD70 MAC, SD90 MAC, AC6000W, AC440W, the 286 K & 315 K cars, with numerous heavy duty (190 ton to 866 ton) flat cars. (All other loading combinations were slightly less than the E95 loading.)
4. Strongly recommend not operating equipment over the bridge at a speed greater than 10 MPH. (There is no need to do so, as other factors, such as the tracks located off the bridge, may become a factor in the future.)
5. **Do not permit stopping or starting of diesel equipment on the bridge structure.**
6. Do not operate railroad equipment (diesels + flat cars) on the bridge if the wind is equal to or greater than 50 MPH.
7. **Under no circumstances, permit two adjacent loaded flat cars, with either one diesel or two diesels, to operate on the bridge. If there is a situation where there is either one diesel (not likely) or two diesels and a loaded flat car (such as a 190 ton car), there must be at least a distance equal to the length of the flatcar separating the two flat cars. In any case, the distance must not be less than 60'.**
8. As shown in the attached photographs, several bracing connection details have a lower category (E & E') fatigue stress than what is typically permitted. It is recommended that the connections receive regular inspections if heavy equipment with high loading cycles is experienced on the bridge structure.
9. Depending upon how long the structure is to remain in service, recommend a future coating to protect the structural steel members. A typical bitumastic coating, such as one coat of Carboline 300M, is typically used for railroad bridges, especially in regions of high moisture. The inspection revealed surface pitting in the girder webs and a majority of the bracing has mild corrosion and pitting. The surfaces (especially the girder web and flanges) do not have a pristine look or texture associated with coated bridges (or Corten for that matter).

FINAL RECOMMENDATION

To circumvent the issues of overload stresses, fatigue, speed, impact, and other restrictions, recommend an effective operating rating of **E80** to **E85** with **E90** being the maximum overload

rating. However, the recommendations for the proposed inspection of Category E & E' details should remain in effect.

Frank J. Crisp, PE

Southern Nuclear Operating Company

ND-10-0510

Enclosure 2

Westinghouse Authorization Letter CAW-10-2775

NOTE: This enclosure consists of a 6-page letter.

Westinghouse

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SVP_SV0_000398

CAW-10-2775

March 9, 2010

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: Vogtle Units 3 and 4 Project Heavy Equipment Transport Options for AP1000™ Major Components Assessment and Recommendation Report ("Transportation Report")

The proprietary information for which withholding is being requested in the above-referenced letter is further identified in the affidavit signed by Westinghouse Electric Company LLC. The affidavit accompanying this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and address with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying affidavit by Southern Nuclear Operating Company, Inc.

Correspondence with respect to this Application for Withholding Proprietary Information from Public Disclosure or the accompanying affidavits should reference CAW-10-2775 and should be addressed to Robert B. Sisk, Manager, AP1000 Licensing and Customer Interface, 1000 Westinghouse Drive, Cranberry Township, PA 16066.

Very truly yours,

R. M. Spanfor

Robert B. Sisk, Manager
AP1000 Licensing and Customer Interface

CAW-10-2775

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared Richard M. Span, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

R. M. Span

Richard M. Span, Principal Engineer
Regulatory Compliance and Plant Licensing

Sworn to and subscribed before me
this 9th day of March, 2010.

Renee' Giampole

Notary Public

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Renee Giampole, Notary Public
Penn Township, Westmoreland County
My Commission Expires September 25, 2013

(1) I am Principal Engineer, Regulatory Compliance and Plant Licensing , Westinghouse Electric Company, LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitute Westinghouse policy and provide the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of

Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390; it is to be received in confidence by the Commission.

(iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld from within the "Transportation Report" relates to equipment in the AP1000 plant design as well as specifics to the Project's schedule.

This information is being provided in connection with a Request for Additional Information ("RAI") where the NRC Staff has required SNC to produce a copy of the Transportation Report.

The information requested to be withheld reveals details of the AP1000 design; timing and content of procurement; sequence and method of construction; and timing and content of inspection and testing. This information was developed and continues to be

developed by Westinghouse. The information is part of that which enables Westinghouse to manufacture and deliver products to utilities based on proprietary designs.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar commercial power reactors without commensurate expenses.

The information requested to be withheld is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.