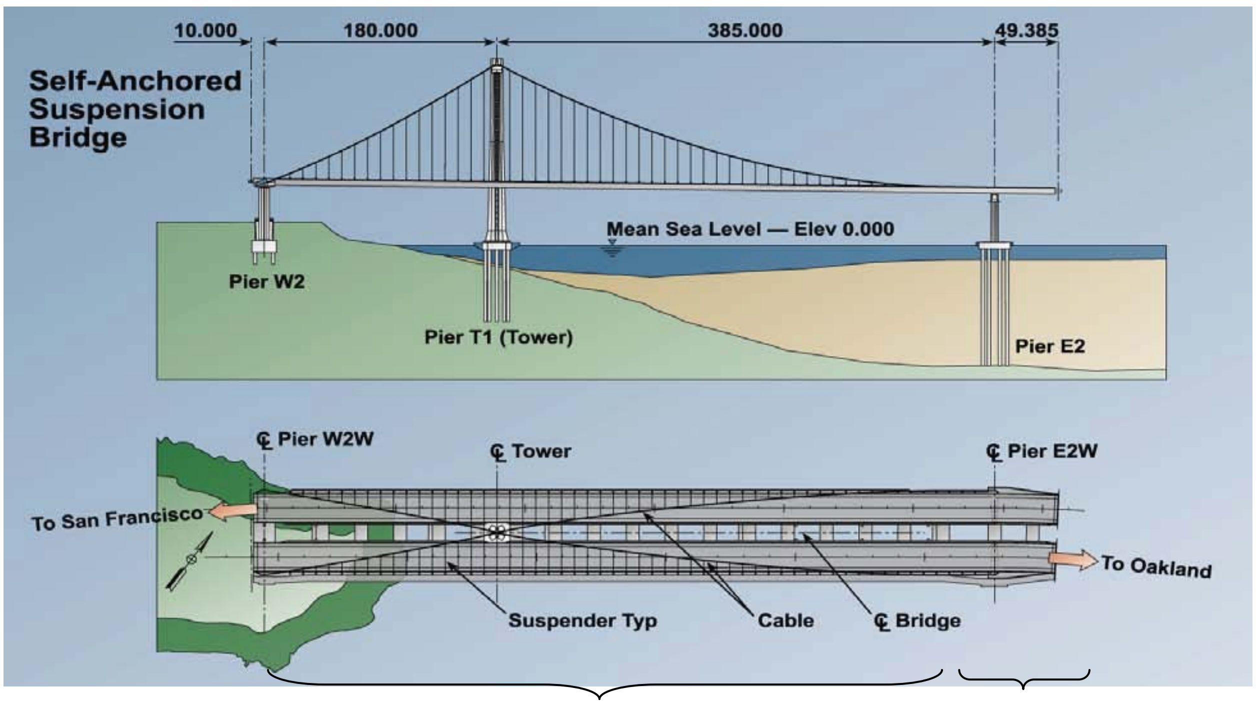
San Francisco-Oakland Bay Bridge

Self-Anchored Suspension Bridge Project

Project Team Response to QA/QC Expert Panel Recommendations

November 2011 (updated)

March 2011 (original)



Orthotropic Box Girder (OBG) Lifts 1-11 Crossbeams 1-16

East End OBG Lifts 12-14 Crossbeams 17-19

UPDATED FINAL 11/03/11

Prepared by

The Self-Anchored Suspension Bridge Project Team:

THE SAN FRANCISCO-OAKLAND BAY BRIDGE SEISMIC SAFETY PROJECT

American Bridge / FLUOR A JOINT VENTURE

NOTE TO READER

The following updated Project Team Report (dated November 3, 2011) includes supplemental weld data to the March 31, 2011 Project Team Report (Report) and incorporates comments received from the QA/QC Expert Panel and Seismic Safety Peer Review Panel in March/April 2011. The information provided in the updated November 3rd Report encompasses the complete collection of all data for the “welds of interest”, as previously defined in the Report. The steel orthotropic box girder fabrication welding is complete.

San Francisco-Oakland Bay Bridge

Self-Anchored Suspension Bridge Project

Project Team Response to QA/QC Expert Panel Recommendations

November 2011 (updated)
March 2011 (original)

The Self-Anchored Suspension Bridge Project Team:

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5.0 APPENDICES

1.0 EXECUTIVE SUMMARY

The Self-Anchored Suspension (SAS) segment of the San Francisco-Oakland Bay Bridge East Spans Seismic Safety Project is advancing with the ongoing erection of the SAS Orthotropic Box Girders (OBG) as visual testaments to its progress. The SAS segment is part of the overall Toll Bridge Program under the direction of the Toll Bridge Program Oversight Committee (TBPOC). The construction contract is administered by the California Department of Transportation (CT). The Prime Contractor is American Bridge / Fluor Enterprises, Inc., A Joint Venture (ABFJV).

The SAS steel OBGs and East End anchorages are being fabricated at Shanghai Zhenhua Heavy Industry Company, LTD. (ZPMC) in Shanghai, China under a contract with ABFJV. Twenty-two of the twenty-eight OBG lifts have been erected as of early March 2011. The remaining six OBG lifts are expected to ship from ZPMC in May and July of 2011.

As is the case in all real-world fabrication-construction projects, fabrication is expected to require inspection and some rework. The rework is required to repair rejectable flaws. This document responds to the QA/QC Expert Panel (Panel) recommendations stated in a November 2010 draft report. A main focus to these recommendations is aimed to reduce and effectively eliminate the number of transverse linear indications (TLIs) related to, in part, an excess hydrogen contaminant problem present in the performance of certain welding processes and their environments.

Significant and continued expertise and effort have been dedicated to Quality Control (Contractor) and Quality Assurance (Owner) resources to employ the requirements of the Contract Documents to identify and repair rejectable transverse crack-like indications. In some cases, contract changes have been made (i.e. implementation of the new FCAW welding process), and may be made in the future to continually improve the quality of the work and expedite the schedule.

Continual efforts to reduce transverse crack-like indications have been on-going since initial discovery in November 2009. To further expand these efforts to the more challenging fabrication of the East End of the SAS, the Project Team solicited the services of the Panel. At the end of a weeklong QA/QC Steel Fabrication meeting conducted in November 2010 at ZPMC, a draft report by the Panel was generated and distributed. This draft report reemphasized earlier welding procedure recommendations made in November 2009 and provided additional recommendations on weld inspection testing and welding procedures and processes. Recommendations can be organized into two categories:
1) Recommendations for evaluation of welding previously performed (OBG Lifts 1-11); and
2) Recommendations for welding to be performed in future work (East End, OBG Lifts 12-14).

A well-qualified and complex problem-focused team (Project Team) was assembled to directly and effectively address all elements of the Panel's recommendations regarding transverse crack-like indications, while advancing the OBG fabrication work to its completion, and provide status reporting to the Toll Bridge Seismic Safety Peer Review Panel (TBSSPRP) and the TBPOC. Weekly videoconferences were held between the Project Team members in China and Oakland to maximize communications and effectively document progress and consensus. Monthly meetings with the Project Team and Panel have also been established to provide opportunity for interaction and updates on progress focused towards the development of a document formally addressing and responding to the recommendations stated in the November 2010 draft report.

Through these efforts, the Project Team, along with the Panel, has clarified the intent of the recommendations from which practical and reasonable consensus has been achieved on both the evaluation and the actions to be taken on the completed welds (Lifts 1 thru 11 and Crossbeams 1 thru 16) and future welds (Lifts 12 thru 14 and Crossbeams 17 thru 19). Tremendous effort has been directed to identify weld types and processes that were thought to potentially contribute to the TLIs caused by excess hydrogen contamination in order to eliminate this problem in future welds. Based upon Non-Destructive Examination (NDE) data provided from welds placed after November 30, 2010, the Project Team and the Panel concluded that TLIs caused by excess hydrogen have been effectively eliminated by implementation of multiple enhancements to the welding procedures.

The November 2010 draft report conservatively placed <u>all</u> weld types into a broad set of welds of interest, requiring detailed evaluation for all future (East End, Lifts 12 thru 14) welds. However, after a thorough technical evaluation by the Project Team and subsequent consensus from the Panel, it was determined that only a relatively small and select subset of welds was of further interest. The criteria in defining the welds of interest included type of weld, welding procedure used to perform the weld, welding wire, welds subjected to tensile stresses during the service life of the bridge, and weld inspection criteria. In certain cases, additional inspection has been directed either by the Contractor or the Owner. In all cases, the fabrication of the East End meets or exceeds the requirements of the Contract Documents.

The majority of the SAS OBG fabrication (Lifts 1 thru 11) has been completed, and as stated previously, has been erected in the field after undergoing the rigorous inspection as required in the Contract Documents. In the early stages of the efforts to address the Panel's recommendation regarding OBG Lifts 1 thru 11 (Ref. Additional Recommendation From The Panel #6), many welds were thought to be welds of interest prior to all of the supplemental and detailed inspection and bridge analysis data being fully organized and evaluated together. With such information made available, it was determined that the vast majority of the welds in OBG Lifts 1 thru 11 are not welds of interest. The weld inspection data for the relatively small set of welds identified as welds of interest provided in this response document indicates inspection percentages ranging from 50 to near 100%, exceeding contract NDE requirements. Such high percentages of weld inspection using inspection methods required in the Contract Documents and the American Welding Society D1.5 Bridge Welding Code can confidently detect systemic hydrogen generated TLIs. **In all cases, detected rejectable indications, including TLIs, were removed and welds repaired as required by the Contract Documents. After review of all data, it has been demonstrated that the investigated welds have in general been of high quality with very low rejection and repair percentages due in large part to the highly automated welding process at ZPMC.**

Final evaluation results of the OBG steel fabrication, as summarized within this response, clearly confirms that any necessary follow-up actions taken were well-founded and were based on proper technical information and contract administrative procedures. After extensive investigation, review, and consideration, the steel fabrication of the OBGs is advancing and is being completed in compliance with the Contract Documents, including the American Welding Society D1.5 Bridge Welding Code.

2.0 INTRODUCTION

Project Background

The Self-Anchored Suspension (SAS) segment of the San Francisco-Oakland Bay Bridge East Spans Seismic Safety Project consists of twenty-eight steel Orthotropic Box Girder (OBG) lifts and nineteen crossbeams spanning 605 meters of total length. Fabrication of these steel pieces commenced in late 2007 at Shanghai Zhenhua Heavy Industry Company, LTD. (ZPMC) in Shanghai, China under a contract with American Bridge / Fluor Enterprises, Inc. (ABFJV).

Main Focus on Quality Efforts and Issue Resolution

Continual efforts to reduce transverse crack-like indications have been on-going since initial discovery in early 2008 and additional discovery in mid-2009. Through a series of destructive tests and evaluations performed in November 2009, an initial assessment of potential excess hydrogen being a root cause was made. While all rejectable crack-like indications were removed and welds repaired in compliance with the Contract Documents, the following improvements were implemented:

- Modified Welding Procedures were put into effect in a November 2009 report that was prepared by consultants to Caltrans and ABFJV;
- Amended UT Procedures were developed to address transverse linear crack-like indications;
- Over-checks of non-destructive testing were performed by ABFJV QC in addition to non-destructive testing performed ZPMC QC.

The QA/QC Expert Panel (Panel)

To further expand the ongoing efforts to improve quality and place additional emphasis on the more challenging fabrication of the East End of the SAS, the Project Team solicited the services of subject matter expert consultants that are already associated with the project through either ABFJV or Caltrans or Bay Area Toll Authority. Those third party consultants were Mr. Don Rager (Chair of the American Welding Society Code Committee for Structural Steel Welding), Mr. David McQuaid (Chair of the American Welding Society Code Committee for Bridge Steel Welding), Dr. John Barsom (Fracture Mechanics Specialist and Metallurgist) and Mr. Alan Cavendish-Tribe (Professional Welding Engineer). This group of four formed the QA/QC Expert Panel who was tasked to work collaboratively with the Project Team in the requested assessment of quality within the ongoing OBG steel fabrication in China.

The steel fabrication and erection of the OBGs, at the time of the QA/QC Expert Panel Visit and development of their November 2010 Draft Report, was as follows: (Reference Exhibit 2.0 below)

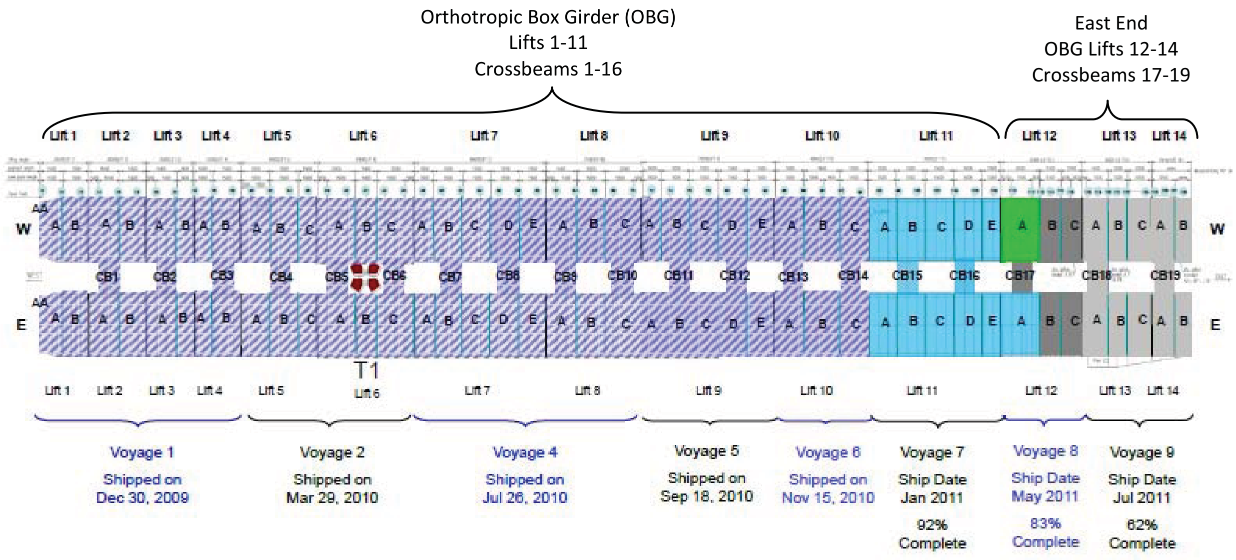
OBG Lifts 1 through 11, Crossbeams (CB) 1 through 16 -

- OBG Lifts 1 through 9 and Crossbeams (CB) 1 through 12 were completed, shipped and erected;
- OBG Lift 10 and CB 13 and 14 were shipped on November 15, 2010;
- OBG Lift 11 and CB 15 and 16 were 92% complete in fabrication.

East End, OBG Lifts 12 through 14 and CBs 17 through 19 -

- OBG Lift 12 and CB 17 were 83% complete in fabrication;
- OBG Lifts 13 and 14 and CBs 18 and 19 were 62% complete in fabrication;
- OBG Lifts 13 and 14 and CBs 18 and 19 had completed their parts fabrication and had commenced segment and crossbeam assembly in which the major and more complicated welding was to be performed.

Exhibit 2.0: OBG Segment Fabrication Status as of November 19, 2010
(Information obtained from Caltrans' Weekly China Fabrication Status from 11/19/10)



The initial draft report was issued by the Panel at the conclusion of the meetings conducted during the week of November 15, 2010. The Project Team's response is based on the November 2010 draft report, Revision 9, issued on January 12, 2011.

<u>Project Team Response</u>
The Project Team, as a special assignment, formed a task group to address, react and respond to the Panel's recommendations. Proactive measures such as the following were implemented within two weeks from receipt of the report:

1. Weekly videoconferences were held between the Project Team members in China and Oakland to maximize communications and effectively document progress and consensus.

2. Monthly meetings with the Project Team and Panel have also been established to provide opportunity for interaction and updates on progress focused towards the development of a document formally addressing and responding to the recommendations stated in the November 2010 draft report.

3. Extensive "live" (prepared real-time during the meeting) meeting minutes were concurred by all attendees and provided in organized matrices for all weekly and monthly meetings. (Ref. Appendices B and C)

Through the weekly and monthly meetings, the Project Team addressed the following major topics in the process of clarifying and responding to the Panel's recommendations (Ref. Section 3.0):

1. Clarification of the welds of interest. (Ref. Additional Recommendations From The Panel #1 and #2)

2. Welding Process – Implementation of a new FCAW welding process, includes revisions to gas mixture and delivery system, additional focus on controls of preheat, continual evaluation of the new FCAW welding process results focusing on findings of any apparent hydrogen-related TLIs, verification of fracture critical requirements for certain weld repairs are met. (Ref. Previously Presented Recommendation #1 and #2, Additional Recommendations From the Panel #3)

3. Welder Performance – Engaged the Panel in discussions with ZPMC QC on welder performance incentive and disciplinary programs. (Ref. Additional Recommendations From The Panel #4)

4. Inspection – Collected and organized weld inspection mapping for welds of interest and reviewed and evaluated data (Ref. Additional Recommendations From the Panel #6 and #7); confirmed that the CWI process was meeting or exceeding contract requirements. (Ref. Additional Recommendations From The Panel #5)

5. Tension/Compression Mapping – Presented summary of tension/compression mapping to explain in a more visual and more graphical form stress magnitude and range, stress direction and stress location in the efforts to obtain the welds of interest. (Ref. Additional Recommendations From The Panel #6)

3.0 PROJECT TEAM RESPONSE TO QA/QC EXPERT PANEL RECOMMENDATIONS

Section 3.0 includes all ten of the QA/QC Expert Panel recommendations as stated in the "SAS Steel Fabrication Expert Panel Review of Orthotropic Deck Fabrication in China report", revision 9, dated November 2010, and issued January 12, 2011 (Ref. Appendix I). Following each recommendation are the SAS Project Team's responses as discussed and recorded during the weekly and monthly QA/QC meetings for the period of November 2010 through March 2011. Refer to Appendix B and C for meeting note references.

PREVIOUSLY PRESENTED RECOMMENDATION #1:
Follow the 'Welding Procedure Requirements for New Welds,' [October 2009] that was developed by ABFJV/Caltrans and issued under a covering ABFJV letter dated November 9, 2009.

PROJECT TEAM RESPONSE:

a. Some elements of the "Welding Procedure Requirements for New Welds," dated October 2009, were already included in the Contract Documents which incorporate the AWS D1.5 Bridge Welding Code. Other elements were deemed to be means and methods that were at the discretion of the Contractor to implement. Refer to Appendix J for the delineation between contract items and means and methods.

b. An alternative means and methods, through the implementation of the new FCAW Welding Process has demonstrated that welds can be placed consistently free of rejectable transverse indications. This implementation was made effective in welds of Lifts 12, 13, and 14 placed after November 29, 2010. Refer to Project Team's Response in "Previously Presented Recommendation #2" for more detailed information. (Ref. 12/10/11 Meeting Notes)

PREVIOUSLY PRESENTED RECOMMENDATION #2:
Implement the use of ESAB FCAW Electrodes and Ar – CO_2 Mix Shielding Gas per CCO164 dated September 21, 2010, for all FCAW welding [see Appendix C and D]. The Panel recommends implementation by November 30, 2010.

PROJECT TEAM RESPONSE:

a. ABFJV/ZPMC completely implemented the use of the new welding process using ESAB FCAW wire and Ar – CO2 Mix Shielding Gas per CCO 164 as of November 29, 2010, in line with ABFJV letter AFC-ZPM-LTR-000648. (Ref. 12/10/10 Meeting Notes)

b. The Panel is satisfied with the implementation of the use of the new welding process based on the data received to date. The combination of wire/shielding gas and other recommended process changes in the new welding process effectively eliminated the effects of excess hydrogen in the welds. (Ref. 1/10/11 Meeting Notes)

c. The data presented to the Panel during the February 17th meeting led to the conclusion that the new welding process eliminated the hydrogen-related transverse indications. (Ref. 2/17/11 Meeting Notes)

d. ABFJV/ZPMC arranged with ESAB to provide representatives at ZPMC's site for proper implementation and training of welders using the new welding process, starting December 8, 2010.

e. ABF/METS met with Linde (shielding gas supplier) to review the Ar–CO2 Mix Shielding Gas mixture and delivery system and to discuss the method to eliminate contamination. Prior to switching to the manifold piping system, ZPMC is to perform pressure test of piping system to verify no leaks. When in use, Linde is to perform every other week check on the AR and CO2 mixture concentration test of manifold cylinder packs system. In the interim, before switching over to the manifold system, ZPMC used bottled gas. To date, ZPMC continues to use bottled gas and has not yet switched to the manifold gas system. It is likely that ZPMC will not use the manifold system for the duration of the project. (Ref. 2/17/11 Meeting Notes)

ADDITIONAL RECOMMENDATIONS FROM THE PANEL #1
In addition to conformance with ABFJV letter dated November 9, 2009, the 'Welding Procedure Requirements for New Welds' procedure is to apply to ALL remaining SMAW, FCAW and SAW welds.

PROJECT TEAM RESPONSE:

a. The Project Team did not apply the **'**Welding Procedure Requirements for New Welds' procedure to ALL remaining SMAW, FCAW and SAW welds. ABFJV had performed an investigation into the welding processes that included review of inspection records and extensive overchecks of the welding which revealed the hydrogen induced cracking problem was solely in the 100% FCAW welds, therefore, measures were put into place for FCAW welds only. The group clarified that the focus set of welds are the welds made with 100% FCAW filler metals only including PJP, CJP and fillet welds. (Ref. 1/10/11 Meeting Notes)

b. During the January 12, 2011 meeting, the Panel further confirmed the Project Team's statement that the transverse indications are of concern only in welds made with 100% FCAW. All such indications, when discovered in existing welds, were repaired. Crack-like indications were not detected when using the new FCAW welding process. (Ref. 1/12/11 Meeting Notes)

c. During the February 17, 2011 meeting, it was further clarified with and confirmed by the Panel that the welds of interest are those formed using the old 100% FCAW welding process in locations throughout the bridge that are expected to experience cyclic tension under service load conditions. (Ref. 2/17/11 Meeting Notes)

ADDITIONAL RECOMMENDATION FROM THE PANEL #2:
Conformance with ABFJV letter dated November 9, 2009, the 'Welding Procedure Requirements for New Welds' procedure is to apply to all welds not just to the skin plate welds.

PROJECT TEAM RESPONSE:

a. The focus set of welds is: ALL internal and skin plate welds made with the old 100% FCAW welding process and includes PJP, CJP and fillets. (Ref. 1/10/11 Meeting Notes)

b. During the February 17, 2011 meeting, it was further clarified with and confirmed by the Panel that the welds of interest are those formed using the old 100% FCAW welding process in locations throughout the bridge that are expected to experience cyclic tension under service load conditions. (Ref. 2/17/11 Meeting Notes)

ADDITIONAL RECOMMENDATION FROM THE PANEL #3:
Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location.

PROJECT TEAM RESPONSE:

a. ABFJV and Caltrans have implemented this through the preapproved Critical Weld Repair (CWR) templates since November 2009 and all weld repairs if more than two (2) weld repairs are made in the same location in Lifts 13 and 14. (Ref. 12/22/10 Meeting Notes)

ADDITIONAL RECOMMENDATIONS FROM THE PANEL #4:
Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV.

PROJECT TEAM RESPONSE:

a. Currently, ZPMC has 2 separate programs for their welders' evaluation: disciplinary and incentive programs. (Ref. 1/10/11 Meeting Notes)

b. The Panel commented that welder performance depends on several factors including weld position, weld location, as well as other factors. Therefore, the decision to remove a welder is to be made at the project level based on welder statistics, performance and management evaluations. (Ref. 1/10/11 Meeting Notes)

ADDITIONAL RECOMMENDATION FROM THE PANEL #5:
An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes.

PROJECT TEAM RESPONSE:

a. ABFJV described how the Certified Weld Inspectors (CWI) are being utilized during the welding activities. METS (Caltrans QA) confirmed that the 30 minute interval was being properly implemented and there are no problems with CWI coverage. The Panel is satisfied. (Ref. 1/11/11 Meeting Notes)

ADDITIONAL RECOMMENDATION FROM THE PANEL #6:
The performance of structural members in Lifts 1 through 12 that are determined to be subjected to tensile stresses should be investigated once the maximum and cyclic tensile stress magnitudes are determined.

PROJECT TEAM RESPONSE:

a. Item 6 of the Additional Recommendations from the Panel only applies to 100% CJP FCAW skin welds made with the old welding process for Lifts 1 through 11. (Ref. 02/23/11 Meeting Notes)

b. The Project Team collected and organized cyclic tensile stress information for Lifts 1 through 12. (Ref. Tables in Appendix G), (Ref. 01/10/11, 01/26/11, 02/09/11, 02/17/11, 02/23/11, 03/02/11 and 03/09/11 Meeting Notes)

c. The tension mapping was developed to explain in a more visual and graphical form stress magnitude and range, stress direction and stress location. This detailed information does not represent a change in design, engineering and construction documents. (Ref. Appendix G for OBG-Crossbeam Tension Mapping), (Ref. 03/09/11 Meeting Notes).

d. Weld type and inspection data were collected and organized for Lifts 1 through 12 and Crossbeams 1 through 16. (Ref. Exhibits 4.1 and 4.2 in Appendix E), (Ref. 01/10/11, 01/26/11, 02/09/11, 02/17/11, 02/23/11, 03/02/11 and 03/09/11 Meeting Notes)

e. For OBG Lifts 1 through 11, CJP welds produced with the old 100% FCAW welding process were inspected to varying percentages using either UT Scanning Pattern D or E in accordance with the Contract Documents. (Ref. NDT Exhibit 4.0 and 4.1 in Appendix E)

    - Longitudinal welds (longitudinal to the direction of the bridge) for Lifts 1 through 11, are in compression and are therefore not of interest.

    - Transverse welds (transverse to the direction of the bridge) for Lifts 1 through 11, bottom portions of the bridge carry tension. These welds have received and passed contract and code required inspection and all indications determined to be rejectable were repaired. (Ref. 01/12/11 Meeting Notes)

f. Crossbeam 1-16: The bottom corner welds made with the old 100% FCAW welding process received 100% inspection using either UT Scanning Pattern D or E. These are the only 100% FCAW welds in these crossbeams that are subjected to tensile stresses. ABFJV provided the NDT results for these welds and the Project Team agrees that there is no evidence to support a systemic hydrogen problem in these welds. (Ref. Exhibit 4.2 in Appendix E) (Ref. 03/09/11 Meeting Notes)

ADDITIONAL RECOMMENDATIONS FROM THE PANEL #7:
All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with + 6 dB above Class B acceptance criteria [acceptance criteria in Table 6.3 – UT Acceptance / Rejection Criteria – Tensile Stress in addition to the standard UT requirements of the AWS D1.5 Code [see Appendix E].

PROJECT TEAM RESPONSE:

a. The focus set of welds within this guideline are welds that are 100% FCAW, performed using the old welding procedure and the shielding gas delivery system, in locations that are expected to experience cyclic tension under service load conditions. (Ref. 02/17/11 Meeting Notes)

b. The recommendation is specific to OBG Lifts 12, 13 and 14 and Crossbeams 17, 18 and 19.

c. For Lift 12, skin plates, all FCAW CJP welds made with the old 100% FCAW welding process have been or will be 100% inspected using UT Scanning Pattern D with +6 dB above Class B acceptance criteria (with the exception of the lower corner assembly weld, in the 2n and 2s location which is 100% inspected using UT Scanning Pattern E). Per Design Joint Venture (DJV), the state of stress in these welds in Lift 12 is primarily in compression and it may vary due to variations in the dead load moment and transverse moment (Ref. 03/09/11 Meeting Notes). The Scanning Pattern E performed on this lower corner assembly weld is acceptable. ABFJV QC has reviewed the weld inspection data for these welds and has determined there is no concern. Caltrans (CT) QA reviewed their records and also have no concern. Note that CT performed 100% UT E or D scan. (Ref. 02/17/11 and 03/09/11 Meeting Notes)

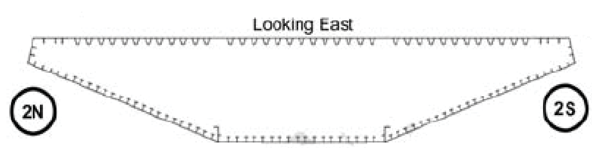


Exhibit 3.0: Typical OBG Cross Section Showing Longitudinal Weld Locations on the External Skin Plate

d. For Lift 13 and 14 skin plates, CJP welds made with the old 100% FCAW welding process have received or will receive 100% inspection using UT Scanning Pattern D with +6 dB above Class B acceptance criteria, exceeding the Contract Document requirements. (Ref. 02/17/11 Meeting Notes)

e. For Crossbeam 17, 18 and 19, 100 % FCAW CJP bottom corner welds made with the old welding process have received or will receive 100% inspection using UT Scanning Pattern D with +6dB above Class B acceptance criteria, exceeding the Contract Document requirements. (Ref. 02/17/11 and 03/09/11 Meeting Notes)

f. Any rejectable discontinuities found have been or will be properly repaired, reinspected, and cleared per Critical Weld Repair (CWR) template.

g. During the February 17th meeting, the Panel commented that they acknowledge the Project Team has correctly applied the Code and Contract Documents and has extended these requirements to the appropriate alternative UT methods as the Code allows. (Ref. Notes from 02/17/11 Meeting)

ADDITIONAL RECOMMENDATION FROM THE PANEL #8:
The Engineer may relax the UT Acceptance / Rejection Criteria to the standard requirements of the AWS D1.5 Code - if it can be demonstrated that rejectable transverse crack-like indications are no longer occurring.

PROJECT TEAM RESPONSE:

a. Even though the results have shown that the Project Team could relax this requirement, the parties have agreed to continue with the modified UT procedure so that there is consistency throughout the project. Consequently this recommendation was removed during the December 10, 2010 meeting between the Panel and the Project Team. (Ref. 12/10/10 Meeting Notes)

4.0 CONCLUSION

The Project Team provides this document as the formal response to the QA/QC Expert Panel recommendations stated in its November 2010 draft report and is one of the many continual efforts in supporting the quality and schedule of the Orthotropic Box Girder (OBG) fabrication. A main focus to these recommendations is aimed to reduce and effectively eliminate the number of transverse linear indications (TLIs) related to an excess hydrogen contaminant problem present in the performance of certain welding processes and their environments. Through this response, the Project Team has demonstrated that hydrogen-related TLIs have been effectively eliminated. Further, the Project Team has thoughtfully considered and responded successfully through investigation, action, and documentation to each of the recommendations made by the Panel.

The fabrication of the OBGs for the Self-Anchored Suspension segment of the San Francisco-Oakland Bay Bridge is advancing on schedule for a final shipping date from ZPMC, in July 2011. The fabricated work is in compliance with the Contract Documents, including the American Welding Society D1.5 Bridge Welding Code.

5.0 APPENDICES

APPENDIX A

California Department of Transportation and
American Bridge / Fluor Enterprises, Inc., A Joint Venture
375 Burma Road
Oakland, California 94607

March 29, 2011

Dear Ladies and Gentlemen:

Project: **San Francisco Oakland Bay SAS Bridge Superstructure**
Subject: **Statement by the QA/QC Fabrication Expert Panel**

In response to the Expert Panel's recommendations made in November 2010, the Project Team has embraced the concerns and taken action as a result. The Expert Panel has read the response report issued by the Project Team in March 2011 and agrees with the commentary which has been supported by both corrective actions and data collected throughout the investigation.

The Expert Panel was formed in November 2010 and tasked to work collaboratively with the Project Team in the requested assessment of quality within the Orthotropic Box Girder (OBG) steel fabrication in China. An initial draft report was issued by the Expert Panel upon completion of the mid-November 2010 meetings held in China. The initial draft was debated during the course of the following weeks with the "SAS Steel Fabrication Expert Panel Review of Orthotropic Deck Fabrication in China report", revision 9, dated November 2010, and issued January 12, 2011. Due to the limited information available during the first meeting of the Expert Panel, the resulting recommendations were broad in scope. Subsequently, as more data was provided by the Project Team and presented in an organized format, the Panel's direction became more focused.

Based on the results of the combined efforts of the Project Team and the Expert Panel, the following observations are made:

- Modifications made to the FCAW welding process to mitigate transverse cracking in weld metal, presented in November 2009, have been adopted with successful results.

- QA/QC inspection requirements stated in the Contract Documents have been satisfied. The implemented UT inspection criteria exceed the AWS D1.5 Bridge Welding Code requirements and provide a high level of confidence in the weld quality for the entire Orthotropic Box Girder (OBG) and Cross Beams. This has been confirmed in statements made by ABFJV Foreign QC Manager and the Department's QA Manager that the fabrication has been performed in compliance with the Contract Documents.

- The Expert Panel believes that the Project Team has demonstrated that hydrogen-related transverse linear indications (TLI) have been effectively eliminated. No hydrogen-related TLI have been detected by non-destructive examination since the new FCAW welding process was fully implemented.

The Expert Panel commends and thanks the Project Team for their willingness to tackle the complex task and provide us with the information necessary to make an objective analysis and resultant conclusions.

Sincerely,

QA/QC Fabrication Expert Panel:

John M Barsom — Alan Cavendish-Tribe

Dr. J. Barsom — Mr. A. Cavendish-Tribe, CEng., FWeldI.

David McQuaid

Mr. D. McQuaid, P.E. — Mr. D. Rager, P.E.

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APPENDIX B

SAS Steel Fabrication Expert QA/QC Consultants Review List

Item	Status Source Doc	Title	Actions/ (Due Date)	December 10 2010 Status Update/Comments
1	Draft Report (Revision 5, dated December 3, 2010)	Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures		Per meeting notes from 12/10/10: (ACTION) For FCAW, ABF to implement the previously cited guidelines from November 2009-2010. Alternatively, if it can be demonstrated (weld trials and continued inspection) that alternative means and methods that lead to welds that are consistently free of transverse cracks, then those means and methods would be recognized as acceptable.
2		Item 2 of Additional Guidelines "Implement the use of ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164…"		Per meeting notes from 12/10/10: (ACTION) ABF has completely implemented the use of the ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164. QA/QC inspection results are to be given to the panel members for their review prior to the next meeting in January.
3		Item 3 of Additional Guidelines "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location."		Per meeting notes from 12/10/10: (ACTION) ABF and Caltrans has implemented this through the preapproved CWR templates that was implemented during the CCO 160 process.
4		Item 4 of Additional Guidelines "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV."		Per meeting notes from 12/10/10: (ACTION) ABF to further look into rejectable discontinuities and provide a printout of the reject rate for a sample amount of welders.
5		Item 5 of Additional Guidelines "An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes."		Per meeting notes from 12/10/10: (ACTION) ABFJV to provide CWI in accordance with this guideline.
6		Item 6 of Additional Guidelines "All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…"		Per meeting notes from 12/10/10: (ACTION) Group agreed to update the guideline to read as "All external skin CJP welds not currently required to be ground flush and determined by the Engineer to be subject to service load tensile stress should be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…" (ACTION) Department to work with DJV to provide a map of the longitudinal external skin welds stress ranges. (ACTION) Based upon the outcome of the above and the guidelines provided, Department to determine which skin longitudinal butt welds should be ground flush and UT inspected using Scanning Pattern D.

SAS Steel Fabrication Expert QA/QC Consultants Review List

Item	Status	Title	Actions/ (Due Date)	
	Source Doc			December 10 2010 Status Update/Comments
7		Item 7 of Additional Guidelines “The Engineer may relax the UT Acceptance / Rejection Criteria to the standard requirements of the AWS D1.5 Code – if can be demonstrated that rejectable transvers crack-like indications are no longer occurring.”		Per meeting notes from 12/10/10: (ACTION) The group agreed to delete the guideline.
8		Item 8 of Additional Guidelines “The Engineer shall analyze the fatigue performance of the discontinuous backing bar geometry in the grillage to ensure that it would not detrimentally affect the performance of the bridge.”		Per meeting notes from 12/10/10: (ACTION) The group agreed that this matter has been addressed in a form of a RFI.

SAS QA/QC Weekly VTC List

Item	Status Source Doc	Title	December 10, 2010 Status Update/Comments	December 10 2010 Status Update/Comments
		Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures	Per meeting notes from 12/10/10: (ACTION) For FCAW, ABF to implement the previously cited guidelines from November 2009-2010. Alternatively, if it can be demonstrated (weld trials and continued inspection) that alternative means and methods that lead to welds that are consistently free of transverse cracks, then those means and methods would be recognized as acceptable.	Per meeting notes from 12/15/10: (ACTION) China still working on collecting data on welds using ESAB wire with the 110degC preheat temperature. Data expected in 2 weeks.
		Item 2 of Additional Guidelines "Implement the use of ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164…"	Per meeting notes from 12/10/10: (ACTION) ABF has completely implemented the use of the ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164. QA/QC inspection results are to be given to the panel members for their review prior to the next meeting in January.	Per meeting notes from 12/15/10: a. (ACTION) ABF is discussing with ZPMC to pressure test the Ar system to confirm properties are adequate and there is no moisture in the system b. (ACTION) ABF has 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. c. (ACTION) ABF to provide the QC inspection results for the implementation of the ESAB wire to METS QA. METS QA to verify results prior to sharing information to QA/QC consultants. d. (ACTION) ABF shop floor contact person is Peter Ferguson or Steve Lawton for the day-to-day implementation of the ESAB wire. If necessary, the issues can be elevated to Thomas Nilsson or Gang Jiao in Thomas' absence.
		Item 3 of Additional Guidelines "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location."	Per meeting notes from 12/10/10: (ACTION) ABF and Caltrans has implemented this through the preapproved CWR templates that was implemented during the CCO 160 process.	Per meeting notes from 12/15/10: a. (ACTION) METS to verify that the preapproved CWRs include this requirement.
		Item 4 of Additional Guidelines "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV."	Per meeting notes from 12/10/10: (ACTION) ABF to further look into rejectable discontinuities and provide a printout of the reject rate for a sample amount of welders.	Per meeting notes from 12/10/10: a. (ACTION) ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.
		Item 5 of Additional Guidelines "An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes."	Per meeting notes from 12/10/10: (ACTION) ABFJV to provide CWI in accordance with this guideline.	Per meeting notes from 12/15/10: a. (ACTION) METS to provide overview to QA/QC consultants of how this is being complied with.
		Item 6 of Additional Guidelines "All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…"	Per meeting notes from 12/10/10: (ACTION) Group agreed to update the guideline to read as "All external skin CJP welds not currently required to be ground flush and determined by the Engineer to be subject to service load tensile stress should be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…" (ACTION) Department to work with DJV to provide a map of the longitudinal external skin welds stress ranges. (ACTION) Based upon the outcome of the above and the guidelines provided, Department to determine which skin longitudinal butt welds should be ground flush and UT inspected using Scanning Pattern D.	Per meeting notes from 12/15/10: a. (ACTION) DJV to provide mapping of tension members for Lifts 12 thru 14 and anchorage by this Friday (12/17/10). (How much of Lift 12 is in tension?) b. (ACTION) DJV to provide mapping of tension members of all crossbeams. From this information, Department will determine if welds require to be ground flush. c. (ACTION) METS to verify all transverse OBG welds are ground flush and 100% NDT by next Wednesday/Thursday meeting. d. (ACTION) Department to provide direction to ABF on both items 'a' and 'b' (above) once mapping is complete. e. (ACTION) Department to determine if the fillet welds for the connection of the sandwich plate to the anchorage plate are in tension.

SAS QA/QC Weekly VTC List

Item	Status	Title	Description	Sketch (Y/N)	Actions/ (Due Date)		
	Source Doc			Date		December 15 2010 Status Update/Comments	December 22 2010 Status Update/Comments
	Open	Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures				Per meeting notes from 12/15/10: (ACTION) China still working on collecting data on welds using ESAB wire with the 110degC preheat temperature. Data expected in 2 weeks.	Per meeting notes from 12/22/10: China continues to collect data on welds using ESAB wire with the 110deg C preheat temperature. Data expected by next week. ABF to provide data up through December 30, 2010 to METS by January 3, 2011. METS to provide information to Karen by January 4, 2011 for distribution. ABF will continue to provide data up through January 6, 2011 to METS by January 7, 2011 for presentation on January 10, 2011.
	Open	Item 2 of Additional Guidelines "Implement the use of ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164…"				Per meeting notes from 12/15/10: a. (ACTION) ABF is discussing with ZPMC to pressure test the Ar system to confirm properties are adequate and there is no moisture in the system b. (ACTION) ABF has 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. c. (ACTION) ABF to provide the QC inspection results for the implementation of the ESAB wire to METS QA. METS QA to verify results prior to sharing information to QA/QC consultants. d. (ACTION) ABF shop floor contact person is Peter Ferguson or Steve Lawton for the day-to-day implementation of the ESAB wire. If necessary, the issues can be elevated to Thomas Nilsson or Gang Jiao in Thomas' absence.	(ACTION) ABF/METS is reviewing with Linde (Ar gas supplier) to review both manifold system and the method to eliminate contamination. In the interim, ZPMC continues to use bottled gas. (ACTION) ABF to schedule meeting with Linde for the week of January 3, 2011 to review the gas distribution and purging system. (ACTION) ABF continues to have 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. Also performing training for the ZPMC welders for the use of the ESAB wire. (ACTION) ESAB rep to provide to ABF a summary to date of performance of ESAB wire by week of December 27, 2010.
	Closed	Item 3 of Additional Guidelines "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location."				Per meeting notes from 12/15/10: a. (ACTION) METS to verify that the preapproved CWRs include this requirement.	Per meeting notes from 12/22/10: METS has verified that this item is on the CWR template for Lift 13 and 14 repairs.
	Open	Item 4 of Additional Guidelines "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV."				Per meeting notes from 12/10/10: a. (ACTION) ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.	Per meeting notes from 12/22/10: (ACTION) ABF to gather existing data about rejection rates for a sample amount of welders by the January 10, 2011 meeting. (ACTION) ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.
	Open	Item 5 of Additional Guidelines "An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes."				Per meeting notes from 12/15/10: a. (ACTION) METS to provide overview to QA/QC consultants of how this is being complied with.	Per meeting notes from 12/22/10: (ACTION) METS to provide overview to QA/QC consultants of how this is being complied with.
	Open	Item 6 of Additional Guidelines "All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…"				Per meeting notes from 12/15/10: a. (ACTION) DJV to provide mapping of tension members for Lifts 12 thru 14 and anchorage by this Friday (12/17/10). (How much of Lift 12 is in tension?) b. (ACTION) DJV to provide mapping of tension members of all crossbeams. From this information, Department will determine if welds require to be ground flush. c. (ACTION) METS to verify all transverse OBG welds are ground flush and 100% NDT by next Wednesday/Thursday meeting. d. (ACTION) Department to provide direction to ABF on both items 'a' and 'b' (above) once mapping is complete. e. (ACTION) Department to determine if the fillet welds for the connection of the sandwich plate to the anchorage plate are in tension.	a. (ACTION) DJV to provide mapping of the tension members for Lifts 12 thru 14 and anchorage. Workshop between Department and DJV to discuss the mapping (January 4, 2011) and determine steps moving forward on what will be done in China vs. what will be done at the Pier. b. (ACTION) Lift 12 – Review of tension members to be provided by December 29, 2010 and direction to ABF provided by January 4, 2011. c. (ACTION) Lifts 13 and 14 – Workshop to be scheduled on January 4, 2011 between DJV and Department to review the identified tension members. Department to provide direction to ABF by January 5, 2011. ABF to immediately provide the information to ZPMC for review and preparation for meeting on January 12, 2011. d. (ACTION) Lifts 12 thru 14 – TBPOC/Department/ABF/ZPMC meeting scheduled on January 12, 2011 to discuss all current issues inclusive of additional grinding of weld and NDT. e. (ACTION) Crossbeams 17, 18, 19 - DJV to provide mapping of tension members. Item to be discussed during January 4, 2011 workshop. From this information, Department will determine if welds require to be ground flush and NDT'd. f. (ACTION) METS to verify all transverse OBG welds are ground flush and 100% NDT by next Wednesday/Thursday meeting. g. (ACTION) Department to determine if the fillet welds for the connection of the sandwich plate to the anchorage plate are in tension. ABF directed ZPMC to perform a post weld thermal heating of the west anchor plate based on the assumption that the fillet welds are in tension.

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Item	Status / Source Doc	Title	December 22 2010 Status Update/Comments	December 29 2010 Status Update/Comments
	Open	Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures	Per meeting notes from 12/22/10: China continues to collect data on welds using ESAB wire with the 110deg C preheat temperature. Data expected by next week. ABF to provide data up through December 30, 2010 to METS by January 3, 2011. METS to provide information to Karen by January 4, 2011 for distribution. ABF will continue to provide data up through January 6, 2011 to METS by January 7, 2011 for presentation on January 10, 2011.	Per meeting notes from 12/29/10: (ACTION) China continues to collect data on welds using ESAB wire with the 110deg C preheat temperature. Data expected by next week. ABF to provide data up through December 30, 2010 to METS by January 3, 2011. METS to provide information to Karen by January 4, 2011 for distribution. ABF will continue to provide data up through January 6, 2011 to METS by January 7, 2011 for presentation on January 10, 2011. ABF/CT (Mahlen/Steve Lawton) will attempt to focus on jointly documenting application of heat and the entire ESAB weld process for 1 or 2 weld stations. Review of the NDT results will follow.
	Open	Item 2 of Additional Guidelines "Implement the use of ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164…"	Per meeting notes from 12/22/10: (ACTION) ABF/METS is reviewing with Linde (Ar gas supplier) to review both manifold system and the method to eliminate contamination. In the interim, ZPMC continues to use bottled gas. (ACTION) ABF to schedule meeting with Linde for the week of January 3, 2011 to review the gas distribution and purging system. (ACTION) ABF continues to have 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. Also performing training for the ZPMC welders for the use of the ESAB wire. (ACTION) ESAB rep to provide to ABF a summary to date of performance of ESAB wire by week of December 27, 2010.	Per meeting notes from 12/29/10: ABF/CT met with Linde (AR gas supplier) on December 28, 2010 at the ZPMC shop to check the gas line manifold system. (ACTION) Linde to provide a report documenting the inspection of the manifold system. ZPMC is currently using both bottles and the manifold system. Linde to visit the ZPMC shop biweekly (fortnight) to check the system.
	Closed	Item 3 of Additional Guidelines "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location."	Per meeting notes from 12/22/10: METS has verified that this item is on the CWR template for Lift 13 and 14 repairs.	Per meeting notes from 12/29/10: Item closed.
	Open	Item 4 of Additional Guidelines "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV."	Per meeting notes from 12/22/10: (ACTION) ABF to gather existing data about rejection rates for a sample amount of welders by the January 10, 2011 meeting. (ACTION) ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.	Per meeting notes from 12/29/10: (ACTION) ABF to gather existing data about rejection rates for a sample amount of welders by the January 10, 2011 meeting. (ACTION) ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.
	Open	Item 5 of Additional Guidelines "An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes."	Per meeting notes from 12/22/10: (ACTION) METS to provide overview to QA/QC consultants of how this is being complied with.	Per meeting notes from 12/29/10: (ACTION) METS/ABF to provide overview to QA/QC consultants of how this is being complied with.
	Open	Item 6 of Additional Guidelines "All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…"	Per meeting notes from 12/22/10: a. (ACTION) DJV to provide mapping of the tension members for Lifts 12 thru 14 and anchorage. Workshop between Department and DJV to discuss the mapping (January 4, 2011) and determine steps moving forward on what will be done in China vs. what will be done at the Pier. b. (ACTION) Lift 12 – Review of tension members to be provided by December 29, 2010 and direction to ABF provided by January 4, 2011. c. (ACTION) Lifts 13 and 14 – Workshop to be scheduled on January 4, 2011 between DJV and Department to review the identified tension members. Department to provide direction to ABF by January 5, 2011. ABF to immediately provide the information to ZPMC for review and preparation for meeting on January 12, 2011. d. (ACTION) Lifts 12 thru 14 – TBPOC/Department/ABF/ZPMC meeting scheduled on January 12, 2011 to discuss all current issues inclusive of additional grinding of weld and NDT. e. (ACTION) Crossbeams 17, 18, 19 - DJV to provide mapping of tension members. Item to be discussed during January 4, 2011 workshop. From this information, Department will determine if welds require to be ground flush and NDT'd. f. (ACTION) METS to verify all transverse OBG welds are ground flush and 100% NDT by next Wednesday/Thursday meeting. g. (ACTION) Department to determine if the fillet welds for the connection of the sandwich plate to the anchorage plate are in tension. ABF directed ZPMC to perform a post weld thermal heating of the west anchor plate based on the assumption that the fillet welds are in tension.	Per meeting notes from 12/29/10: a. (ACTION) DJV to provide mapping of the tension members for Lifts 12 thru 14 and anchorage. Workshop between Department and DJV to discuss the mapping (January 4, 2011) and determine steps moving forward on what will be done in China vs. what will be done at the Pier. b. (ACTION) Lift 12 – CT/DJV reviewed and identified the tension members and will provide direction to ABF by January 4, 2011. c. (ACTION) Lifts 13 and 14 – Workshop to be scheduled on January 4, 2011 between DJV and Department to review the identified tension members. Department to provide direction to ABF by January 5, 2011. ABF to immediately provide the information to ZPMC for review and preparation for meeting on January 12, 2011. d. (ACTION) Lifts 12 thru 14 – TBPOC/Department/ABF/ZPMC meeting scheduled on January 12, 2011 to discuss all current issues inclusive of additional grinding of weld and NDT. e. (ACTION) Crossbeams 17, 18, 19 - DJV to provide mapping of tension members. Item to be discussed during January 4, 2011 workshop. From this information, Department will determine if welds require to be ground flush and NDT'd. f. (ACTION) METS to provide mapping of all verify all transverse ground flush and 100% NDT'd OBG welds by next Wednesday/Thursday meeting. g. (ACTION) Department to determine if the fillet welds for the connection of the sandwich plate to the anchorage plate are in tension. ABF directed ZPMC to perform a post weld thermal heating of the west anchor plate based on the assumption that the fillet welds are in tension. h. (ACTION) Next week, Department to work with ABF on identifying areas for exploratory grinding on a sample selection of welds.

SAS QA/QC Weekly VTC List

ID	Status	Title		
	Source Doc		December 29 2010 Status Update/Comments	January 5, 2011 Status Update/Comments
1	Open	Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures	Per meeting notes from 12/29/10: (ACTION) China continues to collect data on welds using ESAB wire with the 110deg C preheat temperature. Data expected by next week. ABF to provide data up through December 30, 2010 to METS by January 3, 2011. METS to provide information to Karen by January 4, 2011 for distribution. ABF will continue to provide data up through January 6, 2011 to METS by January 7, 2011 for presentation on January 10, 2011. ABF/CT (Mahlen/Steve Lawton) will attempt to focus on jointly documenting application of heat and the entire ESAB weld process for 1 or 2 weld stations. Review of the NDT results will follow.	Per meeting notes from 01/05/11: (ACTION) ABF to refine data by end of the day and send to Karen.
2	Open	Item 2 of Additional Guidelines "Implement the use of ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164…"	Per meeting notes from 12/29/10: ABF/CT met with Linde (AR gas supplier) on December 28, 2010 at the ZPMC shop to check the gas line manifold system. (ACTION) Linde to provide a report documenting the inspection of the manifold system. ZPMC is currently using both bottles and the manifold system. Linde to visit the ZPMC shop biweekly (fortnight) to check the system.	Per meeting notes from 01/05/11: (ACTION) Mazen to forward Linde's report of their inspection of the gas manifold system.
3	Closed	Item 3 of Additional Guidelines "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location."	Per meeting notes from 12/29/10: Item closed.	Issue closed.
4	Open	Item 4 of Additional Guidelines "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV."	Per meeting notes from 12/29/10: (ACTION) ABF to gather existing data about rejection rates for a sample amount of welders by the January 10, 2011 meeting. (ACTION) ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.	Per meeting notes from 01/05/11: (ACTION) ABF to provide sampling of welders performance at the January 10th meeting.
5	Open	Item 5 of Additional Guidelines "An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes."	Per meeting notes from 12/29/10: (ACTION) METS/ABF to provide overview to QA/QC consultants of how this is being complied with.	Per meeting notes from 01/05/11: (ACTION) Lawton to verbally present at the meeting.

ID	Status Source Doc	Title	December 29 2010 Status Update/Comments	January 5, 2011 Status Update/Comments
6	Open	Item 6 of Additional Guidelines "All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…"	Per meeting notes from 12/29/10: a. (ACTION) DJV to provide mapping of the tension members for Lifts 12 thru 14 and anchorage. Workshop between Department and DJV to discuss the mapping (January 4, 2011) and determine steps moving forward on what will be done in China vs. what will be done at the Pier. b. (ACTION) Lift 12 – CT/DJV reviewed and identified the tension members and will provide direction to ABF by January 4, 2011. c. (ACTION) Lifts 13 and 14 – Workshop to be scheduled on January 4, 2011 between DJV and Department to review the identified tension members. Department to provide direction to ABF by January 5, 2011. ABF to immediately provide the information to ZPMC for review and preparation for meeting on January 12, 2011. d. (ACTION) Lifts 12 thru 14 – TBPOC/Department/ABF/ZPMC meeting scheduled on January 12, 2011 to discuss all current issues inclusive of additional grinding of weld and NDT. e. (ACTION) Crossbeams 17, 18, 19 - DJV to provide mapping of tension members. Item to be discussed during January 4, 2011 workshop. From this information, Department will determine if welds require to be ground flush and NDT'd. f. (ACTION) METS to provide mapping of all verify all transverse ground flush and 100% NDT'd OBG welds by next Wednesday/Thursday meeting. g. (ACTION) Department to determine if the fillet welds for the connection of the sandwich plate to the anchorage plate are in tension. ABF directed ZPMC to perform a post weld thermal heating of the west anchor plate based on the assumption that the fillet welds are in tension. h. (ACTION) Next week, Department to work with ABF on identifying areas for exploratory grinding on a sample selection of welds.	Per meeting notes from 01/05/11: a. (ACTION) Lift 12 – DJV provided mapping of tension members. Department continues to evaluate the information and will determine if welds require to be ground flush and NDT'd. b. (ACTION) Lifts 13 and 14 – DJV provided mapping of tension members. Department continues to evaluate the information and will determine if welds require to be ground flush and NDT'd. c. (ACTION) Lifts 12 thru 14 – TBPOC/Department/ABF/ZPMC meeting rescheduled to February 2011 to discuss all current issues. (ACTION)DJV provided mapping of tension members. Department continues to evaluate the information and will determine if welds require to be ground flush and NDT'd. d. Crossbeams 17, 18, 19 - DJV provided mapping of tension members. Department continues to evaluate the information and will determine if welds require to be ground flush and NDT'd. e. (ACTION) METS continues to provide mapping of all ground flush and 100% NDT'd OBG welds by next Wednesday/Thursday meeting. f. (ACTION) Department to determine if the fillet welds for the connection of the sandwich plate to the anchorage plate are in tension. ABF directed ZPMC to perform a post weld thermal heating of the west anchor plate based on the assumption that the fillet welds are in tension. g. (ACTION) Department to work with ABF on identifying areas for exploratory grinding on a sample selection of welds. Pending on discussions with Panel on January 11th meeting.
7	NEW ITEM Open	Draft Report - Comment 1 (dated 1/5/11) Brian M. question - Has the bridge been inspected to the requirements in the contract documents? Statements to be provided by S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh? (ACTION) All parties to provide statements by Monday, 1/10/11. Brian M. comment - The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12 are in compression should be removed or corrected.	N/A	Per meeting notes from 01/05/11: Brian Maroney provided the following question and comment on the Draft Report: Brian M. question - Has the bridge been inspected to the requirements in the contract documents? Statements to be provided by S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh? (ACTION) All parties to provide statements by Monday, 1/10/11. Brian M. comment - The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12 are in compression should be removed or corrected.
8	NEW ITEM Open	Draft Report - Comment 2 (dated 1/5/11) Brian M. comment - The QA/QC expert consultant report is draft and is a work in progress. The project team has met and discussed the document, its intent, and several elements of the report. Those discussion have led to a new organized focus group to update the effort, including clearly defining the purpose of the group (including the QA/QC expert consulting group) and providing high quality information and data to the group in order to improve responses and documentation.	N/A	Per meeting notes from 01/05/11: Brian M. comment - The QA/QC expert consultant report is draft and is a work in progress. The project team has met and discussed the document, its intent, and several elements of the report. Those discussion have led to a new organized focus group to update the effort, including clearly defining the purpose of the group (including the QA/QC expert consulting group) and providing high quality information and data to the group in order to improve responses and documentation.

ID	Status / Source Doc	Title	December 29 2010 Status Update/Comments	January 5, 2011 Status Update/Comments
9	NEW ITEM Open	Draft Report - Comment 3 (dated 1/5/11) Brian M. comment - Progress of bridge opening date slower than expected, due in part to inspection repair iteration that is not disallowed by the code or contract documents. There is a strong desire to reduce the iterations and speed up delivery, while maintaining necessary quality.	N/A	Per meeting notes from 01/05/11: Brian M. comment - Progress of bridge opening date slower than expected, due in part to inspection repair iteration that is not disallowed by the code or contract documents. There is a strong desire to reduce the iterations and speed up delivery, while maintaining necessary quality.
10	NEW ITEM Open	Draft Report - Comment 4 (dated 1/5/11) Brian M. comment - A significant portion of the iterations are due to development of transverse crack-like indication in some welds.	N/A	Per meeting notes from 01/05/11: Brian M. comment - A significant portion of the iterations are due to development of transverse crack-like indication in some welds.
11	NEW ITEM Open	Draft Report - Comment 5 (dated 1/5/11) Brian M. comment - The transverse indications are predominantly from contaminants.	N/A	Per meeting notes from 01/05/11: Brian M. comment - The transverse indications are predominantly from contaminants.
12	NEW ITEM Open	Draft Report - Comment 6 (dated 1/5/11) Brian M. comment - The transverse indications are of significant concern only in the full FCAW welds.	N/A	Per meeting notes from 01/05/11: Brian M. comment - The transverse indications are of significant concern only in the full FCAW welds.
13	NEW ITEM Open	Draft Report - Comment 7 (dated 1/5/11) Brian M. comment - The previous welds have been inspected and repaired until acceptable and meeting the requirements in the contract documents.	N/A	Per meeting notes from 01/05/11: Brian M. comment - The previous welds have been inspected and repaired until acceptable and meeting the requirements in the contract documents.
14	NEW ITEM Open	Draft Report - Comment 8 (dated 1/5/11) Brian M. comment - The early data from the change in the welding process that includes a switch in wire, increase in heat, and changing gas and delivery system, is effectively removing the transverse indications, though there are learning curve challenges and in some ways the wire is harder to work with for the welders. It is expected that improvements can continue.	N/A	Per meeting notes from 01/05/11: Brian M. comment - The early data from the change in the welding process that includes a switch in wire, increase in heat, and changing gas and delivery system, is effectively removing the transverse indications, though there are learning curve challenges and in some ways the wire is harder to work with for the welders. It is expected that improvements can continue.

SAS QA/QC Weekly VTC List

ID	Status Source Doc	Title	December 29 2010 Status Update/Comments	January 5, 2011 Status Update/Comments
15	NEW ITEM Open	Draft Report - Comment 9 (dated 1/5/11) Brian M. comment - The QC and QA teams, or both together, if requested, can investigate FCAW welds on thoughtfully selected sample groups of welds on Lifts 13 and 14 to use to gather information to use to project on to the full population of similar welds to continue to improve the entire bridge fabrication efficiency.	N/A	Per meeting notes from 01/05/11: Brian M. comment - The QC and QA teams, or both together, if requested, can investigate FCAW welds on thoughtfully selected sample groups of welds on Lifts 13 and 14 to use to gather information to use to project on to the full population of similar welds to continue to improve the entire bridge fabrication efficiency.
16	NEW ITEM Open	Draft Report - Comment 10 (dated 1/5/11) Group discussion on Draft Report: a. (ACTION) ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract Drawings) that are FCAW and how much NDT inspection was required and was performed. Use NDT table provided on CCO 22 to identify which are FCAW (by 1/20/11).	N/A	Per meeting notes from 01/05/11: Group discussion on Draft Report: a. (ACTION) ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract Drawings) that are FCAW and how much NDT inspection was required and was performed. Use NDT table provided on CCO 22 to identify which are FCAW (by 1/20/11).

ID	Status Source Doc	Title	Actions/ (Due Date)	January 10-12, 2011 Status Update/Comments	January 19, 2011 Status Update/Comments
1	Open	Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures	1. For FCAW, ABF to implement the previously cited guidelines from November 2009-2010. Alternatively, if it can be demonstrated (weld trials and continued inspection) that alternative means and methods that lead to welds that are consistently free of transverse cracks, then those means and methods would be recognized as acceptable. 2. China to collect data on welds using ESAB wire with the 110degC preheat temperature. Data expected in 2 weeks. ABF/CT (Mahlen/Steve Lawton) will attempt to focus on jointly documenting application of heat and the entire ESAB weld process for 1 or 2 weld stations. Review of the NDT results will follow. 3. Mahlon L. and Steve L. to witness some excavations to verify indication type. 4. ABF to correct and update weld data and provide within the next week. 5. ABF to continue reporting TLI and classify type of indication on a two week basis. However, if significant change occurs, notify Panel immediately. Use the same table format and provide detailed description of length, depth and type of each TLI in the footnotes.	Per meeting notes from 01/10/11: (Panel comments) From the QC results since the welding process changes, which include the change in wire to ESAB, gas mixture, and controls of preheat and overall process, these appear to have eliminated the transverse crack-like indications. The Panel is satisfied. (ACTION) Mahlon L. and Steve L. to witness some excavations to verify indication type. (ACTION) ABF to correct and update weld data and provide within the next week. (ACTION) ABF to continue reporting TLI and classify type of indication on a two week basis. However, if significant change occurs, notify Panel immediately. Use the same table format and provide detailed description of length, depth and type of each TLI in the footnotes.	Per meeting notes from 01/19/11: (ACTION) Mahlon and Steve had witnessed excavations of FCAW welds on the bikepath. They investigated 10 indications that were found to be slag lines and start/stop related. In reference to weld data, Steve has provided updated data showing the corrected locations for indications. Data to be posted on the FTP site. (ACTION) TLI's were found, excavated and jointly witnessed to be non-hydrogen related. ABF continues to report TLI's and classify type of indication on a two week basis. For Segment 12a to 12b, the transverse weld was completed using the new ESAB welding wire and process. These welds were cleared with fewer repair cycles, in the order of one or two repairs. ZPMC continues to have issues with slag inclusions in the 2G position and continues to work through this to improve the process. (ACTION) ABF to provide comparison data to show the performance of the SMAW weld versus the FCAW weld in respective to slag inclusions.
2	Open	Item 2 of Additional Guidelines "Implement the use of ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164…"	1. ABF has completely implemented the use of the ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164. QA/QC inspection results are to be given to the panel members for their review prior to the next meeting in January. 2. ABF to discuss with ZPMC to pressure test the Ar system to confirm properties are adequate and there is no moisture in the system (on-going) 3. ABF has 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. (on-going) 4. ABF to provide the QC inspection results for the implementation of the ESAB wire to METS QA. METS QA to verify results prior to sharing information to QA/QC consultants. 5. ABF shop floor contact person is Peter Ferguson or Steve Lawton for the day-to-day implementation of the ESAB wire. If necessary, the issues can be elevated to Thomas Nilsson or Gang Jiao in Thomas' absence. 6. ABF/METS to review with Linde (Ar gas supplier) to review both manifold system and the method to eliminate contamination. In the interim, ZPMC continues to use bottled gas. (complete and on-going) 7. ABF to schedule meeting with Linde for the week of January 3, 2011 to review the gas distribution and purging system. (complete) 8. ABF to have 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. Also performing training for the ZPMC welders for the use of the ESAB wire. (on-going) 9. ESAB rep to provide to ABF a summary to date of performance of ESAB wire by week of December 27, 2010. (complete) 10. Linde rep to visit ZPMC shop biweekly to check the gas manifold system. (on-going) 11. ZPMC to continue with the use of the bottled gas. Prior to switching to manifolded piping system, ZPMC to perform pressure test of piping system to verify no leaks. When in use, Linde to perform every other week check on the AR and CO2 mixture concentration test of manifold cylinder packs system.	Per meeting notes from 01/10/11: (Panel comments) The panel is satisfied as per Item 1 (above). The specific manufacturer is not the primary reason for the change. It was the combination of electrode/shielding gas and other process changes that were recommended. (ACTION) ZPMC to continue with the use of the bottled gas. Prior to switching to manifolded piping system, ZPMC to perform pressure test of piping system to verify no leaks. When in use, Linde to perform every other week check on the AR and CO2 mixture concentration test of manifold cylinder packs system.	Per meeting notes from 01/19/11: ZPMC continues to use bottled gas. Manifold system currently not in use. (Existing ACTION) Prior to switching to manifolded piping system, ZPMC to perform pressure test of piping system to verify no leaks. When in use, Linde to perform every other week check on the AR and CO2 mixture concentration test of manifold cylinder packs system.

ID	Status / Source Doc	Title	Actions/ (Due Date)	January 10-12, 2011 Status Update/Comments	January 19, 2011 Status Update/Comments
3	Closed	Item 3 of Additional Guidelines "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location."	1. ABF and Caltrans has implemented this through the preapproved CWR templates that was implemented during the CCO 160 process. (METS Confirmed for Lifts 13 and 14 repairs)	Issue closed.	Issue closed.
4	Closed	Item 4 of Additional Guidelines "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV."	1. ABF to further look into rejectable discontinuities and provide a printout of the reject rate for a sample amount of welders. 2. ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.	Per meeting notes from 01/10/11: (Panel Comment) Welder performance depends on several factors including weld position, weld location, as well as other factors. Therefore, the decision to remove a welder is to be made at the project level based on welder statistics, performance and management evaluations. Currently, ZPMC has 2 separate programs for their welders' evaluation: disciplinary and incentive programs.	Per meeting notes from 01/19/11: Issue considered closed.
5	Closed	"An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes."	1. ABFJV to provide CWI in accordance with this guideline.	Per meeting notes from 01/11/11: ABFJV provided a report on how the CWI is being utilized during the welding activities. METS confirmed that the process is being properly implemented and there are no problems with CWI coverage. (Panel Comments) Panel is satisfied. (ACTION) Item considered closed.	Issue closed.
6	Open	Item 6 of Additional Guidelines "All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…"	1. Group agreed to update the guideline to read as "All external skin CJP welds not currently required to be ground flush and determined by the Engineer to be subject to service load tensile stress should be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…" 2. Department to work with DJV to provide a map of the longitudinal external skin welds stress ranges. 3. Based upon the outcome of the above and the guidelines provided, Department to determine which skin longitudinal butt welds should be ground flush and UT inspected using Scanning Pattern D. 4. Per Panel comments: Longitudinal Welds: A. Lifts 1 through 12 longitudinal welds are all subjected to compression; therefore no further investigation is needed. B. Lifts 13 and 14 longitudinal bottom welds are in compression, therefore no further investigation is needed on these welds; the top third above the neutral axis are subjected to tensile stresses. a. Corner Weld Assemblies: The two corner weld assemblies have been ground flush and inspected with Scanning Pattern D with +6 dB above Class B acceptance criteria. b. Panel-to-Panel Welds: Panel-to-panel welds are welded using the FCAW in the root with SAW fill & caps. Panel flipped, backgouged removing most of the FCAW root; filled and capped with SAW. Grinding flush is not required. c. Super Panel Welds: Super Panel Welds are welded from one side into ceramic or steel backing. The root will be welded with the new filler metal/shielding gas combination. Fill and cap passes will be welded using submerged arc (SAW). Grinding flush is not required. d. Welds made with FCAW from one side with the old filler metal/shielding gas combination will be ground flush and inspected with Scanning Pattern D with +6 dB above Class B acceptance criteria.	Per meeting notes from 01/10/11: Brian M. walked the group through the tension mapping provided in the attachments. Lifts 2-11 OBG and Crossbeams 1-16: Unchecked preliminary calculations suggest that the bottom skin plate fibers of the OBG are believed to be in compression in the longitudinal direction under the unfactored dead load and live load (without impact and permit load). Service level winds (approximately 50 mph) will drive the structure vertically and need to be considered. Unchecked preliminary calculations suggest that the max tensile stresses in the transverse direction for the bottom plates between the suspenders of the OBG is approximately 15 ksi under the unfactored dead load and live load (without impact and permit load). Service level winds (approximately 50 mph) will drive the structure vertically and need to be considered. Panel Comments: Longitudinal Welds: 1. Lifts 1 through 12 longitudinal welds are all subjected to compression; therefore no further investigation is needed. 2. Lifts 13 and 14 longitudinal bottom welds are in compression, therefore no further investigation is needed on these welds; the top third above the neutral axis are subjected to tensile stresses. a. Corner Weld Assemblies: The two corner weld assemblies have been ground flush and inspected with Scanning Pattern D with +6 dB above Class B acceptance criteria. b. Panel-to-Panel Welds: Panel-to-panel welds are welded using the FCAW in the root with SAW fill & caps. Panel flipped, backgouged removing most of the FCAW root; filled and capped with SAW. Grinding flush is not required. c. Super Panel Welds: Super Panel Welds are welded from one side into ceramic or steel backing. The root will be welded with the new filler metal/shielding gas combination. Fill and cap passes will be welded using submerged arc (SAW). Grinding flush is not required. d. Welds made with FCAW from one side with the old filler metal/shielding gas combination will be ground flush and inspected with Scanning Pattern D with +6 dB above Class B acceptance criteria.	Per meeting notes from 01/19/11: (ACTION) Lifts 13 and 14, including CBs 18 and 19: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement by next Thursday, January 27th (China). ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement. (ACTION) Lift 12, including CB 17: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement at a later date. ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement.

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			Transverse Welds: 1. Lifts 1 through 12: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria. 2. Lifts 13 and 14: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.	Lifts 12-14 OBG and Crossbeam 17-19: Unchecked preliminary calculations suggest that the tensile stresses in the longitudinal direction of the East End OBG (from pp109 east) is well in the 20's ksi. Current information from Design indicate that Crossbeams 17-19 undergo cyclic loadings that extend into the tensile stress range in the transverse direction of the bridge. Anchorage System: The anchorage system was discussed at length and like most anchorage systems, it transfers load through compression and shear elements. However, there are some second order tensile stresses that result from predominantly shear and compressive load transfers. The post weld heat and the NDT performed on the anchorage system exceeded the requirements of AWS D1.5 and requirements in the contract documents. The focus set of welds are the welds made with FCAW filler metals only including PJP, CJP and fillet. Transverse Welds: 1. Lifts 1 through 12: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria. 2. Lifts 13 and 14: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.	(ACTION) Lifts 1 thru 11, including CBs 1 thru 16: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement at a later date. ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement. (ACTION) Department will use this information to determine if additional NDT will be required.
7	NEW ITEM Open	Comment 1 (dated 1/5/11) Brian M. question - Has the bridge been inspected to the requirements in the contract documents? Statements to be provided by S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh? (ACTION) All parties to provide statements by Monday, 1/10/11. Brian M. comment - The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12	1. All parties (S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh?) to provide statements by Monday, 1/10/11.	Per meeting notes from 01/12/11: "Has the bridge been inspected to the requirements in the contract documents?" Panel Comment: This action resides with ABFJV-QC and Caltrans QA managers. ITEM 7 (continued): "The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12 are in compression should be removed or corrected." Panel Comment: Information provided by ABFJV-QC indicates that all welds are inspected using tension criteria in accordance with the contract documents.	No comment.

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8	NEW ITEM Open	Draft Report - Comment 2 (dated 1/5/11) Brian M. comment - The QA/QC expert consultant report is draft and is a work in progress. The project team has met and discussed the document, its intent, and several elements of the report. Those discussion have led to a new organized focus group to update the effort, including clearly defining the purpose of the group (including the QA/QC expert consulting group) and providing high quality information and data to the group in order to improve responses and documentation.		Per meeting notes from 01/12/11: Panel Comment: Draft Revision 8 (November 2010 Meeting in China) has been finalized and information going forward is being recorded in SAS Steel Fabrication Expert Panel Monthly Review Report. A copy of the Draft Revision ~~8~~ 9 is being transmitted along with these comments.	No comment.
9	NEW ITEM Open	Draft Report - Comment 3 (dated 1/5/11) Brian M. comment - Progress of bridge opening date slower than expected, due in part to inspection repair iteration that is not disallowed by the code or contract documents. There is a strong desire to reduce the iterations and speed up delivery, while maintaining necessary quality.		Per meeting notes from 01/12/11: Panel Comment: No comment.	No comment.
10	NEW ITEM Open	Draft Report - Comment 4 (dated 1/5/11) Brian M. comment - A significant portion of the iterations are due to development of transverse crack-like indication in some welds.		Per meeting notes from 01/12/11: Panel Comment: The "iterations" alleged to be due to transverse crack-like indications are no longer an issue based on current data that show the elimination of such indications.	No comment.

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11	NEW ITEM Open	Draft Report - Comment 5 (dated 1/5/11) Brian M. comment - The transverse indications are predominantly from contaminants.		Per meeting notes from 01/12/11: Panel Comment: The transverse indications are caused by a combination of contamination and residual stresses.	No comment.
12	NEW ITEM Open	Draft Report - Comment 6 (dated 1/5/11) Brian M. comment - The transverse indications are of significant concern only in the full FCAW welds.		Per meeting notes from 01/12/11: Panel Comment: The Panel agrees. It is correct that transverse indications are of concern only in welds made with FCAW. However, such indications when discovered in existing welds were repaired and crack-like indications in work made using amended welding process parameters have not been found with NDT.	No comment.
13	NEW ITEM Open	Draft Report - Comment 7 (dated 1/5/11) Brian M. comment - The previous welds have been inspected and repaired until acceptable and meeting the requirements in the contract documents.		Per meeting notes from 01/12/11: Panel Comment: The panel agrees.	No comment.
14	NEW ITEM Open	Draft Report - Comment 8 (dated 1/5/11) Brian M. comment - The early data from the change in the welding process that includes a switch in wire, increase in heat, and changing gas and delivery system, is effectively removing the transverse indications, though there are learning curve challenges and in some ways the wire is harder to work with for the welders. It is expected that improvements can continue.		Per meeting notes from 01/12/11: Panel Comment: The Panel agrees in part. However the Panel does not agree that the new welding wire/gas combination makes it harder for the welder to use.	No comment.

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15	NEW ITEM Open	Draft Report - Comment 9 (dated 1/5/11) Brian M. comment - The QC and QA teams, or both together, if requested, can investigate FCAW welds on thoughtfully selected sample groups of welds on Lifts 13 and 14 to use to gather information to use to project on to the full population of similar welds to continue to improve the entire bridge fabrication efficiency.		Per meeting notes from 01/12/11: Panel Comment: This concern is addressed with the implementation of the new welding wire/gas combination now being used.	No comment.
16	NEW ITEM Open	Draft Report - Comment 10 (dated 1/5/11) Group discussion on Draft Report: a. (ACTION) ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract	1. ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract Drawings) that are FCAW and how much NDT inspection was required and was performed. Use NDT table provided on CCO 22 to identify which are FCAW (by 1/20/11). 2. Draft Report 8 will remain in draft form and the group will move forward with documenting the on-going weekly and monthly meetings in the SAS Steel Fabrication Expert Panel Monthly Review Notes. The Draft ~~8~~ 9 dated January ~~11~~ 12, 2011, supersedes all prior versions of this report. Panel signatures are not required from draft reports to make it clear that they are draft.	Per meeting notes from 01/12/11: Panel Comment: The Panel determined that the NDT inspections on the OBG meet or exceed the requirements of the contract documents. (ACTION) Draft Report 8 will remain in draft form and the group will move forward with documenting the on-going weekly and monthly meetings in the SAS Steel Fabrication Expert Panel Monthly Review Notes. The Draft 8 dated January 11, 2011, supersedes all prior versions of this report. Panel signatures are not required from draft reports to make it clear that they are draft.	No comment.

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17				Other comments: a. (Brian M.) Are there other pieces of information or reports related to the transverse indication issue that we should all be aware of? (ACTION) ABF to provide one outstanding report to the group. b. (Brian M. Question) In regards to the Barsom's Report (Investigation of Weld Discontinuities in the OBG) dated in 2009, what important information should be taken from this report? In regards to the testing performed, the main premise was to determine the root cause of the indications. The fatigue test performed does not correlate with fatigue performance of the fabricated components. Rather, the test was conducted to expose the pre-existing indications for metallographic in the least number of cycles for fractographic investigation. c. Brian's comment in regards to the November 2009 Draft Report (ACTION) Panel to review the comments and group to discuss their feedback by end of Wednesday. (complete) d. Brian's presented a slide presentation to share thoughts on the behavior of the bridge e. (Brian M.)- There was discussion on the potential evaluation on the condition (with FCAW filler metals only including PJP, CJP and fillet) and it may be necessary for the Fabrication Welding Expert Panel to participate in characterizing the state of the welds. Brian M. expects TY Lin to characterize the demands and it would be up to Caltrans, with the potential for ABF's participation to evaluate the demand to capacity ratios. Caltrans would expect a review by external independent groups such as the Seismic Peer Review Panel to review the evaluation. The intent would be to evaluate and verify conditions such that the capacities are greater than demands.	No comment.
18		Strategy Moving Forward		Per meeting notes from 01/10/11: Strategy moving forward (Panel Comments) Based on the information given to the Panel, a demand-capacity analysis was performed by the Panel. The results of which the Panel believes there is no need to do anything in addition to Lifts 1 through 12 welds. The Panel confirmed that sampling for additional destructive testing is not needed. (ACTION) The Department to provide the stress ranges. Demand-capacity ratio to be further discussed between ABF and the Department during the Wednesday weekly meetings. (ACTION) As requested by the Panel, the Department will provide data from MTR's and check samples. (ACTION) ABF-China to provide mapping of all FCAW welds and identify which ones are ground flush and UT'd using Scanning Pattern D. Design will use this information to determine if additional NDT will be required.	No comment.

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1	Open	Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures	1. For FCAW, ABF to implement the previously cited guidelines from November 2009-2010. Alternatively, if it can be demonstrated (weld trials and continued inspection) that alternative means and methods that lead to welds that are consistently free of transverse cracks, then those means and methods would be recognized as acceptable. 2. China to collect data on welds using ESAB wire with the 110degC preheat temperature. Data expected in 2 weeks. ABF/CT (Mahlen/Steve Lawton) will attempt to focus on jointly documenting application of heat and the entire ESAB weld process for 1 or 2 weld stations. Review of the NDT results will follow. 3. Mahlon L. and Steve L. to witness some excavations to verify indication type. 4. ABF to correct and update weld data and provide within the next week. 5. ABF to continue reporting TLI and classify type of indication on a two week basis. However, if significant change occurs, notify Panel immediately. Use the same table format and provide detailed description of length, depth and type of each TLI in the footnotes. 6. Table to be updated to clarify which crack indications were actually investigated and are hydrogen related. ABF to share the table with METS for review and comment. 7. ABF to notify METS once an indication is investigated so that METS may verify the results. 8. When ABF consults with their welding experts, ABF to provide response from consultants for Department's review and confirm determination. 9. QA and QC to continue to work together in confirming data retrieved. 10. ABF to submit an Engineering Evaluation of the issue to the Department in the next two days.	Per meeting notes from 01/19/11: Mahlon and Steve had witnessed excavations of FCAW welds on the bikepath. They investigated 10 indications that were found to be slag lines and start/stop related. In reference to weld data, Steve has provided updated data showing the corrected locations for indications. Data to be posted on the FTP site. (ACTION) TLI's were found, excavated and jointly witnessed to be non-hydrogen related. ABF continues to report TLI's and classify type of indication on a two week basis. For Segment 12a to 12b, the transverse weld was completed using the new ESAB welding wire and process. These welds were cleared with fewer repair cycles, in the order of one or two repairs. ZPMC continues to have issues with slag inclusions in the 2G position and continues to work through this to improve the process. (ACTION) ABF to provide comparison data to show the performance of the SMAW weld versus the FCAW weld in respective to slag inclusions.	Per meeting notes from 01/26/11: Reference ESAB Weld Data attachment. ABF Update: Since switching to the ESAB wire, ABF noted that the TLI's investigated to date are not hydrogen based related transverse crack-like indications from FCAW welding. At one location, crack-like indications from an SMAW weld were found to be hydrogen based and are being further evaluated for potential process improvement. (ACTION) Table to be updated to clarify which crack indications were actually investigated and are hydrogen related. ABF to share the table with METS for review and comment. (ACTION) ABF to notify METS once an indication is investigated so that METS may verify the results. (ACTION) When ABF consults with their welding experts, ABF to provide response from consultants for Department's review and confirm determination. (ACTION) QA and QC to continue to work together in confirming data retrieved. (ACTION) ABF to submit an Engineering Evaluation of the issue to the Department in the next two days. METS update: Since switching to the ESAB wire, METS noted that in 5 locations (4 were FCAW and 1 was SMAW welds), hydrogen-like indications were found. ABF does not agree with the FCAW hydrogen based findings and does agree with the SMAW hydrogen based findings.
2	Open	Item 2 of Additional Guidelines "Implement the use of ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164…"	1. ABF has completely implemented the use of the ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164. QA/QC inspection results are to be given to the panel members for their review prior to the next meeting in January. 2. ABF to discuss with ZPMC to pressure test the Ar system to confirm properties are adequate and there is no moisture in the system (on-going) 3. ABF has 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. (on-going) 4. ABF to provide the QC inspection results for the implementation of the ESAB wire to METS QA. METS QA to verify results prior to sharing information to QA/QC consultants. 5. ABF shop floor contact person is Peter Ferguson or Steve Lawton for the day-to-day implementation of the ESAB wire. If necessary, the issues can be elevated to Thomas Nilsson or Gang Jiao in Thomas' absence. 6. ABF/METS to review with Linde (Ar gas supplier) to review both manifold system and the method to eliminate contamination. In the interim, ZPMC continues to use bottled gas. (complete and on-going) 7. ABF to schedule meeting with Linde for the week of January 3, 2011 to review the gas distribution and purging system. (complete) 8. ABF to have 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. Also performing training for the ZPMC welders for the use of the ESAB wire. (on-going) 9. ESAB rep to provide to ABF a summary to date of performance of ESAB wire by week of December 27, 2010. (complete) 10. Linde rep to visit ZPMC shop biweekly to check the gas manifold system. (on-going) 11. ZPMC to continue with the use of the bottled gas. Prior to switching to manifolded piping system, ZPMC to perform pressure test of piping system to verify no leaks. When in use, Linde to perform every other week check on the AR and CO2 mixture concentration test of manifold cylinder packs system.	Per meeting notes from 01/19/11: ZPMC continues to use bottled gas. Manifold system currently not in use. (Existing ACTION) Prior to switching to manifolded piping system, ZPMC to perform pressure test of piping system to verify no leaks. When in use, Linde to perform every other week check on the AR and CO2 mixture concentration test of manifold cylinder packs system.	Per meeting notes from 01/26/11: ABF reported that they continue to use bottled gas. Switch to gas manifold system to potentially commence. Steve has contacted Linde about the potential need to test for the purity of gas supply. ABF to also conduct a pressure test of the line.

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4	Closed	Item 4 of Additional Guidelines "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV."	1. ABF to further look into rejectable discontinuities and provide a printout of the reject rate for a sample amount of welders. 2. ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.	Per meeting notes from 01/19/11: Issue considered closed.	Issue closed.
5	Closed	"An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes."	1. ABFJV to provide CWI in accordance with this guideline.	Issue closed.	Issue closed.
6	Open	Item 6 of Additional Guidelines "All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…"	(ACTION) Lifts 13 and 14, including CBs 18 and 19: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement by next Thursday, January 27th (China). ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement. (ACTION) Lift 12, including CB 17: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement at a later date. ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement.	Per meeting notes from 01/19/11: (ACTION) Lifts 13 and 14, including CBs 18 and 19: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement by next Thursday, January 27th (China). ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement. (ACTION) Lift 12, including CB 17: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement at a later date. ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement.	Per meeting notes from 01/26/11: Status of Mapping: 100% FCAW welds (CJP, PJP, and Fillets) made with welding process that included the Hyundai wire; type of inspection performed; % of inspection (Steve Lawton) is the following: **o Lifts 13 and 14 –** a) CJP Welds - Of the Skin Plates and Floorbeam CJP Welds (Major CJP Welds) in Lift 13, ABF reported that only two weld locations were found that met the criteria of the pure FCAW CJP weld using 100% Hyundai wire that were NOT ground flush and 100% UT'd using D-scan. (ACTION) ABF to confirm what level of NDT inspection was completed for the specified welds. Of the Skin Plates and Floorbeam CJP Welds (Major CJP Welds) in Lift 14: ABF reported that no welds were found that met the criteria of the pure FCAW CJP weld using 100% Hyundai wire that were NOT ground flush and 100% UT'd using D-scan. Minor CJP Welds - ABF presented a list of minor CJP welds that have not received 100% NDT inspection in Lifts 13 and 14 that have been performed using the pure FCAW process. Next week, ABF will provide a refined list showing only the welds using the Hyundai wire. b)PJP Welds – ABF presented a list of PJP welds that have not received 100% NDT inspection in Lifts 13 and 14 that have been performed using the pure FCAW process. Next week, ABF will provide a refined list showing only the welds using the Hyundai wire. c) Fillet Welds – (ACTION) ABF to continue to prepare data for fillet welds that have not received 100% NDT inspection in Lifts 13 and 14 that have been performed using the pure FCAW process using Hyundai wire.

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				(ACTION) Lifts 1 thru 11, including CBs 1 thru 16: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement at a later date. ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement. (ACTION) Department will use this information to determine if additional NDT will be required.	**o Crossbeam 19** - (ACTION) With respect to Crossbeam 19 (including FL3 extension outside of the box girder), ABF to provide the list of NDT inspection performed by next week. ABF to provide 100% NDT to all CJP, PJP and fillet welds. **o Crossbeam 18** - (ACTION) With respect to Crossbeam 18, ABF to provide NDT information of the pure FCAW welds using Hyundai wire. **o Lift 12** – ABF continues to prepare data. **o Lifts 1 thru 11 –** Fillet Welds for Lifts 1 thru 11– ABF has commenced an initial collection of the fillet weld data. ABF to report more data next week. (ACTION) ABF/METS to identify the fillet welds of interest to the QA/QC Expert Consultant Panel by jointly evaluating production experience and statistical inspection data. ABF asked if there is a way to differentiate secondary members (less important) from primary members, and their welds, based on less than 100% NDT inspection contract requirement. (ACTION) The Department/DJV to consider the question and respond next week.
					Per meeting notes from 01/26/11 meeting: Status of Mapping: Cyclic tension loading and stress ranges for those loadings throughout the SAS for high cycle fatigue-type loadings ~10^6 (George Baker) **o Lifts 13 and 14** DJV continues to develop the detailed tension models for the East End. In the meantime, the Department will use engineering judgment and results from their Global Spine Model and Erection Model with the Department's intent to address the amount of any additional NDT inspection. **o Lifts 1 thru 12 and Crossbeams** As reported last week, DJV had provided to the group the following reports:1) OBG-Cross Beam Transverse Tension Zone Analysis Report for Lifts 2 thru 12 , 2) OBG Spine and OBG Deck Longitudinal Stresses (ACTION) DJV to identify the cyclic tension loading and stress ranges for those loadings throughout the SAS for high cycle fatigue-type loadings ~10^6 by next week from their completed analysis report. (ACTION) ABF/DJV/Department to further summarize stress analysis followed by a workshop with ABF next week.

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ID	Status Source Doc	Title	Actions/ (Due Date)	January 19, 2011 Status Update/Comments	January 26, 2011 Status Update/Comments
7	NEW ITEM Open	Comment 1 (dated 1/5/11) Brian M. question - Has the bridge been inspected to the requirements in the contract documents? Statements to be provided by S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh? (ACTION) All parties to provide statements by Monday, 1/10/11. Brian M. comment - The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12	1. All parties (S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh?) to provide statements by Monday, 1/10/11.	No comment.	No comment.
8	NEW ITEM Open	Draft Report - Comment 2 (dated 1/5/11) Brian M. comment - The QA/QC expert consultant report is draft and is a work in progress. The project team has met and discussed the document, its intent, and several elements of the report. Those discussion have led to a new organized focus group to update the effort, including clearly defining the purpose of the group (including the QA/QC expert consulting group) and providing high quality information and data to the group in order to improve responses and documentation.		No comment.	No comment.

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ID	Status Source Doc	Title	Actions/ (Due Date)	January 19, 2011 Status Update/Comments	January 26, 2011 Status Update/Comments
9	NEW ITEM Open	Draft Report - Comment 3 (dated 1/5/11) Brian M. comment - Progress of bridge opening date slower than expected, due in part to inspection repair iteration that is not disallowed by the code or contract documents. There is a strong desire to reduce the iterations and speed up delivery, while maintaining necessary quality.		No comment.	No comment.
10	NEW ITEM Open	Draft Report - Comment 4 (dated 1/5/11) Brian M. comment - A significant portion of the iterations are due to development of transverse crack-like indication in some welds.		No comment.	No comment.
11	NEW ITEM Open	Draft Report - Comment 5 (dated 1/5/11) Brian M. comment - The transverse indications are predominantly from contaminants.		No comment.	No comment.
12	NEW ITEM Open	Draft Report - Comment 6 (dated 1/5/11) Brian M. comment - The transverse indications are of significant concern only in the full FCAW welds.		No comment.	No comment.

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13	NEW ITEM Open	Draft Report - Comment 7 (dated 1/5/11) Brian M. comment - The previous welds have been inspected and repaired until acceptable and meeting the requirements in the contract documents.		No comment.	No comment.
14	NEW ITEM Open	Draft Report - Comment 8 (dated 1/5/11) Brian M. comment - The early data from the change in the welding process that includes a switch in wire, increase in heat, and changing gas and delivery system, is effectively removing the transverse indications, though there are learning curve challenges and in some ways the wire is harder to work with for the welders. It is expected that improvements can continue.		No comment.	No comment.
15	NEW ITEM Open	Draft Report - Comment 9 (dated 1/5/11) Brian M. comment - The QC and QA teams, or both together, if requested, can investigate FCAW welds on thoughtfully selected sample groups of welds on Lifts 13 and 14 to use to gather information to use to project on to the full population of similar welds to continue to improve the entire bridge fabrication efficiency.		No comment.	No comment.

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16	NEW ITEM Open	Draft Report - Comment 10 (dated 1/5/11) Group discussion on Draft Report: a. (ACTION) ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract	1. ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract Drawings) that are FCAW and how much NDT inspection was required and was performed. Use NDT table provided on CCO 22 to identify which are FCAW (by 1/20/11). 2. Draft Report 8 will remain in draft form and the group will move forward with documenting the on-going weekly and monthly meetings in the SAS Steel Fabrication Expert Panel Monthly Review Notes. The Draft ~~8~~ 9 dated January ~~11~~ 12, 2011, supersedes all prior versions of this report. Panel signatures are not required from draft reports to make it clear that they are draft.	No comment.	No comment.
17		Other Items		No comment.	Per meeting notes from 01/26/11: Other Items • February 17th QA/QC Expert Panel Monthly Review Meeting in Oakland • February 18th TBPOC Meeting – Bill/Mazen/Brian Maroney/Ade and Expert Panel to attend. • Expert Panel Draft Report (ACTION) Department to further comment on report by next week. Department and ABF to discuss potential comments with the Expert Panel via teleconference prior to the February 17th Expert Panel Meeting.

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18		Strategy Moving Forward	1. The Department to provide the stress ranges. Demand-capacity ratio to be further discussed between ABF and the Department during the Wednesday weekly meetings. 2. As requested by the Panel, the Department will provide data from MTR's and check samples. 3. ABF-China to provide mapping of all FCAW welds and identify which ones are ground flush and UT'd using Scanning Pattern D. Design will use this information to determine if additional NDT will be required.	No comment.	No comment.

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			January 26, 2011 Status Update/Comments	February 2, 2011 Status Update/Comments
1	Open	Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures	1. For FCAW, ABF to implement the previously cited guidelines from November 2009-2010. Alternatively, if it can be demonstrated (weld trials and continued inspection) that alternative means and methods that lead to welds that are consistently free of transverse cracks, then those means and methods would be recognized as acceptable. 2. China to collect data on welds using ESAB wire with the 110degC preheat temperature. Data expected in 2 weeks. ABF/CT (Mahlen/Steve Lawton) will attempt to focus on jointly documenting application of heat and the entire ESAB weld process for 1 or 2 weld stations. Review of the NDT results will follow. 3. Mahlon L. and Steve L. to witness some excavations to verify indication type. 4. ABF to correct and update weld data and provide within the next week. 5. ABF to continue reporting TLI and classify type of indication on a two week basis. However, if significant change occurs, notify Panel immediately. Use the same table format and provide detailed description of length, depth and type of each TLI in the footnotes.	Per meeting notes from 01/26/11: Reference ESAB Weld Data attachment. ABF Update: Since switching to the ESAB wire, ABF noted that the TLI's investigated to date are not hydrogen based related transverse crack-like indications from FCAW welding. At one location, crack-like indications from an SMAW weld were found to be hydrogen based and are being further evaluated for potential process improvement. (ACTION) Table to be updated to clarify which crack indications were actually investigated and are hydrogen related. ABF to share the table with METS for review and comment. (ACTION) ABF to notify METS once an indication is investigated so that METS may verify the results. (ACTION) When ABF consults with their welding experts, ABF to provide response from consultants for Department's review and confirm determination. (ACTION) QA and QC to continue to work together in confirming data retrieved. (ACTION) ABF to submit an Engineering Evaluation of the issue to the Department in the next two days. METS update: Since switching to the ESAB wire, METS noted that in 5 locations (4 were FCAW and 1 was SMAW welds), hydrogen-like indications were found. ABF does not agree with the FCAW hydrogen based findings and does agree with the SMAW hydrogen based findings.	Status on TLI's using ESAB wire and classification (Steve Lawton) a. New TLI's This Week – No new TLI's were reported this week. b. Status of Investigation of Previously Reported TLI's from Last Week: 1. Confirmation by QC (Steve Lawton) – Steve indicated that he received e-mails as follows: - Barsom did not believe the cracks to be hydrogen related from the photos of areas he was provided. - McQuaid did not believe the cracks to be hydrogen related from the photos of areas he was provided. - Rager thought these might be hydrogen related from the photos of areas he was provided. - (ACTION) ABFJV to send Department the e-mail received from Dr. Barsom on this matter. - The initial set of photos sent to Dr. Barsom were of the FL3 to Edge Plate in Bay 14 welded with FCAW. These photos he did not believe were Hydrogen induced linear indications. The photo's of the SMAW welding of 12BE to 12CE DP to EP hold back welds were believed to be Hydrogen related according to Dr. Barsom. 2. Confirmation by QA (Mazen Wahbeh) - (ACTION) Department to review with METS for their opinion. 3. The amount of welds associated with the potential hydrogen related cracks is approximately 1 – 1.2M. It was noted that during this period the above noted weld was performed approximately 1KM of weld was placed. Steve Lawton noted this was an high level gross estimate of quantity of welds placed as actual weld length placement per day is not kept. (ACTION) ABFJV to provide the statistic of the total amount of weld placed during the same time to which the potential hydrogen crack-related welds were performed. 1. MT of Root Pass of CJP Welds. 2. MT of Backgouge of CJP Welds. 3. Purchase of Tempil Stiks to confirm Pre-Heat and Interpass Temperatures by having Welders use these Stiks. ABFJV advised that they recommended to ZPMC to increase the Pre-Heat to 165 degrees C. Steve Lawton indicated that ABFJV has met with both the QC and QA personnel from ZPMC and explained the above and also the need for the welders themselves to confirm the pre-heat and interpass temperatures before they start welding.

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2	Open	Item 2 of Additional Guidelines "Implement the use of ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164…"	1. ABF has completely implemented the use of the ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164. QA/QC inspection results are to be given to the panel members for their review prior to the next meeting in January. 2. ABF to discuss with ZPMC to pressure test the Ar system to confirm properties are adequate and there is no moisture in the system (on-going) 3. ABF has 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. (on-going) 4. ABF to provide the QC inspection results for the implementation of the ESAB wire to METS QA. METS QA to verify results prior to sharing information to QA/QC consultants. 5. ABF shop floor contact person is Peter Ferguson or Steve Lawton for the day-to-day implementation of the ESAB wire. If necessary, the issues can be elevated to Thomas Nilsson or Gang Jiao in Thomas' absence. 6. ABF/METS to review with Linde (Ar gas supplier) to review both manifold system and the method to eliminate contamination. In the interim, ZPMC continues to use bottled gas. (complete and on-going) 7. ABF to schedule meeting with Linde for the week of January 3, 2011 to review the gas distribution and purging system. (complete) 8. ABF to have 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. Also performing training for the ZPMC welders for the use of the ESAB wire. (on-going) 9. ESAB rep to provide to ABF a summary to date of performance of ESAB wire by week of December 27, 2010. (complete) 10. Linde rep to visit ZPMC shop biweekly to check the gas manifold system. (on-going) 11. ZPMC to continue with the use of the bottled gas. Prior to switching to manifolded piping system, ZPMC to perform pressure test of piping system to verify no leaks. When in use, Linde to perform every other week check on the AR and CO2 mixture concentration test of manifold cylinder packs system.	Per meeting notes from 01/26/11: ABF reported that they continue to use bottled gas. Switch to gas manifold system to potentially commence. Steve has contacted Linde about the potential need to test for the purity of gas supply. ABF to also conduct a pressure test of the line.	Per meeting notes from 02/2/11: ZPMC is still using bottled gas. The in-line system is currently NOT being used.
3	Closed	Item 3 of Additional Guidelines "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location."	1. ABF and Caltrans has implemented this through the preapproved CWR templates that was implemented during the CCO 160 process. (METS Confirmed for Lifts 13 and 14 repairs)	Issue closed.	Issue closed.
4	Closed	Item 4 of Additional Guidelines "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV."	1. ABF to further look into rejectable discontinuities and provide a printout of the reject rate for a sample amount of welders. 2. ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.	Issue closed.	Issue closed.
5	Closed	"An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes."	1. ABFJV to provide CWI in accordance with this guideline.	Issue closed.	Issue closed.

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6	Open	Item 6 of Additional Guidelines "All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…"	(ACTION) Lifts 13 and 14, including CBs 18 and 19: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement by next Thursday, January 27th (China). ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement. (ACTION) Lift 12, including CB 17: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement at a later date. ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement. Transverse Welds: 1. Lifts 1 through 12: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria. 2. Lifts 13 and 14: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.	Per meeting notes from 01/26/11: Status of Mapping: 100% FCAW welds (CJP, PJP, and Fillets) made with welding process that included the Hyundai wire; type of inspection performed; % of inspection (Steve Lawton) is the following: **o Lifts 13 and 14 –** a) CJP Welds - Of the Skin Plates and Floorbeam CJP Welds (Major CJP Welds) in Lift 13, ABF reported that only two weld locations were found that met the criteria of the pure FCAW CJP weld using 100% Hyundai wire that were NOT ground flush and 100% UT'd using D-scan. (ACTION) ABF to confirm what level of NDT inspection was completed for the specified welds. Of the Skin Plates and Floorbeam CJP Welds (Major CJP Welds) in Lift 14: ABF reported that no welds were found that met the criteria of the pure FCAW CJP weld using 100% Hyundai wire that were NOT ground flush and 100% UT'd using D-scan. Minor CJP Welds - ABF presented a list of minor CJP welds that have not received 100% NDT inspection in Lifts 13 and 14 that have been performed using the pure FCAW process. Next week, ABF will provide a refined list showing only the welds using the Hyundai wire. b)PJP Welds – ABF presented a list of PJP welds that have not received 100% NDT inspection in Lifts 13 and 14 that have been performed using the pure FCAW process. Next week, ABF will provide a refined list showing only the welds using the Hyundai wire. c) Fillet Welds – (ACTION) ABF to continue to prepare data for fillet welds that have not received 100% NDT inspection in Lifts 13 and 14 that have been performed using the pure FCAW process using Hyundai wire. **o Crossbeam 19** - (ACTION) With respect to Crossbeam 19 (including FL3 extension outside of the box girder), ABF to provide the list of NDT inspection performed by next week. ABF to provide 100% NDT to all CJP, PJP and fillet welds. **o Crossbeam 18** - (ACTION) With respect to Crossbeam 18, ABF to provide NDT information of the pure FCAW welds using Hyundai wire. **o Lift 12** – ABF continues to prepare data. **o Lifts 1 thru 11 –** Fillet Welds for Lifts 1 thru 11– ABF has commenced an initial collection of the fillet weld data. ABF to report more data next week. (ACTION) ABF/METS to identify the fillet welds of interest to the QA/QC Expert Consultant Panel by jointly evaluating production experience and statistical inspection data. ABF asked if there is a way to differentiate secondary members (less important) from primary members, and their welds, based on less than 100% NDT inspection contract requirement. (ACTION) The Department/DJV to consider the question and respond next week.	Per meeting notes from 02/2/11: Status of Mapping: 100% FCAW welds (CJP, PJP, and Fillets) made with welding process that included the Hyundai wire; type of inspection performed; % of inspection (Steve Lawton) **• Lifts 1 thru 12** ABFJV reviewed the Table they have prepared entitled "FCAW Welds Less than 100% with MT or UT". It was noted that this Matrix is for Lifts 2 – 12. Upon review of the data, the following was noted: - Fillet Welds Related to Gantry Process - Steve noted that, after initial refinement to the gantry weld process, a consistent fillet weld has been placed for the past two (2) years. - Based upon the initial data presented in last week's meeting respective to NDT (MT & VT) Repair Percentage statistics for Fillet Welds, the Fillet Welds appears to be of generally high quality. It was noted that should there have been any hydrogen like problems in these Fillet Welds, it would have shown up during their inspection and thus the percent repair would have been higher. - Steve Lawton noted that the percentages presented in the table are of actual lengths of welds. The lengths of any weld repairs are not included in these numbers. - It was discussed that while certain percentages indicated may be over what the Contract or AWS D1.5 Code requires, the increased percentages of tests taken is also in accordance with the Contract and AWS D1.5 Code requirements. - (ACTION) Department/METS to work with ABFJV to verify statistics shown in attached. - (ACTION) ABFJV to continue to complete statistical data on the columns indicated as TBD and also work with Department and METS on corroboration of existing data. - (ACTION) ABFJV and Department/METS to continue to meet to review Fillet Weld locations and data. **• Lifts 13 and 14 -** ABFJV reviewed the following isometrics which indicate the full FCAW 100% Hyundai Wire Welds for Lifts 13 and 14 and discussed the NDT performed or to be performed (Reference the Attachment): - "Lift 13AW Butt welds welded with 100% Hyundai Supercord 71H, will be tested using Scan D" - "Lift 13BW/13BE: Butt welds welded with 100% Hyundai Supercord 71H, will be tested using Scan D" - "Lift 13CW/13CE: Butt welds welded with 100% Hyundai Supercord 71H, will be tested using Scan D" - "Lift 14W Butt welds welded with FCAW root pass, and SMAW in overhead position, not ground flush, almost transverse (D Scan feasible?)" – ABFJV noted that a D-scan has or will be performed on these welds. - "Lift 14E Butt welds welded with FCAW root pass, and SMAW in overhead position, not ground flush, almost transverse (D Scan feasible?)" - ABFJV noted that a D-scan has or will be performed on these welds. **• Crossbeam 19 -** ACTION) Department / DJV to review the NDT requirements for the area within Lift 14 in and around the anchorplate to confirm that the proper amount is specified for NDT %ages. **• Crossbeam 18 -** ABFJV indicated that the CJP's on some of the corners of Crossbeam 18 have been ground flush and all remaining will be ground flush and 100% UT's using Scanning Pattern "D".

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				Per meeting notes from 01/26/11 meeting: Status of Mapping: Cyclic tension loading and stress ranges for those loadings throughout the SAS for high cycle fatigue-type loadings ~10^6 (George Baker) **o Lifts 13 and 14** DJV continues to develop the detailed tension models for the East End. In the meantime, the Department will use engineering judgment and results from their Global Spine Model and Erection Model with the Department's intent to address the amount of any additional NDT inspection. **o Lifts 1 thru 12 and Crossbeams** As reported last week, DJV had provided to the group the following reports:1) OBG-Cross Beam Transverse Tension Zone Analysis Report for Lifts 2 thru 12 , 2) OBG Spine and OBG Deck Longitudinal Stresses (ACTION) DJV to identify the cyclic tension loading and stress ranges for those loadings throughout the SAS for high cycle fatigue-type loadings ~10^6 by next week from their completed analysis report. (ACTION) ABF/DJV/Department to further summarize stress analysis followed by a workshop with ABF next week.	Per meeting notes from 2/2/11 meeting: Status of Mapping: Cyclic tension loading and stress ranges for those loadings throughout the SAS for high cycle fatigue-type loadings ~10^6 (Marwan Nader / Ade Akinsanya) **• Lifts 1 thru 12 and Crossbeams** Marwan Nader reviewed the following DRAFT Reports prepared by the DJV: - OBG-Cross Beam Transverse Tension Mapping (Lifts 2 – 12) -OBG-Cross Beam Longitudinal Tension Mapping (Lifts 2 – 12*)
7	NEW ITEM Open	Comment 1 (dated 1/5/11) Brian M. question - Has the bridge been inspected to the requirements in the contract documents? Statements to be provided by S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh? (ACTION) All parties to provide statements by Monday, 1/10/11. Brian M. comment - The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12	1. All parties (S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh?) to provide statements by Monday, 1/10/11.	No comment.	No comment.

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8	NEW ITEM Open	Draft Report - Comment 2 (dated 1/5/11) Brian M. comment - The QA/QC expert consultant report is draft and is a work in progress. The project team has met and discussed the document, its intent, and several elements of the report. Those discussion have led to a new organized focus group to update the effort, including clearly defining the purpose of the group (including the QA/QC expert consulting group) and providing high quality information and data to the group in order to improve responses and documentation.		No comment.	No comment.
9	NEW ITEM Open	Draft Report - Comment 3 (dated 1/5/11) Brian M. comment - Progress of bridge opening date slower than expected, due in part to inspection repair iteration that is not disallowed by the code or contract documents. There is a strong desire to reduce the iterations and speed up delivery, while maintaining necessary quality.		No comment.	No comment.
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11	NEW ITEM Open	Draft Report - Comment 5 (dated 1/5/11) Brian M. comment - The transverse indications are predominantly from contaminants.		No comment.	No comment.
12	NEW ITEM Open	Draft Report - Comment 6 (dated 1/5/11) Brian M. comment - The transverse indications are of significant concern only in the full FCAW welds.		No comment.	No comment.
13	NEW ITEM Open	Draft Report - Comment 7 (dated 1/5/11) Brian M. comment - The previous welds have been inspected and repaired until acceptable and meeting the requirements in the contract documents.		No comment.	No comment.
14	NEW ITEM Open	Draft Report - Comment 8 (dated 1/5/11) Brian M. comment - The early data from the change in the welding process that includes a switch in wire, increase in heat, and changing gas and delivery system, is effectively removing the transverse indications, though there are learning curve challenges and in some ways the wire is harder to work with for the welders. It is expected that improvements can continue.		No comment.	No comment.

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			January 26, 2011 Status Update/Comments	February 2, 2011 Status Update/Comments
15	NEW ITEM Open	Draft Report - Comment 9 (dated 1/5/11) Brian M. comment - The QC and QA teams, or both together, if requested, can investigate FCAW welds on thoughtfully selected sample groups of welds on Lifts 13 and 14 to use to gather information to use to project on to the full population of similar welds to continue to improve the entire bridge fabrication efficiency.		No comment.	No comment.
16	NEW ITEM Open	Draft Report - Comment 10 (dated 1/5/11) Group discussion on Draft Report: a. (ACTION) ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract	1. ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract Drawings) that are FCAW and how much NDT inspection was required and was performed. Use NDT table provided on CCO 22 to identify which are FCAW (by 1/20/11). 2. Draft Report 8 will remain in draft form and the group will move forward with documenting the on-going weekly and monthly meetings in the SAS Steel Fabrication Expert Panel Monthly Review Notes. The Draft ~~8~~ 9 dated January ~~11~~ 12, 2011, supersedes all prior versions of this report. Panel signatures are not required from draft reports to make it clear that they are draft.	No comment.	No comment.
17		Other Items		Per meeting notes from 01/26/11: Other Items • February 17th QA/QC Expert Panel Monthly Review Meeting in Oakland • February 18th TBPOC Meeting – Bill/Mazen/Brian Maroney/Ade and Expert Panel to attend. • Expert Panel Draft Report (ACTION) Department to further comment on report by next week. Department and ABF to discuss potential comments with the Expert Panel via teleconference prior to the February 17th Expert Panel Meeting.	Per meeting notes from 02/2/11: Other Items • February Meetings Department and ABFJV to work on the preparation of an Agenda for the February 17th Meeting and also the Department's presentation at the February 18, 2010 Seismic Peer Review Panel Meeting to which the QA/QC Expert Panel will also be in attendance at. • Expert Panel Draft Report No Action on this Item. • March Meeting Department and ABFJV to work on Agenda and information for March 28 – 30 Meeting in China.

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ID	Status	Title	Actions/ (Due Date)		
	Source Doc			January 26, 2011 Status Update/Comments	February 2, 2011 Status Update/Comments
18		Strategy Moving Forward	1. The Department to provide the stress ranges. Demand-capacity ratio to be further discussed between ABF and the Department during the Wednesday weekly meetings. 2. As requested by the Panel, the Department will provide data from MTR's and check samples. 3. ABF-China to provide mapping of all FCAW welds and identify which ones are ground flush and UT'd using Scanning Pattern D. Design will use this information to determine if additional NDT will be required.	No comment.	No comment.

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			February 2, 2011 Status Update/Comments	February 9, 2011 Status Update/Comments
1	Open	Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures	1. For FCAW, ABF to implement the previously cited guidelines from November 2009-2010. Alternatively, if it can be demonstrated (weld trials and continued inspection) that alternative means and methods that lead to welds that are consistently free of transverse cracks, then those means and methods would be recognized as acceptable. 2. China to collect data on welds using ESAB wire with the 110degC preheat temperature. Data expected in 2 weeks. ABF/CT (Mahlen/Steve Lawton) will attempt to focus on jointly documenting application of heat and the entire ESAB weld process for 1 or 2 weld stations. Review of the NDT results will follow. 3. Mahlon L. and Steve L. to witness some excavations to verify indication type. 4. ABF to correct and update weld data and provide within the next week. 5. ABF to continue reporting TLI and classify type of indication on a two week basis. However, if significant change occurs, notify Panel immediately. Use the same table format and provide detailed description of length, depth and type of each TLI in the footnotes.	Status on TLI's using ESAB wire and classification (Steve Lawton) a. New TLI's This Week – No new TLI's were reported this week. b. Status of Investigation of Previously Reported TLI's from Last Week: 1. Confirmation by QC (Steve Lawton) – Steve indicated that he received e-mails as follows: - Barsom did not believe the cracks to be hydrogen related from the photos of areas he was provided. - McQuaid did not believe the cracks to be hydrogen related from the photos of areas he was provided. - Rager thought these might be hydrogen related from the photos of areas he was provided. - (ACTION) ABFJV to send Department the e-mail received from Dr. Barsom on this matter. - The initial set of photos sent to Dr. Barsom were of the FL3 to Edge Plate in Bay 14 welded with FCAW. These photos he did not believe were Hydrogen induced linear indications. The photo's of the SMAW welding of 12BE to 12CE DP to EP hold back welds were believed to be Hydrogen related according to Dr. Barsom. 2. Confirmation by QA (Mazen Wahbeh) - (ACTION) Department to review with METS for their opinion. 3. The amount of welds associated with the potential hydrogen related cracks is approximately 1 – 1.2M. It was noted that during this period the above noted weld was performed approximately 1KM of weld was placed. Steve Lawton noted this was an high level gross estimate of quantity of welds placed as actual weld length placement per day is not kept. (ACTION) ABFJV to provide the statistic of the total amount of weld placed during the same time to which the potential hydrogen crack-related welds were performed. 1. MT of Root Pass of CJP Welds. 2. MT of Backgouge of CJP Welds. 3. Purchase of Tempil Stiks to confirm Pre-Heat and Interpass Temperatures by having Welders use these Stiks. ABFJV advised that they recommended to ZPMC to increase the Pre-Heat to 165 degrees C. Steve Lawton indicated that ABFJV has met with both the QC and QA personnel from ZPMC and explained the above and also the need for the welders themselves to confirm the pre-heat and interpass temperatures before they start welding.	Status on TLI's using ESAB wire and classification (Steve Lawton) a. New TLI's This Week- No new TLI's to report this week. b. Status of Investigation of Previously Reported TLI's In response to the action from last week, Steve Lawton and Mazen Wahbeh reported the following statistics on weld length NDT inspected for all welds. - From 8 January to 16 January: 2792 meter of weld MT inspected. 1862 meters of weld UT inspected. It was noted of these welds, there were no TLI's found. - From 17 January to 27 January: 2553 meters of weld MT inspected. 1312 meters of weld UT inspected It was noted of these welds, there were no TLI's found. ● ABF has reported that generally, the overall rejection rate has gone down. There are a couple welds that ABF continue to deal with: 1) Welds in the 2G position for the floorbeam to bottom plate, 2) Welds at the suspender brackets ● In regards to last week's issue of the FCAW welds in question, they are currently being reviewed by the Expert Panel to determine if they are hydrogen related or not. c. ABFJV Engineering Evaluation (ACTION) ABFJV to formally submit the Engineering Evaluation incorporating METS comments via CWR prior to next repair. For informational purposes, ABFJV will provide a copy of ZPMC's technical memorandum regarding these related recommendation at next week's meeting.

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2	Open	Item 2 of Additional Guidelines "Implement the use of ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164…"	1. ABF has completely implemented the use of the ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164. QA/QC inspection results are to be given to the panel members for their review prior to the next meeting in January. 2. ABF to discuss with ZPMC to pressure test the Ar system to confirm properties are adequate and there is no moisture in the system (on-going) 3. ABF has 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. (on-going) 4. ABF to provide the QC inspection results for the implementation of the ESAB wire to METS QA. METS QA to verify results prior to sharing information to QA/QC consultants. 5. ABF shop floor contact person is Peter Ferguson or Steve Lawton for the day-to-day implementation of the ESAB wire. If necessary, the issues can be elevated to Thomas Nilsson or Gang Jiao in Thomas' absence. 6. ABF/METS to review with Linde (Ar gas supplier) to review both manifold system and the method to eliminate contamination. In the interim, ZPMC continues to use bottled gas. (complete and on-going) 7. ABF to schedule meeting with Linde for the week of January 3, 2011 to review the gas distribution and purging system. (complete) 8. ABF to have 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. Also performing training for the ZPMC welders for the use of the ESAB wire. (on-going) 9. ESAB rep to provide to ABF a summary to date of performance of ESAB wire by week of December 27, 2010. (complete) 10. Linde rep to visit ZPMC shop biweekly to check the gas manifold system. (on-going) 11. ZPMC to continue with the use of the bottled gas. Prior to switching to manifolded piping system, ZPMC to perform pressure test of piping system to verify no leaks. When in use, Linde to perform every other week check on the AR and CO2 mixture concentration test of manifold cylinder packs system.	Per meeting notes from 02/2/11: ZPMC is still using bottled gas. The in-line system is currently NOT being used.	Per meeting notes from 02/9/11: ZPMC is still using the bottled gas. The in-line system is currently not being used.
3	Closed	Item 3 of Additional Guidelines "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location."	1. ABF and Caltrans has implemented this through the preapproved CWR templates that was implemented during the CCO 160 process. (METS Confirmed for Lifts 13 and 14 repairs)	Issue closed.	Issue closed.
4	Closed	Item 4 of Additional Guidelines "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV."	1. ABF to further look into rejectable discontinuities and provide a printout of the reject rate for a sample amount of welders. 2. ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.	Issue closed.	Issue closed.
5	Closed	"An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes."	1. ABFJV to provide CWI in accordance with this guideline.	Issue closed.	Issue closed.

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6	Open	Item 6 of Additional Guidelines "All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…"	(ACTION) Lifts 13 and 14, including CBs 18 and 19: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement by next Thursday, January 27th (China). ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement. (ACTION) Lift 12, including CB 17: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement at a later date. ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement. Transverse Welds: 1. Lifts 1 through 12: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria. 2. Lifts 13 and 14: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.	Per meeting notes from 02/2/11: Status of Mapping: 100% FCAW welds (CJP, PJP, and Fillets) made with welding process that included the Hyundai wire; type of inspection performed; % of inspection (Steve Lawton) **• Lifts 1 thru 12** ABFJV reviewed the Table they have prepared entitled "FCAW Welds Less than 100% with MT or UT". It was noted that this Matrix is for Lifts 2 – 12. Upon review of the data, the following was noted: - Fillet Welds Related to Gantry Process - Steve noted that, after initial refinement to the gantry weld process, a consistent fillet weld has been placed for the past two (2) years. - Based upon the initial data presented in last week's meeting respective to NDT (MT & VT) Repair Percentage statistics for Fillet Welds, the Fillet Welds appears to be of generally high quality. It was noted that should there have been any hydrogen like problems in these Fillet Welds, it would have shown up during their inspection and thus the percent repair would have been higher. - Steve Lawton noted that the percentages presented in the table are of actual lengths of welds. The lengths of any weld repairs are not included in these numbers. - It was discussed that while certain percentages indicated may be over what the Contract or AWS D1.5 Code requires, the increased percentages of tests taken is also in accordance with the Contract and AWS D1.5 Code requirements. - (ACTION) Department/METS to work with ABFJV to verify statistics shown in attached. - (ACTION) ABFJV to continue to complete statistical data on the columns indicated as TBD and also work with Department and METS on corroboration of existing data. - (ACTION) ABFJV and Department/METS to continue to meet to review Fillet Weld locations and data. **• Lifts 13 and 14 -** ABFJV reviewed the following isometrics which indicate the full FCAW 100% Hyundai Wire Welds for Lifts 13 and 14 and discussed the NDT performed or to be performed (Reference the Attachment): - "Lift 13AW Butt welds welded with 100% Hyundai Supercord 71H, will be tested using Scan D" - "Lift 13BW/13BE: Butt welds welded with 100% Hyundai Supercord 71H, will be tested using Scan D" - "Lift 13CW/13CE: Butt welds welded with 100% Hyundai Supercord 71H, will be tested using Scan D" - "Lift 14W Butt welds welded with FCAW root pass, and SMAW in overhead position, not ground flush, almost transverse (D Scan feasible?)" – ABFJV noted that a D-scan has or will be performed on these welds. - "Lift 14E Butt welds welded with FCAW root pass, and SMAW in overhead position, not ground flush, almost transverse (D Scan feasible?)" - ABFJV noted that a D-scan has or will be performed on these welds. **• Crossbeam 19 -** ACTION) Department / DJV to review the NDT requirements for the area within Lift 14 in and around the anchorplate to confirm that the proper amount is specified for NDT %ages. **• Crossbeam 18 -** ABFJV indicated that the CJP's on some of the corners of Crossbeam 18 have been ground flush and all remaining will be ground flush and 100% UT's using Scanning Pattern "D".	Per meeting notes from 02/9/11: Status of Weld Inspection Mapping (Steve Lawton) Steve confirmed that the table below represents the current status of the data collected to date. (ACTION) Steve and Mazen to continue this effort in collecting the data.
6 (cont.)					

Data collected for the 100% FCAW Welds made with welding process that included the Hyundai wire

	CJP		PJP		Fillet	
	Type of Inspection performed	% of Inspection	Type of Inspection performed	% of Inspection	Type of Inspection performed	% of Inspection
Lifts 1 thru 12	complete	complete	In process; target 2/15/11	In process; target 2/15/11	In process	In process
Lifts 13 and 14	complete	complete	In process	In process	In process	In process
Crossbeam 19	complete	complete	complete	complete	In process	In process
Crossbeam 18	complete	complete	In process	In process	In process	In process

Notes:
- "complete" – indicates that the data has been compiled, corroborated and complete
- "in process" – indicates that data collection is on-going

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6 (cont.)				Per meeting notes from 2/2/11 meeting: Status of Mapping: Cyclic tension loading and stress ranges for those loadings throughout the SAS for high cycle fatigue-type loadings ~10^6 (Marwan Nader / Ade Akinsanya) **• Lifts 1 thru 12 and Crossbeams** Marwan Nader reviewed the following DRAFT Reports prepared by the DJV: - OBG-Cross Beam Transverse Tension Mapping (Lifts 2 – 12) -OBG-Cross Beam Longitudinal Tension Mapping (Lifts 2 – 12*)	Per meeting notes from 02/9/11: Status of Tension/Compression Mapping: Cyclic tension loading and stress ranges for those loadings throughout the SAS for high cycle fatigue-type loadings ~10^6 (Marwan Nader / Ade Akinsanya) **● Lifts 13 and 14** Sufficient information has been provided by the DJV and corroborated by the group for these areas. **● Lifts 2 thru 12 and Crossbeams (draft report provided)** (ACTION) DJV/Ade to provide final copy.
6a	NEW ITEM Open	Demand and Capacity Analysis of Welds			Per meeting notes from 02/9/11: **Demand and Capacity Analysis of Welds** **● Discussions with Dr. Barsom on Fillet Welds (2/4/11)** On Friday, February 4th, Brian M. and Kevin S and Dr. Barsom had a teleconference to discuss the fillet welds. We discussed with Dr. Barsom the first draft of the fillet weld NDT inspection results for the welds of interest (100% FCAW welding procedure that included the Hyundai wire and those areas that are of interest). First draft shows MT inspection was near 94% of the weld and much of the data showed very low reported rejection rates, some well below 1%. Though there were some as high as 16%, those areas were not representative. Also, fillet welds made on the gantry system were discussed as also showing high quality NDT results and it was reported by Steve Lawton that approximately 2 years ago, additional heat was added to the process, which he felt was a important reason those welds had such high acceptance rates/high quality. If the data trends continue, Brian suggested to Dr. Barsom this is reason to interpret the high quality of MT-VT test results as a measure of the “quality of the weld”. And further /specifically if there was a hydrogen problem in these welds, it would have impacted the NDT results and it would have shown in the data. This would tend to lead to a conclusion that the fillets are of high quality and not of concern. Dr. Barsom said he supported Brian M. and Kevin S. judgment of the situation and wanted to see the supporting data on February 17th meeting.

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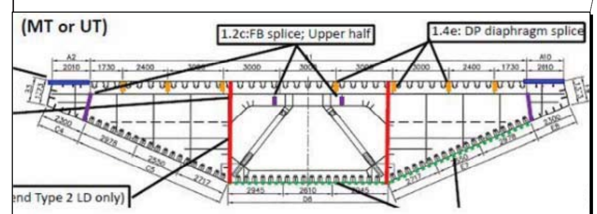
6a (cont)					Dr. Barsom sent Brian M. and Kevin S. an email that specifically asked 4 questions that Caltrans and ABF should prepare for the QA/QC group by the February 17th meeting. See below. 1. Was the 1% fillet weld repairs based on number of welds that were repaired or was it based on linear inches repaired of the total fillet weld length? Regardless of the answer, what is the % for the other computation and what, if any, is the significance of the answer to the performance of the Bridge. 2. What is the rejection rate with the present welding procedure? What type of discontinuities are being rejected [cracks, porosity, slag…]? 3. In their report November 2010, the Fabrication Expert Panel expressed dissatisfaction with the frequency of rejectable weld indications. Has there been a significant decrease since November 2010? If not why not? 4. Have we eliminated the hydrogen cracking problem? If not, why? How many welds contained hydrogen cracks in the last two months?
6a (cont)					• **Teleconference with Dr. Barsom (2/7/11)** DJV provided a brief overview of the TYL/MN Draft reports entitled: 1) OBG-Cross Beam Transverse Tension Mapping (Lifts 2-12), 2) OBG-Cross Beam Longitudinal Tension Mapping (Lifts 2-12). Refer to attached draft minutes. (ACTION) DJV to perform demand and capacity analysis, using Dr. Barsom's model, for the welds in the floorbeam and diaphragm (1.4e and 1.2c of the ABFJV Isometric graphic below). Steve commented that the corner welds were performed in segment assembly in Bay 14. The 1.2c welds are generally done in the flat position. 

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	Source Doc			**February 2, 2011** **Status Update/Comments**	**February 9, 2011** **Status Update/Comments**
7	Open	Comment 1 (dated 1/5/11) Brian M. question - Has the bridge been inspected to the requirements in the contract documents? Statements to be provided by S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh? (ACTION) All parties to provide statements by Monday, 1/10/11. Brian M. comment - The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12	1. All parties (S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh?) to provide statements by Monday, 1/10/11.	No comment.	No comment.
8	Open	Draft Report - Comment 2 (dated 1/5/11) Brian M. comment - The QA/QC expert consultant report is draft and is a work in progress. The project team has met and discussed the document, its intent, and several elements of the report. Those discussion have led to a new organized focus group to update the effort, including clearly defining the purpose of the group (including the QA/QC expert consulting group) and providing high quality information and data to the group in order to improve responses and documentation.		No comment.	No comment.

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9	Open	Draft Report - Comment 3 (dated 1/5/11) Brian M. comment - Progress of bridge opening date slower than expected, due in part to inspection repair iteration that is not disallowed by the code or contract documents. There is a strong desire to reduce the iterations and speed up delivery, while maintaining necessary quality.		No comment.	No comment.
10	Open	Draft Report - Comment 4 (dated 1/5/11) Brian M. comment - A significant portion of the iterations are due to development of transverse crack-like indication in some welds.		No comment.	No comment.
11	Open	Draft Report - Comment 5 (dated 1/5/11) Brian M. comment - The transverse indications are predominantly from contaminants.		No comment.	No comment.
12	Open	Draft Report - Comment 6 (dated 1/5/11) Brian M. comment - The transverse indications are of significant concern only in the full FCAW welds.		No comment.	No comment.

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13	Open	Draft Report - Comment 7 (dated 1/5/11) Brian M. comment - The previous welds have been inspected and repaired until acceptable and meeting the requirements in the contract documents.		No comment.	No comment.
14	Open	Draft Report - Comment 8 (dated 1/5/11) Brian M. comment - The early data from the change in the welding process that includes a switch in wire, increase in heat, and changing gas and delivery system, is effectively removing the transverse indications, though there are learning curve challenges and in some ways the wire is harder to work with for the welders. It is expected that improvements can continue.		No comment.	No comment.
15	Open	Draft Report - Comment 9 (dated 1/5/11) Brian M. comment - The QC and QA teams, or both together, if requested, can investigate FCAW welds on thoughtfully selected sample groups of welds on Lifts 13 and 14 to use to gather information to use to project on to the full population of similar welds to continue to improve the entire bridge fabrication efficiency.		No comment.	No comment.

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16	Open	Draft Report - Comment 10 (dated 1/5/11) Group discussion on Draft Report: a. (ACTION) ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract	1. ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract Drawings) that are FCAW and how much NDT inspection was required and was performed. Use NDT table provided on CCO 22 to identify which are FCAW (by 1/20/11). 2. Draft Report 8 will remain in draft form and the group will move forward with documenting the on-going weekly and monthly meetings in the SAS Steel Fabrication Expert Panel Monthly Review Notes. The Draft ~~8~~ 9 dated January ~~11~~ 12, 2011, supersedes all prior versions of this report. Panel signatures are not required from draft reports to make it clear that they are draft.	No comment.	No comment.
17		Other Items		Per meeting notes from 02/2/11: Other Items • February Meetings Department and ABFJV to work on the preparation of an Agenda for the February 17th Meeting and also the Department's presentation at the February 18, 2010 Seismic Peer Review Panel Meeting to which the QA/QC Expert Panel will also be in attendance at. • Expert Panel Draft Report No Action on this Item. • March Meeting Department and ABFJV to work on Agenda and information for March 28 – 30 Meeting in China.	Other Items **• February 17th Steel Fabrication Expert Panel Meeting Agenda (start 10am)** - Review of the Expert Panel Draft Report - Department/ABFJV response to the Expert Panel Draft Report 1. Status of TLI's – Steve Lawton 2. Status of Bottled Gas – Steve Lawton 3. Status of Welding Inspection Mapping – Steve Lawton 4. Summary of the Tension/Compression Mapping – Marwan Nader 5. Demand and Capacity of Welds (Marwan Nader) **• February 18th Draft Meeting Agenda (SSPRP meeting) – Brian Maroney (Facilitator)** - Review of the Expert Panel Draft Report - Department/ABFJV response to the Expert Panel Draft Report 1. Status of TLI's (1 slide) – Steve Lawton 2. Status of Bottled Gas (1 slide) – Steve Lawton 3. Status of Welding Inspection Mapping (1 slide – include the table) – Steve Lawton 4. Summary of the Tension/Compression Mapping (1 slide) – Marwan Nader 5. Demand and Capacity of Welds (Marwan Nader) (ACTION) Group to meet for a February 18th prep meeting on February 17th.
18		Strategy Moving Forward	1. The Department to provide the stress ranges. Demand-capacity ratio to be further discussed between ABF and the Department during the Wednesday weekly meetings. 2. As requested by the Panel, the Department will provide data from MTR's and check samples. 3. ABF-China to provide mapping of all FCAW welds and identify which ones are ground flush and UT'd using Scanning Pattern D. Design will use this information to determine if additional NDT will be required.	No comment.	No comment.

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	Source Doc			February 17, 2011 Status Update/Comments	February 23, 2011 Status Update/Comments
1	Open	Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures	1. For FCAW, ABF to implement the previously cited guidelines from November 2009-2010. Alternatively, if it can be demonstrated (weld trials and continued inspection) that alternative means and methods that lead to welds that are consistently free of transverse cracks, then those means and methods would be recognized as acceptable. 2. China to collect data on welds using ESAB wire with the 110degC preheat temperature. Data expected in 2 weeks. ABF/CT (Mahlen/Steve Lawton) will attempt to focus on jointly documenting application of heat and the entire ESAB weld process for 1 or 2 weld stations. Review of the NDT results will follow. 3. Mahlon L. and Steve L. to witness some excavations to verify indication type. 4. ABF to correct and update weld data and provide within the next week. 5. ABF to continue reporting TLI and classify type of indication on a two week basis. However, if significant change occurs, notify Panel immediately. Use the same table format and provide detailed description of length, depth and type of each TLI in the footnotes.	Per meeting notes from 02/17/11: • New TLI's Since Last Meeting No new hydrogen-related TLI's reported since the switch to the new welding procedure. Steve Lawton walked the group through the statistics for the new welding procedure. (ACTION) ABF to add to the table a footnote clarifying the TLI wording in the "remarks" column and a "hydrogen present" column . ABF to update the title of the table to read as "New FCAW Welding Process Statistics…" (ACTION) ABF to add a footnote of the following: "Investigations are performed on selected found TLI's that appear at the lower decibel ratings. All indications, whether investigated or not are repaired." • Status of Investigation of Previously Reported TLI's In reference to the 4 weld locations in discussion from February 2nd meeting, the group acknowledges that these indications represent small percentage (significantly less than 1%) of the weld and are not representative of the welding. This data represents a conclusion that the welding procedure has eliminated the of hydrogen problem. Since then, the following additional steps were put in place by ABF: MT of the root pass, MT of the backgouge, writing on the steel with soap stone of the preheat temperature checked by the welders with temperature indicating sticks. These steps are documented in an Engineering Evaluation document that will be submitted in the next CWR. The group agreed that the issue of classifying indications at 4 weld locations where QA and QC had differing opinions are considered closed.	Per meeting notes from 2/23/11: a. Status of TLI's using New FCAW Weld Process– Steve Lawton (Ref. Tab 3 of Binder, Exhibit 3.1) (ACTION completed) ABF to add to the table a footnote clarifying the TLI wording in the "remarks" column and a "hydrogen present" column . ABF to update the title of the table to read as "New FCAW Welding Process Statistics…" (ACTION completed) ABF to add a footnote of the following: "Investigations are performed on selected found TLI's that appear at the lower decibel ratings. All indications, whether investigated or not are repaired." (ACTION) ABF to continue to update table with current data.

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			February 17, 2011 Status Update/Comments	February 23, 2011 Status Update/Comments
2	Open	Item 2 of Additional Guidelines "Implement the use of ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164…"	1. ABF has completely implemented the use of the ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164. QA/QC inspection results are to be given to the panel members for their review prior to the next meeting in January. 2. ABF to discuss with ZPMC to pressure test the Ar system to confirm properties are adequate and there is no moisture in the system (on-going) 3. ABF has 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. (on-going) 4. ABF to provide the QC inspection results for the implementation of the ESAB wire to METS QA. METS QA to verify results prior to sharing information to QA/QC consultants. 5. ABF shop floor contact person is Peter Ferguson or Steve Lawton for the day-to-day implementation of the ESAB wire. If necessary, the issues can be elevated to Thomas Nilsson or Gang Jiao in Thomas' absence. 6. ABF/METS to review with Linde (Ar gas supplier) to review both manifold system and the method to eliminate contamination. In the interim, ZPMC continues to use bottled gas. (complete and on-going) 7. ABF to schedule meeting with Linde for the week of January 3, 2011 to review the gas distribution and purging system. (complete) 8. ABF to have 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. Also performing training for the ZPMC welders for the use of the ESAB wire. (on-going) 9. ESAB rep to provide to ABF a summary to date of performance of ESAB wire by week of December 27, 2010. (complete)	Per meeting notes from 02/17/11: ZPMC is currently using the bottled gas and has not yet switched to the manifold gas system. [Action] Consider closed until such time as ZPMC switches to manifolded gas supply.	Per meeting notes from 2/23/11: Future reporting will be provided only when manifold piping system is implemented. Bottled gas will remain the source for welding.
3	Closed	Item 3 of Additional Guidelines "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location."	1. ABF and Caltrans has implemented this through the preapproved CWR templates that was implemented during the CCO 160 process. (METS Confirmed for Lifts 13 and 14 repairs)	Issue closed.	Issue closed.
4	Closed	Item 4 of Additional Guidelines "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV."	1. ABF to further look into rejectable discontinuities and provide a printout of the reject rate for a sample amount of welders. 2. ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.	Issue closed.	Issue closed.
5	Closed	"An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes."	1. ABFJV to provide CWI in accordance with this guideline.	Issue closed.	Issue closed.

<table>
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<tr><th></th><th>Source Doc</th><th></th><th></th><th>February 17, 2011
Status Update/Comments</th><th>February 23, 2011
Status Update/Comments</th></tr>
<tr>
<td>6</td>
<td>Open</td>
<td>Item 6 of Additional Guidelines

"All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…"</td>
<td>(ACTION) Lifts 13 and 14, including CBs 18 and 19:
ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement by next Thursday, January 27th (China).

ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement.

(ACTION) Lift 12, including CB 17:
ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement at a later date.

ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement.

Transverse Welds:
1. Lifts 1 through 12: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.

2. Lifts 13 and 14: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.</td>
<td>Per meeting notes from 02/17/11:

The following summary table is the current status of the NDT inspection performed for 100% FCAW welds made with welding process that included Hyundai wire.
<table>
<tr><th>CJP</th><th></th><th></th><th></th></tr>
<tr><th></th><th>Location ID per CCO 22</th><th>Type of Inspection performed or to be performed</th><th>Actual % of inspection **</th></tr>
<tr><td>Lifts 1 thru 12</td><td>1.2c*
1.4e1
1.4e2
1.4e3
All other major welds*
Refer to Exhibit 4.1</td><td>UT - Scanning Pattern E
UT - Scanning Pattern E
UT - Scanning Pattern E or D
UT - Scanning Pattern E or D</td><td>15 – 100% with average @ 43%
100%
25 – 100% with average @ 49%
25 – 100% with average @ 97%</td></tr>
<tr><td>Lifts 13 and 14</td><td>All CJP welds on the skin plates*
Refer to Exhibit 4.2</td><td>UT - Scanning Pattern D</td><td>100%</td></tr>
<tr><td>Crossbeams 1-17</td><td>All CJP welds*
Refer to Exhibit 4.4</td><td>UT - Scanning Pattern D or E</td><td>50-100%</td></tr>
<tr><td>Crossbeam 18</td><td>All CJP welds*
Refer to Exhibit 4.4</td><td>UT - Scanning Pattern D</td><td>100%</td></tr>
<tr><td>Crossbeam 19</td><td>All CJP welds*</td><td>UT - Scanning Pattern E or D</td><td>100%</td></tr>
</table>

a) For Lift 13 and 14 skin plates, all pure FCAW CJP welds made with old welding process have been or will be 100% UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.

b) (ACTION) ABF to develop an isometric graphic identifying locations of internal pure FCAW CJP welds made with the old welding process.

c) (ACTION) For Lifts 1-12, referencing Exhibit 4.1 table, all pure FCAW CJP welds made with old welding process, ABF to add "reject rate" column by next meeting.

d) For Lift 12, skin plates, all pure FCAW CJP welds made with old welding process have been or will be 100% UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria (with the exception of the lower corner assembly weld which is 100% UT inspected using Scanning Pattern E). The Scanning Pattern E performed on this lower corner assembly weld is acceptable.

e) For Lift 12, internal plates, all pure FCAW CJP welds made with the welding process have been UT inspected to varying percentages using Scanning Pattern E in accordance with the contract documents.

f) Crossbeams 17-19 corner welds will be or have been ground flush and UT inspected with Scanning Pattern D with +6 dB above Class B acceptance criteria. Reference Exhibit 4.4.

g) Crossbeams 1-16 corner welds will be or have been UT inspected using either Scanning Pattern D or E depending on whether the welds were required to be ground flush or not by the contract documents.
(ACTION) ABF to provide inspection data for the corner welds.

(Panel comments) The Panel recognizes that the project has correctly applied the code and contract documents and has extended these requirements to the appropriate alternative UT methods as the code allows.</td>
<td>Per meeting notes from 2/23/11:

Response to Expert Panel Draft Report Version 9, Issued January 12, 2011:
1. Item 6 of Additional Guidelines
The performance of structural members in Lifts 1 through 12 that are determined to be subjected to tensile stresses should be investigated once the maximum and cyclic tensile stress magnitudes are determined.

(Project Team Response) Item 6 of the Additional Guidelines only applies to 100% pure skin CJP FCAW welds made with the old welding process.

2. Item 7 of Additional Guidelines
"All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria [acceptance criteria in Table 6.3 – UT Acceptance / Rejection Criteria – Tensile Stress in addition to the standard UT requirements of the AWS D1.5 Code [see Appendix E]."

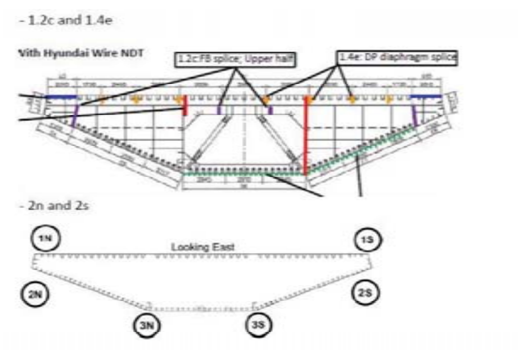
(Project Team Response) The basis for the responses for Item 7 of the Additional Guidelines is that this only concerns 100% pure skin CJP FCAW welds made with the old welding process.

(Project Team Response) For Lifts 12-14, all 100% pure skin CJP FCAW made with the old welding process (with the exception of the Lift 12 welds in the 2n and 2s location) were 100% UT inspected using Scanning Pattern D with +6dB above Class B acceptance criteria.

(Project Team Response) For all welds, the project team believes the code was both applied appropriately and performed additional NDT in line with the contract and code requirements. If there was a systemic problem in the welds, including TLI's, it would be detected using Scanning Pattern E.

Status of Welding Inspection Mapping
(ACTION) Refer to NDT Table attachment for action items.
As for fillet welds on Lifts 13 and 14, no exhibit needed.
(ACTION) Add a footnote stating the action taken for how the anchorage fillet weld defects were addressed.

Summary of the Tension/Compression Mapping – Marwan Nader
(ACTION) DJV to provide stress information on the welds for the locations listed below, per the February 17th meeting.
- 1.2c and 1.4e
- 2n and 2s
(ACTION) ABF to obtain NDT data on these specific welds.</td>
</tr>
</table>

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			February 17, 2011 Status Update/Comments	February 23, 2011 Status Update/Comments
6 (cont.)				Per meeting notes from 2/17/11: • Summary of the Tension/Compression Mapping – Marwan Nader (Ref. Tab 5) Marwan Nader walked the group through the PowerPoint slides of the Summary of the Tension/Compression Mapping. The information presented is consistent with the last presentation discussed in the January 10-12 meetings and provides greater detail. (Panel Comments) The Panel finds the information and clarification provided in the presentation informative and very helpful in understanding the complexity of the stress loading on the structure. This mapping helped identify which welds were of concern and how to evaluate them. Crossbeams 1-16, DJV confirmed the following stress ranges for use by Dr. Barsom in his weld evaluation requested by ABF: 125MPa (DL) + 28 MPa (LL) + 24 MPa (WL) = 177MPA - upper boundary 125MPa (DL) - 24 MPa (WL) = 101 MPa - lower boundary (ACTION) For Lifts 1-11, as discussed in February 9th meeting, DJV is to provide stress information on the following welds: 	

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			February 17, 2011 Status Update/Comments	February 23, 2011 Status Update/Comments
6a	Open	Demand and Capacity Analysis of Welds		Per meeting notes from 02/17/11: Demand and Capacity Analysis of Welds : (Department's Comments) Structure Rep and the QA Principal of the OBG commented that there is no need at this point for a fit-for-purpose demand and capacity analysis of the welds. (Brian Maroney's comments) The mapping of tension regions is complete and if necessary, the team has demand estimates that could be used to perform "fit-for-purpose" analyses if required. To date, such fit-for-purpose evaluations have not been recognized as necessary. Should this change at some point in the future, the process would likely follow closely the California Bridge Design Specifications and other related documents in a Demand/Capacity format. Such an evaluation would need to have a peer review conducted by the Toll Bridge Seismic Safety Peer Review Panel. Dr. John Barsom has provided an example of one approach to evaluating the potential for an assumed large crack across a weld and into the base metal to propagate. This should be recognized as an example of a powerful tool that could be part of an important evaluation at such a time that a fit-for-purpose study becomes necessary.	
7	Open	Comment 1 (dated 1/5/11) Brian M. question - Has the bridge been inspected to the requirements in the contract documents? Statements to be provided by S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh? (ACTION) All parties to provide statements by Monday, 1/10/11. Brian M. comment - The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12	1. All parties (S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh?) to provide statements by Monday, 1/10/11.	No comment.	No comment.

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			February 17, 2011 Status Update/Comments	February 23, 2011 Status Update/Comments
8	Open	Draft Report - Comment 2 (dated 1/5/11) Brian M. comment - The QA/QC expert consultant report is draft and is a work in progress. The project team has met and discussed the document, its intent, and several elements of the report. Those discussion have led to a new organized focus group to update the effort, including clearly defining the purpose of the group (including the QA/QC expert consulting group) and providing high quality information and data to the group in order to improve responses and documentation.		No comment.	No comment.
9	Open	Draft Report - Comment 3 (dated 1/5/11) Brian M. comment - Progress of bridge opening date slower than expected, due in part to inspection repair iteration that is not disallowed by the code or contract documents. There is a strong desire to reduce the iterations and speed up delivery, while maintaining necessary quality.		No comment.	No comment.
10	Open	Draft Report - Comment 4 (dated 1/5/11) Brian M. comment - A significant portion of the iterations are due to development of transverse crack-like indication in some welds.		No comment.	No comment.

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			February 17, 2011 Status Update/Comments	February 23, 2011 Status Update/Comments
11	Open	Draft Report - Comment 5 (dated 1/5/11) Brian M. comment - The transverse indications are predominantly from contaminants.		No comment.	No comment.
12	Open	Draft Report - Comment 6 (dated 1/5/11) Brian M. comment - The transverse indications are of significant concern only in the full FCAW welds.		No comment.	No comment.
13	Open	Draft Report - Comment 7 (dated 1/5/11) Brian M. comment - The previous welds have been inspected and repaired until acceptable and meeting the requirements in the contract documents.		No comment.	No comment.
14	Open	Draft Report - Comment 8 (dated 1/5/11) Brian M. comment - The early data from the change in the welding process that includes a switch in wire, increase in heat, and changing gas and delivery system, is effectively removing the transverse indications, though there are learning curve challenges and in some ways the wire is harder to work with for the welders. It is expected that improvements can continue.		No comment.	No comment.

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ID	Status / Source Doc	Title	Actions/ (Due Date)	February 17, 2011 Status Update/Comments	February 23, 2011 Status Update/Comments
15	Open	Draft Report - Comment 9 (dated 1/5/11) Brian M. comment - The QC and QA teams, or both together, if requested, can investigate FCAW welds on thoughtfully selected sample groups of welds on Lifts 13 and 14 to use to gather information to use to project on to the full population of similar welds to continue to improve the entire bridge fabrication efficiency.		No comment.	No comment.
16	Open	Draft Report - Comment 10 (dated 1/5/11) Group discussion on Draft Report: a. (ACTION) ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract	1. ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract Drawings) that are FCAW and how much NDT inspection was required and was performed. Use NDT table provided on CCO 22 to identify which are FCAW (by 1/20/11). 2. Draft Report 8 will remain in draft form and the group will move forward with documenting the on-going weekly and monthly meetings in the SAS Steel Fabrication Expert Panel Monthly Review Notes. The Draft ~~8~~ 9 dated January ~~11~~ 12, 2011, supersedes all prior versions of this report. Panel signatures are not required from draft reports to make it clear that they are draft.	No comment.	No comment.

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			February 17, 2011 Status Update/Comments	February 23, 2011 Status Update/Comments
17	NA	Other Items		Other Items • Seismic Peer Review Panel Meeting Preparation Brian Maroney will take the lead in the presentation to the Peer Review Panel on February 18th. Next Meeting: March 28-30, 2011 in China Draft Agenda Day 1 – ZPMC shop 1. Introductions –All 2. Status of Action Items from the Draft Report Guideline Discussion • Status of TLI's – Steve Lawton (Ref. Tab 3 of Binder) New TLI's Since Last Meeting Status of Investigation of Previously Reported TLI's • Status of Welding Inspection Mapping – Steve Lawton (Ref. Tab 4) • Summary of the Tension/Compression Mapping – Marwan Nader (Ref. Tab 5) 3. Demand and Capacity Analysis of Welds - Brian Maroney (Ref. Tab 6) 4. Review of any changes made to the Expert Panel Draft Report – Issued Jan. 12, 2011 – Rev 9 as a result of group review actions due by March 7th (Ref. Tab 7) 5. Other Items 6. Summary of Action Items from Today's Meeting Day 2 (Caltrop Office in Pudong, VTC) 1. QA/QC Expert Panel workshop on focus discussion on Item 6 – All Day 3 - ZPMC Shop 1. Shop Tour (Optional) 2. Review and finalize action items developed through January China visit and meetings 3. Next Monthly Meeting • Date • Location • Draft Agenda	Per meeting notes from 2/23/11: Review of Upcoming Meetings a. Weekly QA/QC Meetings: 3/2, 3/9, 3/16, 3/23 b. Teleconference with SPRP and QA/QC Panel: 9am on 3/24 c. China QA/QC Meetings: 3/28, 3/29, 3/30 d. Pre- TBPOC Meeting with SPRP and QA/QC Panel: 4/6 e. TBPOC Meeting with SPRP and QA/QC Panel: 4/7
18	Closed	Strategy Moving Forward	1. The Department to provide the stress ranges. Demand-capacity ratio to be further discussed between ABF and the Department during the Wednesday weekly meetings. 2. As requested by the Panel, the Department will provide data from MTR's and check samples. 3. ABF-China to provide mapping of all FCAW welds and identify which ones are ground flush and UT'd using Scanning Pattern D. Design will use this information to determine if additional NDT will be required.	No comment.	No comment.

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			**February 17, 2011 Status Update/Comments**	**February 23, 2011 Status Update/Comments**
19	NA	General Comments		(Brian's comments) It is important to continue to recognize this as a "work in progress," and I want to emphasize "progress." As stated during the last meeting, the complex focused team that was assembled in response to the November 2010 report continues to work to improve performance via the welding process that includes the ESAB wire with Ar-Co2 gas shielding, different gas delivery system, and enhancements to the QC program. Additionally, the team is continuing to investigate and map welds focusing on the "welds of interest," those welds that are 100% FCAW, performed using the previous welding procedure that included the Hyundai wire, the manifold gas delivery system, in locations throughout the bridge that are expected to experience cyclic tension under service load conditions. These three criteria are fundamental and worth repeating: 1) 100% FCAW, 2) Welded using the previous welding procedure that included the Hyundai wire, CO2 gas shielding, 3) In locations expected to experience cyclic tension. In the process that has been developed to organize the massive amounts of data and evaluate it, it has become clear that two additional criteria are surfacing to filter out welds that are not of interest. Those additional criteria are: 4) welds that are documented to have very low rejection rates (e.g., ~1% and even lower), and 5) welds that have not been inspected to near 100%. Criterion #4 is founded in part on the understanding that if an excess hydrogen problem existed in a weld, a high rejection rate would have been experienced during NDT and would show in the inspection data, even if the NDT testing method was VT, MT, UT (D or E), or a combination. Criterion #5 is based on recognition that when the inspection penalties within the contract documents (i.e., special provisions) are engaged, essentially the entire weld is inspected (e.g., 94%). The fillet welds and gantry welds are examples of welds that exhibit good NDT results and document they are generally not of interest. A variety of other welds show near 100% inspection, which to me suggests that they have been driven to quality through massive amounts of inspection and therefore are not of interest for this effort.	No comment.
20	Open	Expert Panel Draft Report		Per meeting notes from 2/17/11: Review of the Expert Panel Draft Report – Issued Jan. 12, 2011 – Rev 9 (Ref. Tab 7) (ACTION) The report will be jointly updated at a future date and will supersede the Revision 9 draft report. Brian Petersen will lead the effort in the preparation of the final report. (ACTION) Group to provide any comments to revision of the Revision 9 Draft Report by March 7th.	Per meeting notes from 2/23/11: (ACTION) In lieu of revising the Expert Panel Draft Report, the project team proposes to provide the responses to the Expert Panel Report Guidelines in a separate report. The intent of the Project Team report will be to present their responses to the Expert Panel's guidelines.
21	NA	General Panel Comments		Per meeting notes from 2/17/11: [Panel Comment] The Panel acknowledges the efforts of those involved to incorporate the recommendations madeby the Panel in November, 2010 and believes that these efforts have significantly improved the quality of fabrication. Analysis of the NDT results following the adoption of the new welding process confirms that the Hydrogen problem has been resolved. The Panel expects that the new welding process requirements will be adhered to for the remainder of fabrication.	No comment.

SAS QA/QC Weekly VTC List

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			February 23, 2011 Status Update/Comments	March 2, 2011 Status Update/Comments
1	Open	Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures	1. For FCAW, ABF to implement the previously cited guidelines from November 2009-2010. Alternatively, if it can be demonstrated (weld trials and continued inspection) that alternative means and methods that lead to welds that are consistently free of transverse cracks, then those means and methods would be recognized as acceptable. 2. China to collect data on welds using ESAB wire with the 110degC preheat temperature. Data expected in 2 weeks. ABF/CT (Mahlen/Steve Lawton) will attempt to focus on jointly documenting application of heat and the entire ESAB weld process for 1 or 2 weld stations. Review of the NDT results will follow. 3. Mahlon L. and Steve L. to witness some excavations to verify indication type. 4. ABF to correct and update weld data and provide within the next week. 5. ABF to continue reporting TLI and classify type of indication on a two week basis. However, if significant change occurs, notify Panel immediately. Use the same table format and provide detailed description of length, depth and type of each TLI in the footnotes.	Per meeting notes from 2/23/11: a. Status of TLI's using New FCAW Weld Process– Steve Lawton (Ref. Tab 3 of Binder, Exhibit 3.1) (ACTION completed) ABF to add to the table a footnote clarifying the TLI wording in the "remarks" column and a "hydrogen present" column . ABF to update the title of the table to read as "New FCAW Welding Process Statistics…" (ACTION completed) ABF to add a footnote of the following: "Investigations are performed on selected found TLI's that appear at the lower decibel ratings. All indications, whether investigated or not are repaired." (ACTION) ABF to continue to update table with current data.	Per meeting notes from 3/2/11: Status of TLI's using New FCAW Weld Process– Steve Lawton (Ref. Tab 3 of Binder, Exhibit 3.1) No new TLI's reported in the last 4 weeks. (ACTION) Steve Lawton continues to update the table "The New FCAW Welding Process Statistics…."

SAS QA/QC Weekly VTC List

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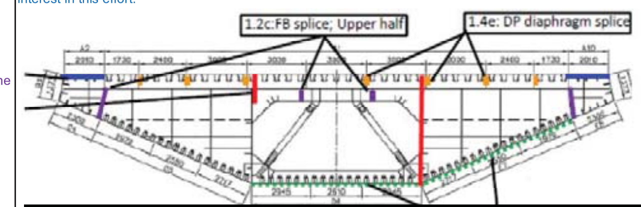
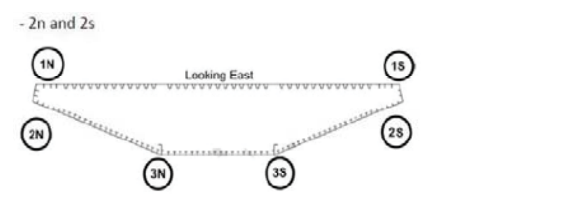
	Source Doc			February 23, 2011 Status Update/Comments	March 2, 2011 Status Update/Comments
2	Open	Item 2 of Additional Guidelines "Implement the use of ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164…"	1. ABF has completely implemented the use of the ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164. QA/QC inspection results are to be given to the panel members for their review prior to the next meeting in January. 2. ABF to discuss with ZPMC to pressure test the Ar system to confirm properties are adequate and there is no moisture in the system (on-going) 3. ABF has 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. (on-going) 4. ABF to provide the QC inspection results for the implementation of the ESAB wire to METS QA. METS QA to verify results prior to sharing information to QA/QC consultants. 5. ABF shop floor contact person is Peter Ferguson or Steve Lawton for the day-to-day implementation of the ESAB wire. If necessary, the issues can be elevated to Thomas Nilsson or Gang Jiao in Thomas' absence. 6. ABF/METS to review with Linde (Ar gas supplier) to review both manifold system and the method to eliminate contamination. In the interim, ZPMC continues to use bottled gas. (complete and on-going) 7. ABF to schedule meeting with Linde for the week of January 3, 2011 to review the gas distribution and purging system. (complete) 8. ABF to have 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. Also performing training for the ZPMC welders for the use of the ESAB wire. (on-going) 9. ESAB rep to provide to ABF a summary to date of performance of ESAB wire by week of December 27, 2010. (complete)	Per meeting notes from 2/23/11: Future reporting will be provided only when manifold piping system is implemented. Bottled gas will remain the source for welding.	No comments.
3	Closed	Item 3 of Additional Guidelines "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location."	1. ABF and Caltrans has implemented this through the preapproved CWR templates that was implemented during the CCO 160 process. (METS Confirmed for Lifts 13 and 14 repairs)	Issue closed.	Issue closed.
4	Closed	Item 4 of Additional Guidelines "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV."	1. ABF to further look into rejectable discontinuities and provide a printout of the reject rate for a sample amount of welders. 2. ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.	Issue closed.	Issue closed.
5	Closed	"An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes."	1. ABFJV to provide CWI in accordance with this guideline.	Issue closed.	Issue closed.

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			**February 23, 2011** **Status Update/Comments**	**March 2, 2011** **Status Update/Comments**
6	Open	Item 6 of Additional Guidelines "All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…"	(ACTION) Lifts 13 and 14, including CBs 18 and 19: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement by next Thursday, January 27th (China). ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement. (ACTION) Lift 12, including CB 17: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement at a later date. ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement. Transverse Welds: 1. Lifts 1 through 12: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria. 2. Lifts 13 and 14: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.	Per meeting notes from 2/23/11: Response to Expert Panel Draft Report Version 9, Issued January 12, 2011: 1. Item 6 of Additional Guidelines The performance of structural members in Lifts 1 through 12 that are determined to be subjected to tensile stresses should be investigated once the maximum and cyclic tensile stress magnitudes are determined. (Project Team Response) Item 6 of the Additional Guidelines only applies to 100% pure skin CJP FCAW welds made with the old welding process. 2. Item 7 of Additional Guidelines "All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria [acceptance criteria in Table 6.3 – UT Acceptance / Rejection Criteria – Tensile Stress in addition to the standard UT requirements of the AWS D1.5 Code [see Appendix E]." (Project Team Response) The basis for the responses for Item 7 of the Additional Guidelines is that this only concerns 100% pure skin CJP FCAW welds made with the old welding process. (Project Team Response) For Lifts 12-14, all 100% pure skin CJP FCAW made with the old welding process (with the exception of the Lift 12 welds in the 2n and 2s location) were 100% UT inspected using Scanning Pattern D with +6dB above Class B acceptance criteria. (Project Team Response) For all welds, the project team believes the code was both applied appropriately and performed additional NDT in line with the contract and code requirements. If there was a systemic problem in the welds, including TLI's, it would be detected using Scanning Pattern E. Status of Welding Inspection Mapping (ACTION) Refer to NDT Table attachment for action items. As for fillet welds on Lifts 13 and 14, no exhibit needed. (ACTION) Add a footnote stating the action taken for how the anchorage fillet weld defects were addressed. Summary of the Tension/Compression Mapping – Marwan Nader (ACTION) DJV to provide stress information on the welds for the locations listed below, per the February 17th meeting. - 1.2c and 1.4e - 2n and 2s (ACTION) ABF to obtain NDT data on these specific welds.	Per meeting notes from 3/2/11: Status of Welding Inspection Mapping (ACTION) Steve Lawton continues to work on the updates for the welding inspection mapping. Mapping in segment 13 and 14 continue for the fillet welds for both the old and new welding process, however, it has already been documented that for Lifts 13 and 14 has shown high quality welds with the low rejection rates that are consistent with the quality expected by both the QA/QC Panel and the Seismic Peer Review Panel. Thomas Nilsson noted that the reason for the low values of the NDT rejection rate in the database is due to the modern nature of ZPMC facility that allows for more automated welds thus reducing the manual welding. Reference table "Summary of NDT Inspections..." for status of action items due by March 16th cut off date. Summary of the Tension/Compression Mapping - Lift 1-11: 1.2c and 1.4e Per DJV, these welds are orientated vertically while the tension is transverse. Therefore, these welds are not of interest in this effort.  -Lift 12: 2n and 2s Per DJV, the state of stress in these welds in Lift 12 is in general compression and it may vary due to variations in the dead load moment and transverse moment. (ACTION) QA and QC to review the NDT inspection records on these welds and provide input at next week's meeting. 

ID	Status	Title	Actions/ (Due Date)		
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6a	Closed	Demand and Capacity Analysis of Welds	Demand and Capacity Analysis of Welds : (Department's Comments) Structure Rep and the QA Principal of the OBG commented that there is no need at this point for a fit-for-purpose demand and capacity analysis of the welds. (Brian Maroney's comments) The mapping of tension regions is complete and if necessary, the team has demand estimates that could be used to perform "fit-for-purpose" analyses if required. To date, such fit-for-purpose evaluations have not been recognized as necessary. Should this change at some point in the future, the process would likely follow closely the California Bridge Design Specifications and other related documents in a Demand/Capacity format. Such an evaluation would need to have a peer review conducted by the Toll Bridge Seismic Safety Peer Review Panel. Dr. John Barsom has provided an example of one approach to evaluating the potential for an assumed large crack across a weld and into the base metal to propagate. This should be recognized as an example of a powerful tool that could be part of an important evaluation at such a time that a fit-for-purpose study becomes necessary.	No comment.	No comment.
7	Open	Comment 1 (dated 1/5/11) Brian M. question - Has the bridge been inspected to the requirements in the contract documents? Statements to be provided by S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh? (ACTION) All parties to provide statements by Monday, 1/10/11. Brian M. comment - The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12	1. All parties (S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh?) to provide statements by Monday, 1/10/11.	No comment.	No comment.

SAS QA/QC Weekly VTC List

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8	Open	Draft Report - Comment 2 (dated 1/5/11) Brian M. comment - The QA/QC expert consultant report is draft and is a work in progress. The project team has met and discussed the document, its intent, and several elements of the report. Those discussion have led to a new organized focus group to update the effort, including clearly defining the purpose of the group (including the QA/QC expert consulting group) and providing high quality information and data to the group in order to improve responses and documentation.		No comment.	No comment.
9	Open	Draft Report - Comment 3 (dated 1/5/11) Brian M. comment - Progress of bridge opening date slower than expected, due in part to inspection repair iteration that is not disallowed by the code or contract documents. There is a strong desire to reduce the iterations and speed up delivery, while maintaining necessary quality.		No comment.	No comment.
10	Open	Draft Report - Comment 4 (dated 1/5/11) Brian M. comment - A significant portion of the iterations are due to development of transverse crack-like indication in some welds.		No comment.	No comment.

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11	Open	Draft Report - Comment 5 (dated 1/5/11) Brian M. comment - The transverse indications are predominantly from contaminants.		No comment.	No comment.
12	Open	Draft Report - Comment 6 (dated 1/5/11) Brian M. comment - The transverse indications are of significant concern only in the full FCAW welds.		No comment.	No comment.
13	Open	Draft Report - Comment 7 (dated 1/5/11) Brian M. comment - The previous welds have been inspected and repaired until acceptable and meeting the requirements in the contract documents.		No comment.	No comment.
14	Open	Draft Report - Comment 8 (dated 1/5/11) Brian M. comment - The early data from the change in the welding process that includes a switch in wire, increase in heat, and changing gas and delivery system, is effectively removing the transverse indications, though there are learning curve challenges and in some ways the wire is harder to work with for the welders. It is expected that improvements can continue.		No comment.	No comment.

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15	Open	Draft Report - Comment 9 (dated 1/5/11) Brian M. comment - The QC and QA teams, or both together, if requested, can investigate FCAW welds on thoughtfully selected sample groups of welds on Lifts 13 and 14 to use to gather information to use to project on to the full population of similar welds to continue to improve the entire bridge fabrication efficiency.		No comment.	No comment.
16	Open	Draft Report - Comment 10 (dated 1/5/11) Group discussion on Draft Report: a. (ACTION) ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract	1. ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract Drawings) that are FCAW and how much NDT inspection was required and was performed. Use NDT table provided on CCO 22 to identify which are FCAW (by 1/20/11). 2. Draft Report 8 will remain in draft form and the group will move forward with documenting the on-going weekly and monthly meetings in the SAS Steel Fabrication Expert Panel Monthly Review Notes. The Draft ~~8~~ 9 dated January ~~11~~ 12, 2011, supersedes all prior versions of this report. Panel signatures are not required from draft reports to make it clear that they are draft.	No comment.	No comment.
17	NA	Other Items		Per meeting notes from 2/23/11: Review of Upcoming Meetings a. Weekly QA/QC Meetings: 3/2, 3/9, 3/16, 3/23 b. Teleconference with SPRP and QA/QC Panel: 9am on 3/24 c. China QA/QC Meetings: 3/28, 3/29, 3/30 d. Pre- TBPOC Meeting with SPRP and QA/QC Panel: 4/6 e. TBPOC Meeting with SPRP and QA/QC Panel: 4/7	Per meeting notes from 3/2/11: Review of Upcoming Meetings a. Weekly QA/QC Meetings: 3/2, 3/9, 3/16, 3/23 b. Teleconference with SPRP (QA/QC Panel is invited to participate): 9am on 3/24 c. China QA/QC Meetings: 3/28, 3/29, 3/30 d. Pre- TBPOC Meeting with SPRP (QA/QC Panel is invited to participate): 9am on 4/6 e. TBPOC Meeting with SPRP (QA/QC Panel is invited to participate): 4/7

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18	NA	Strategy Moving Forward	1. The Department to provide the stress ranges. Demand-capacity ratio to be further discussed between ABF and the Department during the Wednesday weekly meetings. 2. As requested by the Panel, the Department will provide data from MTR's and check samples. 3. ABF-China to provide mapping of all FCAW welds and identify which ones are ground flush and UT'd using Scanning Pattern D. Design will use this information to determine if additional NDT will be required.	No comment.	No comment.
19	NA	General Comments		No comment.	No comment.
20	Open	Expert Panel Draft Report		Per meeting notes from 2/23/11: (ACTION) In lieu of revising the Expert Panel Draft Report, the project team proposes to provide the responses to the Expert Panel Report Guidelines in a separate report. The intent of the Project Team report will be to present their responses to the Expert Panel's guidelines.	No comment.
21	NA	General Panel Comments		No comment.	No comment.

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22	Open	Project Team Response to Expert Panel Report			Per meeting notes from 3/2/11: Discussion of Project Team (TEAM)'s Formal Response to Expert Panel Draft Report Project Team Formal Response to forward to Panel for their review: March 24, 2011 Department to present the Project Team Formal Response to TBPOC: April 2011 TBPOC meeting a. Executive Summary – As a follow up to their action item, Brian Maroney and Brian Petersen has provided their drafts of the Executive Summary. (ACTION) Brian and Brian to work together on a combined draft document. b. Introduction – Tony has provided a draft of the Introduction. (ACTION) Tony and Brian P. to work together in further developing the document. c. Discussion – TBD d. Team's Response to Panel Recommendations (By Next Wednesday) • Item 1 of Previously Presented Recommendation (November 2009 Report) (ACTION) Mazen and Bill to review the November 2009 recommendations and determine which are contract requirement and ones that are means and methods. Mazen to provide a summary paragraph of the implementation of the November 2009 recommendations. • Item 2 of Previously Presented Recommendation Implement the use of the FCAW ESAB Electrodes and AR-CO2 Gas Shielding (ACTION) Steve Lawton to provide response for this section • Item 1 of Additional Recommendations "In addition to conformance with ABFJV letter dated November 9, 2009, the 'Welding Procedure Requirements for New Welds' procedure is to apply to ALL remaining SMAW, FCAW and SAW welds." (ACTION) Karen and Brian M. to provide response for this section. • Item 2 of Additional Recommendations "Conformance with ABFJV letter dated November 9, 2009, the 'Welding Procedure Requirements for New Welds' procedure is to apply to all welds not just to the skin plate welds." (ACTION) Karen and Brian M. to provide response for this section. • Item 3 of Additional Recommendations "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location." (ACTION) Mazen to provide response for this section. • Item 4 of Additional Recommendations "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV." Draft completed. • Item 5 of Additional Recommendations "An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes." Draft completed. • Item 6 of Additional Recommendations "The performance of structural members in Lifts 1 through 12 that are determined to be subjected to tensile stresses should be investigated once the maximum and cyclic tensile stress magnitudes are determined." (ACTION) Brian M. to provide response to this section.

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22 (cont.)		Project Team Response to Expert Panel Report			• Item 7 of Additional Recommendations All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with + 6 dB above Class B acceptance criteria [acceptance criteria in Table 6.3 – UT Acceptance / Rejection Criteria – Tensile Stress in addition to the standard UT requirements of the AWS D1.5 Code [see Appendix E]." (ACTION) Bill to provide response to this section. • Item 8 of Additional Recommendations "The Engineer may relax the UT Acceptance / Rejection Criteria to the standard requirements of the AWS D1.5 Code - if it can be demonstrated that rejectable transverse crack-like indications are no longer occurring." The group agreed that it was appropriate to not continue this recommendation because it was implicit in the process that was agreed to in December 10, 2010 meeting (refer to the weekly consensus meeting notes). (ACTION) Tony to provide the response to this section. e. Conclusion (in two weeks) (ACTION) Brian^2 to provide write-up for this section.

SAS QA/QC Weekly VTC List

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1	Open	Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures	1. For FCAW, ABF to implement the previously cited guidelines from November 2009-2010. Alternatively, if it can be demonstrated (weld trials and continued inspection) that alternative means and methods that lead to welds that are consistently free of transverse cracks, then those means and methods would be recognized as acceptable. 2. China to collect data on welds using ESAB wire with the 110degC preheat temperature. Data expected in 2 weeks. ABF/CT (Mahlen/Steve Lawton) will attempt to focus on jointly documenting application of heat and the entire ESAB weld process for 1 or 2 weld stations. Review of the NDT results will follow. 3. Mahlon L. and Steve L. to witness some excavations to verify indication type. 4. ABF to correct and update weld data and provide within the next week. 5. ABF to continue reporting TLI and classify type of indication on a two week basis. However, if significant change occurs, notify Panel immediately. Use the same table format and provide detailed description of length, depth and type of each TLI in the footnotes.	Per meeting notes from 3/2/11: Status of TLI's using New FCAW Weld Process– Steve Lawton (Ref. Tab 3 of Binder, Exhibit 3.1) No new TLI's reported in the last 4 weeks. (ACTION) Steve Lawton continues to update the table "The New FCAW Welding Process Statistics…."	Per meeting notes from 3/9/11: Status of TLI's using New FCAW Weld Process– Steve Lawton : No new hydrogen-related TLI's were reported using the New FCAW weld process.

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2	Open	Item 2 of Additional Guidelines "Implement the use of ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164…"	1. ABF has completely implemented the use of the ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164. QA/QC inspection results are to be given to the panel members for their review prior to the next meeting in January. 2. ABF to discuss with ZPMC to pressure test the Ar system to confirm properties are adequate and there is no moisture in the system (on-going) 3. ABF has 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. (on-going) 4. ABF to provide the QC inspection results for the implementation of the ESAB wire to METS QA. METS QA to verify results prior to sharing information to QA/QC consultants. 5. ABF shop floor contact person is Peter Ferguson or Steve Lawton for the day-to-day implementation of the ESAB wire. If necessary, the issues can be elevated to Thomas Nilsson or Gang Jiao in Thomas' absence. 6. ABF/METS to review with Linde (Ar gas supplier) to review both manifold system and the method to eliminate contamination. In the interim, ZPMC continues to use bottled gas. (complete and on-going) 7. ABF to schedule meeting with Linde for the week of January 3, 2011 to review the gas distribution and purging system. (complete) 8. ABF to have 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. Also performing training for the ZPMC welders for the use of the ESAB wire. (on-going) 9. ESAB rep to provide to ABF a summary to date of performance of ESAB wire by week of December 27, 2010. (complete)	No comments.	No comments.
3	Closed	Item 3 of Additional Guidelines "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location."	1. ABF and Caltrans has implemented this through the preapproved CWR templates that was implemented during the CCO 160 process. (METS Confirmed for Lifts 13 and 14 repairs)	Issue closed.	Issue closed.
4	Closed	Item 4 of Additional Guidelines "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV."	1. ABF to further look into rejectable discontinuities and provide a printout of the reject rate for a sample amount of welders. 2. ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.	Issue closed.	Issue closed.
5	Closed	"An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes."	1. ABFJV to provide CWI in accordance with this guideline.	Issue closed.	Issue closed.

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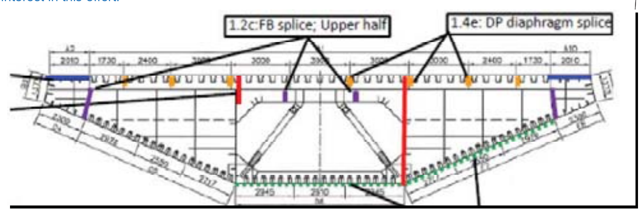
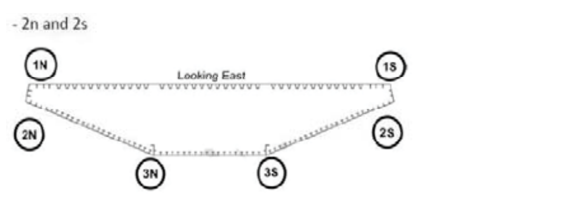
6	Open	Item 6 of Additional Guidelines "All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…"	(ACTION) Lifts 13 and 14, including CBs 18 and 19: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement by next Thursday, January 27th (China). ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement. (ACTION) Lift 12, including CB 17: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement at a later date. ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement. Transverse Welds: 1. Lifts 1 through 12: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria. 2. Lifts 13 and 14: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.	Per meeting notes from 3/2/11: Status of Welding Inspection Mapping (ACTION) Steve Lawton continues to work on the updates for the welding inspection mapping. Mapping in segment 13 and 14 continue for the fillet welds for both the old and new welding process, however, it has already been documented that for Lifts 13 and 14 has shown high quality welds with the low rejection rates that are consistent with the quality expected by both the QA/QC Panel and the Seismic Peer Review Panel. Thomas Nilsson noted that the reason for the low values of the NDT rejection rate in the database is due to the modern nature of ZPMC facility that allows for more automated welds thus reducing the manual welding. Reference table "Summary of NDT Inspections..." for status of action items due by March 16th cut off date. Summary of the Tension/Compression Mapping - Lift 1-11: 1.2c and 1.4e Per DJV, these welds are orientated vertically while the tension is transverse. Therefore, these welds are not of interest in this effort.  -Lift 12: 2n and 2s Per DJV, the state of stress in these welds in Lift 12 is in general compression and it may vary due to variations in the dead load moment and transverse moment. (ACTION) QA and QC to review the NDT inspection records on these welds and provide input at next week's meeting.  	Per meeting notes from 3/9/11: Status of Welding Inspection Mapping – Steve Lawton Crossbeam 17, 18 and 19: 100 % FCAW CJP welds made with welding process that included Hyundai wire received 100% UT inspection using either Scanning Pattern D or E. Therefore, these welds are not of interest. Crossbeam 1-16: The bottom corner 100% FCAW CJP welds made with the old welding process that included Hyundai wire received 100% UT inspection using either Scanning Pattern D or E. These are the only pure FCAW welds in these crossbeams that are subjected to tensile stresses. ABF provided the NDT results for these welds and the Project Team agrees that there is no evidence of a systemic hydrogen problem in these welds PJP welds on OBG Lifts 1-14 and Crossbeams 1-19 were determined to be welds not of interest due to the fact that there are not PJP welds that fit into the focus set criteria of 100 % FCAW welds made with welding process that included Hyundai wire. Fillet welds have been determined to be welds not of interest due to their high level of quality and low level rejection rates. c. Lift 12 Welds - 2n and 2s (ACTION) Bill and Mazen to review the weld inspection data for these welds and provide input in an email to the group by 3/11/11.

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6a	Closed	Demand and Capacity Analysis of Welds	Demand and Capacity Analysis of Welds : (Department's Comments) Structure Rep and the QA Principal of the OBG commented that there is no need at this point for a fit-for-purpose demand and capacity analysis of the welds. (Brian Maroney's comments) The mapping of tension regions is complete and if necessary, the team has demand estimates that could be used to perform "fit-for-purpose" analyses if required. To date, such fit-for-purpose evaluations have not been recognized as necessary. Should this change at some point in the future, the process would likely follow closely the California Bridge Design Specifications and other related documents in a Demand/Capacity format. Such an evaluation would need to have a peer review conducted by the Toll Bridge Seismic Safety Peer Review Panel. Dr. John Barsom has provided an example of one approach to evaluating the potential for an assumed large crack across a weld and into the base metal to propagate. This should be recognized as an example of a powerful tool that could be part of an important evaluation at such a time that a fit-for-purpose study becomes necessary.	No comment.	No comment.
7	Open	Comment 1 (dated 1/5/11) Brian M. question - Has the bridge been inspected to the requirements in the contract documents? Statements to be provided by S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh? (ACTION) All parties to provide statements by Monday, 1/10/11. Brian M. comment - The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12	1. All parties (S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh?) to provide statements by Monday, 1/10/11.	No comment.	No comment.

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19	NA	General Comments		No comment.	No comment.
20	Open	Expert Panel Draft Report		No comment.	No comment.
21	NA	General Panel Comments		No comment.	No comment.

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			March 2, 2011 Status Update/Comments	March 9, 2011 Status Update/Comments
22	Open	Project Team Response to Expert Panel Report		Per meeting notes from 3/2/11: 3. Discussion of Project Team (TEAM)'s Formal Response to Expert Panel Draft Report Project Team Formal Response to forward to Panel for their review: March 24, 2011 Department to present the Project Team Formal Response to TBPOC: April 2011 TBPOC meeting a. Executive Summary – As a follow up to their action item, Brian Maroney and Brian Petersen has provided their drafts of the Executive Summary. (ACTION) Brian and Brian to work together on a combined draft document. b. Introduction – Tony has provided a draft of the Introduction. (ACTION) Tony and Brian P. to work together in further developing the document. c. Discussion – TBD d. Team's Response to Panel Recommendations (By Next Wednesday) • Item 1 of Previously Presented Recommendation (November 2009 Report) (ACTION) Mazen and Bill to review the November 2009 recommendations and determine which are contract requirement and ones that are means and methods. Mazen to provide a summary paragraph of the implementation of the November 2009 recommendations. • Item 2 of Previously Presented Recommendation Implement the use of the FCAW ESAB Electrodes and AR-CO2 Gas Shielding (ACTION) Steve Lawton to provide response for this section • Item 1 of Additional Recommendations "In addition to conformance with ABFJV letter dated November 9, 2009, the 'Welding Procedure Requirements for New Welds' procedure is to apply to ALL remaining SMAW, FCAW and SAW welds." (ACTION) Karen and Brian M. to provide response for this section. • Item 2 of Additional Recommendations "Conformance with ABFJV letter dated November 9, 2009, the 'Welding Procedure Requirements for New Welds' procedure is to apply to all welds not just to the skin plate welds." (ACTION) Karen and Brian M. to provide response for this section. • Item 3 of Additional Recommendations "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location." (ACTION) Mazen to provide response for this section. • Item 4 of Additional Recommendations "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV." Draft completed. • Item 5 of Additional Recommendations "An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes." Draft completed. • Item 6 of Additional Recommendations "The performance of structural members in Lifts 1 through 12 that are determined to be subjected to tensile stresses should be investigated once the maximum and cyclic tensile stress magnitudes are determined." (ACTION) Brian M. to provide response to this section.	Per meeting notes from 3/9/11: Discussion of Project Team (TEAM)'s Formal Response to Expert Panel Draft Report • Project Team Formal Response to forward to Panel for their review: March 24, 2011 • Department to present the Project Team Formal Response to TBPOC: April 2011 TBPOC meeting (ACTION) Project Team to forward the Project Team's Formal Response for the Expert Panel Draft Report by March 24, 2011 for the Panel's review. The Project Team requested for the Panel to provide a joint concurrence letter addressed to the Department (Tony Anziano) and ABFJV (Brian Petersen) during the March 2011 China meetings.

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			**March 2, 2011** **Status Update/Comments**	**March 9, 2011** **Status Update/Comments**
22 (cont.)		Project Team Response to Expert Panel Report		• Item 7 of Additional Recommendations All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with + 6 dB above Class B acceptance criteria [acceptance criteria in Table 6.3 – UT Acceptance / Rejection Criteria – Tensile Stress in addition to the standard UT requirements of the AWS D1.5 Code [see Appendix E]." (ACTION) Bill to provide response to this section. • Item 8 of Additional Recommendations "The Engineer may relax the UT Acceptance / Rejection Criteria to the standard requirements of the AWS D1.5 Code - if it can be demonstrated that rejectable transverse crack-like indications are no longer occurring." The group agreed that it was appropriate to not continue this recommendation because it was implicit in the process that was agreed to in December 10, 2010 meeting (refer to the weekly consensus meeting notes). (ACTION) Tony to provide the response to this section. e. Conclusion (in two weeks) (ACTION) Brian^2 to provide write-up for this section.	

SAS QA/QC Weekly VTC List

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			March 9, 2011 Status Update/Comments	March 16, 2011 Status Update/Comments
1	Open	Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures	1. For FCAW, ABF to implement the previously cited guidelines from November 2009-2010. Alternatively, if it can be demonstrated (weld trials and continued inspection) that alternative means and methods that lead to welds that are consistently free of transverse cracks, then those means and methods would be recognized as acceptable. 2. China to collect data on welds using ESAB wire with the 110degC preheat temperature. Data expected in 2 weeks. ABF/CT (Mahlen/Steve Lawton) will attempt to focus on jointly documenting application of heat and the entire ESAB weld process for 1 or 2 weld stations. Review of the NDT results will follow. 3. Mahlon L. and Steve L. to witness some excavations to verify indication type. 4. ABF to correct and update weld data and provide within the next week. 5. ABF to continue reporting TLI and classify type of indication on a two week basis. However, if significant change occurs, notify Panel immediately. Use the same table format and provide detailed description of length, depth and type of each TLI in the footnotes.	Per meeting notes from 3/9/11: Status of TLI's using New FCAW Weld Process– Steve Lawton : No new hydrogen-related TLI's were reported using the New FCAW weld process.	Per meeting notes from 3/16/11: Status of Action Items from the Draft Report Guideline Discussion and Past QA/QC Meetings a. Status of TLI's using New FCAW Weld Process No new TLI's reported to date.

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			March 9, 2011 Status Update/Comments	March 16, 2011 Status Update/Comments
2	Open	Item 2 of Additional Guidelines "Implement the use of ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164…"	1. ABF has completely implemented the use of the ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164. QA/QC inspection results are to be given to the panel members for their review prior to the next meeting in January. 2. ABF to discuss with ZPMC to pressure test the Ar system to confirm properties are adequate and there is no moisture in the system (on-going) 3. ABF has 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. (on-going) 4. ABF to provide the QC inspection results for the implementation of the ESAB wire to METS QA. METS QA to verify results prior to sharing information to QA/QC consultants. 5. ABF shop floor contact person is Peter Ferguson or Steve Lawton for the day-to-day implementation of the ESAB wire. If necessary, the issues can be elevated to Thomas Nilsson or Gang Jiao in Thomas' absence. 6. ABF/METS to review with Linde (Ar gas supplier) to review both manifold system and the method to eliminate contamination. In the interim, ZPMC continues to use bottled gas. (complete and on-going) 7. ABF to schedule meeting with Linde for the week of January 3, 2011 to review the gas distribution and purging system. (complete) 8. ABF to have 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. Also performing training for the ZPMC welders for the use of the ESAB wire. (on-going) 9. ESAB rep to provide to ABF a summary to date of performance of ESAB wire by week of December 27, 2010. (complete)	No comments.	No comments.
3	Closed	Item 3 of Additional Guidelines "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location."	1. ABF and Caltrans has implemented this through the preapproved CWR templates that was implemented during the CCO 160 process. (METS Confirmed for Lifts 13 and 14 repairs)	Issue closed.	Issue closed.
4	Closed	Item 4 of Additional Guidelines "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV."	1. ABF to further look into rejectable discontinuities and provide a printout of the reject rate for a sample amount of welders. 2. ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.	Issue closed.	Issue closed.
5	Closed	"An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes."	1. ABFJV to provide CWI in accordance with this guideline.	Issue closed.	Issue closed.

ID	Status Source Doc	Title	Actions/ (Due Date)	March 9, 2011 Status Update/Comments	March 16, 2011 Status Update/Comments
6	Open	Item 6 of Additional Guidelines "All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…"	(ACTION) Lifts 13 and 14, including CBs 18 and 19: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement by next Thursday, January 27th (China). ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement. (ACTION) Lift 12, including CB 17: ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement at a later date. ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement. Transverse Welds: 1. Lifts 1 through 12: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria. 2. Lifts 13 and 14: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.	Per meeting notes from 3/9/11: Status of Welding Inspection Mapping – Steve Lawton Crossbeam 17, 18 and 19: 100 % FCAW CJP welds made with welding process that included Hyundai wire received 100% UT inspection using either Scanning Pattern D or E. Therefore, these welds are not of interest. Crossbeam 1-16: The bottom corner 100% FCAW CJP welds made with the old welding process that included Hyundai wire received 100% UT inspection using either Scanning Pattern D or E. These are the only pure FCAW welds in these crossbeams that are subjected to tensile stresses. ABF provided the NDT results for these welds and the Project Team agrees that there is no evidence of a systemic hydrogen problem in these welds PJP welds on OBG Lifts 1-14 and Crossbeams 1-19 were determined to be welds not of interest due to the fact that there are not PJP welds that fit into the focus set criteria of 100 % FCAW welds made with welding process that included Hyundai wire. Fillet welds have been determined to be welds not of interest due to their high level of quality and low level rejection rates. c. Lift 12 Welds - 2n and 2s (ACTION) Bill and Mazen to review the weld inspection data for these welds and provide input in an email to the group by 3/11/11.	Per meeting notes from 3/16/11: b. Status of Welding Inspection Mapping – (all reports are based on data through to 3/16/11) • Review of Draft Exhibit 3.1 – New FCAW Welding Process Statistics (ACTION)Add footnote to explain the high outliers (ie anything above 20% reject rate), recognizing that it represents a small length of weld. (ACTION) ABF to provide pictures showing the difficulties of welding in the 2g position. • Review of Draft Exhibit 4.1 – Lifts 1 thru 12 of the pure FCAW using the old welding process and NDT inspected less than 100% • Exhibit 4.2 – Lifts 13 – 14 Pure FCAW CJP Welds Made With Old Welding Process NDT Tested Less than 100% (originally less than 100% / now 100%) (ACTION) Delete Exhibit, not needed. • Exhibit 4.3 – Summary of Ultrasonic Testing and Transverse Indications on Crossbeams 1 – 16 Bottom Corner Welds Including Holdbacks • Exhibit 4.4 – Crossbeam 17 - 18 Pure FCAW Weld Made With Old Welding Process Tested Less than 100% (ACTION) Delete Exhibit, not needed. • Exhibit 4.5 - Lifts 13 & 14 Interior CJP Welds Welded Using Old Process, Less Than 100% Tested • Exhibit 4.6 – Lifts 13 & 14 Fillet Welds Welded Using Old Process, Less Than 100% Tested • Exhibit 4.7 – Statistics of Welds (ACTION) Include footnote to explain reject rates for above 20%. c. Lift 12 Welds - 2n and 2s (QC and QA Comment) ABF QC has reviewed the weld inspection data for these welds and has determined there is no concern. CT QA reviewed CT records and have no concern. Note that CT performed 100% E scan and various areas of D scan. d. Tension Mapping The tension mapping was developed to expand and to explain in a more visual and more graphical form stress magnitude and range, stress direction and stress location. This more detailed information is consistent with contract documents and does not represent a change in design, engineering and construction intent.

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ID	Status Source Doc	Title	Actions/ (Due Date)	March 9, 2011 Status Update/Comments	March 16, 2011 Status Update/Comments
6a	Closed	Demand and Capacity Analysis of Welds	Demand and Capacity Analysis of Welds : (Department's Comments) Structure Rep and the QA Principal of the OBG commented that there is no need at this point for a fit-for-purpose demand and capacity analysis of the welds. (Brian Maroney's comments) The mapping of tension regions is complete and if necessary, the team has demand estimates that could be used to perform "fit-for-purpose" analyses if required. To date, such fit-for-purpose evaluations have not been recognized as necessary. Should this change at some point in the future, the process would likely follow closely the California Bridge Design Specifications and other related documents in a Demand/Capacity format. Such an evaluation would need to have a peer review conducted by the Toll Bridge Seismic Safety Peer Review Panel. Dr. John Barsom has provided an example of one approach to evaluating the potential for an assumed large crack across a weld and into the base metal to propagate. This should be recognized as an example of a powerful tool that could be part of an important evaluation at such a time that a fit-for-purpose study becomes necessary.	No comment.	No comment.
7	Open	Comment 1 (dated 1/5/11) Brian M. question - Has the bridge been inspected to the requirements in the contract documents? Statements to be provided by S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh? (ACTION) All parties to provide statements by Monday, 1/10/11. Brian M. comment - The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12	1. All parties (S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh?) to provide statements by Monday, 1/10/11.	No comment.	No comment.

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			March 9, 2011 Status Update/Comments	March 16, 2011 Status Update/Comments
8	Open	Draft Report - Comment 2 (dated 1/5/11) Brian M. comment - The QA/QC expert consultant report is draft and is a work in progress. The project team has met and discussed the document, its intent, and several elements of the report. Those discussion have led to a new organized focus group to update the effort, including clearly defining the purpose of the group (including the QA/QC expert consulting group) and providing high quality information and data to the group in order to improve responses and documentation.		No comment.	No comment.
9	Open	Draft Report - Comment 3 (dated 1/5/11) Brian M. comment - Progress of bridge opening date slower than expected, due in part to inspection repair iteration that is not disallowed by the code or contract documents. There is a strong desire to reduce the iterations and speed up delivery, while maintaining necessary quality.		No comment.	No comment.
10	Open	Draft Report - Comment 4 (dated 1/5/11) Brian M. comment - A significant portion of the iterations are due to development of transverse crack-like indication in some welds.		No comment.	No comment.

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	Source Doc			March 9, 2011 Status Update/Comments	March 16, 2011 Status Update/Comments
11	Open	Draft Report - Comment 5 (dated 1/5/11) Brian M. comment - The transverse indications are predominantly from contaminants.		No comment.	No comment.
12	Open	Draft Report - Comment 6 (dated 1/5/11) Brian M. comment - The transverse indications are of significant concern only in the full FCAW welds.		No comment.	No comment.
13	Open	Draft Report - Comment 7 (dated 1/5/11) Brian M. comment - The previous welds have been inspected and repaired until acceptable and meeting the requirements in the contract documents.		No comment.	No comment.
14	Open	Draft Report - Comment 8 (dated 1/5/11) Brian M. comment - The early data from the change in the welding process that includes a switch in wire, increase in heat, and changing gas and delivery system, is effectively removing the transverse indications, though there are learning curve challenges and in some ways the wire is harder to work with for the welders. It is expected that improvements can continue.		No comment.	No comment.

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ID	Status	Title	Actions/ (Due Date)		
	Source Doc			March 9, 2011 Status Update/Comments	March 16, 2011 Status Update/Comments
15	Open	Draft Report - Comment 9 (dated 1/5/11) Brian M. comment - The QC and QA teams, or both together, if requested, can investigate FCAW welds on thoughtfully selected sample groups of welds on Lifts 13 and 14 to use to gather information to use to project on to the full population of similar welds to continue to improve the entire bridge fabrication efficiency.		No comment.	No comment.
16	Open	Draft Report - Comment 10 (dated 1/5/11) Group discussion on Draft Report: a. (ACTION) ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract	1. ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract Drawings) that are FCAW and how much NDT inspection was required and was performed. Use NDT table provided on CCO 22 to identify which are FCAW (by 1/20/11). 2. Draft Report 8 will remain in draft form and the group will move forward with documenting the on-going weekly and monthly meetings in the SAS Steel Fabrication Expert Panel Monthly Review Notes. The Draft ~~8~~ 9 dated January ~~11~~ 12, 2011, supersedes all prior versions of this report. Panel signatures are not required from draft reports to make it clear that they are draft.	No comment.	No comment.

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			March 9, 2011 Status Update/Comments	March 16, 2011 Status Update/Comments
17	NA	Other Items		Per meeting notes from 3/9/11: Review of Upcoming Meetings a. Weekly QA/QC Meetings: 3/16, 3/23 b. Teleconference with SPRP (QA/QC Panel is invited to participate): 9am on 3/24 (ACTION) Fransciso to send out meeting invite/agenda and set up meeting logistics. • Answer any questions from the SPRP regarding the binder materials and updated data c. China QA/QC Meetings: 3/28, 3/29, 3/30 d. Pre- TBPOC Meeting with SPRP (QA/QC Panel is invited to participate): 9am on 4/6 (ACTION) Karen to send out meeting invites and set up meeting logistics. • SAS Expert Consultant Group Response and TBPOC slide presentation e. TBPOC Meeting with SPRP (QA/QC Panel is invited to participate): 4/7	Per meeting notes from 3/16/11: 3. Review of Upcoming Meetings a. Weekly QA/QC Meetings: 3/23 b. Teleconference with SPRP (QA/QC Panel is invited to participate): 9am on 3/24 1. Distribute meeting material to group by 3/21 2. Review of Draft Agenda - Bay Bridge - SAS (30-45 min) – presentation of highlights of the material a) CCO 134 Skin Plate Flatness b) Electroslag Welding c) QA/QC of Fabrication in China d) Bolts - Antioch - Dumbarton c. Monthly QA/QC Meetings: 3/28, 3/29 (starting at 9am) 1. Location – ABF Conference room, Oakland 2. Review of Draft Agenda Day 1: 1. Introductions –All 2. Status of Action Items from the Draft Report Guideline Discussion a. Status of TLI's with new FCAW weld process – Steve Lawton (Ref. Tab 3 of Binder) b. Status of Welding Inspection Mapping – Steve Lawton (Ref. Tab 4) c. Summary of the Tension/Compression Mapping – Marwan Nader (Ref. Tab 5) 3. Project Team Response to the Expert Panel Draft Report - Issued Jan. 12, 2011 – Rev 9 (Ref. Tab 7) 4. Expert Panel Comments/Concurrence to the Project Team Response 5. Other Items 6. Summary of Action Items from Today's Meeting
					Day 2: 1. Expert Panel Comments to the Project Team Response 2. Expert Panel Concurrence to the Updated/Final Project Team Response 3. Review of upcoming meetings: - 4/6 Pre-TBPOC Meeting - 4/7 TBPOC Meeting - April Expert Panel Monthly Review Meeting d. Pre- TBPOC Meeting with SPRP (QA/QC Panel is invited to participate): 9am on 4/6 - Location – SAS Trailer (9am) - Distribute meeting material to group by 4/4(?) - Review of Draft Agenda e. TBPOC Meeting with SPRP (QA/QC Panel is invited to participate): 4/7 - Location – Mission Bay Trailer (10am) - Distribute meeting material to group by 4/4(?) - Review of Draft Agenda

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ID	Status	Title	Actions/ (Due Date)		
	Source Doc			March 9, 2011 Status Update/Comments	March 16, 2011 Status Update/Comments
18	NA	Strategy Moving Forward	1. The Department to provide the stress ranges. Demand-capacity ratio to be further discussed between ABF and the Department during the Wednesday weekly meetings. 2. As requested by the Panel, the Department will provide data from MTR's and check samples. 3. ABF-China to provide mapping of all FCAW welds and identify which ones are ground flush and UT'd using Scanning Pattern D. Design will use this information to determine if additional NDT will be required.	No comment.	No comment.
19	NA	General Comments		No comment.	No comment.
20	Open	Expert Panel Draft Report		No comment.	No comment.
21	NA	General Panel Comments		No comment.	No comment.

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ID	Status Source Doc	Title	Actions/ (Due Date)	March 9, 2011 Status Update/Comments	March 16, 2011 Status Update/Comments
22	Open	Project Team Response to Expert Panel Report		Per meeting notes from 3/9/11: Discussion of Project Team (TEAM)'s Formal Response to Expert Panel Draft Report • Project Team Formal Response to forward to Panel for their review: March 24, 2011 • Department to present the Project Team Formal Response to TBPOC: April 2011 TBPOC meeting (ACTION) Project Team to forward the Project Team's Formal Response for the Expert Panel Draft Report by March 24, 2011 for the Panel's review. The Project Team requested for the Panel to provide a joint concurrence letter addressed to the Department (Tony Anziano) and ABFJV (Brian Petersen) during the March 2011 China meetings.	Per meeting notes from 3/16/11: Discussion of Project Team (TEAM)'s Formal Response to Expert Panel Draft Report • Project Team Formal Response to forward to Panel for their review: March 24, 2011 • Department to present the Project Team Formal Response to TBPOC: April 2011 TBPOC meeting

APPENDIX C

SAS Steel Fabrication Expert Panel Monthly Review

ID	Status Source Doc	Title	Actions/ (Due Date)	December 10, 2010 Status Update/Comments	January 5, 2011 Status Update/Comments
1	Open	Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures	1. For FCAW, ABF to implement the previously cited guidelines from November 2009-2010. Alternatively, if it can be demonstrated (weld trials and continued inspection) that alternative means and methods that lead to welds that are consistently free of transverse cracks, then those means and methods would be recognized as acceptable. 2. China to collect data on welds using ESAB wire with the 110degC preheat temperature. Data expected in 2 weeks. ABF/CT (Mahlen/Steve Lawton) will attempt to focus on jointly documenting application of heat and the entire ESAB weld process for 1 or 2 weld stations. Review of the NDT results will follow.	Per meeting notes from 12/10/10: (ACTION) For FCAW, ABF to implement the previously cited guidelines from November 2009-2010. Alternatively, if it can be demonstrated (weld trials and continued inspection) that alternative means and methods that lead to welds that are consistently free of transverse cracks, then those means and methods would be recognized as acceptable.	Per meeting notes from 01/05/11: (ACTION) ABF to refine data (on welds using ESAB wire with the 110deg C preheat temperature) by end of the day and send to Karen.
2	Open	Item 2 of Additional Guidelines "Implement the use of ESAB FCAW Electrodes and Ar – CO_2 Mix Shielding Gas per CCO 164…"	1. ABF has completely implemented the use of the ESAB FCAW Electrodes and Ar – CO_2 Mix Shielding Gas per CCO 164. QA/QC inspection results are to be given to the panel members for their review prior to the next meeting in January. 2. ABF to discuss with ZPMC to pressure test the Ar system to confirm properties are adequate and there is no moisture in the system (on-going) 3. ABF has 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. (on-going) 4. ABF to provide the QC inspection results for the implementation of the ESAB wire to METS QA. METS QA to verify results prior to sharing information to QA/QC consultants. 5. ABF shop floor contact person is Peter Ferguson or Steve Lawton for the day-to-day implementation of the ESAB wire. If necessary, the issues can be elevated to Thomas Nilsson or Gang Jiao in Thomas' absence. 6. ABF/METS to review with Linde (Ar gas supplier) to review both manifold system and the method to eliminate contamination. In the interim, ZPMC continues to use bottled gas. (complete and on-going) 7. ABF to schedule meeting with Linde for the week of January 3, 2011 to review the gas distribution and purging system. (complete) 8. ABF to have 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. Also performing training for the ZPMC welders for the use of the ESAB wire. (on-going) 9. ESAB rep to provide to ABF a summary to date of performance of ESAB wire by week of December 27, 2010. (complete) 10. Linde rep to visit ZPMC shop biweekly to check the gas manifold system. (on-going)	Per meeting notes from 12/10/10: (ACTION) ABF has completely implemented the use of the ESAB FCAW Electrodes and Ar – CO_2 Mix Shielding Gas per CCO 164. QA/QC inspection results are to be given to the panel members for their review prior to the next meeting in January.	Per meeting notes from 01/05/11: (ACTION) Mazen to forward Linde's report of their inspection of the gas manifold system.
3	Closed	Item 3 of Additional Guidelines "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location."	1. ABF and Caltrans has implemented this through the preapproved CWR templates that was implemented during the CCO 160 process. (METS Confirmed for Lifts 13 and 14 repairs)	Per meeting notes from 12/10/10: (ACTION) ABF and Caltrans has implemented this through the preapproved CWR templates that was implemented during the CCO 160 process.	Issue closed.
4	Open	Item 4 of Additional Guidelines "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV."	1. ABF to further look into rejectable discontinuities and provide a printout of the reject rate for a sample amount of welders. 2. ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.	Per meeting notes from 12/10/10: (ACTION) ABF to further look into rejectable discontinuities and provide a printout of the reject rate for a sample amount of welders.	Per meeting notes from 01/05/11: (ACTION) ABF to provide sampling of welders performance at the January 10th meeting.
5	Open	Item 5 of Additional Guidelines "An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes."	1. ABFJV to provide CWI in accordance with this guideline.	Per meeting notes from 12/10/10: (ACTION) ABFJV to provide CWI in accordance with this guideline.	Per meeting notes from 01/05/11: (ACTION) Lawton to verbally present at the meeting.

SAS Steel Fabrication Expert Panel Monthly Review

ID	Status / Source Doc	Title	Actions/ (Due Date)	December 10, 2010 Status Update/Comments	January 5, 2011 Status Update/Comments
6	Open	Item 6 of Additional Guidelines "All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…"	1. Group agreed to update the guideline to read as "All external skin CJP welds not currently required to be ground flush and determined by the Engineer to be subject to service load tensile stress should be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…" 2. Department to work with DJV to provide a map of the longitudinal external skin welds stress ranges. 3. Based upon the outcome of the above and the guidelines provided, Department to determine which skin longitudinal butt welds should be ground flush and UT inspected using Scanning Pattern D.	Per meeting notes from 12/10/10: (ACTION) Group agreed to update the guideline to read as "All external skin CJP welds not currently required to be ground flush and determined by the Engineer to be subject to service load tensile stress should be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…" (ACTION) Department to work with DJV to provide a map of the longitudinal external skin welds stress ranges. (ACTION) Based upon the outcome of the above and the guidelines provided, Department to determine which skin longitudinal butt welds should be ground flush and UT inspected using Scanning Pattern D.	a. (ACTION) Lift 12 – DJV provided mapping of tension members. Department continues to evaluate the information and will determine if welds require to be ground flush and NDT'd. b. (ACTION) Lifts 13 and 14 – DJV provided mapping of tension members. Department continues to evaluate the information and will determine if welds require to be ground flush and NDT'd. c. (ACTION) Lifts 12 thru 14 – TBPOC/Department/ABF/ZPMC meeting rescheduled to February 2011 to discuss all current issues. (ACTION)DJV provided mapping of tension members. Department continues to evaluate the information and will determine if welds require to be ground flush and NDT'd. d. Crossbeams 17, 18, 19 - DJV provided mapping of tension members. Department continues to evaluate the information and will determine if welds require to be ground flush and NDT'd. e. (ACTION) METS continues to provide mapping of all ground flush and 100% NDT'd OBG welds by next Wednesday/Thursday meeting. f. (ACTION) Department to determine if the fillet welds for the connection of the sandwich plate to the anchorage plate are in tension. ABF directed ZPMC to perform a post weld thermal heating of the west anchor plate based on the assumption that the fillet welds are in tension.
7	NEW ITEM Open	Draft Report - Comment 1 (dated 1/5/11) Brian M. question - Has the bridge been inspected to the requirements in the contract documents? Statements to be provided by S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh? (ACTION) All parties to provide statements by Monday, 1/10/11. Brian M. comment - The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12 are in compression should be removed or corrected.	1. All parties (S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh?) to provide statements by Monday, 1/10/11.		Per meeting notes from 01/05/11: Brian Maroney provided the following question and comment on the Draft Report: Brian M. question - Has the bridge been inspected to the requirements in the contract documents? Statements to be provided by S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh? (ACTION) All parties to provide statements by Monday, 1/10/11. Brian M. comment - The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12 are in compression should be removed or corrected.
8	NEW ITEM Open	Draft Report - Comment 2 (dated 1/5/11) Brian M. comment - The QA/QC expert consultant report is draft and is a work in progress. The project team has met and discussed the document, its intent, and several elements of the report. Those discussion have led to a new organized focus group to update the effort, including clearly defining the purpose of the group (including the QA/QC expert consulting group) and providing high quality information and data to the group in order to improve responses and documentation.			Per meeting notes from 01/05/11: Brian M. comment - The QA/QC expert consultant report is draft and is a work in progress. The project team has met and discussed the document, its intent, and several elements of the report. Those discussion have led to a new organized focus group to update the effort, including clearly defining the purpose of the group (including the QA/QC expert consulting group) and providing high quality information and data to the group in order to improve responses and documentation.

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9	NEW ITEM Open	Draft Report - Comment 3 (dated 1/5/11) Brian M. comment - Progress of bridge opening date slower than expected, due in part to inspection repair iteration that is not disallowed by the code or contract documents. There is a strong desire to reduce the iterations and speed up delivery, while maintaining necessary quality.			Per meeting notes from 01/05/11: Brian M. comment - Progress of bridge opening date slower than expected, due in part to inspection repair iteration that is not disallowed by the code or contract documents. There is a strong desire to reduce the iterations and speed up delivery, while maintaining necessary quality.
10	NEW ITEM Open	Draft Report - Comment 4 (dated 1/5/11) Brian M. comment - A significant portion of the iterations are due to development of transverse crack-like indication in some welds.			Per meeting notes from 01/05/11: Brian M. comment - A significant portion of the iterations are due to development of transverse crack-like indication in some welds.
11	NEW ITEM Open	Draft Report - Comment 5 (dated 1/5/11) Brian M. comment - The transverse indications are predominantly from contaminants.			Per meeting notes from 01/05/11: Brian M. comment - The transverse indications are predominantly from contaminants.
12	NEW ITEM Open	Draft Report - Comment 6 (dated 1/5/11) Brian M. comment - The transverse indications are of significant concern only in the full FCAW welds.			Per meeting notes from 01/05/11: Brian M. comment - The transverse indications are of significant concern only in the full FCAW welds.
13	NEW ITEM Open	Draft Report - Comment 7 (dated 1/5/11) Brian M. comment - The previous welds have been inspected and repaired until acceptable and meeting the requirements in the contract documents.			Per meeting notes from 01/05/11: Brian M. comment - The previous welds have been inspected and repaired until acceptable and meeting the requirements in the contract documents.
14	NEW ITEM Open	Draft Report - Comment 8 (dated 1/5/11) Brian M. comment - The early data from the change in the welding process that includes a switch in wire, increase in heat, and changing gas and delivery system, is effectively removing the transverse indications, though there are learning curve challenges and in some ways the wire is harder to work with for the welders. It is expected that improvements can continue.			Per meeting notes from 01/05/11: Brian M. comment - The early data from the change in the welding process that includes a switch in wire, increase in heat, and changing gas and delivery system, is effectively removing the transverse indications, though there are learning curve challenges and in some ways the wire is harder to work with for the welders. It is expected that improvements can continue.

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ID	Status Source Doc	Title	Actions/ (Due Date)	December 10, 2010 Status Update/Comments	January 5, 2011 Status Update/Comments
15	NEW ITEM Open	Draft Report - Comment 9 (dated 1/5/11) Brian M. comment - The QC and QA teams, or both together, if requested, can investigate FCAW welds on thoughtfully selected sample groups of welds on Lifts 13 and 14 to use to gather information to use to project on to the full population of similar welds to continue to improve the entire bridge fabrication efficiency.			Per meeting notes from 01/05/11: Brian M. comment - The QC and QA teams, or both together, if requested, can investigate FCAW welds on thoughtfully selected sample groups of welds on Lifts 13 and 14 to use to gather information to use to project on to the full population of similar welds to continue to improve the entire bridge fabrication efficiency.
16	NEW ITEM Open	Draft Report - Comment 10 (dated 1/5/11) Group discussion on Draft Report: a. (ACTION) ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract Drawings) that are FCAW and how much NDT inspection was required and was performed. Use NDT table provided on CCO 22 to identify which are FCAW (by 1/20/11).	1. ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract Drawings) that are FCAW and how much NDT inspection was required and was performed. Use NDT table provided on CCO 22 to identify which are FCAW (by 1/20/11).		Per meeting notes from 01/05/11: Group discussion on Draft Report: a. (ACTION) ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract Drawings) that are FCAW and how much NDT inspection was required and was performed. Use NDT table provided on CCO 22 to identify which are FCAW (by 1/20/11).

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ID	Status Source Doc	Title	Actions/ (Due Date)	January 10-12, 2011 Status Update/Comments	February 9, 2011 Status Update/Comments
1	Open	Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures	1. For FCAW, ABF to implement the previously cited guidelines from November 2009-2010. Alternatively, if it can be demonstrated (weld trials and continued inspection) that alternative means and methods that lead to welds that are consistently free of transverse cracks, then those means and methods would be recognized as acceptable. 2. China to collect data on welds using ESAB wire with the 110degC preheat temperature. Data expected in 2 weeks. ABF/CT (Mahlen/Steve Lawton) will attempt to focus on jointly documenting application of heat and the entire ESAB weld process for 1 or 2 weld stations. Review of the NDT results will follow. 3. Mahlon L. and Steve L. to witness some excavations to verify indication type. 4. ABF to correct and update weld data and provide within the next week. 5. ABF to continue reporting TLI and classify type of indication on a two week basis. However, if significant change occurs, notify Panel immediately. Use the same table format and provide detailed description of length, depth and type of each TLI in the footnotes.	Per meeting notes from 01/10/11: (Panel comments) From the QC results since the welding process changes, which include the change in wire to ESAB, gas mixture, and controls of preheat and overall process, these appear to have eliminated the transverse crack-like indications. The Panel is satisfied. (ACTION) Mahlon L. and Steve L. to witness some excavations to verify indication type. (ACTION) ABF to correct and update weld data and provide within the next week. (ACTION) ABF to continue reporting TLI and classify type of indication on a two week basis. However, if significant change occurs, notify Panel immediately. Use the same table format and provide detailed description of length, depth and type of each TLI in the footnotes.	Status on TLI's using ESAB wire and classification (Steve Lawton) a. New TLI's This Week- No new TLI's to report this week. b. Status of Investigation of Previously Reported TLI's In response to the action from last week, Steve Lawton and Mazen Wahbeh reported the following statistics on weld length NDT inspected for all welds. - From 8 January to 16 January: 2792 meter of weld MT inspected. 1862 meters of weld UT inspected. It was noted of these welds, there were no TLI's found. - From 17 January to 27 January: 2553 meters of weld MT inspected. 1312 meters of weld UT inspected It was noted of these welds, there were no TLI's found. ● ABF has reported that generally, the overall rejection rate has gone down. There are a couple welds that ABF continue to deal with: 1) Welds in the 2G position for the floorbeam to bottom plate, 2) Welds at the suspender brackets ● In regards to last week's issue of the FCAW welds in question, they are currently being reviewed by the Expert Panel to determine if they are hydrogen related or not. c. ABFJV Engineering Evaluation (ACTION) ABFJV to formally submit the Engineering Evaluation incorporating METS comments via CWR prior to next repair. For informational purposes, ABFJV will provide a copy of ZPMC's technical memorandum regarding these related recommendation at next week's meeting.

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2	Open	Item 2 of Additional Guidelines “Implement the use of ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164…”	1. ABF has completely implemented the use of the ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164. QA/QC inspection results are to be given to the panel members for their review prior to the next meeting in January. 2. ABF to discuss with ZPMC to pressure test the Ar system to confirm properties are adequate and there is no moisture in the system (on-going) 3. ABF has 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. (on-going) 4. ABF to provide the QC inspection results for the implementation of the ESAB wire to METS QA. METS QA to verify results prior to sharing information to QA/QC consultants. 5. ABF shop floor contact person is Peter Ferguson or Steve Lawton for the day-to-day implementation of the ESAB wire. If necessary, the issues can be elevated to Thomas Nilsson or Gang Jiao in Thomas' absence. 6. ABF/METS to review with Linde (Ar gas supplier) to review both manifold system and the method to eliminate contamination. In the interim, ZPMC continues to use bottled gas. (complete and on-going) 7. ABF to schedule meeting with Linde for the week of January 3, 2011 to review the gas distribution and purging system. (complete) 8. ABF to have 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. Also performing training for the ZPMC welders for the use of the ESAB wire. (on-going) 9. ESAB rep to provide to ABF a summary to date of performance of ESAB wire by week of December 27, 2010. (complete)	Per meeting notes from 01/10/11: (Panel comments) The panel is satisfied as per Item 1 (above). The specific manufacturer is not the primary reason for the change. It was the combination of electrode/shielding gas and other process changes that were recommended. (ACTION) ZPMC to continue with the use of the bottled gas. Prior to switching to manifolded piping system, ZPMC to perform pressure test of piping system to verify no leaks. When in use, Linde to perform every other week check on the AR and CO2 mixture concentration test of manifold cylinder packs system.	Per meeting notes from 02/9/11: ZPMC is still using the bottled gas. The in-line system is currently not being used.
3	Closed	Item 3 of Additional Guidelines “Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location.”	1. ABF and Caltrans has implemented this through the preapproved CWR templates that was implemented during the CCO 160 process. (METS Confirmed for Lifts 13 and 14 repairs)	Issue closed.	Issue closed.
4	Closed	Item 4 of Additional Guidelines “Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV.”	1. ABF to further look into rejectable discontinuities and provide a printout of the reject rate for a sample amount of welders. 2. ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.	Per meeting notes from 01/10/11: (Panel Comment) Welder performance depends on several factors including weld position, weld location, as well as other factors. Therefore, the decision to remove a welder is to be made at the project level based on welder statistics, performance and management evaluations. Currently, ZPMC has 2 separate programs for their welders' evaluation: disciplinary and incentive programs.	Issue closed.
5	Closed	“An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes.”	1. ABFJV to provide CWI in accordance with this guideline.	Per meeting notes from 01/11/11: ABFJV provided a report on how the CWI is being utilized during the welding activities. METS confirmed that the process is being properly implemented and there are no problems with CWI coverage. (Panel Comments) Panel is satisfied. (ACTION) Item considered closed.	Issue closed.

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<tr>
<td>6
6
(cont.)</td>
<td>Open</td>
<td>Item 6 of Additional Guidelines

“All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…”</td>
<td>(ACTION) Lifts 13 and 14, including CBs 18 and 19:
ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement by next Thursday, January 27th (China).

ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT’d using Scanning Pattern D. ABF to provide data confirming this statement.

(ACTION) Lift 12, including CB 17:
ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement at a later date.

ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT’d using Scanning Pattern D. ABF to provide data confirming this statement.

Transverse Welds:
1. Lifts 1 through 12: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.

2. Lifts 13 and 14: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.</td>
<td>Per meeting notes from 01/10/11:

Brian M. walked the group through the tension mapping provided in the attachments.

Lifts 2-11 OBG and Crossbeams 1-16:
Unchecked preliminary calculations suggest that the bottom skin plate fibers of the OBG are believed to be in compression in the longitudinal direction under the unfactored dead load and live load (without impact and permit load). Service level winds (approximately 50 mph) will drive the structure vertically and need to be considered.

Unchecked preliminary calculations suggest that the max tensile stresses in the transverse direction for the bottom plates between the suspenders of the OBG is approximately 15 ksi under the unfactored dead load and live load (without impact and permit load). Service level winds (approximately 50 mph) will drive the structure vertically and need to be considered.

Lifts 12-14 OBG and Crossbeam 17-19:
Unchecked preliminary calculations suggest that the tensile stresses in the longitudinal direction of the East End OBG (from pp109 east) is well in the 20’s ksi.

Current information from Design indicate that Crossbeams 17-19 undergo cyclic loadings that extend into the tensile stress range in the transverse direction of the bridge.

Anchorage System:
The anchorage system was discussed at length and like most anchorage systems, it transfers load through compression and shear elements. However, there are some second order tensile stresses that result from predominantly shear and compressive load transfers. The post weld heat and the NDT performed on the anchorage system exceeded the requirements of AWS D1.5 and requirements in the contract documents.

The focus set of welds are the welds made with FCAW filler metals only including PJP, CJP and fillet.

Panel Comments:
Longitudinal Welds:
1. Lifts 1 through 12 longitudinal welds are all subjected to compression; therefore no further investigation is needed.

2. Lifts 13 and 14 longitudinal bottom welds are in compression, therefore no further investigation is needed on these welds; the top third above the neutral axis are subjected to tensile stresses.
a. Corner Weld Assemblies: The two corner weld assemblies have been ground flush and inspected with Scanning Pattern D with +6 dB above Class B acceptance criteria.
b. Panel-to-Panel Welds: Panel-to-panel welds are welded using the FCAW in the root with SAW fill & caps. Panel flipped, backgouged removing most of the FCAW root; filled and capped with SAW. Grinding flush is not required.
c. Super Panel Welds: Super Panel Welds are welded from one side into ceramic or steel backing. The root will be welded with the new filler metal/shielding gas combination. Fill and cap passes will be welded using submerged arc (SAW). Grinding flush is not required.
d. Welds made with FCAW from one side with the old filler metal/shielding gas combination will be ground flush and inspected with Scanning Pattern D with +6 dB above Class B acceptance criteria.

Transverse Welds:
1. Lifts 1 through 12: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.

2. Lifts 13 and 14: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.</td>
<td>Per meeting notes from 02/9/11:

Status of Weld Inspection Mapping (Steve Lawton)
Steve confirmed that the table below represents the current status of the data collected to date.
(ACTION) Steve and Mazen to continue this effort in collecting the data.</td>
</tr>
</table>

Data collected for the 100% FCAW Welds made with welding process that included the Hyundai wire

	CJP		PJP		Fillet	
	Type of Inspection performed	% of Inspection	Type of Inspection performed	% of Inspection	Type of Inspection performed	% of Inspection
Lifts1 thru 12	complete	complete	In process; target 2/15/11	In process; target 2/15/11	In process	In process
Lifts13 and 14	complete	complete	In process	In process	In process	In process
Crossbeam 19	complete	complete	complete	complete	In process	In process
Crossbeam 18	complete	complete	In process	In process	In process	In process

Notes:
- “complete” – indicates that the data has been compiled, corroborated and complete
- “in process” – indicates that data collection is on-going

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6 (cont.)					Per meeting notes from 02/9/11: Status of Tension/Compression Mapping: Cyclic tension loading and stress ranges for those loadings throughout the SAS for high cycle fatigue-type loadings ~10^6 (Marwan Nader / Ade Akinsanya) ● **Lifts 13 and 14** Sufficient information has been provided by the DJV and corroborated by the group for these areas. ● **Lifts 2 thru 12 and Crossbeams (draft report provided)** (ACTION) DJV/Ade to provide final copy.
6a	NEW ITEM Open	Demand and Capacity Analysis of Welds			Per meeting notes from 02/9/11: **Demand and Capacity Analysis of Welds** ● **Discussions with Dr. Barsom on Fillet Welds (2/4/11)** On Friday, February 4th, Brian M. and Kevin S and Dr. Barsom had a teleconference to discuss the fillet welds. We discussed with Dr. Barsom the first draft of the fillet weld NDT inspection results for the welds of interest (100% FCAW welding procedure that included the Hyundai wire and those areas that are of interest). First draft shows MT inspection was near 94% of the weld and much of the data showed very low reported rejection rates, some well below 1%. Though there were some as high as 16%, those areas were not representative. Also, fillet welds made on the gantry system were discussed as also showing high quality NDT results and it was reported by Steve Lawton that approximately 2 years ago, additional heat was added to the process, which he felt was a important reason those welds had such high acceptance rates/high quality. If the data trends continue, Brian suggested to Dr. Barsom this is reason to interpret the high quality of MT-VT test results as a measure of the "quality of the weld". And further /specifically if there was a hydrogen problem in these welds, it would have impacted the NDT results and it would have shown in the data. This would tend to lead to a conclusion that the fillets are of high quality and not of concern. Dr. Barsom said he supported Brian M. and Kevin S. judgment of the situation and wanted to see the supporting data on February 17th meeting.

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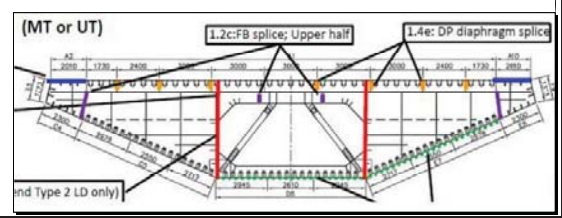
6a (cont)					Dr. Barsom sent Brian M. and Kevin S. an email that specifically asked 4 questions that Caltrans and ABF should prepare for the QA/QC group by the February 17th meeting. See below. 1. Was the 1% fillet weld repairs based on number of welds that were repaired or was it based on linear inches repaired of the total fillet weld length? Regardless of the answer, what is the % for the other computation and what, if any, is the significance of the answer to the performance of the Bridge. 2. What is the rejection rate with the present welding procedure? What type of discontinuities are being rejected [cracks, porosity, slag…]? 3. In their report November 2010, the Fabrication Expert Panel expressed dissatisfaction with the frequency of rejectable weld indications. Has there been a significant decrease since November 2010? If not why not? 4. Have we eliminated the hydrogen cracking problem? If not, why? How many welds contained hydrogen cracks in the last two months?
6a (cont)					• **Teleconference with Dr. Barsom (2/7/11)** DJV provided a brief overview of the TYL/MN Draft reports entitled: 1) OBG-Cross Beam Transverse Tension Mapping (Lifts 2-12), 2) OBG-Cross Beam Longitudinal Tension Mapping (Lifts 2-12). Refer to attached draft minutes. (ACTION) DJV to perform demand and capacity analysis, using Dr. Barsom's model, for the welds in the floorbeam and diaphragm (1.4e and 1.2c of the ABFJV Isometric graphic below). Steve commented that the corner welds were performed in segment assembly in Bay 14. The 1.2c welds are generally done in the flat position. 

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7	Open	Comment 1 (dated 1/5/11) Brian M. question - Has the bridge been inspected to the requirements in the contract documents? Statements to be provided by S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh? (ACTION) All parties to provide statements by Monday, 1/10/11. Brian M. comment - The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12	1. All parties (S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh?) to provide statements by Monday, 1/10/11.	Per meeting notes from 01/12/11: "Has the bridge been inspected to the requirements in the contract documents?" Panel Comment: This action resides with ABFJV-QC and Caltrans QA managers. ITEM 7 (continued): "The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12 are in compression should be removed or corrected." Panel Comment: Information provided by ABFJV-QC indicates that all welds are inspected using tension criteria in accordance with the contract documents.	No comment.
8	Open	Draft Report - Comment 2 (dated 1/5/11) Brian M. comment - The QA/QC expert consultant report is draft and is a work in progress. The project team has met and discussed the document, its intent, and several elements of the report. Those discussion have led to a new organized focus group to update the effort, including clearly defining the purpose of the group (including the QA/QC expert consulting group) and providing high quality information and data to the group in order to improve responses and documentation.		Per meeting notes from 01/12/11: Panel Comment: Draft Revision 8 (November 2010 Meeting in China) has been finalized and information going forward is being recorded in SAS Steel Fabrication Expert Panel Monthly Review Report. A copy of the Draft Revision ~~8~~ 9 is being transmitted along with these comments.	No comment.

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9	Open	Draft Report - Comment 3 (dated 1/5/11) Brian M. comment - Progress of bridge opening date slower than expected, due in part to inspection repair iteration that is not disallowed by the code or contract documents. There is a strong desire to reduce the iterations and speed up delivery, while maintaining necessary quality.		Per meeting notes from 01/12/11: Panel Comment: No comment.	No comment.
10	Open	Draft Report - Comment 4 (dated 1/5/11) Brian M. comment - A significant portion of the iterations are due to development of transverse crack-like indication in some welds.		Per meeting notes from 01/12/11: Panel Comment: The "iterations" alleged to be due to transverse crack-like indications are no longer an issue based on current data that show the elimination of such indications.	No comment.
11	Open	Draft Report - Comment 5 (dated 1/5/11) Brian M. comment - The transverse indications are predominantly from contaminants.		Per meeting notes from 01/12/11: Panel Comment: The transverse indications are caused by a combination of contamination and residual stresses.	No comment.
12	Open	Draft Report - Comment 6 (dated 1/5/11) Brian M. comment - The transverse indications are of significant concern only in the full FCAW welds.		Per meeting notes from 01/12/11: Panel Comment: The Panel agrees. It is correct that transverse indications are of concern only in welds made with FCAW. However, such indications when discovered in existing welds were repaired and crack-like indications in work made using amended welding process parameters have not been found with NDT.	No comment.

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13	Open	Draft Report - Comment 7 (dated 1/5/11) Brian M. comment - The previous welds have been inspected and repaired until acceptable and meeting the requirements in the contract documents.		Per meeting notes from 01/12/11: Panel Comment: The panel agrees.	No comment.
14	Open	Draft Report - Comment 8 (dated 1/5/11) Brian M. comment - The early data from the change in the welding process that includes a switch in wire, increase in heat, and changing gas and delivery system, is effectively removing the transverse indications, though there are learning curve challenges and in some ways the wire is harder to work with for the welders. It is expected that improvements can continue.		Per meeting notes from 01/12/11: Panel Comment: The Panel agrees in part. However the Panel does not agree that the new welding wire/gas combination makes it harder for the welder to use.	No comment.
15	Open	Draft Report - Comment 9 (dated 1/5/11) Brian M. comment - The QC and QA teams, or both together, if requested, can investigate FCAW welds on thoughtfully selected sample groups of welds on Lifts 13 and 14 to use to gather information to use to project on to the full population of similar welds to continue to improve the entire bridge fabrication efficiency.		Per meeting notes from 01/12/11: Panel Comment: This concern is addressed with the implementation of the new welding wire/gas combination now being used.	No comment.

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ID	Status	Title	Actions/ (Due Date)		
	Source Doc			January 10-12, 2011 Status Update/Comments	February 9, 2011 Status Update/Comments
16	Open	Draft Report - Comment 10 (dated 1/5/11) Group discussion on Draft Report: a. (ACTION) ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract	1. ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract Drawings) that are FCAW and how much NDT inspection was required and was performed. Use NDT table provided on CCO 22 to identify which are FCAW (by 1/20/11). 2. Draft Report 8 will remain in draft form and the group will move forward with documenting the on-going weekly and monthly meetings in the SAS Steel Fabrication Expert Panel Monthly Review Notes. The Draft ~~8~~ 9 dated January ~~11~~ 12, 2011, supersedes all prior versions of this report. Panel signatures are not required from draft reports to make it clear that they are draft.	Per meeting notes from 01/12/11: Panel Comment: The Panel determined that the NDT inspections on the OBG meet or exceed the requirements of the contract documents. (ACTION) Draft Report 8 will remain in draft form and the group will move forward with documenting the on-going weekly and monthly meetings in the SAS Steel Fabrication Expert Panel Monthly Review Notes. The Draft 8 dated January 11, 2011, supersedes all prior versions of this report. Panel signatures are not required from draft reports to make it clear that they are draft.	No comment.
17		Other Items		Other comments: a. (Brian M.) Are there other pieces of information or reports related to the transverse indication issue that we should all be aware of? (ACTION) ABF to provide one outstanding report to the group. b. (Brian M. Question) In regards to the Barsom's Report (Investigation of Weld Discontinuities in the OBG) dated in 2009, what important information should be taken from this report? In regards to the testing performed, the main premise was to determine the root cause of the indications. The fatigue test performed does not correlate with fatigue performance of the fabricated components. Rather, the test was conducted to expose the pre-existing indications for metallographic in the least number of cycles for fractographic investigation. c. Brian's comment in regards to the November 2009 Draft Report (ACTION) Panel to review the comments and group to discuss their feedback by end of Wednesday. (complete) d. Brian's presented a slide presentation to share thoughts on the behavior of the bridge e. (Brian M.)- There was discussion on the potential evaluation on the condition (with FCAW filler metals only including PJP, CJP and fillet) and it may be necessary for the Fabrication Welding Expert Panel to participate in characterizing the state of the welds. Brian M. expects TY Lin to characterize the demands and it would be up to Caltrans, with the potential for ABF's participation to evaluate the demand to capacity ratios. Caltrans would expect a review by external independent groups such as the Seismic Peer Review Panel to review the evaluation. The intent would be to evaluate and verify conditions such that the capacities are greater than demands.	Per meeting notes from 02/9/11: Other Items **• February 17th Steel Fabrication Expert Panel Meeting Agenda (start 10am)** - Review of the Expert Panel Draft Report - Department/ABFJV response to the Expert Panel Draft Report 1. Status of TLI's – Steve Lawton 2. Status of Bottled Gas – Steve Lawton 3. Status of Welding Inspection Mapping – Steve Lawton 4. Summary of the Tension/Compression Mapping – Marwan Nader 5. Demand and Capacity of Welds (Marwan Nader) **• February 18th Draft Meeting Agenda (SSPRP meeting) – Brian Maroney (Facilitator)** - Review of the Expert Panel Draft Report - Department/ABFJV response to the Expert Panel Draft Report 1. Status of TLI's (1 slide) – Steve Lawton 2. Status of Bottled Gas (1 slide) – Steve Lawton 3. Status of Welding Inspection Mapping (1 slide – include the table) – Steve Lawton 4. Summary of the Tension/Compression Mapping (1 slide) – Marwan Nader 5. Demand and Capacity of Welds (Marwan Nader) (ACTION) Group to meet for a February 18th prep meeting on February 17th.
18		Strategy Moving Forward	1. The Department to provide the stress ranges. Demand-capacity ratio to be further discussed between ABF and the Department during the Wednesday weekly meetings. 2. As requested by the Panel, the Department will provide data from MTR's and check samples. 3. ABF-China to provide mapping of all FCAW welds and identify which ones are ground flush and UT'd using Scanning Pattern D. Design will use this information to determine if additional NDT will be required.	Per meeting notes from 01/10/11: Strategy moving forward (Panel Comments) Based on the information given to the Panel, a demand-capacity analysis was performed by the Panel. The results of which the Panel believes there is no need to do anything in addition to Lifts 1 through 12 welds. The Panel confirmed that sampling for additional destructive testing is not needed. (ACTION) The Department to provide the stress ranges. Demand-capacity ratio to be further discussed between ABF and the Department during the Wednesday weekly meetings. (ACTION) As requested by the Panel, the Department will provide data from MTR's and check samples. (ACTION) ABF-China to provide mapping of all FCAW welds and identify which ones are ground flush and UT'd using Scanning Pattern D. Design will use this information to determine if additional NDT will be required.	No comment.

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ID	Status Source Doc	Title	Actions/ (Due Date)	February 17, 2011 Status Update/Comments	March 16, 2011 Status Update/Comments
1	Open	Item 1 of Previous Guidelines and Items 1 and 2 of Additional Guidelines Welding Procedures	1. For FCAW, ABF to implement the previously cited guidelines from November 2009-2010. Alternatively, if it can be demonstrated (weld trials and continued inspection) that alternative means and methods that lead to welds that are consistently free of transverse cracks, then those means and methods would be recognized as acceptable. 2. China to collect data on welds using ESAB wire with the 110degC preheat temperature. Data expected in 2 weeks. ABF/CT (Mahlen/Steve Lawton) will attempt to focus on jointly documenting application of heat and the entire ESAB weld process for 1 or 2 weld stations. Review of the NDT results will follow. 3. Mahlon L. and Steve L. to witness some excavations to verify indication type. 4. ABF to correct and update weld data and provide within the next week. 5. ABF to continue reporting TLI and classify type of indication on a two week basis. However, if significant change occurs, notify Panel immediately. Use the same table format and provide detailed description of length, depth and type of each TLI in the footnotes.	Per meeting notes from 02/17/11: • New TLI's Since Last Meeting No new hydrogen-related TLI's reported since the switch to the new welding procedure. Steve Lawton walked the group through the statistics for the new welding procedure. (ACTION) ABF to add to the table a footnote clarifying the TLI wording in the "remarks" column and a "hydrogen present" column . ABF to update the title of the table to read as "New FCAW Welding Process Statistics…" (ACTION) ABF to add a footnote of the following: "Investigations are performed on selected found TLI's that appear at the lower decibel ratings. All indications, whether investigated or not are repaired." • Status of Investigation of Previously Reported TLI's In reference to the 4 weld locations in discussion from February 2nd meeting, the group acknowledges that these indications represent small percentage (significantly less than 1%) of the weld and are not representative of the welding. This data represents a conclusion that the welding procedure has eliminated the of hydrogen problem. Since then, the following additional steps were put in place by ABF: MT of the root pass, MT of the backgouge, writing on the steel with soap stone of the preheat temperature checked by the welders with temperature indicating sticks. These steps are documented in an Engineering Evaluation document that will be submitted in the next CWR. The group agreed that the issue of classifying indications at 4 weld locations where QA and QC had differing opinions are considered closed.	Per meeting notes from 3/16/11: Status of Action Items from the Draft Report Guideline Discussion and Past QA/QC Meetings a. Status of TLI's using New FCAW Weld Process No new TLI's reported to date.
2	Open	Item 2 of Additional Guidelines "Implement the use of ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164…"	1. ABF has completely implemented the use of the ESAB FCAW Electrodes and Ar – CO2 Mix Shielding Gas per CCO 164. QA/QC inspection results are to be given to the panel members for their review prior to the next meeting in January. 2. ABF to discuss with ZPMC to pressure test the Ar system to confirm properties are adequate and there is no moisture in the system (on-going) 3. ABF has 2+ ESAB representatives on ZPMC site to oversee proper implementation of the ESAB wire. (on-going) 4. ABF to provide the QC inspection results for the implementation of the ESAB wire to METS QA. METS QA to verify results prior to sharing information to QA/QC consultants.	Per meeting notes from 02/17/11: ZPMC is currently using the bottled gas and has not yet switched to the manifold gas system. [Action] Consider closed until such time as ZPMC switches to manifolded gas supply.	No comments.
3	Closed	Item 3 of Additional Guidelines "Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location."	1. ABF and Caltrans has implemented this through the preapproved CWR templates that was implemented during the CCO 160 process. (METS Confirmed for Lifts 13 and 14 repairs)	Issue closed.	Issue closed.
4	Closed	Item 4 of Additional Guidelines "Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV."	1. ABF to further look into rejectable discontinuities and provide a printout of the reject rate for a sample amount of welders. 2. ABF to discuss with the QA/QC consultants the process for incentive payment for a successful completion of a weld.	Issue closed.	Issue closed.

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<tr><td>5</td><td>Closed</td><td>"An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes."</td><td>1. ABFJV to provide CWI in accordance with this guideline.</td><td>Issue closed.</td><td>Issue closed.</td></tr>
<tr><td>6</td><td>Open</td><td>Item 6 of Additional Guidelines

"All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria…"</td><td>(ACTION) Lifts 13 and 14, including CBs 18 and 19:
ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement by next Thursday, January 27th (China).

ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement.

(ACTION) Lift 12, including CB 17:
ABF to identify all pure FCAW welds made using 100% Hyundai wire that did not receive 100% UT (CJP, Fillet and PJP) for confirmation purposes only. ABF to provide data confirming this statement at a later date.

ABF to confirm that all pure FCAW CJP butt and corner welds made using 100% Hyundai wire were or will be ground flush and UT'd using Scanning Pattern D. ABF to provide data confirming this statement.

Transverse Welds:
1. Lifts 1 through 12: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.

2. Lifts 13 and 14: All transverse welds are ground flush and UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.</td><td>Per meeting notes from 02/17/11:

The following summary table is the current status of the NDT inspection performed for 100% FCAW welds made with welding process that included Hyundai wire.
<table><tr><th>CJP</th><th></th><th></th><th></th></tr><tr><td></td><td>Location ID per CCO 22</td><td>Type of Inspection performed or to be performed</td><td>Actual % of inspection **</td></tr><tr><td>Lifts 1 thru 12</td><td>1.2c*
1.4e1
1.4e2
1.4e3
All other major welds*
Refer to Exhibit 4.1</td><td>UT - Scanning Pattern E
UT - Scanning Pattern E
UT - Scanning Pattern E or D
UT - Scanning Pattern E or D</td><td>15 – 100% with average @ 43%
100%
25 – 100% with average @ 49%
25 – 100% with average @ 97%</td></tr><tr><td>Lifts 13 and 14</td><td>All CJP welds on the skin plates*
Refer to Exhibit 4.2</td><td>UT - Scanning Pattern D</td><td>100%</td></tr><tr><td>Crossbeams 1-17</td><td>All CJP welds*
Refer to Exhibit 4.4</td><td>UT - Scanning Pattern D or E</td><td>50-100%</td></tr><tr><td>Crossbeam 18</td><td>All CJP welds*
Refer to Exhibit 4.4</td><td>UT - Scanning Pattern D</td><td>100%</td></tr><tr><td>Crossbeam 19</td><td>All CJP welds*</td><td>UT - Scanning Pattern E or D</td><td>100%</td></tr></table>
a) For Lift 13 and 14 skin plates, all pure FCAW CJP welds made with old welding process have been or will be 100% UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria.

b) (ACTION) ABF to develop an isometric graphic identifying locations of internal pure FCAW CJP welds made with the old welding process.

c) (ACTION) For Lifts 1-12, referencing Exhibit 4.1 table, all pure FCAW CJP welds made with old welding process, ABF to add "reject rate" column by next meeting.

d) For Lift 12, skin plates, all pure FCAW CJP welds made with old welding process have been or will be 100% UT inspected using Scanning Pattern D with +6 dB above Class B acceptance criteria (with the exception of the lower corner assembly weld which is 100% UT inspected using Scanning Pattern E). The Scanning Pattern E performed on this lower corner assembly weld is acceptable.

e) For Lift 12, internal plates, all pure FCAW CJP welds made with the welding process have been UT inspected to varying percentages using Scanning Pattern E in accordance with the contract documents.

f) Crossbeams 17-19 corner welds will be or have been ground flush and UT inspected with Scanning Pattern D with +6 dB above Class B acceptance criteria. Reference Exhibit 4.4.

g) Crossbeams 1-16 corner welds will be or have been UT inspected using either Scanning Pattern D or E depending on whether the welds were required to be ground flush or not by the contract documents.
(ACTION) ABF to provide inspection data for the corner welds.

(Panel comments) The Panel recognizes that the project has correctly applied the code and contract documents and has extended these requirements to the appropriate alternative UT methods as the code allows.</td><td>Per meeting notes from 3/16/11:

b. Status of Welding Inspection Mapping – (all reports are based on data through to 3/16/11)
• Review of Draft Exhibit 3.1 – New FCAW Welding Process Statistics
(ACTION)Add footnote to explain the high outliers (ie anything above 20% reject rate), recognizing that it represents a small length of weld.
(ACTION) ABF to provide pictures showing the difficulties of welding in the 2g position.
• Review of Draft Exhibit 4.1 – Lifts 1 thru 12 of the pure FCAW using the old welding process and NDT inspected less than 100%

• Exhibit 4.2 – Lifts 13 – 14 Pure FCAW CJP Welds Made With Old Welding Process NDT Tested Less than 100% (originally less than 100% / now 100%)
(ACTION) Delete Exhibit, not needed.

• Exhibit 4.3 – Summary of Ultrasonic Testing and Transverse Indications on Crossbeams 1 – 16 Bottom Corner Welds Including Holdbacks

• Exhibit 4.4 – Crossbeam 17 - 18 Pure FCAW Weld Made With Old Welding Process Tested Less than 100%
(ACTION) Delete Exhibit, not needed.

• Exhibit 4.5 - Lifts 13 & 14 Interior CJP Welds Welded Using Old Process, Less Than 100% Tested

• Exhibit 4.6 – Lifts 13 & 14 Fillet Welds Welded Using Old Process, Less Than 100% Tested

• Exhibit 4.7 – Statistics of Welds
(ACTION) Include footnote to explain reject rates for above 20%.

c. Lift 12 Welds - 2n and 2s
(QC and QA Comment) ABF QC has reviewed the weld inspection data for these welds and has determined there is no concern. CT QA reviewed CT records and have no concern. Note that CT performed 100% E scan and various areas of D scan.

d. Tension Mapping
The tension mapping was developed to expand and to explain in a more visual and more graphical form stress magnitude and range, stress direction and stress location. This more detailed information is consistent with contract documents and does not represent a change in design, engineering and construction intent.</td></tr>
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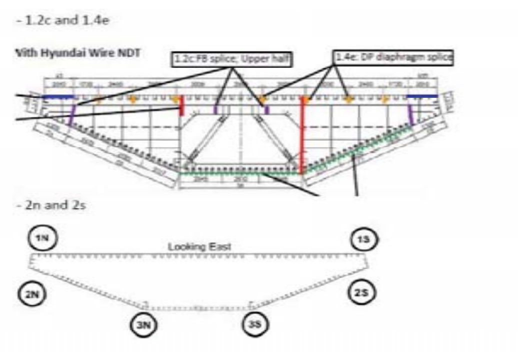
(cont.)</td><td></td><td></td><td></td><td>Per meeting notes from 2/17/11:

• Summary of the Tension/Compression Mapping – Marwan Nader (Ref. Tab 5)
Marwan Nader walked the group through the PowerPoint slides of the Summary of the Tension/Compression Mapping. The information presented is consistent with the last presentation discussed in the January 10-12 meetings and provides greater detail.

(Panel Comments) The Panel finds the information and clarification provided in the presentation informative and very helpful in understanding the complexity of the stress loading on the structure. This mapping helped identify which welds were of concern and how to evaluate them.

Crossbeams 1-16, DJV confirmed the following stress ranges for use by Dr. Barsom in his weld evaluation requested by ABF:
125MPa (DL) + 28 MPa (LL) + 24 MPa (WL) = 177MPA - upper boundary
125MPa (DL) - 24 MPa (WL) = 101 MPa - lower boundary

(ACTION) For Lifts 1-11, as discussed in February 9th meeting, DJV is to provide stress information on the following welds:


</td><td></td></tr>
<tr><td>6a</td><td>Closed</td><td>Demand and Capacity Analysis of Welds</td><td>(Department's Comments) Structure Rep and the QA Principal of the OBG commented that there is no need at this point for a fit-for-purpose demand and capacity analysis of the welds.

(Brian Maroney's comments) The mapping of tension regions is complete and if necessary, the team has demand estimates that could be used to perform "fit-for-purpose" analyses if required. To date, such fit-for-purpose evaluations have not been recognized as necessary. Should this change at some point in the future, the process would likely follow closely the California Bridge Design Specifications and other related documents in a Demand/Capacity format. Such an evaluation would need to have a peer review conducted by the Toll Bridge Seismic Safety Peer Review Panel. Dr. John Barsom has provided an example of one approach to evaluating the potential for an assumed large crack across a weld and into the base metal to propagate. This should be recognized as an example of a powerful tool that could be part of an important evaluation at such a time that a fit-for-purpose</td><td>Per meeting notes from 02/17/11:

Demand and Capacity Analysis of Welds :

(Department's Comments) Structure Rep and the QA Principal of the OBG commented that there is no need at this point for a fit-for-purpose demand and capacity analysis of the welds.

(Brian Maroney's comments) The mapping of tension regions is complete and if necessary, the team has demand estimates that could be used to perform "fit-for-purpose" analyses if required. To date, such fit-for-purpose evaluations have not been recognized as necessary. Should this change at some point in the future, the process would likely follow closely the California Bridge Design Specifications and other related documents in a Demand/Capacity format. Such an evaluation would need to have a peer review conducted by the Toll Bridge Seismic Safety Peer Review Panel. Dr. John Barsom has provided an example of one approach to evaluating the potential for an assumed large crack across a weld and into the base metal to propagate. This should be recognized as an example of a powerful tool that could be part of an important evaluation at such a time that a fit-for-purpose study becomes necessary.</td><td>No comment.</td></tr>
</table>

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ID	Status Source Doc	Title	Actions/ (Due Date)	February 17, 2011 Status Update/Comments	March 16, 2011 Status Update/Comments
7	Open	Comment 1 (dated 1/5/11) Brian M. question - Has the bridge been inspected to the requirements in the contract documents? Statements to be provided by S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh? (ACTION) All parties to provide statements by Monday, 1/10/11. Brian M. comment - The contract documents account for members that carry tension and identify which elements of the bridge are to be inspected for tension criteria and this documentation included elements throughout the bridge (e.g. Lifts 1-12). Text such as on page 8 of 31 that state Lifts 1-12	1. All parties (S. Lawton and D. McQuaid, D. Ragor and M. Wahbeh?) to provide statements by Monday, 1/10/11.	No comment.	No comment.
8	Open	Draft Report - Comment 2 (dated 1/5/11) Brian M. comment - The QA/QC expert consultant report is draft and is a work in progress. The project team has met and discussed the document, its intent, and several elements of the report. Those discussion have led to a new organized focus group to update the effort, including clearly defining the purpose of the group (including the QA/QC expert consulting group) and providing high quality information and data to the group in order to improve responses and documentation.		No comment.	No comment.

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9	Open	Draft Report - Comment 3 (dated 1/5/11) Brian M. comment - Progress of bridge opening date slower than expected, due in part to inspection repair iteration that is not disallowed by the code or contract documents. There is a strong desire to reduce the iterations and speed up delivery, while maintaining necessary quality.		No comment.	No comment.
10	Open	Draft Report - Comment 4 (dated 1/5/11) Brian M. comment - A significant portion of the iterations are due to development of transverse crack-like indication in some welds.		No comment.	No comment.
11	Open	Draft Report - Comment 5 (dated 1/5/11) Brian M. comment - The transverse indications are predominantly from contaminants.		No comment.	No comment.
12	Open	Draft Report - Comment 6 (dated 1/5/11) Brian M. comment - The transverse indications are of significant concern only in the full FCAW welds.		No comment.	No comment.

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13	Open	Draft Report - Comment 7 (dated 1/5/11) Brian M. comment - The previous welds have been inspected and repaired until acceptable and meeting the requirements in the contract documents.		No comment.	No comment.
14	Open	Draft Report - Comment 8 (dated 1/5/11) Brian M. comment - The early data from the change in the welding process that includes a switch in wire, increase in heat, and changing gas and delivery system, is effectively removing the transverse indications, though there are learning curve challenges and in some ways the wire is harder to work with for the welders. It is expected that improvements can continue.		No comment.	No comment.
15	Open	Draft Report - Comment 9 (dated 1/5/11) Brian M. comment - The QC and QA teams, or both together, if requested, can investigate FCAW welds on thoughtfully selected sample groups of welds on Lifts 13 and 14 to use to gather information to use to project on to the full population of similar welds to continue to improve the entire bridge fabrication efficiency.		No comment.	No comment.

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16	Open	Draft Report - Comment 10 (dated 1/5/11) Group discussion on Draft Report: a. (ACTION) ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract	1. ABF-China to determine which of the Tension Member/Stress Reversal Member (as specified on sheet 426C of Contract Drawings) that are FCAW and how much NDT inspection was required and was performed. Use NDT table provided on CCO 22 to identify which are FCAW (by 1/20/11). 2. Draft Report 8 will remain in draft form and the group will move forward with documenting the on-going weekly and monthly meetings in the SAS Steel Fabrication Expert Panel Monthly Review Notes. The Draft ~~8~~ 9 dated January ~~11~~ 12, 2011, supersedes all prior versions of this report. Panel signatures are not required from draft reports to make it clear that they are draft.	No comment.	No comment.
17	NA	Other Items		Other Items • Seismic Peer Review Panel Meeting Preparation Brian Maroney will take the lead in the presentation to the Peer Review Panel on February 18th. Next Meeting: March 28-30, 2011 in China Draft Agenda Day 1 – ZPMC shop 1. Introductions –All 2. Status of Action Items from the Draft Report Guideline Discussion • Status of TLI's – Steve Lawton (Ref. Tab 3 of Binder) New TLI's Since Last Meeting Status of Investigation of Previously Reported TLI's • Status of Welding Inspection Mapping – Steve Lawton (Ref. Tab 4) • Summary of the Tension/Compression Mapping – Marwan Nader (Ref. Tab 5) 3. Demand and Capacity Analysis of Welds - Brian Maroney (Ref. Tab 6) 4. Review of any changes made to the Expert Panel Draft Report – Issued Jan. 12, 2011 – Rev 9 as a result of group review actions due by March 7th (Ref. Tab 7) 5. Other Items 6. Summary of Action Items from Today's Meeting Day 2 (Caltrop Office in Pudong, VTC) 1. QA/QC Expert Panel workshop on focus discussion on Item 6 – All Day 3 - ZPMC Shop 1. Shop Tour (Optional) 2. Review and finalize action items developed through January China visit and meetings 3. Next Monthly Meeting • Date • Location • Draft Agenda	Per meeting notes from 3/16/11: 3. Review of Upcoming Meetings a. Weekly QA/QC Meetings: 3/23 b. Teleconference with SPRP (QA/QC Panel is invited to participate): 9am on 3/24 1. Distribute meeting material to group by 3/21 2. Review of Draft Agenda - Bay Bridge - SAS (30-45 min) – presentation of highlights of the material a) CCO 134 Skin Plate Flatness b) Electroslag Welding c) QA/QC of Fabrication in China d) Bolts - Antioch - Dumbarton c. Monthly QA/QC Meetings: 3/28, 3/29 (starting at 9am) 1. Location – ABF Conference room, Oakland 2. Review of Draft Agenda Day 1: 1. Introductions –All 2. Status of Action Items from the Draft Report Guideline Discussion a. Status of TLI's with new FCAW weld process – Steve Lawton (Ref. Tab 3 of Binder) b. Status of Welding Inspection Mapping – Steve Lawton (Ref. Tab 4) c. Summary of the Tension/Compression Mapping – Marwan Nader (Ref. Tab 5) 3. Project Team Response to the Expert Panel Draft Report - Issued Jan. 12, 2011 – Rev 9 (Ref. Tab 7) 4. Expert Panel Comments/Concurrence to the Project Team Response 5. Other Items 6. Summary of Action Items from Today's Meeting

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ID	Status	Title	Actions/ (Due Date)		
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					Day 2: 1. Expert Panel Comments to the Project Team Response 2. Expert Panel Concurrence to the Updated/Final Project Team Response 3. Review of upcoming meetings: - 4/6 Pre-TBPOC Meeting - 4/7 TBPOC Meeting - April Expert Panel Monthly Review Meeting d. Pre- TBPOC Meeting with SPRP (QA/QC Panel is invited to participate): 9am on 4/6 - Location – SAS Trailer (9am) - Distribute meeting material to group by 4/4(?) - Review of Draft Agenda e. TBPOC Meeting with SPRP (QA/QC Panel is invited to participate): 4/7 - Location – Mission Bay Trailer (10am) - Distribute meeting material to group by 4/4(?) - Review of Draft Agenda
18	NA	Strategy Moving Forward	ratio to be further discussed between ABF and the Department during the Wednesday weekly meetings. 2. As requested by the Panel, the Department will provide data from MTR's and check samples. 3. ABF-China to provide mapping of all FCAW welds and identify which ones are ground flush and UT'd using Scanning Pattern D. Design will	No comment.	No comment.
19	NA	General Comments		Per meeting notes from 02/17/11: (Brian's comments) It is important to continue to recognize this as a "work in progress," and I want to emphasize "progress." As stated during the last meeting, the complex focused team that was assembled in response to the November 2010 report continues to work to improve performance via the welding process that includes the ESAB wire with Ar-Co2 gas shielding, different gas delivery system, and enhancements to the QC program. Additionally, the team is continuing to investigate and map welds focusing on the "welds of interest," those welds that are 100% FCAW, performed using the previous welding procedure that included the Hyundai wire, the manifold gas delivery system, in locations throughout the bridge that are expected to experience cyclic tension under service load conditions. These three criteria are fundamental and worth repeating: 1) 100% FCAW, 2) Welded using the previous welding procedure that included the Hyundai wire, CO2 gas shielding, 3) In locations expected to experience cyclic tension. In the process that has been developed to organize the massive amounts of data and evaluate it, it has become clear that two additional criteria are surfacing to filter out welds that are not of interest. Those additional criteria are: 4) welds that are documented to have very low rejection rates (e.g., ~1% and even lower), and 5) welds that have not been inspected to near 100%.	No comment.
20	Open	Expert Panel Draft Report		Per meeting notes from 2/17/11: Review of the Expert Panel Draft Report – Issued Jan. 12, 2011 – Rev 9 (Ref. Tab 7) (ACTION) The report will be jointly updated at a future date and will supersede the Revision 9 draft report. Brian Petersen will lead the effort in the preparation of the final report. (ACTION) Group to provide any comments to revision of the Revision 9 Draft Report by March 7th.	No comment.

SAS Steel Fabrication Expert Panel Monthly Review

ID	Status	Title	Actions/ (Due Date)		
	Source Doc			February 17, 2011 Status Update/Comments	March 16, 2011 Status Update/Comments
21	NA	General Panel Comments		Per meeting notes from 2/17/11: [Panel Comment] The Panel acknowledges the efforts of those involved to incorporate the recommendations madeby the Panel in November, 2010 and believes that these efforts have significantly improved the quality of fabrication. Analysis of the NDT results following the adoption of the new welding process confirms that the Hydrogen problem has been resolved. The Panel expects that the new welding process requirements will be adhered to for the remainder of fabrication.	No comment.
22	Open	Project Team Response to Expert Panel Report			Per meeting notes from 3/16/11: Discussion of Project Team (TEAM)'s Formal Response to Expert Panel Draft Report • Project Team Formal Response to forward to Panel for their review: March 24, 2011 • Department to present the Project Team Formal Response to TBPOC: April 2011 TBPOC meeting

APPENDIX D

EXHIBIT 3.1: NEW FCAW WELDING PROCESS STATISTICS

General Overview:

1. The objective of Exhibit 3.1 is to show that by a change to the new FCAW welding process, the occurrence of hydrogen related discontinuities have been eliminated.

2. This Exhibit is a collection of NDT results from the onset of new FCAW welding process that commenced on November 29, 2010.

Page No.	Highlights/Notes
Pages 2-4	Indicates UT results of CJP welds using Scanning Pattern D. In the “Remarks” Column, it is important to note that not all TLI’s were investigated to determine the actual discontinuities present, however a sufficient amount were investigated, none of which revealed a hydrogen related discontinuity. In any case, all discontinuities found were repaired and re-inspected.
Page 5	Chart represents “D Scan Results” from pages 2-4 data. Average reject rate is 5.3%, which is well within industry standards for welds requiring 100% UT inspection.
Pages 6, 7 and 8	Indicates UT results for CJP “T” welds, from different welding positions, using Scanning Pattern E.
Page 9	Chart represents “UT Results with E Scan of Lift 13 and 14 CJP Welds in Bay 14” from pages 6-8 data. Describes the average reject rate based on weld position and shows the average reject rate for each of the weld positions.
Pages 10-17	Provides statistics of MT results by weld type and position.
Pages 18 and 19	Indicates UT results for welds on components other than OBG (i.e. suspender brackets, Traveler Rails, Steel barriers, etc.)
Page 20	Chart represents UT results for New FCAW Welding Process Statistics for Welds on components other than OBG, from pages 18 and 19 data.
Page 21	Indicates MT results for welds on components other than OBG such as Bike Path.
Pages 22 and 23	Photos showing welding access limitations and the difficulty of welding in the 2G position for majority of welds in Lift 13 and Lift 14.

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - UT with D Scan Results

Items	Lift	Description	Welds	Type of Weld	Length of Weld (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Remarks	Hydrogen Present	Length of Discontinuities (mm)	Reject Rate	Location
							Root	Fill+Cap	Back Gouging	Back Side						
1	11EE	SP-EP Holdback	SP-EP-E1 @ FS11	CJP	600	02-Dec-10	FCAW	FCAW	Yes	SMAW	2	No TLI's recorded.	No	80	13.3%	Trial Assembly
2	11EE	SP-EP Holdback	SP-EP-E6 @ FS11	CJP	700	06-Dec-10	FCAW	FCAW	Yes	SMAW	2	No TLI's recorded.	No	30	4.3%	Trial Assembly
3	11EE	BP-SP Split Weld	BP-SP-E3 @ FS11	CJP	1,100	05-Dec-10	FCAW	FCAW	Yes	SMAW	1	No TLI's recorded.	No	1100	100.0%	Trial Assembly
4	11EE	BP-SP Split Weld	BP-SP-E4 @ FS11	CJP	1,050	03-Dec-10	FCAW	FCAW	Yes	SMAW	5	2 TLI's recorded. Investigation of 2 TLI's revealed slag inclusions.	No	76	7.2%	Trial Assembly
5	12AE	SP-EP Holdback	SP-EP-E6 @ FS11	CJP	600	06-Dec-10	FCAW	FCAW	Yes	SMAW	3	No TLI's recorded.	No	60	10.0%	Trial Assembly
6	12AE	SP-EP Holdback	SP-EP-E1 PP111-111.5	CJP	1,200	12-Mar-11	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Trial Assembly
7	12AE	BP-SP Split Weld	BP-SP-E3 @ FS11	CJP	1,200	05-Dec-10	FCAW	FCAW	Yes	SMAW	2	1 TLI recorded. Investigation of 1 TLI revealed slag inclusions.	No	25	2.1%	Trial Assembly
8	12AE	BP-SP Split Weld	BP-SP-E4 @ FS11	CJP	1,200	03-Dec-10	FCAW	FCAW	Yes	SMAW	2	2 TLI's recorded. Investigation of 2 TLI's revealed slag inclusions.	No	18	1.5%	Trial Assembly
9	12AE-12BE	DP Trans. Seam	DP-A1, A2, A10	CJP	27,280	23-Dec-10	FCAW	SAW	No	N/A	26	16 TLI's recorded. Investigation of 4 TLI's revealed fusion indications.	No	447	1.6%	Trial Assembly
10	12AE-12BE	BP Trans. Seam	BP-D6	CJP	8,500	20-Dec-10	FCAW	FCAW	Yes	SMAW	2	No TLI's recorded.	No	45	0.5%	Trial Assembly
11	12AE-12BE	SP Trans. Seam	SP-C4-5	CJP	10,545	21-Dec-10	FCAW	FCAW	Yes	SMAW	16	No TLI's recorded.	No	320	3.0%	Trial Assembly
12	12AE-12BE	SP Trans. Seam	SP-E7-8	CJP	10,545	20-Dec-10	FCAW	FCAW	Yes	SMAW	18	No TLI's recorded.	No	385	3.7%	Trial Assembly
13	12AE-12BE	BP-SP Split Weld	BP-SP-E3	CJP	2,200	19-Dec-10	FCAW	FCAW	Yes	SMAW	6	4 TLI's recorded. Investigation of 4 TLI's revealed slag inclusions.	No	76	3.5%	Trial Assembly
14	12AE-12BE	BP-SP Split Weld	BP-SP-E4	CJP	2,000	18-Dec-10	FCAW	FCAW	Yes	SMAW	2	No TLI's recorded.	No	100	5.0%	Trial Assembly
15	12AE-12BE	SP-EP Holdback	SP-EP-E1 Holdback Areas	CJP	1,150	18-Dec-10	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Trial Assembly
16	12AE-12BE	SP-EP Holdback	SP-EP-E6 Holdback Areas	CJP	1,100	18-Dec-10	FCAW	FCAW	Yes	SMAW	5	5 TLI's recorded. Investigation of 2 TLI's revealed slag inclusions.	No	40	3.6%	Trial Assembly
17	12BE-12CE	BP-SP Split Weld	BP-SP-E3	CJP	1,450	13-Jan-11	FCAW	FCAW	Yes	SMAW	6	No TLI's recorded.	No	340	23.4%	Trial Assembly
18	12BE-12CE	BP-SP Split Weld	BP-SP-E4	CJP	1,470	13-Jan-11	FCAW	FCAW	Yes	SMAW	8	2 TLI's recorded. Investigation of 2TLI's, nothing found.	No	318	21.6%	Trial Assembly
19	12BE-12CE	SP-EP Holdback	SP-EP-E1 Holdback Areas	CJP	990	11-Jan-11	FCAW	FCAW	Yes	SMAW	1	No TLI's recorded.	No	30	3.0%	Trial Assembly
20	12BE-12CE	SP-EP Holdback	SP-EP-E6 Holdback Areas	CJP	1,060	13-Jan-11	FCAW	FCAW	Yes	SMAW	2	1 TLI recorded. Investigation of 1 TLI, nothing found.	No	28	2.6%	Trial Assembly
21	12BE-12CE	DP Trans. Seam	DP-A1, A2, A10	CJP	27,280	06-Jan-11	FCAW	SAW	No	N/A	25	8 TLI's recorded. Investigation of 2 TLI's revealed slag inclusions.	No	481	1.8%	Trial Assembly
22	12BE-12CE	BP Trans. Seam	BP-D6	CJP	8,500	12-Jan-11	FCAW	FCAW	Yes	SMAW	16	No TLI's recorded.	No	615	7.2%	Trial Assembly
23	12BE-12CE	SP Trans. Seam	SP-C4-5	CJP	10,545	22-Jan-11	FCAW	FCAW	Yes	SMAW	18	1 TLI recorded. Investigation of 1 TLI, nothing found.	No	1140	10.8%	Trial Assembly

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - UT with D Scan Results

Items	Lift	Description	Welds	Type of Weld	Length of Weld (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Remarks	Hydrogen Present	Length of Discontinuities (mm)	Reject Rate	Location
							Root	Fill+Cap	Back Gouging	Back Side						
24	12BE-12CE	SP Trans. Seam	SP-E7-8	CJP	10,545	15-Jan-11	FCAW	FCAW	Yes	SMAW	23	No TLI's recorded.	No	1080	10.2%	Trial Assembly
25	12AW-12BW	DP Trans. Seam	DP-A1, A2, A10	CJP	27,280	28-Dec-10	FCAW	SAW	Yes	SMAW	46	4 TLI's recorded. Investigation of 4 TLI's revealed 3 slag inclusions and 1 porosity.	No	1659	6.1%	Trial Assembly
26	12AW-12BW	BP Trans. Seam	BP-D6	CJP	8,500	23-Dec-10	FCAW	FCAW	Yes	SMAW	26	No TLI's recorded.	No	982	11.6%	Trial Assembly
27	12AW-12BW	SP Trans. Seam	SP-C4-5	CJP	10,545	21-Dec-10	FCAW	FCAW	Yes	SMAW	16	No TLI's recorded.	No	1350	12.8%	Trial Assembly
28	12AW-12BW	SP Trans. Seam	SP-E7-8	CJP	10,545	20-Dec-10	FCAW	FCAW	Yes	SMAW	22	No TLI's recorded.	No	622	5.9%	Trial Assembly
29	12BW-12CW	DP Trans. Seam	DP-A1, A2, A10	CJP	27,280	15-Jan-11	FCAW	SAW	Yes	SMAW	39	3 TLI's recorded. Investigation of 3 TLI's revealed 1 porosity and 2 nothing.	No	1165	4.3%	Trial Assembly
30	12BW-12CW	SP Trans. Seam	BP-D6	CJP	8,500	15-Jan-11	FCAW	FCAW	Yes	SMAW	30	No TLI's recorded.	No	1075	12.6%	Trial Assembly
31	12BW-12CW	SP Trans. Seam	SP-C4-5	CJP	10,545	17-Jan-11	FCAW	FCAW	Yes	SMAW	24	3 TLI's recorded. Investigation of 3TLI's revealed 2 slag inclusions and 1 porosity.	No	503	4.8%	Trial Assembly
32	12BW-12CW	SP Trans. Seam	SP-E7-8	CJP	10,545	26-Jan-11	FCAW	FCAW	Yes	SMAW	26	No TLI's recorded.	No	1575	14.9%	Trial Assembly
33	13AE	SP3069A+EP3016A (C4+B3)	SEG3007AB-097, 098	CJP	3,317	20-Jan-11	FCAW	FCAW	Yes	SMAW	1	No TLI's recorded.	No	10	0.3%	Bay 14
34	13AE	SP3058A+EP3013A (E8+F9)	SEG3007AB-017	CJP	3,307	24-Jan-11	FCAW	FCAW	Yes	SMAW	4	No TLI's recorded.	No	70	2.1%	Bay 14
35	13AE	SP3058B+EP3013B (E8+F9)	SEG3007AB-018	CJP	3,472	09-Jan-11	FCAW	FCAW	Yes	SMAW	1	No TLI's recorded.	No	10	0.3%	Bay 14
36	13AE	SP3058C+EP3013C (E8+F9)	SEG3007AB-019	CJP	1,465	08-Jan-11	FCAW	FCAW	Yes	SMAW	2	No TLI's recorded.	No	40	2.7%	Bay 14
37	13AE	SP3058D+EP3013D (E8+F9)	SEG3007AB-020	CJP	1,465	09-Jan-11	FCAW	FCAW	Yes	SMAW	2	No TLI's recorded.	No	40	2.7%	Bay 14
38	13AE	SP3058E+EP3013E (E8+F9)	SEG3007AB-021	CJP	3,470	09-Jan-11	FCAW	FCAW	Yes	SMAW	7	6 TLI's recorded. Investigation of 6 TLI's, nothing found..	No	85	2.4%	Bay 14
39	13AE	SP3058F+EP3013F (E8+F9)	SEG3007AB-022	CJP	400	09-Jan-11	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
40	13BE	DP3088A+DP3089A	SEG3009-004	CJP	9,491	18-Jan-11	FCAW	SAW	No	N/A	24	No TLI's recorded.	No	1410	14.9%	Bay 14
41	13BE	DP3091A+DP3092A	SEG3009-007	CJP	9,366	21-Jan-11	FCAW	SAW	No	N/A	20	No TLI's recorded.	No	585	6.2%	Bay 14
42	13CE	DP3101A+DP3102A	SEG3011-004	CJP	12,080	19-Jan-11	FCAW	SAW	No	N/A	23	No TLI's recorded.	No	660	5.5%	Bay 14
43	13CE	DP3104A+DP3105A	SEG3011-007	CJP	11,975	20-Jan-11	FCAW	SAW	No	N/A	13	No TLI's recorded.	No	400	3.3%	Bay 14
44	13AW	SP-EP-W16 (E8-F9)	SEG3013AA-106	CJP	3,470	19-Dec-10	FCAW	FCAW	Yes	SMAW	1	No TLI's recorded.	No	20	0.6%	Bay 14
45	14E	DP Trans. Seam	DP3157-001-013	CJP	1,730	19-Dec-10	FCAW	SAW	Yes	SAW	1	1 TLI recorded. Investigation of 1 TLI, nothing found.	No	10	0.6%	Bay 14
46	14E	DP Trans. Seam	DP3158-001-017	CJP	2,400	19-Dec-10	FCAW	SAW	Yes	SAW	1	No TLI's recorded.	No	30	1.3%	Bay 14
47	14E	DP Trans. Seam	DP3159-001-021	CJP	3,000	19-Dec-10	FCAW	SAW	Yes	SAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
48	14E	DP Trans. Seam	DP3160-001-001	CJP	3,000	19-Dec-10	FCAW	SAW	Yes	SAW	2	No TLI's recorded.	No	30	1.0%	Bay 14
49	14E	DP Trans. Seam	DP3167-001-030	CJP	3,000	19-Dec-10	FCAW	SAW	Yes	SAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
50	14E	DP Trans. Seam	DP3161-001-392	CJP	3,000	19-Dec-10	FCAW	SAW	Yes	SAW	2	No TLI's recorded.	No	46	1.5%	Bay 14

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - UT with D Scan Results

Items	Lift	Description	Welds	Type of Weld	Length of Weld (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Remarks	Hydrogen Present	Length of Discontinuities (mm)	Reject Rate	Location
							Root	Fill+Cap	Back Gouging	Back Side						
51	14E	DP Trans. Seam	DP3162-001-023	CJP	3,000	19-Dec-10	FCAW	SAW	Yes	SAW	2	1 TLI recorded. Investigation of 1 TLI revealed porosity and slag inclusions.	No	48	1.6%	Bay 14
52	14E	DP Trans. Seam	DP3163-001-017	CJP	2,400	19-Dec-10	FCAW	SAW	Yes	SAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
53	14E	DP Trans. Seam	DP3164-001-014	CJP	1,730	19-Dec-10	FCAW	SAW	Yes	SAW	2	No TLI's recorded.	No	60	3.5%	Bay 14
54	14E	SP-EP-E16 (E8-F9) (SP3116A-EP3027A)	SEG3019AL-294	CJP	1,502	28-Jan-11	FCAW	FCAW	Yes	SMAW	1	1 TLI recorded. Investigation of 1TLI revealed porosity.	No	8	0.5%	Bay 14
55	14E	SP-EP-E16 (E8-F9) (SP3116B-EP3027B)	SEG3019AL-004	CJP	4,977	12-Jan-11	FCAW	FCAW	Yes	SMAW	3	2TLI's recorded. Investigation of 2TLI's, nothing found.	No	45	0.9%	Bay 14
56	14E	SP-EP-E16 (E8-F9) (SP3116C-EP3027C)	SEG3019AL-295	CJP	4,978	12-Jan-11	FCAW	FCAW	Yes	SMAW	3	1 TLI's recorded. Investigation of 1TLI revealed slag inclusion.	No	50	1.0%	Bay 14
57	14E	SP-EP-E16 (M7-F9) (SP3116E-EP3027D)	SEG3019AG-007	CJP	5,107	25-Jan-11	FCAW	FCAW	Yes	SMAW	9	No TLI's recorded.	No	165	3.2%	Bay 14
58	14E	AP3004A-AP3005A	SEG3019AP-004	CJP	9,980	10-Jan-11	FCAW	SAW	Yes	SMAW	1	No TLI's recorded.	No	25	0.3%	Bay 14
59	14W	DP Trans. Seam	DP3169-001-014	CJP	1,730	20-Dec-10	FCAW	SAW	Yes	SAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
60	14W	DP Trans. Seam	DP3170-001-017	CJP	2,400	20-Dec-10	FCAW	SAW	Yes	SAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
61	14W	DP Trans. Seam	DP3171-001-023	CJP	3,000	20-Dec-10	FCAW	SAW	Yes	SAW	1	No TLI's recorded.	No	10	0.3%	Bay 14
62	14W	DP Trans. Seam	DP3172-001-392	CJP	3,000	20-Dec-10	FCAW	SAW	Yes	SAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
63	14W	DP Trans. Seam	DP3173-001-030	CJP	3,000	20-Dec-10	FCAW	SAW	Yes	SAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
64	14W	DP Trans. Seam	DP3174-001-392	CJP	3,000	20-Dec-10	FCAW	SAW	Yes	SAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
65	14W	DP Trans. Seam	DP3175-001-021	CJP	3,000	20-Dec-10	FCAW	SAW	Yes	SAW	4	No TLI's recorded.	No	160	5.3%	Bay 14
66	14W	DP Trans. Seam	DP3176-001-017	CJP	2,400	20-Dec-10	FCAW	SAW	Yes	SAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
67	14W	DP Trans. Seam	DP3177-001-013	CJP	1,730	20-Dec-10	FCAW	SAW	Yes	SAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
68	14W	SP-EP-W16 (E8-F9)	SEG3020AG-063	CJP	1,593	15-Feb-11	FCAW	FCAW	Yes	SMAW	4	No TLI's recorded.	No	810	50.8%	Bay 14
69	14W	SP-EP-W16 (E8-F9)	SEG3020AG-008	CJP	4,977	15-Feb-11	FCAW	FCAW	Yes	SMAW	4	1 TLI recorded. Investigation of 1TLI, nothing found.		140	2.8%	Bay 14
70	14W	SP-EP-W16 (E8-F9)	SEG3020AG-064	CJP	4,979	15-Feb-11	FCAW	FCAW	Yes	SMAW	6	No TLI's recorded.	No	175	3.5%	Bay 14
				Total	394,441									20,907		

Note:

1) TLI - Transverse Linear Indication.
2) Investigations are performed during excavations on selected TLI's. All rejectable discontinuities, whether investigated or not, are repaired.
3) For UT of welds which are not scanned with "Pattern D" please refer to a separate tracking sheet.
4) Average Value of Reject Rate:

Reject Rate = Total Length of Discontinuities / Total Length of Weld

Reject Rate = 20,907 / 394,441

Reject Rate = 5.30%

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

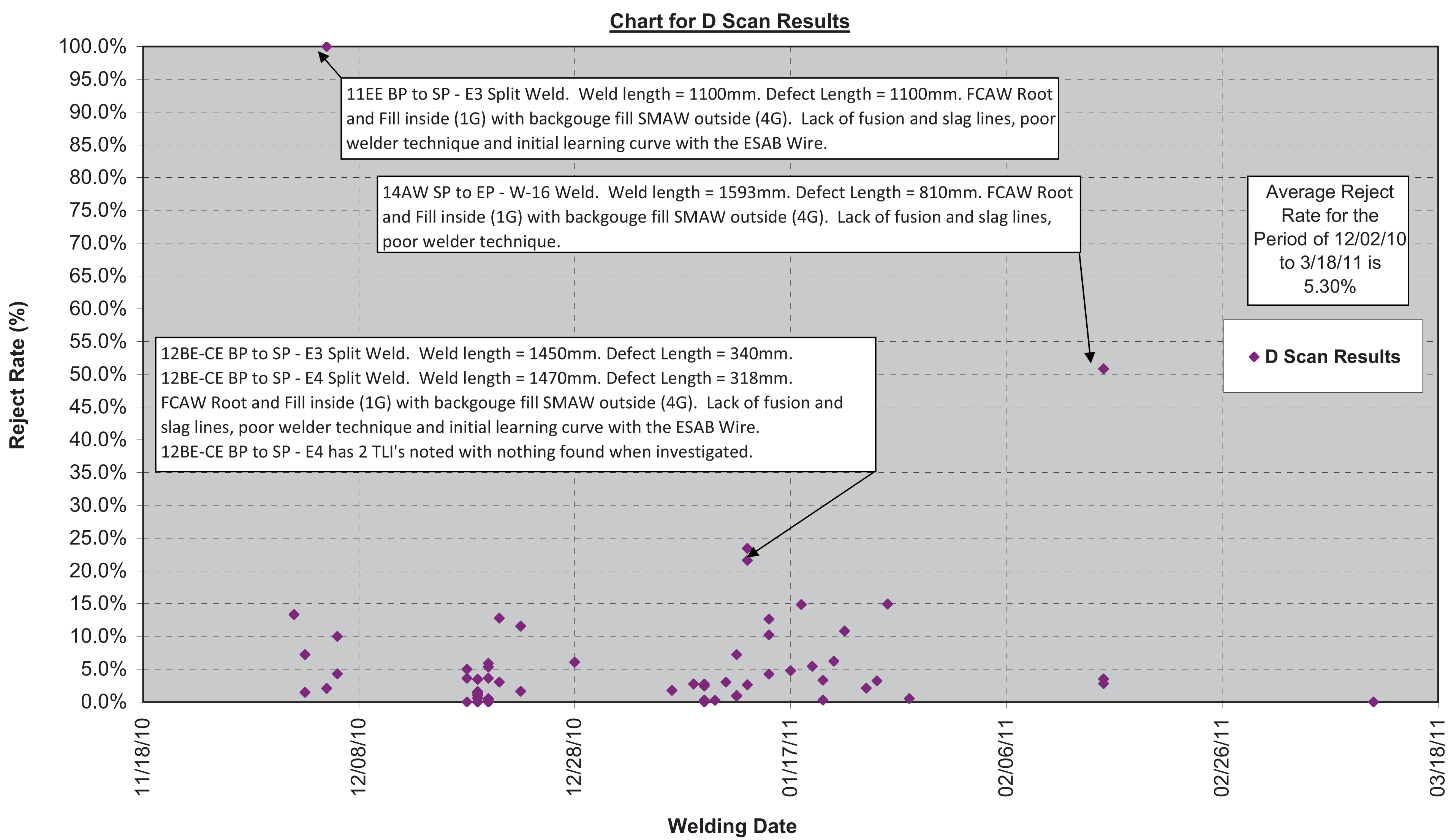


EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - Lift 13 & 14 CJP Welds in Bay 14 - UT with E Scan Results

Lift	Type of Weld	Welding Position	Duration	Weld Length of UT Tested (mm)	Number of Rejectable Discontinuities	Length of Discontinuities (mm)	Reject Rate	Location
Lift 13 & 14	CJP	1G	30/11-5/12/10	143,145	18	995	0.70%	Bay 14
Lift 13 & 14	CJP	1G	6/12-12/12/10	115,497	67	4,010	3.47%	Bay 14
Lift 13 & 14	CJP	1G	13/12-19/12/10	51,215	55	3,504	6.84%	Bay 14
Lift 13 & 14	CJP	1G	20/12-26/12/10	32,144	17	560	1.74%	Bay 14
Lift 13 & 14	CJP	1G	27/12-02/01/11	39,461	39	1,860	4.71%	Bay 14
Lift 13 & 14	CJP	1G	03/01-09/01/11	40,092	16	1,760	4.39%	Bay 14
Lift 13 & 14	CJP	1G	10/01-16/01/11	29,662	38	2,655	8.95%	Bay 14
Lift 13 & 14	CJP	1G	17/01-23/01/11	46,599	88	4,195	9.00%	Bay 14
Lift 13 & 14	CJP	1G	24/01-30/01/11	21,746	14	750	3.45%	Bay 14
Lift 13 & 14	CJP	1G	31/01-06/02/11	887	1	30	3.38%	Bay 14
Lift 13 & 14	CJP	1G	07/02-13/02/11	2,800	5	720	25.71%	Bay 14
Lift 13 & 14	CJP	1G	14/02-20/02/11	1,400	0	0	0.00%	Bay 14
Lift 13 & 14	CJP	1G	21/02-27/02/11	14,093	27	1,180	8.37%	Bay 14
Lift 13 & 14	CJP	1G	28/02-06/03/11	9,980	7	350	3.51%	Bay 14
Lift 13 & 14	CJP	1G	07/03-13/03/11	24,235	33	1,340	5.53%	Bay 14
Lift 13 & 14	CJP	1G	14/03-20/03/11	0	0	0	0.00%	Bay 14
Lift 13 & 14	CJP	1G	21/03-27/03/11	0	0	0	0.00%	Bay 14
			Total	572,956		23,909		

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - Lift 13 & 14 CJP Welds in Bay 14 - UT with E Scan Results

Lift	Type of Weld	Welding Position	Duration	Weld Length of UT Tested (mm)	Number of Rejectable Discontinuities	Length of Discontinuities (mm)	Reject Rate	Location
Lift 13 & 14	CJP	2G	30/11-5/12/10	3,120	9	480	15.38%	Bay 14
Lift 13 & 14	CJP	2G	6/12-12/12/10	3,120	9	430	13.78%	Bay 14
Lift 13 & 14	CJP	2G	13/12-19/12/10	3,470	7	2,000	57.64%	Bay 14
Lift 13 & 14	CJP	2G	20/12-26/12/10	36,924	77	16,150	43.74%	Bay 14
Lift 13 & 14	CJP	2G	27/12-02/01/11	74,856	235	19,630	26.22%	Bay 14
Lift 13 & 14	CJP	2G	03/01-09/01/11	32,271	50	10,573	32.76%	Bay 14
Lift 13 & 14	CJP	2G	10/01-16/01/11	40,151	80	5,705	14.21%	Bay 14
Lift 13 & 14	CJP	2G	17/01-23/01/11	5,075	11	400	7.88%	Bay 14
Lift 13 & 14	CJP	2G	24/01-30/01/11	9,916	15	223	2.25%	Bay 14
Lift 13 & 14	CJP	2G	31/01-06/02/11	0	0	0	0.00%	Bay 14
Lift 13 & 14	CJP	2G	07/02-13/02/11	0	0	0	0.00%	Bay 14
Lift 13 & 14	CJP	2G	14/02-20/02/11	21,679	47	4,945	22.81%	Bay 14
Lift 13 & 14	CJP	2G	21/02-27/02/11	12,685	13	530	4.18%	Bay 14
Lift 13 & 14	CJP	2G	28/02-06/03/11	2,539	3	160	6.30%	Bay 14
Lift 13 & 14	CJP	2G	07/03-13/03/11	33,857	36	2,255	6.66%	Bay 14
Lift 13 & 14	CJP	2G	14/03-20/03/11	0	0	0	0.00%	Bay 14
Lift 13 & 14	CJP	2G	21/03-27/03/11	0	0	0	0.00%	Bay 14
			Total	279,663		63,481		

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - Lift 13 & 14 CJP Welds in Bay 14 - UT with E Scan Results

Lift	Type of Weld	Welding Position	Duration	Weld Length of UT Tested (mm)	Number of Rejectable Discontinuities	Length of Discontinuities (mm)	Reject Rate	Location
Lift 13 & 14	CJP	3G	30/11-5/12/10	20,638	31	1,970	9.55%	Bay 14
Lift 13 & 14	CJP	3G	6/12-12/12/10	33,624	45	2,350	6.99%	Bay 14
Lift 13 & 14	CJP	3G	13/12-19/12/10	32,031	21	5,620	17.55%	Bay 14
Lift 13 & 14	CJP	3G	20/12-26/12/10	90,194	176	6,865	7.61%	Bay 14
Lift 13 & 14	CJP	3G	27/12-02/01/11	111,914	219	12,660	11.31%	Bay 14
Lift 13 & 14	CJP	3G	03/01-09/01/11	195,352	317	15,670	8.02%	Bay 14
Lift 13 & 14	CJP	3G	10/01-16/01/11	76,387	119	6,135	8.03%	Bay 14
Lift 13 & 14	CJP	3G	17/01-23/01/11	33,154	52	5,450	16.44%	Bay 14
Lift 13 & 14	CJP	3G	24/01-30/01/11	27,362	55	4,280	15.64%	Bay 14
Lift 13 & 14	CJP	3G	31/01-06/02/11	0	0	0	0.00%	Bay 14
Lift 13 & 14	CJP	3G	07/02-13/02/11	31,045	40	1,820	5.86%	Bay 14
Lift 13 & 14	CJP	3G	14/02-20/02/11	18,277	11	525	2.87%	Bay 14
Lift 13 & 14	CJP	3G	21/02-27/02/11	47,579	58	3,255	6.84%	Bay 14
Lift 13 & 14	CJP	3G	28/02-06/03/11	24,872	11	470	1.89%	Bay 14
Lift 13 & 14	CJP	3G	07/03-13/03/11	27,654	7	270	0.98%	Bay 14
Lift 13 & 14	CJP	3G	14/03-20/03/11	105,659	131	25,070	23.73%	Bay 14
Lift 13 & 14	CJP	3G	21/03-27/03/11	14,159	3	90	0.64%	Bay 14
			Total	889,901		92,500		

Note:

1) TLI - Transverse Linear Indication.
2) Investigations are peformed during excavations on selected TLI's. All rejectable discontinuities, whether investigated or not, are repaired.
3) For UT of welds which are not scanned with "Pattern D" please refer to a separate tracking sheet.
4) Average Value of Reject Rate as reported in Exhibit 3.1S1:

Reject Rate = Total Length of Discontinuities / Total Length of Weld

Reject Rate = 92,500 / 889,901

Reject Rate = 10.39%

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

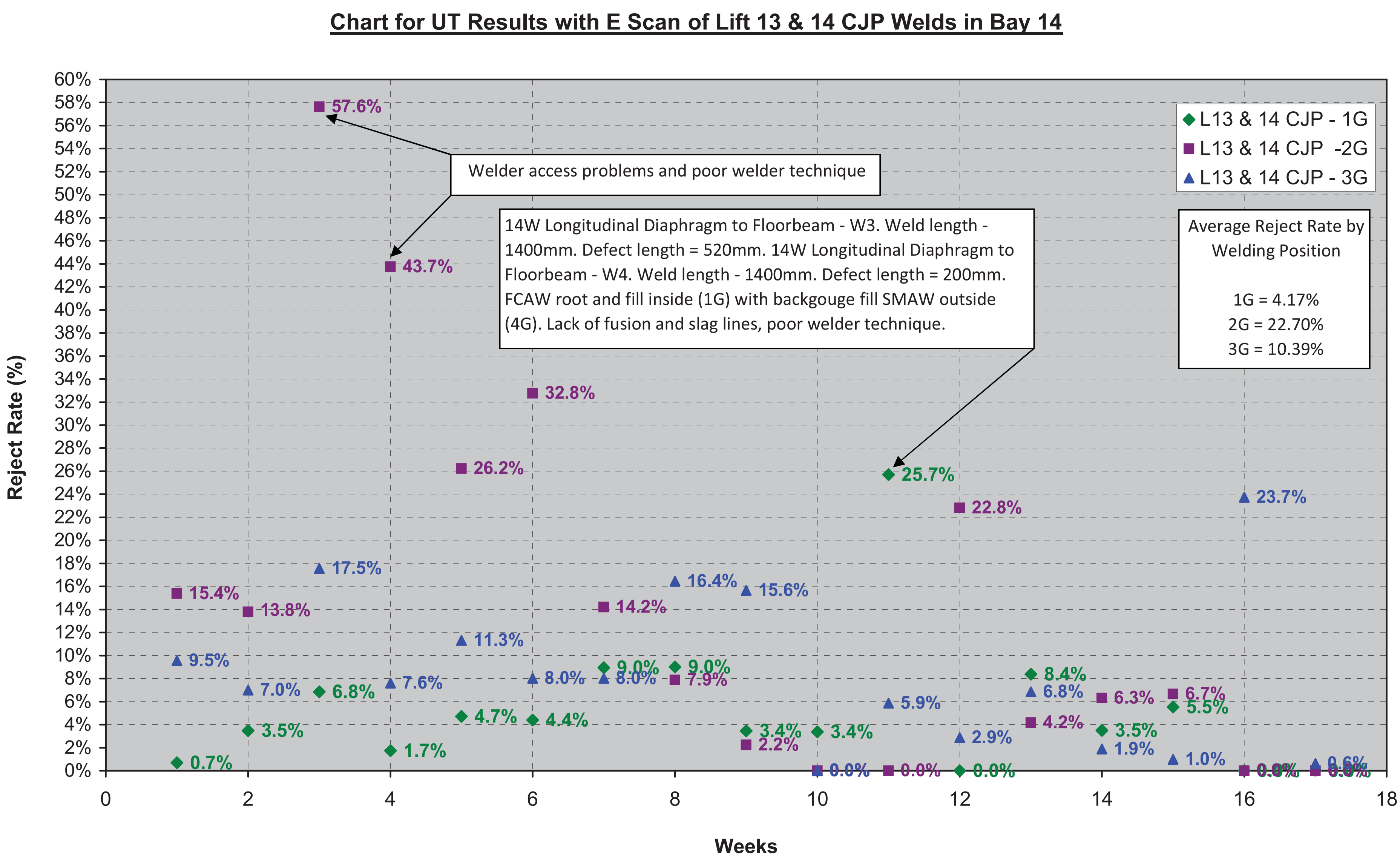


EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - Workshop 14 Welds - MT Results

Lift	Type of Weld	Welding Position	Duration	Weld Length of MT Tested (mm)	Rejectable Discontinities	Crack Indications after Investigation	Length of Discontinuities (mm)	Reject Rate	Location
L13 & 14	Fillet	1F	3Jan - 5Dec						Bay 14
L13 & 14	Fillet	1F	6Dec - 12Dec						Bay 14
L13 & 14	Fillet	1F	13Dec - 19Dec						Bay 14
L13 & 14	Fillet	1F	20Dec - 26Dec						Bay 14
L13 & 14	Fillet	1F	27Dec - 2Jan						Bay 14
L13 & 14	Fillet	1F	3Jan - 9Jan						Bay 14
L13 & 14	Fillet	1F	10Jan - 16Jan						Bay 14
L13 & 14	Fillet	1F	17Jan - 23Jan	13,800	10	0	57	0.41%	Bay 14
L13 & 14	Fillet	1F	24Jan - 30Jan						Bay 14
L13 & 14	Fillet	1F	31Jan - 06Feb						Bay 14
L13 & 14	Fillet	1F	07Feb - 13Feb						Bay 14
L13 & 14	Fillet	1F	14Feb - 20Feb						Bay 14
L13 & 14	Fillet	1F	21Feb - 27Feb	86,000	23	0	375	0.44%	Bay 14
L13 & 14	Fillet	1F	28Feb - 6Mar	13,440	22	0	620	4.61%	Bay 14
L13 & 14	Fillet	1F	7Mar - 13 Mar	41,180	36	0	910	2.21%	Bay 14
L13 & 14	Fillet	1F	14Mar - 20 Mar						Bay 14
L13 & 14	Fillet	1F	21Mar - 27 Mar	183,500	7	0	650	0.35%	Bay 14
L13 & 14	Fillet	2F	30Nov - 5Dec						Bay 14
L13 & 14	Fillet	2F	6Dec - 12Dec						Bay 14
L13 & 14	Fillet	2F	13Dec - 19Dec						Bay 14
L13 & 14	Fillet	2F	20Dec - 26Dec	291,600	10	0	40	0.01%	Bay 14
L13 & 14	Fillet	2F	27Dec - 2Jan						Bay 14
L13 & 14	Fillet	2F	3Jan - 9Jan	96,300	21	0	2,052	2.13%	Bay 14
L13 & 14	Fillet	2F	10Jan - 16Jan	212,300	5	0	200	0.09%	Bay 14
L13 & 14	Fillet	2F	17Jan - 23Jan	3,440	2	0	20	0.58%	Bay 14
L13 & 14	Fillet	2F	24Jan - 30Jan						Bay 14
L13 & 14	Fillet	2F	31Jan - 06Feb						Bay 14
L13 & 14	Fillet	2F	07Feb - 13Feb						Bay 14
L13 & 14	Fillet	2F	14Feb - 20Feb						Bay 14
L13 & 14	Fillet	2F	21Feb - 27Feb	80,000	25	0	1,100	1.38%	Bay 14
L13 & 14	Fillet	2F	28Feb - 6Mar						Bay 14
L13 & 14	Fillet	2F	7Mar - 13 Mar	298,400	13	0	343	0.11%	Bay 14
L13 & 14	Fillet	2F	14Mar - 20 Mar	450,720	64	0	2,685	0.60%	Bay 14
L13 & 14	Fillet	2F	21Mar - 27 Mar						Bay 14

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - Workshop 14 Welds - MT Results

Lift	Type of Weld	Welding Position	Duration	Weld Length of MT Tested (mm)	Rejectable Discontinities	Crack Indications after Investigation	Length of Discontinuities (mm)	Reject Rate	Location
L13 & 14	Fillet	3F	30Nov - 5Dec						Bay 14
L13 & 14	Fillet	3F	6Dec - 12Dec	48,000	5	0	30	0.06%	Bay 14
L13 & 14	Fillet	3F	13Dec - 19Dec	18,000	8	0	55	0.31%	Bay 14
L13 & 14	Fillet	3F	20Dec - 26Dec	39,600	125	0	380	0.96%	Bay 14
L13 & 14	Fillet	3F	27Dec - 2Jan						Bay 14
L13 & 14	Fillet	3F	3Jan - 9Jan	8,000	6	0	1,600	20.00%	Bay 14
L13 & 14	Fillet	3F	10Jan - 16Jan	140,400	40	0	155	0.11%	Bay 14
L13 & 14	Fillet	3F	17Jan - 23Jan						Bay 14
L13 & 14	Fillet	3F	24Jan - 30Jan						Bay 14
L13 & 14	Fillet	3F	31Jan - 06Feb						Bay 14
L13 & 14	Fillet	3F	07Feb - 13Feb						Bay 14
L13 & 14	Fillet	3F	14Feb - 20Feb						Bay 14
L13 & 14	Fillet	3F	21Feb - 27Feb	119,420	41	0	683	0.57%	Bay 14
L13 & 14	Fillet	3F	28Feb - 6Mar	41,300	20	0	376	0.91%	Bay 14
L13 & 14	Fillet	3F	7Mar - 13 Mar	285,750	68	0	1,995	0.70%	Bay 14
L13 & 14	Fillet	3F	14Mar - 20 Mar	5,600	6	0	180	3.21%	Bay 14
L13 & 14	Fillet	3F	21Mar - 27 Mar						Bay 14
L13 & 14	Fillet	4F	30Nov - 5Dec						Bay 14
L13 & 14	Fillet	4F	6Dec - 12Dec						Bay 14
L13 & 14	Fillet	4F	13Dec - 19Dec						Bay 14
L13 & 14	Fillet	4F	20Dec - 26Dec						Bay 14
L13 & 14	Fillet	4F	27Dec - 2Jan						Bay 14
L13 & 14	Fillet	4F	3Jan - 9Jan						Bay 14
L13 & 14	Fillet	4F	10Jan - 16Jan	55,000	20	0	1,100	2.00%	Bay 14
L13 & 14	Fillet	4F	17Jan - 23Jan						Bay 14
L13 & 14	Fillet	4F	24Jan - 30Jan						Bay 14
L13 & 14	Fillet	4F	31Jan - 06Feb						Bay 14
L13 & 14	Fillet	4F	07Feb - 13Feb						Bay 14
L13 & 14	Fillet	4F	14Feb - 20Feb						Bay 14
L13 & 14	Fillet	4F	21Feb - 27Feb						Bay 14
L13 & 14	Fillet	4F	28Feb - 6Mar						Bay 14
L13 & 14	Fillet	4F	7Mar - 13 Mar	40,000	1	0	4	0.01%	Bay 14
L13 & 14	Fillet	4F	14Mar - 20 Mar	71,000	20	0	1,180	1.66%	Bay 14
L13 & 14	Fillet	4F	21Mar - 27 Mar						Bay 14

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - Workshop 14 Welds - MT Results

Lift	Type of Weld	Welding Position	Duration	Weld Length of MT Tested (mm)	Rejectable Discontinities	Crack Indications after Investigation	Length of Discontinuities (mm)	Reject Rate	Location
L13 & 14	PJP	1G	30Nov - 5Dec	6,800	4	0	18	0.26%	Bay 14
L13 & 14	PJP	1G	6Dec - 12Dec						Bay 14
L13 & 14	PJP	1G	13Dec - 19Dec						Bay 14
L13 & 14	PJP	1G	20Dec - 26Dec						Bay 14
L13 & 14	PJP	1G	27Dec - 2Jan						Bay 14
L13 & 14	PJP	1G	3Jan - 9Jan	47,200	32	0	1,190	2.52%	Bay 14
L13 & 14	PJP	1G	10Jan - 16Jan						Bay 14
L13 & 14	PJP	1G	17Jan - 23Jan	328,850	63	0	2,350	0.71%	Bay 14
L13 & 14	PJP	1G	24Jan - 30Jan						Bay 14
L13 & 14	PJP	1G	31Jan - 06Feb						Bay 14
L13 & 14	PJP	1G	07Feb - 13Feb						Bay 14
L13 & 14	PJP	1G	14Feb - 20Feb						Bay 14
L13 & 14	PJP	1G	21Feb - 27Feb						Bay 14
L13 & 14	PJP	1G	28Feb - 6Mar	220,000	49	0	2,005	0.91%	Bay 14
L13 & 14	PJP	1G	7Mar - 13 Mar	51,720	11	0	300	0.58%	Bay 14
L13 & 14	PJP	1G	14Mar - 20 Mar						Bay 14
L13 & 14	PJP	1G	21Mar - 27 Mar						Bay 14

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - Workshop 14 Welds - MT Results

Lift	Type of Weld	Welding Position	Duration	Weld Length of MT Tested (mm)	Rejectable Discontinities	Crack Indications after Investigation	Length of Discontinuities (mm)	Reject Rate	Location
L13 & 14	PJP	2G	30Nov - 5Dec						Bay 14
L13 & 14	PJP	2G	6Dec - 12Dec						Bay 14
L13 & 14	PJP	2G	13Dec - 19Dec						Bay 14
L13 & 14	PJP	2G	20Dec - 26Dec						Bay 14
L13 & 14	PJP	2G	27Dec - 2Jan						Bay 14
L13 & 14	PJP	2G	3Jan - 9Jan						Bay 14
L13 & 14	PJP	2G	10Jan - 16Jan	164,560	68	0	1,585	0.96%	Bay 14
L13 & 14	PJP	2G	17Jan - 23Jan	68,000	28	0	4,000	5.88%	Bay 14
L13 & 14	PJP	2G	24Jan - 30Jan						Bay 14
L13 & 14	PJP	2G	31Jan - 06Feb						Bay 14
L13 & 14	PJP	2G	07Feb - 13Feb						Bay 14
L13 & 14	PJP	2G	14Feb - 20Feb						Bay 14
L13 & 14	PJP	2G	21Feb - 27Feb						Bay 14
L13 & 14	PJP	2G	28Feb - 6Mar	15,000	8	0	59	0.39%	Bay 14
L13 & 14	PJP	2G	7Mar - 13 Mar						Bay 14
L13 & 14	PJP	2G	14Mar - 20 Mar	215,700	44	0	1,535	0.71%	Bay 14
L13 & 14	PJP	2G	21Mar - 27 Mar	39,000	11	0	540	1.38%	Bay 14
L13 & 14	PJP	3G	30Nov - 5Dec	6,800	5	0	20	0.29%	Bay 14
L13 & 14	PJP	3G	6Dec - 12Dec						Bay 14
L13 & 14	PJP	3G	13Dec - 19Dec						Bay 14
L13 & 14	PJP	3G	20Dec - 26Dec						Bay 14
L13 & 14	PJP	3G	27Dec - 2Jan						Bay 14
L13 & 14	PJP	3G	3Jan - 9Jan	9,000	6	0	238	2.64%	Bay 14
L13 & 14	PJP	3G	10Jan - 16Jan	67,400	21	0	730	1.08%	Bay 14
L13 & 14	PJP	3G	17Jan - 23Jan	34,050	22	0	613	1.80%	Bay 14
L13 & 14	PJP	3G	24Jan - 30Jan						Bay 14
L13 & 14	PJP	3G	31Jan - 06Feb						Bay 14
L13 & 14	PJP	3G	07Feb - 13Feb						Bay 14
L13 & 14	PJP	3G	14Feb - 20Feb						Bay 14
L13 & 14	PJP	3G	21Feb - 27Feb	67,640	31	0	1,235	1.83%	Bay 14
L13 & 14	PJP	3G	28Feb - 6Mar	33,600	35	0	488	1.45%	Bay 14
L13 & 14	PJP	3G	7Mar - 13 Mar	23,850	40	0	975	4.09%	Bay 14
L13 & 14	PJP	3G	14Mar - 20 Mar	1,220	2	0	10	0.82%	Bay 14
L13 & 14	PJP	3G	21Mar - 27 Mar	83,000	16	0	820	0.99%	Bay 14

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - Workshop 14 Welds - MT Results

Lift	Type of Weld	Welding Position	Duration	Weld Length of MT Tested (mm)	Rejectable Discontinities	Crack Indications after Investigation	Length of Discontinuities (mm)	Reject Rate	Location
L13 & 14	PJP	4G	30Nov - 5Dec						Bay 14
L13 & 14	PJP	4G	6Dec - 12Dec						Bay 14
L13 & 14	PJP	4G	13Dec - 19Dec						Bay 14
L13 & 14	PJP	4G	20Dec - 26Dec						Bay 14
L13 & 14	PJP	4G	27Dec - 2Jan						Bay 14
L13 & 14	PJP	4G	3Jan - 9Jan						Bay 14
L13 & 14	PJP	4G	10Jan - 16Jan	2,310	13	0	120	5.19%	Bay 14
L13 & 14	PJP	4G	17Jan - 23Jan	43,000	12	0	1,700	3.95%	Bay 14
L13 & 14	PJP	4G	24Jan - 30Jan						Bay 14
L13 & 14	PJP	4G	31Jan - 06Feb						Bay 14
L13 & 14	PJP	4G	07Feb - 13Feb						Bay 14
L13 & 14	PJP	4G	14Feb - 20Feb						Bay 14
L13 & 14	PJP	4G	21Feb - 27Feb						Bay 14
L13 & 14	PJP	4G	28Feb - 6Mar						Bay 14
L13 & 14	PJP	4G	7Mar - 13 Mar						Bay 14
L13 & 14	PJP	4G	14Mar - 20 Mar						Bay 14
L13 & 14	PJP	4G	21Mar - 27 Mar	93,000	21	0	940	1.01%	Bay 14

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - Workshop 14 Welds - MT Results

Lift	Type of Weld	Welding Position	Duration	Weld Length of MT Tested (mm)	Rejectable Discontinities	Crack Indications after Investigation	Length of Discontinuities (mm)	Reject Rate	Location
L13 & 14	CJP	1G	30Nov - 5Dec						Bay 14
L13 & 14	CJP	1G	6Dec - 12Dec						Bay 14
L13 & 14	CJP	1G	13Dec - 19Dec						Bay 14
L13 & 14	CJP	1G	20Dec - 26Dec						Bay 14
L13 & 14	CJP	1G	27Dec - 2Jan						Bay 14
L13 & 15	CJP	1G	3Jan - 9Jan						Bay 14
L13 & 15	CJP	1G	10Jan - 16Jan						Bay 14
L13 & 15	CJP	1G	17Jan - 23Jan	7,500	5	0	35	0.47%	Bay 14
L13 & 14	CJP	1G	24Jan - 30Jan						Bay 14
L13 & 14	CJP	1G	31Jan - 06Feb						Bay 14
L13 & 14	CJP	1G	07Feb - 13Feb						Bay 14
L13 & 14	CJP	1G	14Feb - 20Feb						Bay 14
L13 & 14	CJP	1G	21Feb - 27Feb						Bay 14
L13 & 14	CJP	1G	28Feb - 6Mar						Bay 14
L13 & 14	CJP	1G	7Mar - 13 Mar	26,600	7		205	0.77%	Bay 14
L13 & 14	CJP	1G	14Mar - 20 Mar						Bay 14
L13 & 14	CJP	1G	21Mar - 27 Mar						Bay 14

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - Workshop 14 Welds - MT Results

Lift	Type of Weld	Welding Position	Duration	Weld Length of MT Tested (mm)	Rejectable Discontinities	Crack Indications after Investigation	Length of Discontinuities (mm)	Reject Rate	Location
L13 & 14	CJP	2G	30Nov - 5Dec						Bay 14
L13 & 14	CJP	2G	6Dec - 12Dec						Bay 14
L13 & 14	CJP	2G	13Dec - 19Dec						Bay 14
L13 & 14	CJP	2G	20Dec - 26Dec						Bay 14
L13 & 14	CJP	2G	27Dec - 2Jan						Bay 14
L13 & 15	CJP	2G	3Jan - 9Jan	102,350	29	0	853	0.83%	Bay 14
L13 & 15	CJP	2G	10Jan - 16Jan	88,540	24	0	990	1.12%	Bay 14
L13 & 15	CJP	2G	17Jan - 23Jan	85,000	3	0	35	0.04%	Bay 14
L13 & 14	CJP	2G	24Jan - 30Jan						Bay 14
L13 & 14	CJP	2G	31Jan - 06Feb						Bay 14
L13 & 14	CJP	2G	07Feb - 13Feb						Bay 14
L13 & 14	CJP	2G	14Feb - 20Feb						Bay 14
L13 & 14	CJP	2G	21Feb - 27Feb						Bay 14
L13 & 14	CJP	2G	28Feb - 6Mar						Bay 14
L13 & 14	CJP	2G	7Mar - 13 Mar	34,000	6	0	380	1.12%	Bay 14
L13 & 14	CJP	2G	14Mar - 20 Mar						Bay 14
L13 & 14	CJP	2G	21Mar - 27 Mar						Bay 14
L13 & 14	CJP	3G	30Nov - 5Dec						Bay 14
L13 & 14	CJP	3G	6Dec - 12Dec						Bay 14
L13 & 14	CJP	3G	13Dec - 19Dec						Bay 14
L13 & 14	CJP	3G	20Dec - 26Dec						Bay 14
L13 & 14	CJP	3G	27Dec - 2Jan						Bay 14
L13 & 15	CJP	3G	3Jan - 9Jan						Bay 14
L13 & 15	CJP	3G	10Jan - 16Jan						Bay 14
L13 & 15	CJP	3G	17Jan - 23Jan	15,000	0	0	0	0.00%	Bay 14
L13 & 14	CJP	3G	24Jan - 30Jan						Bay 14
L13 & 14	CJP	3G	31Jan - 06Feb						Bay 14
L13 & 14	CJP	3G	07Feb - 13Feb						Bay 14
L13 & 14	CJP	3G	14Feb - 20Feb						Bay 14
L13 & 14	CJP	3G	21Feb - 27Feb						Bay 14
L13 & 14	CJP	3G	28Feb - 6Mar						Bay 14
L13 & 14	CJP	3G	7Mar - 13 Mar	52,000	14	0	900	1.73%	Bay 14
L13 & 14	CJP	3G	14Mar - 20 Mar	67,000	14	0	670	1.00%	Bay 14
L13 & 14	CJP	3G	21Mar - 27 Mar						Bay 14

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - Workshop 14 Welds - MT Results

Lift	Type of Weld	Welding Position	Duration	Weld Length of MT Tested (mm)	Rejectable Discontinities	Crack Indications after Investigation	Length of Discontinuities (mm)	Reject Rate	Location
L13 & 14	CJP	4G	30Nov - 5Dec						Bay 14
L13 & 14	CJP	4G	6Dec - 12Dec						Bay 14
L13 & 14	CJP	4G	13Dec - 19Dec						Bay 14
L13 & 14	CJP	4G	20Dec - 26Dec						Bay 14
L13 & 14	CJP	4G	27Dec - 2Jan						Bay 14
L13 & 15	CJP	4G	3Jan - 9Jan						Bay 14
L13 & 15	CJP	4G	10Jan - 16Jan						Bay 14
L13 & 15	CJP	4G	17Jan - 23Jan						Bay 14
L13 & 14	CJP	4G	24Jan - 30Jan						Bay 14
L13 & 14	CJP	4G	31Jan - 06Feb						Bay 14
L13 & 14	CJP	4G	07Feb - 13Feb						Bay 14
L13 & 14	CJP	4G	14Feb - 20Feb						Bay 14
L13 & 14	CJP	4G	21Feb - 27Feb						Bay 14
L13 & 14	CJP	4G	28Feb - 6Mar						Bay 14
L13 & 14	CJP	4G	7Mar - 13 Mar						Bay 14
L13 & 14	CJP	4G	14Mar - 20 Mar						Bay 14
L13 & 14	CJP	4G	21Mar - 27 Mar						Bay 14

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - Other Welds - UT Results

Lift	Weld I.D.	Type of weld	Length of Weld (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Crack Indications after Investigation	Length of Discontinuities (mm)	Reject Rate	Location
					Root	Fill+Cap	Back Gouging	Back Side					
13AE	SA3053B-001~008-003	CJP	10240	12/28/2010	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	BAY28
13AE	SA3053B-001~008-004	CJP	10240	12/28/2010	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	BAY28
13AW	SA3102A-001~007-001	CJP	8960	12/28/2010	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	BAY28
13AW	SA3102A-001~007-002	CJP	8960	12/28/2010	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	BAY28
13AW	SA3102C-001~011-005	CJP	14080	12/28/2010	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	BAY28
13AW	SA3102C-001~011-006	CJP	14080	12/28/2010	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	BAY28
13AW	SA3102D-001~007-007	CJP	8960	12/28/2010	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	BAY28
13AW	SA3102D-001~007-008	CJP	8960	12/28/2010	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	BAY28
13AW	SA3103C-001~012-005	CJP	15360	12/28/2010	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	BAY28
13AW	SA3103C-001~012-006	CJP	15360	12/28/2010	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	BAY28
13CW	SA3116D-001~008-007	CJP	10240	12/28/2010	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	BAY28
13CW	SA3116D-001~008-008	CJP	10240	12/28/2010	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	BAY28
13CW	SA3117A-001~006-001	CJP	7680	12/28/2010	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	BAY28
13CW	SA3117A-001~006-002	CJP	7680	12/28/2010	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	BAY28
SB104W	SB022-104-002	CJP	750	1/2/2011	FCAW	FCAW	YES	FCAW	1	0	50	6.67%	Bay19
	SB022-104-004	CJP	1270	1/2/2011	FCAW	FCAW	YES	FCAW	2	0	80	6.30%	Bay19
	SB022-104-005	CJP	1500	1/2/2011	FCAW	FCAW	YES	FCAW	2	0	80	5.33%	Bay19
	SB022-104-006	CJP	550	1/2/2011	FCAW	FCAW	YES	FCAW	4	0	346	62.91%	Bay19
	SB022-104-013	CJP	350	1/2/2011	FCAW	FCAW	YES	FCAW	1	0	220	62.86%	Bay19
	SB022-104-015	CJP	350	1/2/2011	FCAW	FCAW	YES	FCAW	2	0	40	11.43%	Bay19
	SB022-104-023	CJP	350	1/2/2011	FCAW	FCAW	YES	FCAW	1	0	30	8.57%	Bay19
	SB022-104-025	CJP	350	1/2/2011	FCAW	FCAW	YES	FCAW	1	0	20	5.71%	Bay19
	SB022-104-029	CJP	350	1/2/2011	FCAW	FCAW	YES	FCAW	1	0	20	5.71%	Bay19
	SB022-104-035	CJP	350	1/2/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	Bay19
	SB022-104-039	CJP	350	1/2/2011	FCAW	FCAW	YES	FCAW	1	0	200	57.14%	Bay19
	SB022-104-045	CJP	350	1/2/2011	FCAW	FCAW	YES	FCAW	1	0	20	5.71%	Bay19
SB104E	SB023-104-002	CJP	800	1/2/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	Bay19
	SB023-104-004	CJP	1270	1/2/2011	FCAW	FCAW	YES	FCAW	1	0	20	1.57%	Bay19
	SB023-104-005	CJP	1000	1/2/2011	FCAW	FCAW	YES	FCAW	3	0	60	6.00%	Bay19
	SB023-104-006	CJP	100	1/2/2011	FCAW	FCAW	YES	FCAW	2	0	40	40.00%	Bay19
	SB023-104-013	CJP	100	1/2/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	Bay19
	SB023-104-015	CJP	100	1/2/2011	FCAW	FCAW	YES	FCAW	1	0	20	20.00%	Bay19
	SB023-104-023	CJP	120	1/2/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	Bay19
	SB023-104-025	CJP	260	1/2/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	Bay19
	SB023-104-029	CJP	100	1/2/2011	FCAW	FCAW	YES	FCAW	1	0	20	20.00%	Bay19
	SB023-104-035	CJP	60	1/2/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	Bay19
	SB023-104-039	CJP	100	1/2/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	Bay19
Steel Barrier	E5-SB12-001-001	CJP	2387	1/2/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	Bay28
	E5-SB12-001-002	CJP	4987	1/2/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	Bay28
	E5-SB12-001-003	CJP	2587	1/2/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%	Bay28
Steel Barrier	W2-SB8-001-001	CJP	2587	1/2/2011	FCAW	FCAW	YES	FCAW	1	0	30	1.16%	Bay28
	W2-SB8-001-002	CJP	4987	1/2/2011	FCAW	FCAW	YES	FCAW	2	0	100	2.01%	Bay28
	W2-SB8-001-003	CJP	2387	1/2/2011	FCAW	FCAW	YES	FCAW	1	0	40	1.68%	Bay28

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Weld Tracking - Other Welds - UT Results

Lift	Weld I.D.	Type of weld	Length of Weld (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Crack Indications after Investigation	Length of Discontinuities (mm)	Reject Rate	Location
					Root	Fill+Cap	Back Gouging	Back Side					
BK004A-022	BK004A2-022-016	CJP	9202	1/3/2011	FCAW	FCAW	YES	FCAW	26	0	686	7.45%	Bay11
Travel Rails	20TR2-039-009	CJP	2830	1/26/2011	FCAW	FCAW	YES	FCAW	7	0	190	6.71%	Bay10
	20TR2-039-011	CJP	12210	1/26/2011	FCAW	FCAW	YES	FCAW	16	0	2800	22.93%	Bay10
	20TR2-039-013	CJP	2480	1/26/2011	FCAW	FCAW	YES	FCAW	8	0	300	12.10%	Bay10
	20TR2-039-015	CJP	4230	1/26/2011	FCAW	FCAW	YES	FCAW	11	0	660	15.60%	Bay10
	20TR2-039-017	CJP	1690	1/26/2011	FCAW	FCAW	YES	FCAW	8	0	190	11.24%	Bay10
	20TR2-030-009	CJP	2830	1/26/2011	FCAW	FCAW	YES	FCAW	6	0	250	8.83%	Bay10
	20TR2-030-011	CJP	12210	1/26/2011	FCAW	FCAW	YES	FCAW	15	0	5300	43.41%	Bay10
	20TR2-030-013	CJP	2480	1/26/2011	FCAW	FCAW	YES	FCAW	8	0	270	10.89%	Bay10
	20TR2-030-015	CJP	4230	1/26/2011	FCAW	FCAW	YES	FCAW	10	0	1280	30.26%	Bay10
	20TR2-030-017	CJP	1690	1/26/2011	FCAW	FCAW	YES	FCAW	8	0	910	53.85%	Bay10
Tower L6	SSD1-FDSA6-1-9	CJP	5820	1/10/2011	FCAW	FCAW	YES	SMAW	9	0	580	9.97%	Bay10
			243,744								14,852		

Note:

1) TLI - Transverse Linear Indication.
2) Investigations are peformed during excavations on selected TLI's. All rejectable discontinuities, whether investigated or not, are repaired.
3) For UT of welds which are not scanned with "Pattern D" please refer to a separate tracking sheet.
4) Average Value of Reject Rate as reported in Exhibit 3.1S1:

Reject Rate = Total Length of Discontinuities / Total Length of Weld
Reject Rate = 14,852 / 243,744
Reject Rate = 6.09%

EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

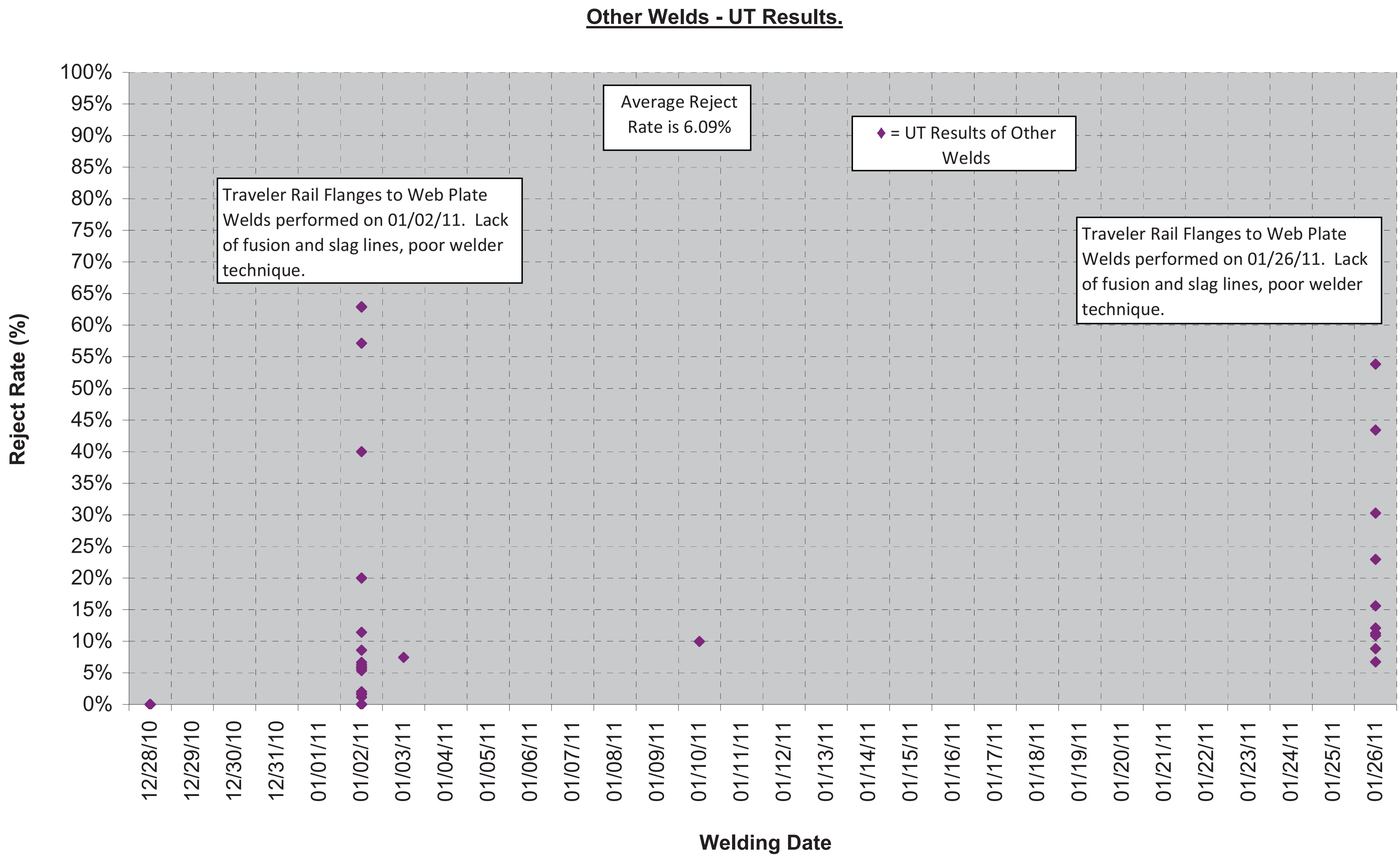
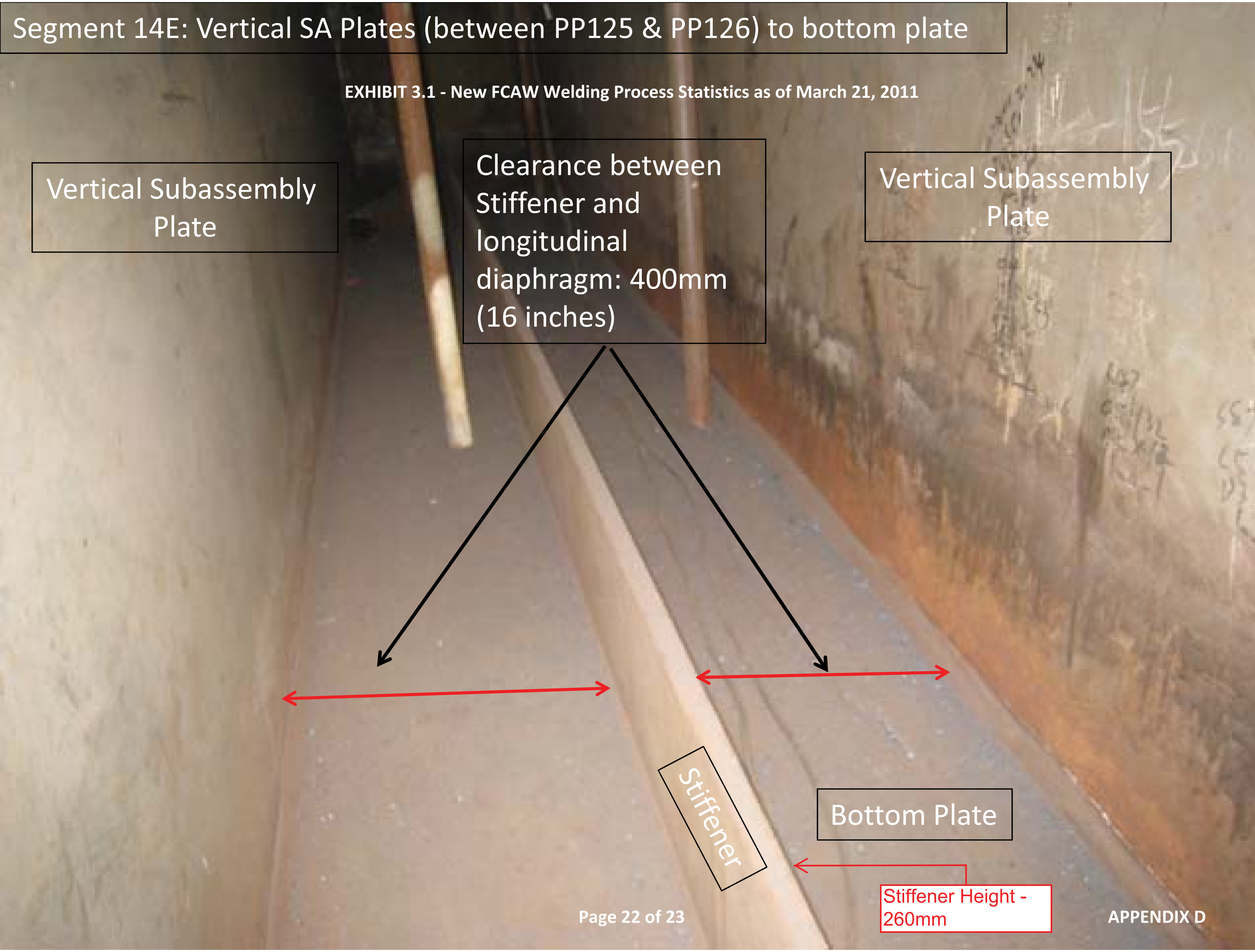
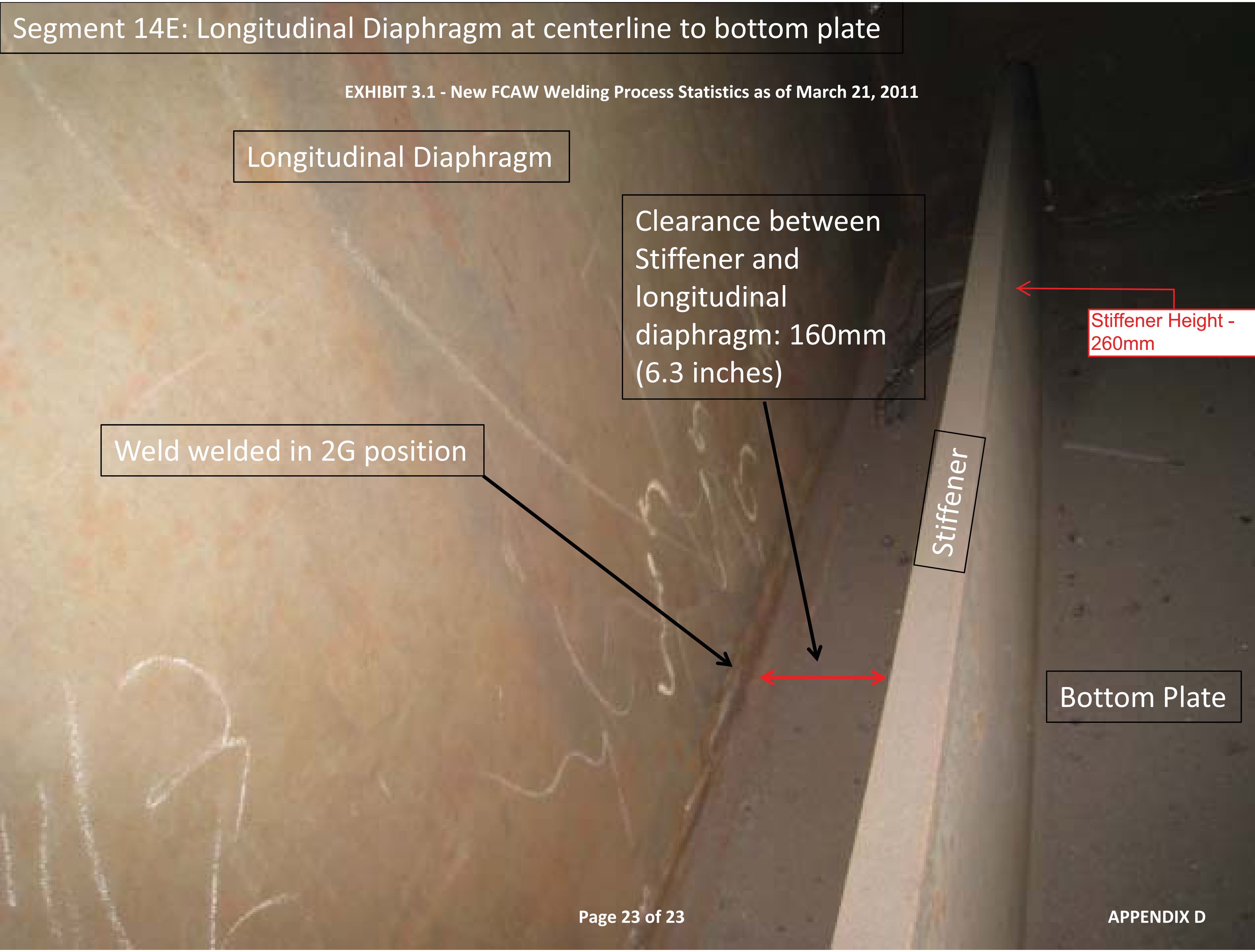


EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011

New FCAW Weld Process Tracking - Other Welds - MT Results

Lift	Weld I.D.	Type of Weld	Weld Length (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Crack Indications after Investigation	Length of Discontinuities (mm)	Reject Rate	Location
					Root	Fill+Cap	Back Gouging	Back Side					
BK004A-064	BK004A5-064-072~073	Fillet	10000	12/28/2010	N/A	ESAB	N/A	N/A	5	0	28	0.28%	BAY8
BK004A-064	BK004A8-064-072~073	Fillet	10000	12/28/2010	N/A	ESAB	N/A	N/A	5	0	20	0.20%	BAY8
BK004A-064	BK004A6/A8-064-061,063,065,070,076,078,080,082,086,088,090,092,096,098,100,102 (STEP7 WELDS)	Fillet	20000	12/28/2010	N/A	ESAB	N/A	N/A	15	0	150	0.75%	BAY8
L6 Skin D	NSD1-FDSA6-3-5	Fillet	8600	1/2/2011	N/A	ESAB	N/A	N/A	1	0	10	0.12%	HD1
13BW	SA3149-002-005	PJP	1100	1/2/2011	ESAB	ESAB	N/A	N/A	2	0	20	1.82%	HD1
13BW	SA3149-003-007	PJP	1100	1/2/2011	ESAB	ESAB	N/A	N/A	1	0	1100	100.00%	HD1
BK004C-024	BK004C8-024-007	PJP	5060	1/3/2011	ESAB	ESAB	N/A	N/A	22	0	516	10.20%	Bay11


Segment 14E: Vertical SA Plates (between PP125 & PP126) to bottom plate
EXHIBIT 3.1 - New FCAW Welding Process Statistics as of March 21, 2011
Vertical Subassembly Plate
Clearance between Stiffener and longitudinal diaphragm: 400mm (16 inches)
Vertical Subassembly Plate
Stiffener
Bottom Plate
Stiffener Height - 260mm
Page 22 of 23
APPENDIX D


Segment 14E: Longitudinal Diaphragm at centerline to bottom plate
Longitudinal Diaphragm
Clearance between Stiffener and longitudinal diaphragm: 160mm (6.3 inches)
Stiffener Height - 260mm
Weld welded in 2G position
Stiffener
Bottom Plate

APPENDIX E

EXHIBIT 4.0: Summary of NDT Inspections Performed for 100% FCAW Welds Made With The Old Welding Process

<u>General Overview:</u>

1. Identifies weld type and location, type of NDT performed and amount of NDT performed based on Contract Document requirements.
2. The comments column describes if the welds of interest considered require further evaluation. It is noted that, based on the amount of NDT performed, there are no welds of interest requiring further evaluation.
3. Refer to Exhibit 4.1 and 4.2 where noted for the corresponding graphic showing specific locations of welds.
4. Page 4 provides notes for clarification of the NDT results.

EXHIBIT 4.1: Pure FCAW Welds Made With Old Welding Process and Contract Required NDT Less Than 100%

<u>General Overview:</u>

1. Page 1 identifies welds made with pure FCAW using the old welding process that were less than 100% NDT tested. This table focuses on welds that, per the Contract Documents, require less than 100% NDT inspection.
2. Page 2-5, provides graphic locations of welds identified from page 1.

EXHIBIT 4.2: Summary of Ultrasonic Testing and Transverse Indications On Crossbeams 1-16 Bottom Corner Welds

<u>General Overview:</u>

1. The data provided is for the bottom corner CJP welds only. These are the only 100% FCAW welds in these crossbeams that are subjected to tensile stresses.
2. Pages 1-5 provide UT results performed separately and independently by ZPMC and ABFJV/CT. Inspection by ABFJV/CT was performed once the weld was repaired and cleared by ZPMC. ZPMC repaired any discontinuities discovered by ABFJV or CT until all welds were cleared by ABFJV/CT.
3. Page 6 provides a graphic showing the location of the bottom corner weld on a Crossbeam and further highlights the length and location of Hold Back welds.
4. Due to the integration of the QC inspection process with ABFJV and ZPMC, weld inspections performed after October 2010 are only recorded under the ABFJV/CT column.

EXHIBIT 4.3: Lifts 13 and 14 Pure FCAW Fillet Welds Made With the Old Welding Process and Contract Required NDT Testing Less Than 100%

<u>General Overview:</u>

1. Provides graphics showing locations of these welds within Lift 13 and Lift 14.
2. The reviewer shall note within the graphic the low reject rate of these welds.

EXHIBIT 4.4: Statistics of the Welds

<u>General Overview:</u>

1. Page 1 provides overall statistics of UT and MT results for the welds identified in Exhibit 4.1 pages 2-5. Weld and defect lengths are provided in millimeters. The defect rates shown for these welds on lifts 1-12 are far below that of industry standards.

EXHIBIT 4.0 - SUMMARY OF NDT INSPECTIONS PERFORMED FOR 100% FCAW WELDS MADE WITH OLD WELDING PROCESS

CJP	Location ID per CCO 22	Type of Inspection Performed or to be Performed	Actual % of inspection *	Comments
Lifts 1 thru 11	1.2c 1.4e1 1.4e2 All other major welds **Refer to Exhibit 4.1**	UT - Scanning Pattern E UT - Scanning Pattern E UT - Scanning Pattern E or D UT - Scanning Pattern E or D	15 – 100% with average @ 87% 25 – 100% with average @ 30% 25 – 100% with average @ 30% 100%	Per Design Joint Venture, welds 1.2c and 1.4e are oriented vertically while the tension is transverse. Therefore these welds are not of interest. (Ref 03/02/11 Meeting Notes)
Crossbeams 1-16	All CJP welds **Refer to Exhibit 4.2**	UT - Scanning Pattern D or E	100%	The bottom corner welds made with the old 100% FCAW welding process received 100% UT inspection using either Scanning Pattern D or E. These are the only 100% FCAW welds in these crossbeams that are subjected to tensile stresses. ABF provided the NDT results for these welds and the Project Team agrees that there is no evidence to support a systemic hydrogen problem in these welds. (Ref 03/09/11 Meeting Notes)

EXHIBIT 4.0 - SUMMARY OF NDT INSPECTIONS PERFORMED FOR 100% FCAW WELDS MADE WITH OLD WELDING PROCESS

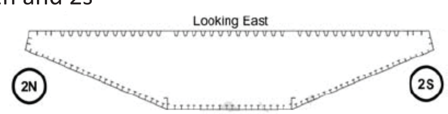
CJP	Location ID per CCO 22	Type of Inspection Performed or to be Performed	Actual % of inspection *	Comments
Lift 12	1.2c 1.4e1 1.4e2 All other major welds **Refer to Exhibit 4.1** 2n and 2s  	UT - Scanning Pattern E UT - Scanning Pattern E UT - Scanning Pattern E or D UT - Scanning Pattern E or D	15 – 100% with average @ 87% 25 – 100% with average @ 30% 25 – 100% with average @ 30% 100%	Per the Design Joint Venture, welds 1.2c and 1.4e are oriented vertically while the tension is transverse. Therefore these welds are not of interest. (Ref 03/02/11 Meeting Notes) Lift 12 Welds - 2n and 2s (QC and QA Comment) ABFJV QC has reviewed the weld inspection data for these welds. In addition to ABFJV performing 100% UT inspection, CT also performed 100% UT inspection and has determined there is no concern. (Ref 03/16/11 Meeting Notes)
Lifts 13 and 14	All Interior and Exterior CJP welds	UT - Scanning Pattern D or E	100%	Insofar as these welds are 100% NDT tested using Scanning Pattern D, they are not considered as welds of interest.
Crossbeam 17	All CJP welds	UT - Scanning Pattern D	100%	ABFJV inspection selection based on conservative load transfer analysis.
Crossbeam 18	All CJP welds	UT - Scanning Pattern D	100%	Insofar as these welds are 100% NDT tested using Scanning Pattern D, they are not considered as welds of interest.
Crossbeam 19	All CJP welds	UT - Scanning Pattern D	100%	Insofar as these welds are 100% NDT tested using Scanning Pattern D, they are not considered as welds of interest.

EXHIBIT 4.0 - SUMMARY OF NDT INSPECTIONS PERFORMED FOR 100% FCAW WELDS MADE WITH OLD WELDING PROCESS

PJP	Location ID per CCO 22	Type of Inspection Performed or to be Performed	Actual % of inspection *	Comments
Lifts 1 thru 11	There are no PJP Welds Fitting this Criterion	N/A	N/A	PJP's have been determined to be welds not of interest because they do not fit the criteria.
Crossbeams 1-16	There are no PJP Welds Fitting this Criterion	N/A	N/A	PJP's have been determined to be welds not of interest because they do not fit the criteria.
Lift 12	There are no PJP Welds Fitting this Criterion	N/A	N/A	PJP's have been determined to be welds not of interest because they do not fit the criteria.
Lifts 13 and 14	There are no PJP Welds Fitting this Criterion	N/A	N/A	PJP's have been determined to be welds not of interest because they do not fit the criteria.
Crossbeam 17	There are no PJP Welds Fitting this Criterion	N/A	N/A	PJP's have been determined to be welds not of interest because they do not fit the criteria.
Crossbeam 18	There are no PJP Welds Fitting this Criterion	N/A	N/A	PJP's have been determined to be welds not of interest because they do not fit the criteria.
Crossbeam 19	There are no PJP Welds Fitting this Criterion	N/A	N/A	PJP's have been determined to be welds not of interest because they do not fit the criteria.

EXHIBIT 4.0 - SUMMARY OF NDT INSPECTIONS PERFORMED FOR 100% FCAW WELDS MADE WITH OLD WELDING PROCESS

Fillet	Location ID per CCO 22	Type of Inspection Performed or to be Performed	Actual % of inspection *	Comments
Lifts 1 thru 11	1.1k 1.1m 1.1p 1.1q 1.1r 1.2e All other major welds **Refer to Exhibit 4.1**	All fillet welds are NDT using MT	10 – 100% with Average @ 60% 50 – 100% with Average @ 90% 10 – 100% with Average @ 94% 25 – 100% with Average @ 60% 25 – 100% with Average @ 84% 25 – 100% with Average @ 40% 100%	Fillet welds have been determined to be welds not of interest due to their high level of quality and low level rejection rates.
Crossbeams 1-16	2.0b - **Refer to Exhibit 4.1**	MT	10 – 100% with Average @ 37%	Welded in gantry, few defects found, holdback welds were tested 100% in the field with no significant defects
Lift 12	1.1k 1.1m 1.1p 1.1q 1.1r 1.2e All other major welds **Refer to Exhibit 4.1**	All fillet welds are NDT using MT	10 – 100% with Average @ 60% 50 – 100% with Average @ 90% 10 – 100% with Average @ 94% 25 – 100% with Average @ 60% 25 – 100% with Average @ 84% 25 – 100% with Average @ 40% 100%	Fillet welds have been determined to be welds not of interest due to their high level of quality and low level rejection rates.
Lifts 13 and 14	**Refer to Exhibit 4.3**	MT	Testing ongoing	Fillet welds have been determined to be welds not of interest due to their high level of quality and low level rejection rates.
Crossbeam 17	2.0b - **Refer to Exhibit 4.1**	MT	10 - 100% with Average @36% (Testing ongoing)	Fillet welds have been determined to be welds not of interest due to their high level of quality and low level rejection rates.
Crossbeam 18	2.0b - **Refer to Exhibit 4.1**	MT	10 - 100% with Average @36% (Testing ongoing)	Fillet welds have been determined to be welds not of interest due to their high level of quality and low level rejection rates.
Crossbeam 19	All fillet welds	MT	100%	

NOTES:

* - Percentages presented in the table are of actual lengths of weld tested and includes the (penalty clause) requirements in Special Provisions Section 10-1.59 which states:

> "If unacceptable discontinuities are found in a joint with a specified percentage of testing of NDT less than 100%, including RT examination of butt weld repairs, the repairs shall be completed and then re-examined by the same NDT method along with an additional 50mm at each end of the weld repair, for a minimum total additional length of 100mm for the repair re-examination. Two additional previously untested segments, each at least 10% of the total weld length, on each side of the repair, for a total additional length of 20%, shall be tested with the same NDT method. If additional unacceptable discontinuities are found as a result of this testing, then 100% of the remaining untested portion of the weld shall be tested with the same NDT method. All weld repairs shall be tested with the same NDT method that located the original defect."

Exhibit 4.1 - Lifts 1 - 12 Pure FCAW Welds Made with Old Welding Process and Contract Required NDT Less Than 100%

	Component	Welding Process	Weld Configuration	Weld Type	Contract Required NDT		Actual NDT Performed		Defect Rate	Comments
					UT	MT	UT	MT		
1.BOX GIRDER 1.1 Box Shell										
k	Stiffener (open rib) to box plate	Gantry FCAW except holdback areas	T Joint	Fillet	0%	10%	0%	10-100%	0.006%	Welded in gantry, no transverse defects found. Holdback welds were tested 100% in the field with no significant defects, Average MT: 30%
m	Floorbeam to Deck plate	FCAW or SMAW	T Joint	Fillet	0%	50%	0%	50-100%	0%	Average MT: 91%
p	Floorbeam to other box shell plates Elsewhere	FCAW	T Joint	Fillet	0%	10%	0%	10-100%	0.01%	Average MT: 81%
q	Longitudinal Shear Plate to Deck Plate West end longitudinal shear plate	FCAW or SMAW	T Joint	Fillet	0%	25%	0%	25-100%	0%	Average MT: 60%
r	Longitudinal Shear Plate to other Box shell plates West end longitudinal shear plate	FCAW or SMAW	T Joint	Fillet	0%	25%	0%	25-100%	0.02%	Average MT: 88%
1.2. Box Internal Stiffening										
c	Floorbeam splice: Upper half	FCAW	Butt Joint	CJP	15%	0%	15-100%	0-100%	0.3%	Average UT: 87% Average MT:1%
e	Floorbeam web to floorbeam web stiffener	FCAW or SMAW	T Joint	Fillet	0%	25%	0%	25-100%	0.03%	Overchecks did not reveal findings of of concern, additional NDT was not performed. Average MT: 40%
1.4 Other box welds										
e	Other welds 1. Open stiffener splice 2. DP diaphragm splice	FCAW FCAW	Butt Joint Butt Joint	CJP CJP	25% 25%	0% 0%	25-100% 25-100%	0-100% 0-100%	UT: 0.1% MT: 0.1%	Average UT: 30% Average MT: 1%
2. CROSSBEAM										
b	Other welds Diaphragm to deck and side plate weld Stiffener to diaphragm weld	FCAW	T Joint	Fillet	0%	10%	0%	10-100%	0.005%	Welded in gantry, few defects found, holdback welds were tested 100% in the field with no significant defects Average UT: 0% Average MT:37%

NOTE:
1) Percentage of NDT in "Contract Required NDT" is based on CCO22 unless otherwised noticed, and they do not include additional NDT after defects are found.
2) Welding processes shown here are for typical fabrication, and they do not include the process used for weld repair.
3) Welds which the contract NDT testing was exceeded are highlighted in green
4) Per Special Provisions Section 10-1.59, "If unacceptable discontinuities are found in a joint with a specified percentage of testing of NDT less than 100%, including RT examination of butt weld repairs, the repairs shall be completed and then re-examined by the same NDT method along with an additional 50mm at each end of the weld repair, for a minimum total additional length of 100mm for the repair re-examination. Two additional previously untested segments, each at least 10% of the total weld length, on each side of the repair, for a total additional length of 20%, shall be tested with the same NDT method. If additional unacceptable discontinuities are found as a result of this testing, then 100% of the remaining untested portion of the weld shall be tested with the same NDT method. All weld repairs shall be tested with the same NDT method that located the original defect."

Exhibit 4.1 - Lifts 1 - 12 Pure FCAW Welds Made with Old Welding Process and Contract Required NDT Less Than 100%

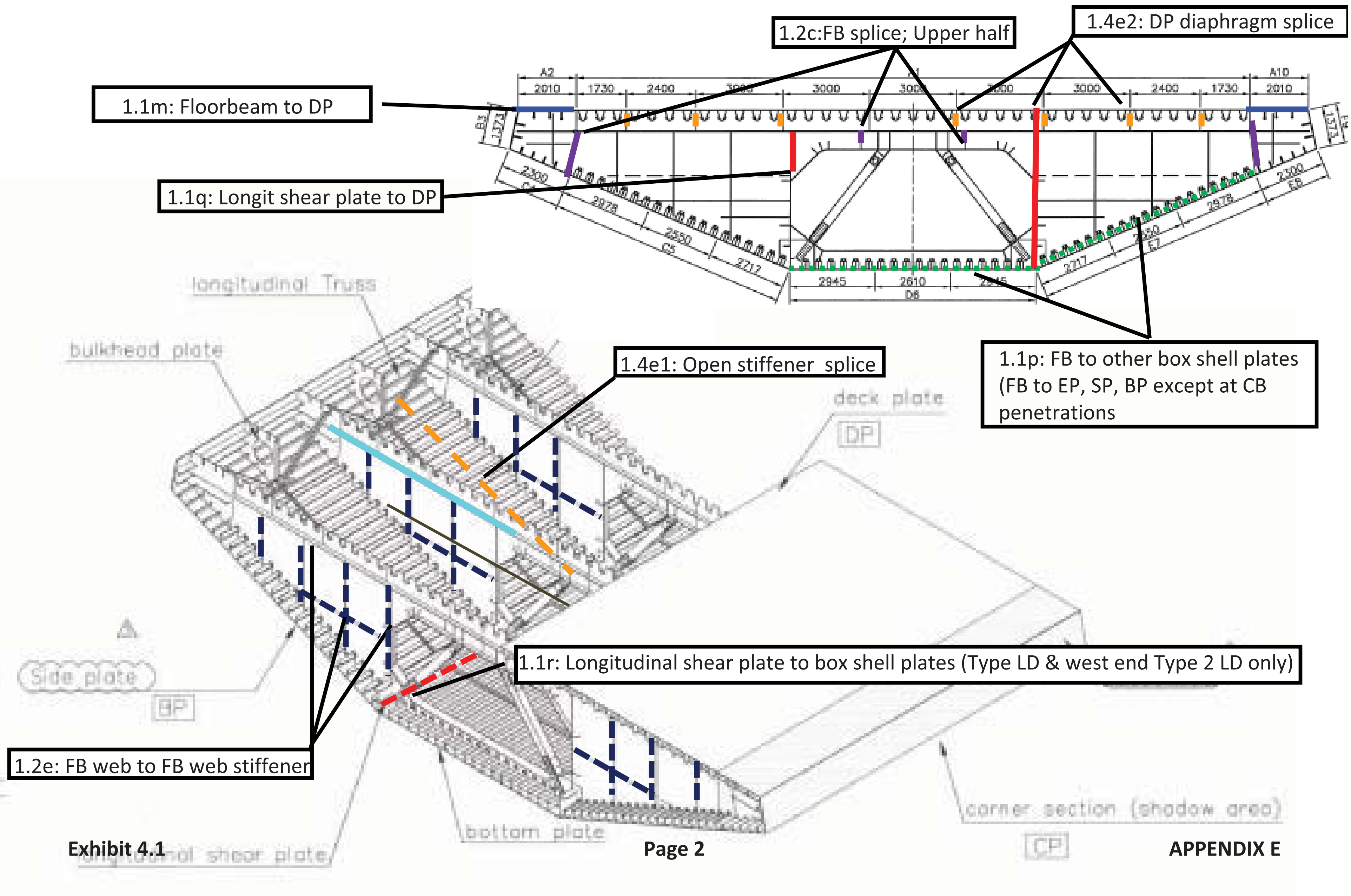


Exhibit 4.1 - Lifts 1 - 12 Pure FCAW Welds Made with Old Welding Process and Contract Required NDT Less Than 100%

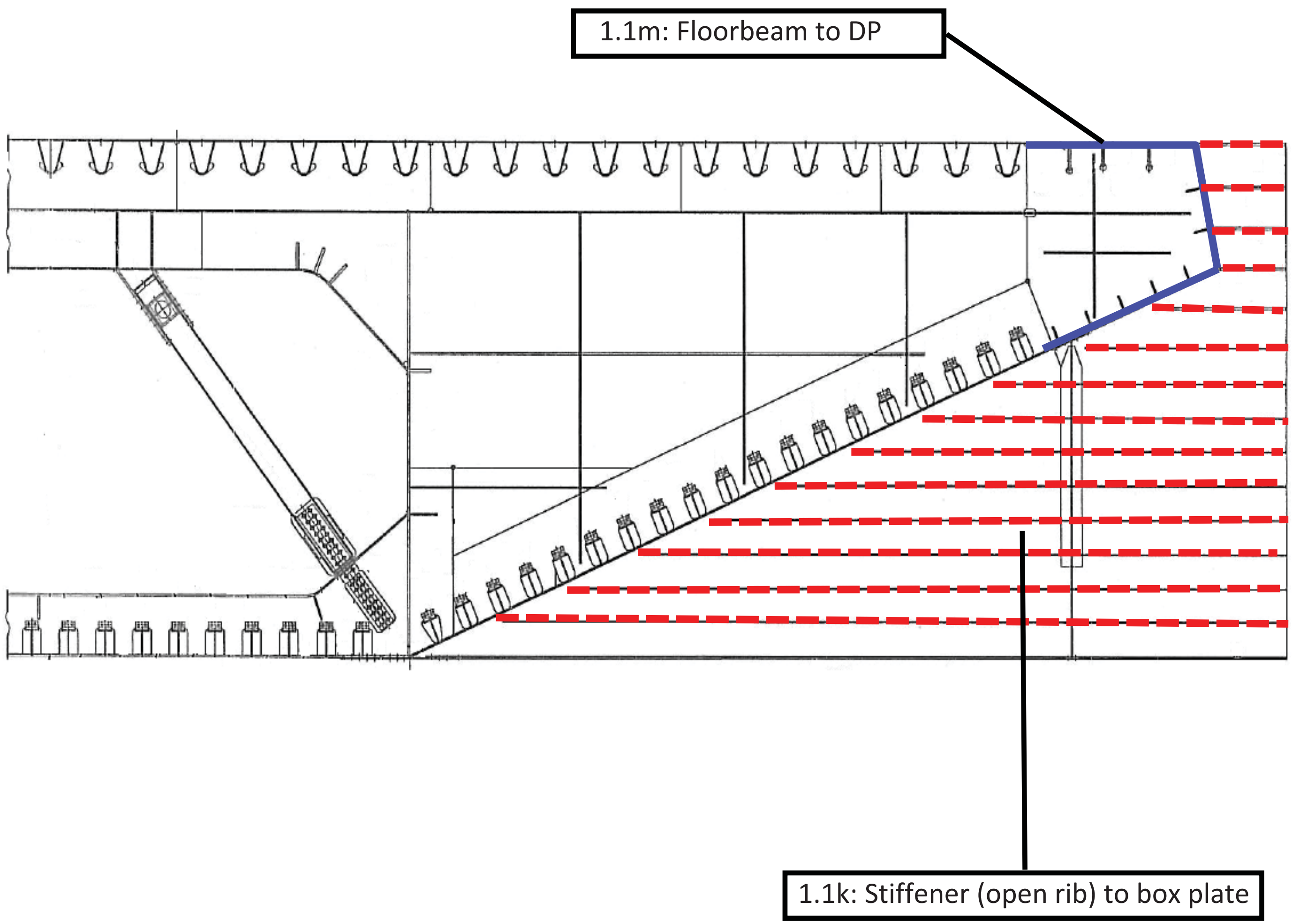


Exhibit 4.1 - Lifts 1 - 12 Pure FCAW Welds Made with Old Welding Process and Contract Required NDT Less Than 100%

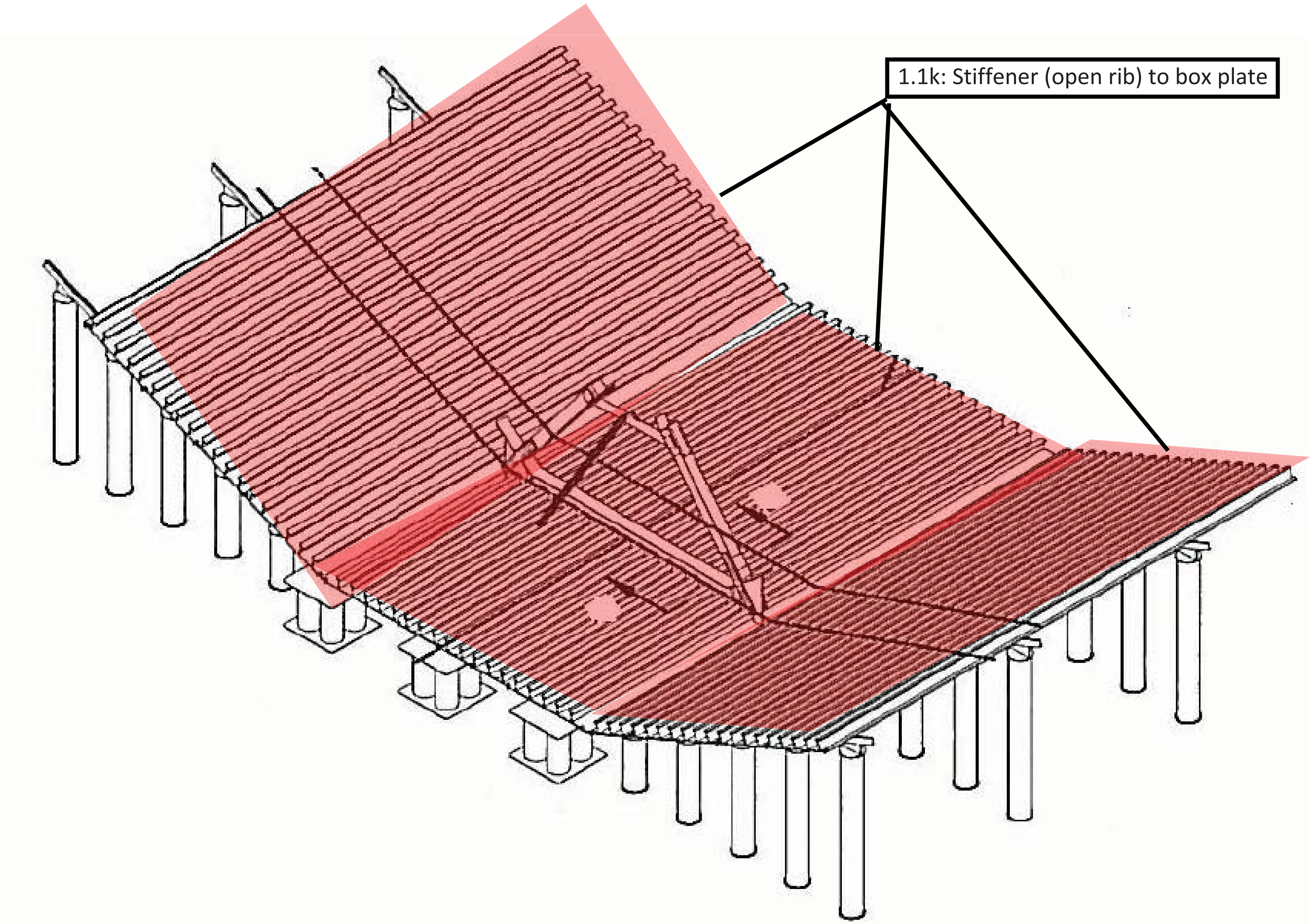


Exhibit 4.1 - Lifts 1 - 12 Pure FCAW Welds Made with Old Welding Process and Contract Required NDT Less Than 100%

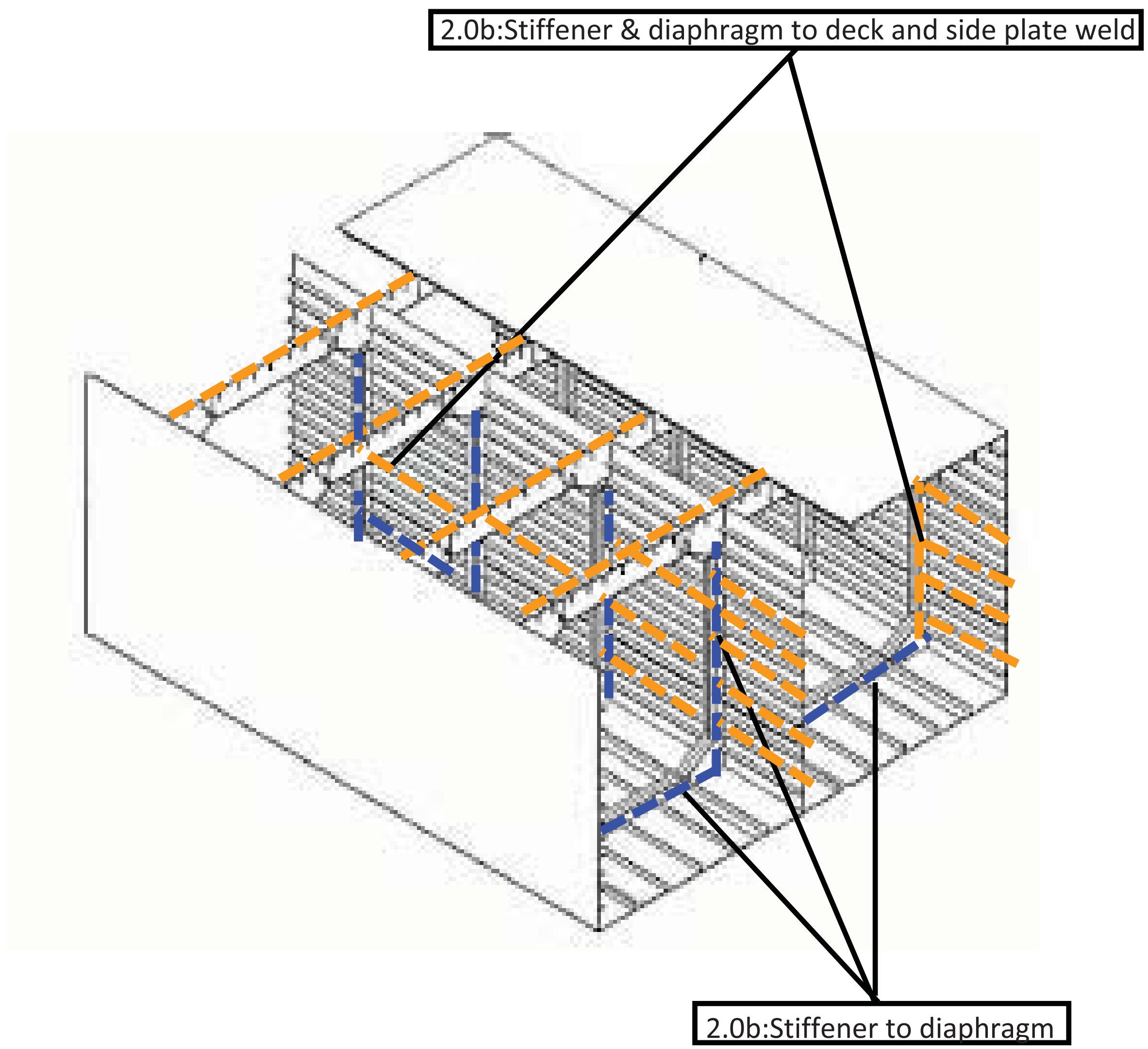


EXHIBIT 4.2 - Crossbeams 1 - 16 Bottom Corner Weld UT Summary

CB#	Description	Weld ID	Scan Pattern	ZPMC NDT Results (2): Rejected Indications per Table 6.3 of AWS D1.5 Code (1) No.	ZPMC NDT Results (2): Rejected Indications per Table 6.3 of AWS D1.5 Code (1) dB Rating	ABFJV / CT NDT Results (3): ABFJV UT Date	ABFJV / CT NDT Results (3): Rejected TLI Indications (1) No.	ABFJV / CT NDT Results (3): Rejected TLI Indications (1) dB Rating (5)	ABFJV / CT NDT Results (3): Other Rejected Non-TLI Indications (1) No.	ABFJV / CT NDT Results (3): Other Rejected Non-TLI Indications (1) dB Rating (5)	Remarks
1	BP to SP-E	CB203A-001-004, 005, 006	A,B,C,D	0	N/A	11-Nov-09	1	+13	0		All rejectable indications found were repaired, retested and cleared
	BP to SP-W	CB203A-001-016, 017, 018	A,B,C,D	0	N/A	11-Nov-09	0		0		
2	BP to SP-E	CB204A-002(001)-004, 005, 006	A,B,C,D	0	N/A	11-Nov-09	0		0		
	BP to SP-W	CB204A-002(001)-016, 017, 018	A,B,C,D	0	N/A	11-Nov-09	0		0		
3	BP to SP-E	CB205A-003(001)-004, 005, 006	A,B,C,D	0	N/A	11-Nov-09	0		0		
	BP to SP-W	CB205A-003(001)-016, 017, 018	A,B,C,D	0	N/A	11-Nov-09	0		1	+10	All rejectable indications found were repaired, retested and cleared
4	BP to SP-E	CB201A-004-004, 005, 006	A,B,C,E	0	N/A	15-Jan-10	0		3	+9, +9, +9	All rejectable indications found were repaired, retested and cleared
	BP to SP-W	CB201A-004-016, 017, 018	A,B,C,E	0	N/A	15-Jan-10	0		3	+7, +9, 0	All rejectable indications found were repaired, retested and cleared
5	BP to SP-E	CB202A-005(001)-004, 005, 006	A,B,C,D	1	+7	3-Nov-09	0		1	+10	All rejectable indications found were repaired, retested and cleared
	BP to SP-W	CB202A-005(001)-016, 017, 018	A,B,C,D	4	+9, +8, +8,+8, +9	3-Nov-09	0		4	+20, +12, +11, +16	All rejectable indications found were repaired, retested and cleared
6	BP to SP-E	CB202A-006-004, 005, 006	A,B,C,E	3	+8, +10, +10	11-Dec-09	0		0		All rejectable indications found were repaired, retested and cleared
	BP to SP-W	CB202A-006-016, 017, 018	A,B,C,E	4	+10, +10, +10, +10	11-Dec-09	1	+13	2	+5, +9	All rejectable indications found were repaired, retested and cleared

NDT Using Scanning Pattern "D"

NDT Using Scanning Pattern "E"

Rejectable Indications Found by ZPMC QC Post Initial Weld NDT

Rejected Transverse Linear Indications (TLIs) Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Other Rejected Non-TLI Indications Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Notes:
(1) - All rejectable indications found were repaired, retested and cleared.
(2) - ZPMC QC NDT performed upon completion of initial welds. ZPMC repairs all rejectable indications. ZPMC QC re-inspects the weld until cleared.
(3) - ABFJV / CT NDT performed once weld is cleared by ZPMC QC. If required, ZPMC then makes repairs and ABFJV/CT re-inspects weld until cleared.
(4) - Due to integration of the QC inspection process with ABFJV and ZPMC, weld inspections performed after October 2010 are only recorded under the ABFJV/CT column
(5) - ABFJV/CT Scanning Pattern D evaluation perfomed using acceptance critera to be 6dB above Class B under Table 6.3 of AWS D1.5 Code.

EXHIBIT 4.2 - Crossbeams 1 - 16 Bottom Corner Weld UT Summary

CB#	Description	Weld ID	Scan Pattern	ZPMC NDT Results (2)		ABFJV / CT NDT Results (3)					Remarks
				Rejected Indications per Table 6.3 of AWS D1.5 Code (1)		ABFJV UT Date	Rejected TLI Indications (1)		Other Rejected Non-TLI Indications (1)		
				No.	dB Rating		No.	dB Rating (5)	No.	dB Rating (5)	
7	BP to SP-E	CB201A-007-005	A,B,C,D	0	N/A	3-Nov-09	3	+17, +15, +16	1	+10	All rejectable indications found were repaired, retested and cleared
	BP to SP-E Holdback	CB201A-007-004, 006	A,B,C,D	1	+8	2-Jun-10	0		0		All rejectable indications found were repaired, retested and cleared
	BP to SP-W	CB201A-007-017	A,B,C,D	0	N/A	3-Nov-09	0		0		
	BP to SP-W Holdback	CB201A-007-016, 018	A,B,C,D	0	N/A	2-Jun-10	1	+15	0		All rejectable indications found were repaired, retested and cleared
8	BP to SP-E	CB202A-008-005	A,B,C,E	0	N/A	22-Dec-09	0		0		
	BP to SP-E Holdback	CB202A-008-004, 006	A,B,C,D	4	+10, +9, +10, +9	5-Jun-10	0		0		All rejectable indications found were repaired, retested and cleared
	BP to SP-W	CB202A-008-017	A,B,C,E	1	+9	22-Dec-09	0		1	+9	All rejectable indications found were repaired, retested and cleared
	BP to SP-W Holdback	CB202A-008-016, 018	A,B,C,D	5	+8, +9, +10, +9, +9	5-Jun-10	0		0		All rejectable indications found were repaired, retested and cleared
9	BP to SP-E	CB202A-009-005	A,B,C,E	0	N/A	26-Mar-10	0		0		
	BP to SP-E Holdback	CB202A-009-004, 006	A,B,C,D	6	+8, +10, +7, +7, +7, +4	4-Jul-10	0		0		All rejectable indications found were repaired, retested and cleared
	BP to SP-W	CB202A-009-017	A,B,C,E	0	N/A	26-Mar-10	4	+13, +9, +9, +14	0		All rejectable indications found were repaired, retested and cleared
	BP to SP-W Holdback	CB202A-009-016, 018	A,B,C,D	11	+0, +8, +10, +10, +10, +8, +6, +8, +10, +10, +10	25-Jun-10	0		0		All rejectable indications found were repaired, retested and cleared

NDT Using Scanning Pattern "D"

NDT Using Scanning Pattern "E"

Rejectable Indications Found by ZPMC QC Post Initial Weld NDT

Rejected Transverse Linear Indications (TLIs) Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Other Rejected Non-TLI Indications Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Notes:
(1) - All rejectable indications found were repaired, retested and cleared.
(2) - ZPMC QC NDT performed upon completion of initial welds. ZPMC repairs all rejectable indications. ZPMC QC re-inspects the weld until cleared.
(3) - ABFJV / CT NDT performed once weld is cleared by ZPMC QC. If required, ZPMC then makes repairs and ABFJV/CT re-inspects weld until cleared.
(4) - Due to integration of the QC inspection process with ABFJV and ZPMC, weld inspections performed after October 2010 are only recorded under the ABFJV/CT column.
(5) - ABFJV/CT Scanning Pattern D evaluation perfomed using acceptance critera to be 6dB above Class B under Table 6.3 of AWS D1.5 Code.

EXHIBIT 4.2 - Crossbeams 1 - 16 Bottom Corner Weld UT Summary

CB#	Description	Weld ID	Scan Pattern	ZPMC NDT Results (2)		ABFJV / CT NDT Results (3)					Remarks
				Rejected Indications per Table 6.3 of AWS D1.5 Code (1)		ABFJV UT Date	Rejected TLI Indications (1)		Other Rejected Non-TLI Indications (1)		
				No.	dB Rating		No.	dB Rating (5)	No.	dB Rating (5)	
10	BP to SP-E	CB202A-010-005	A,B,C,D	0	N/A	4-Nov-09	4	+6, +15, +14, +18	1	+8	All rejectable indications found were repaired, retested and cleared
	BP to SP-E Holdback	CB202A-010-004, 006	A,B,C,D	4	+7, +8, +7, +8	23-Jun-10	0		0		All rejectable indications found were repaired, retested and cleared
	BP to SP-W	CB202A-010-017	A,B,C,D	0	N/A	4-Nov-09	2	+13, +15	0		All rejectable indications found were repaired, retested and cleared
	BP to SP-W Holdback	CB202A-010-016, 018	A,B,C,D	6	+10, +8, +10, +10, +7, +6	23-Jun-10	0		0		All rejectable indications found were repaired, retested and cleared
11	BP to SP-E	CB202A-011-005	A,B,C,E	0	N/A	8-Apr-10	1	+15	2	+9, +10	All rejectable indications found were repaired, retested and cleared
	BP to SP-E Holdback	CB202A-011-004, 006	A,B,C,D	0	N/A	21-Aug-10	0		2	+7, +8	All rejectable indications found were repaired, retested and cleared
	BP to SP-W	CB202A-011-017	A,B,C,E	0	N/A	8-Apr-10	0		1	+10	All rejectable indications found were repaired, retested and cleared
	BP to SP-W Holdback	CB202A-011-016, 018	A,B,C,D	0	N/A	21-Aug-10	1	+12	1	+11	All rejectable indications found were repaired, retested and cleared
12	BP to SP-E	CB201A-012- 005	A,B,C,E	9	+7, +8, +7, +8, +7, +7, +6, +7, +7	8-Apr-10	0		1	+10	All rejectable indications found were repaired, retested and cleared
	BP to SP-E Holdback	CB201A-012- 004, 006	A,B,C,D	0	N/A	21-Aug-10	0		0		
	BP to SP-W	CB201A-012- 017	A,B,C,E	0	N/A	8-Apr-10	0		0		
	BP to SP-W Holdback	CB201A-012- 016, 018	A,B,C,D	0	N/A	21-Aug-10	0		2	+8, +10	All rejectable indications found were repaired, retested and cleared

NDT Using Scanning Pattern "D"

NDT Using Scanning Pattern "E"

Rejectable Indications Found by ZPMC QC Post Initial Weld NDT

Rejected Transverse Linear Indications (TLIs) Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Other Rejected Non-TLI Indications Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Notes:
(1) - All rejectable indications found were repaired, retested and cleared.
(2) - ZPMC QC NDT performed upon completion of initial welds. ZPMC repairs all rejectable indications. ZPMC QC re-inspects the weld until cleared.
(3) - ABFJV / CT NDT performed once weld is cleared by ZPMC QC. If required, ZPMC then makes repairs and ABFJV/CT re-inspects weld until cleared.
(4) - Due to integration of the QC inspection process with ABFJV and ZPMC, weld inspections performed after October 2010 are only recorded under the ABFJV/CT column
(5) - ABFJV/CT Scanning Pattern D evaluation perfomed using acceptance critera to be 6dB above Class B under Table 6.3 of AWS D1.5 Code.

EXHIBIT 4.2 - Crossbeams 1 - 16 Bottom Corner Weld UT Summary

CB#	Description	Weld ID	Scan Pattern	ZPMC NDT Results (2) Rejected Indications per Table 6.3 of AWS D1.5 Code (1)		ABFJV / CT NDT Results (3)					Remarks
				No.	dB Rating	ABFJV UT Date	Rejected TLI Indications (1) No.	Rejected TLI Indications (1) dB Rating (5)	Other Rejected Non-TLI Indications (1) No.	Other Rejected Non-TLI Indications (1) dB Rating (5)	
13	BP to SP-E	CB202A-013-005	A,B,C,D	5	+2, +2, +2, +1, +0	24-Apr-10	5	+16, +12, +15, +16, +17	0		All rejectable indications found were repaired, retested and cleared
13	BP to SP-E Holdback	CB202A-013-004, 006	A,B,C,D	See Note 4		19-Oct-10	11	+17, +13, +10, +13, +14, +11, +14, +15, +16, +10, +16	0		All rejectable indications found were repaired, retested and cleared
13	BP to SP-W	CB202A-013-017	A,B,C,E	7	+7, +8, +6, +1, +7, +8, +7	24-Apr-10	0		1	+10	All rejectable indications found were repaired, retested and cleared
13	BP to SP-W Holdback	CB202A-013-016, 018	A,B,C,D	See Note 4		19-Oct-10	0		2	+8, +8	All rejectable indications found were repaired, retested and cleared
14	BP to SP-E	CB202A-014-005	A,B,C,E	4	7, +8, +10, +10	21-Jun-10	0		0		All rejectable indications found were repaired, retested and cleared
14	BP to SP-E Holdback	CB202A-014-004, 006	A,B,C,D	See Note 4		20-Oct-10	3	+10, +17, +17	1	+10	All rejectable indications found were repaired, retested and cleared
14	BP to SP-W	CB202A-014-017	A,B,C,E	2	+6, +7	21-Jun-10	0		0		All rejectable indications found were repaired, retested and cleared
14	BP to SP-W Holdback	CB202A-014-016, 018	A,B,C,D	See Note 4		20-Oct-10	0		0		
15	BP to SP-E	CB202A-015-005	A,B,C,D	11	+3, +4, +6, +7, +9, +8, +3, +5, +3, +8, +8	30-Jul-10	0		1	+10	All rejectable indications found were repaired, retested and cleared
15	BP to SP-E Holdback	CB202A-015-004, 006	A,B,C,D	See Note 4		10-Dec-10	1	+15	3	+10, +10, +8	All rejectable indications found were repaired, retested and cleared
15	BP to SP-W	CB202A-015-017	A,B,C,D	4	+6, +5, +7, +5	30-Jul-10	0		0		All rejectable indications found were repaired, retested and cleared
15	BP to SP-W Holdback	CB202A-015-016, 018	A,B,C,D	See Note 4		10-Dec-10	0		3	+8, +10, +10	All rejectable indications found were repaired, retested and cleared

NDT Using Scanning Pattern "D"

NDT Using Scanning Pattern "E"

Rejectable Indications Found by ZPMC QC Post Initial Weld NDT

Rejected Transverse Linear Indications (TLIs) Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Other Rejected Non-TLI Indications Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Notes:
(1) - All rejectable indications found were repaired, retested and cleared.
(2) - ZPMC QC NDT performed upon completion of initial welds. ZPMC repairs all rejectable indications. ZPMC QC re-inspects the weld until cleared.
(3) - ABFJV / CT NDT performed once weld is cleared by ZPMC QC. If required, ZPMC then makes repairs and ABFJV/CT re-inspects weld until cleared.
(4) - Due to integration of the QC inspection process with ABFJV and ZPMC, weld inspections performed after October 2010 are only recorded under the ABFJV/CT column
(5) - ABFJV/CT Scanning Pattern D evaluation perfomed using acceptance critera to be 6dB above Class B under Table 6.3 of AWS D1.5 Code.

EXHIBIT 4.2 - Crossbeams 1 - 16 Bottom Corner Weld UT Summary

CB#	Description	Weld ID	Scan Pattern	ZPMC NDT Results (2)		ABFJV / CT NDT Results (3)					Remarks
				Rejected Indications per Table 6.3 of AWS D1.5 Code (1)		ABFJV UT Date	Rejected TLI Indications (1)		Other Rejected Non-TLI Indications (1)		
				No.	dB Rating		No.	dB Rating (5)	No.	dB Rating (5)	
16	BP to SP-E	CB202A-016-005	A,B,C,E	0	N/A	3-Aug-10	0		3	+4, +10, +10	All rejectable indications found were repaired, retested and cleared
	BP to SP-E Holdback	CB202A-016-004, 006	A,B,C,D	See Note 4		15-Dec-10	0		2	+8, +9	All rejectable indications found were repaired, retested and cleared
	BP to SP-W	CB202A-016-017	A,B,C,E	0	N/A	3-Aug-10	0		2	+10, +10	All rejectable indications found were repaired, retested and cleared
	BP to SP-W Holdback	CB202A-016-016, 018	A,B,C,D	See Note 4		15-Dec-10	0		5	+7, +6, +7, +2, +10	All rejectable indications found were repaired, retested and cleared

NDT Using Scanning Pattern "D"

NDT Using Scanning Pattern "E"

Rejectable Indications Found by ZPMC QC Post Initial Weld NDT

Rejected Transverse Linear Indications (TLIs) Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Other Rejected Non-TLI Indications Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Notes:
(1) - All rejectable indications found were repaired, retested and cleared.
(2) - ZPMC QC NDT performed upon completion of initial welds. ZPMC repairs all rejectable indications. ZPMC QC re-inspects the weld until cleared.
(3) - ABFJV / CT NDT performed once weld is cleared by ZPMC QC. If required, ZPMC then makes repairs and ABFJV/CT re-inspects weld until cleared.
(4) - Due to integration of the QC inspection process with ABFJV and ZPMC, weld inspections performed after October 2010 are only recorded under the ABFJV/CT column
(5) - ABFJV/CT Scanning Pattern D evaluation perfomed using acceptance critera to be 6dB above Class B under Table 6.3 of AWS D1.5 Code.

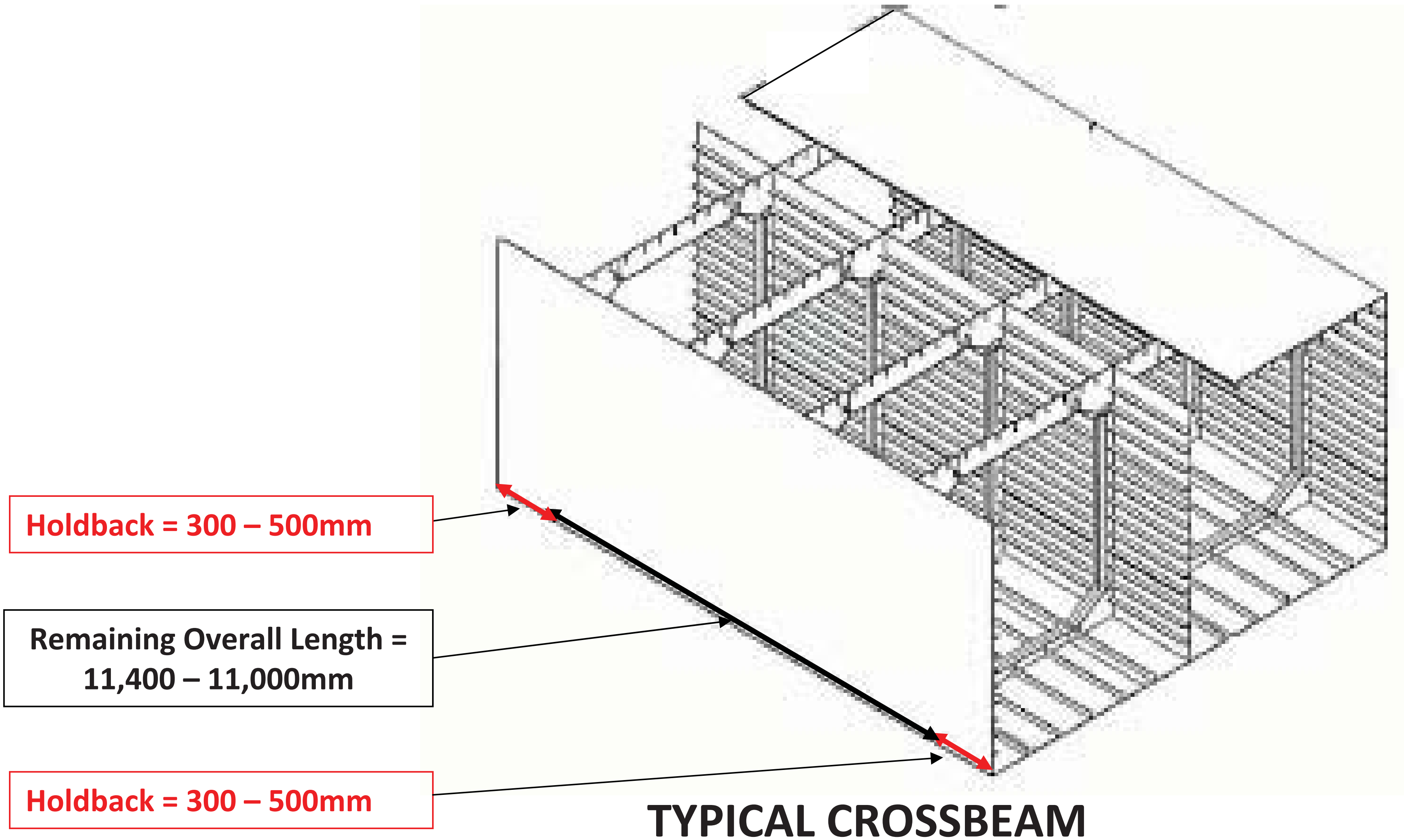

Holdback = 300 – 500mm
Remaining Overall Length = 11,400 – 11,000mm
Holdback = 300 – 500mm
TYPICAL CROSSBEAM

Exhibit 4.3 - Lifts 13 & 14 Pure FCAW Fillet Welds Made with Old Welding Process and Contract Required NDT Testing at Less Than 100%

Lift 13AW/13AE

*Based on non destructive testing records submitted to date. Testing results will continue to be submitted as NDT is completed.

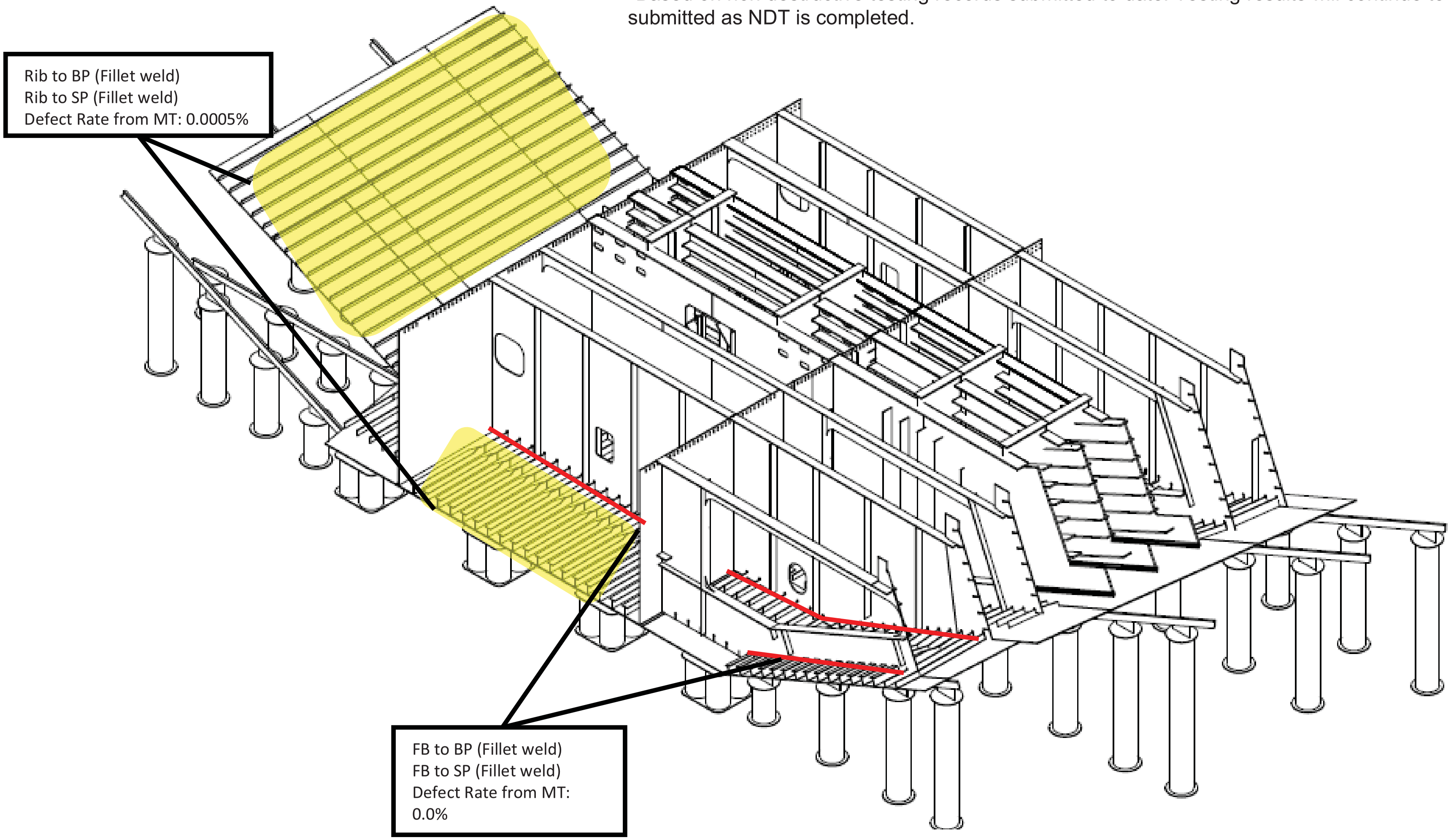


Exhibit 4.3 - Lifts 13 & 14 Pure FCAW Fillet Welds Made with Old Welding Process and Contract Required NDT Testing at Less Than 100%

Lift 13BW/13BE, 13CW/13CE

*Based on non destructive testing records submitted to date. Testing results will continue to be submitted as NDT is completed.

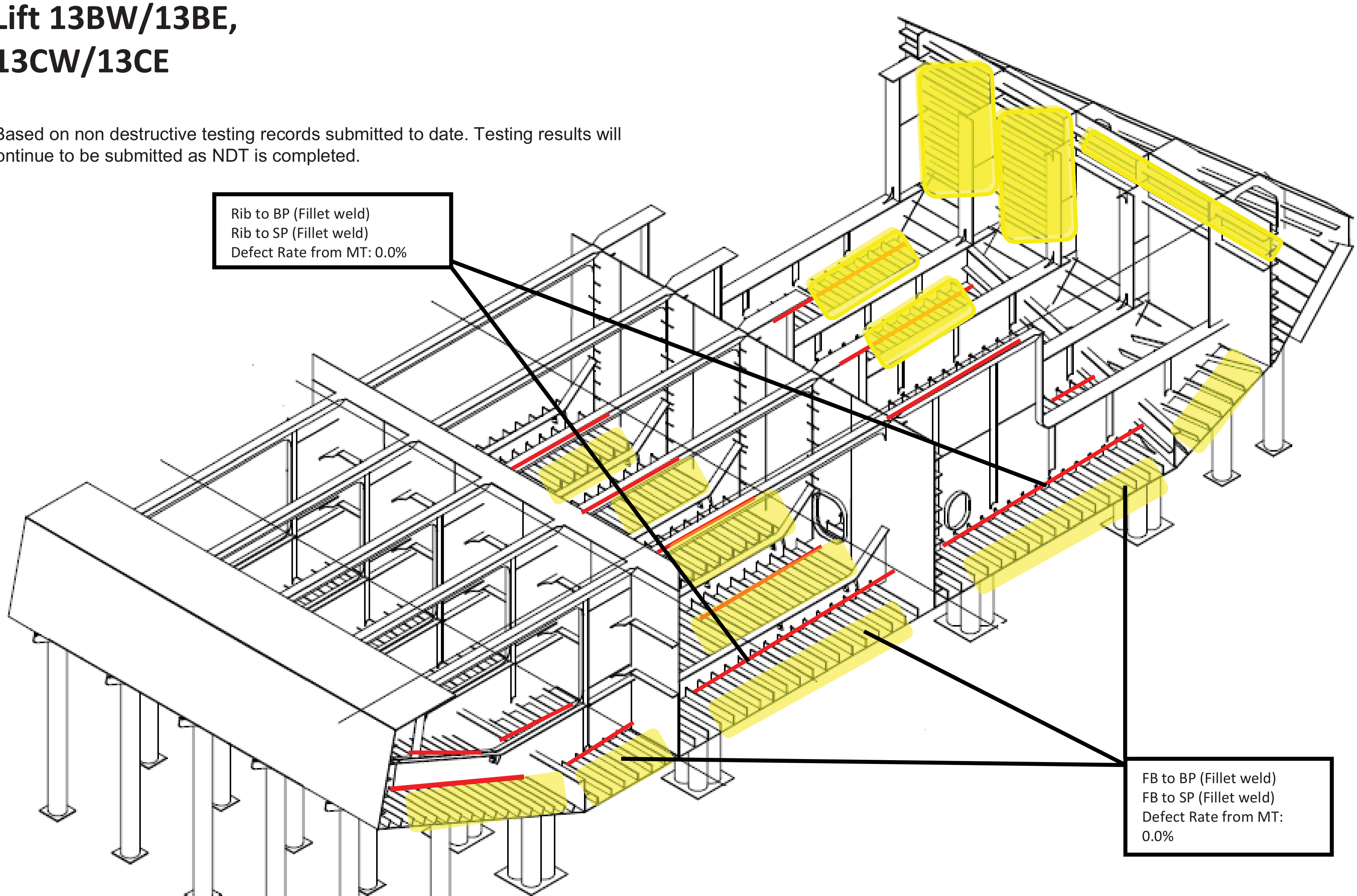
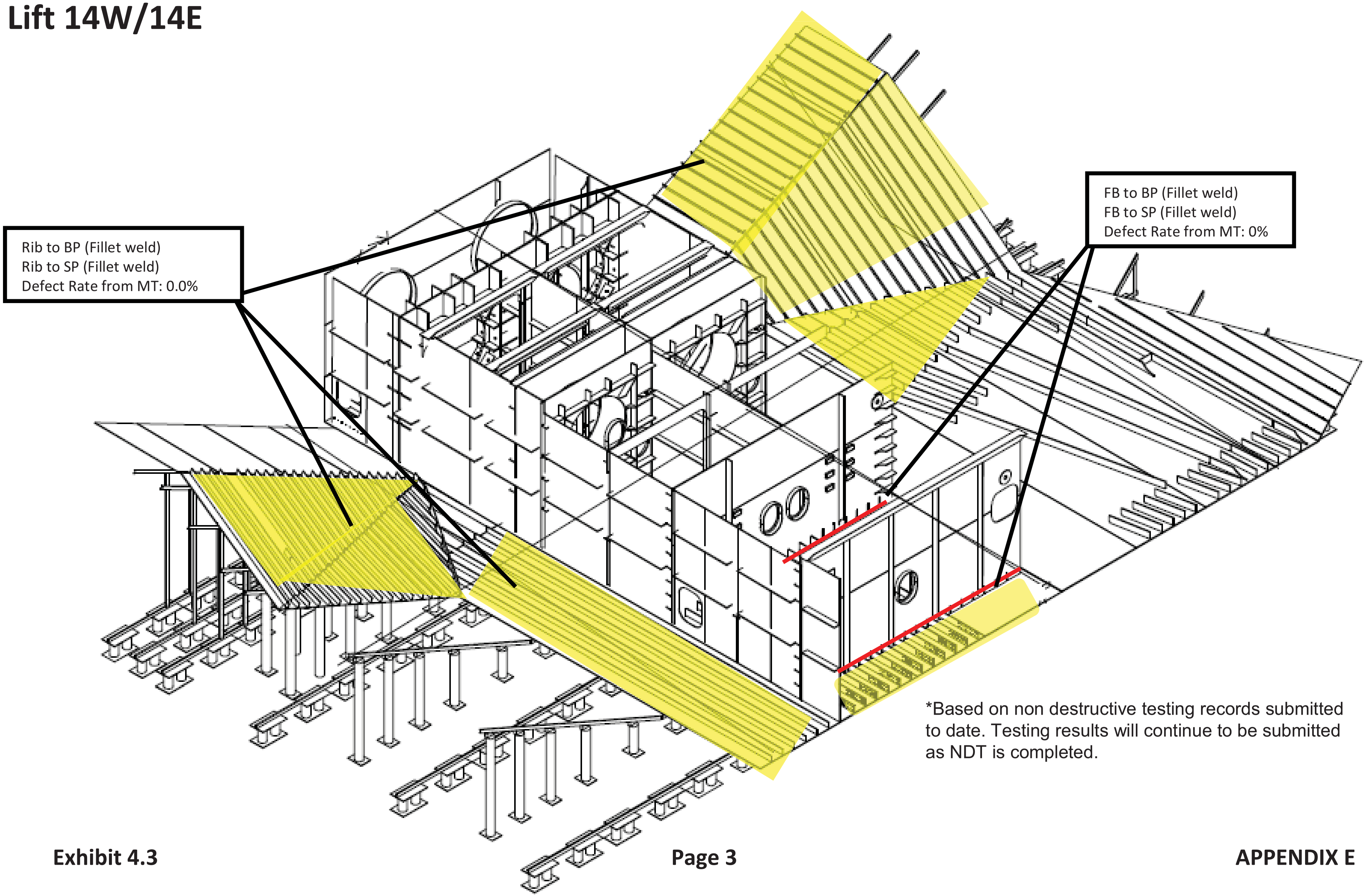


Exhibit 4.3 - Lifts 13 & 14 Pure FCAW Fillet Welds Made with Old Welding Process and Contract Required NDT Testing at Less Than 100%

Lift 14W/14E



*Based on non destructive testing records submitted to date. Testing results will continue to be submitted as NDT is completed.

Exhibit 4.4 - Statistics of the Welds

Ultrasonic Testing

(1) Weld No.	(2) Weld Configuration	(3) Weld Type	(4) Total Weld Length	(5) Weld Examined by UT	(6) = (5) / (4) % Examined by UT	(7) UT Defects	(8) = (7) / (5) Defect Rate
1.1k	T Joint	Fillet	-	None as N/A to this Type Weld	None	None	None
1.1m	T Joint	Fillet	-	None as N/A to this Type Weld	None	None	None
1.1p	T Joint	Fillet	-	None as N/A to this Type Weld	None	None	None
1.1q	T Joint	Fillet	-	None as N/A to this Type Weld	None	None	None
1.1r	T Joint	Fillet	-	None as N/A to this Type Weld	None	None	None
1.2c	Butt Joint	CJP	146,400.00	127,534.00	87.113%	422.00	0.331%
1.2e	T Joint	Fillet	-	None as N/A to this Type Weld	None	None	None
1.4e	Butt	CJP	1,356,864.00	418,137.25	30.816%	472.00	0.113%
2.0b	T Joint	Fillet	-	None as N/A to this Type Weld	None	None	None

Magnetic Particle Testing

(1) Weld No.	(2) Weld Configuration	(3) Weld Type	(4) Total Weld Length	(5) Weld Examined by MT	(6) = (5) / (4) % Examined by MT	(7) MT Defects	(8) = (7) / (5) Defect Rate
1.1k	T Joint	Fillet	68,357,807.00	20,512,372.00	30.007%	1,307.00	0.006%
1.1m	T Joint	Fillet	1,530,593.00	1,390,280.00	90.833%	-	0.000%
1.1p	T Joint	Fillet	2,393,082.00	1,935,770.00	80.890%	226.00	0.012%
1.1q	T Joint	Fillet	196,048.00	116,979.00	59.669%	-	0.000%
1.1r	T Joint	Fillet	3,584,352.00	3,161,468.00	88.202%	510.00	0.016%
1.2c	Butt Joint	CJP	-	None as N/A to this Type Weld	None	None	None
1.2e	T Joint	Fillet	46,560,467.00	18,832,453.00	40.447%	5,237.00	0.028%
2.0b	T Joint	Fillet	3,173,921.00	1,181,529.00	37.226%	59.00	0.005%

General Notes:

1. Welding Processes shown here are for typical fabrication and they do not include the process used for Weld Repair.
2. Reference Exhibit 4.1 for Contract Required NDT.

APPENDIX F

View From the Yerba Buena Island of the SFOBB East Spans Replacement

APPENDIX F

Cross Sections of common bents

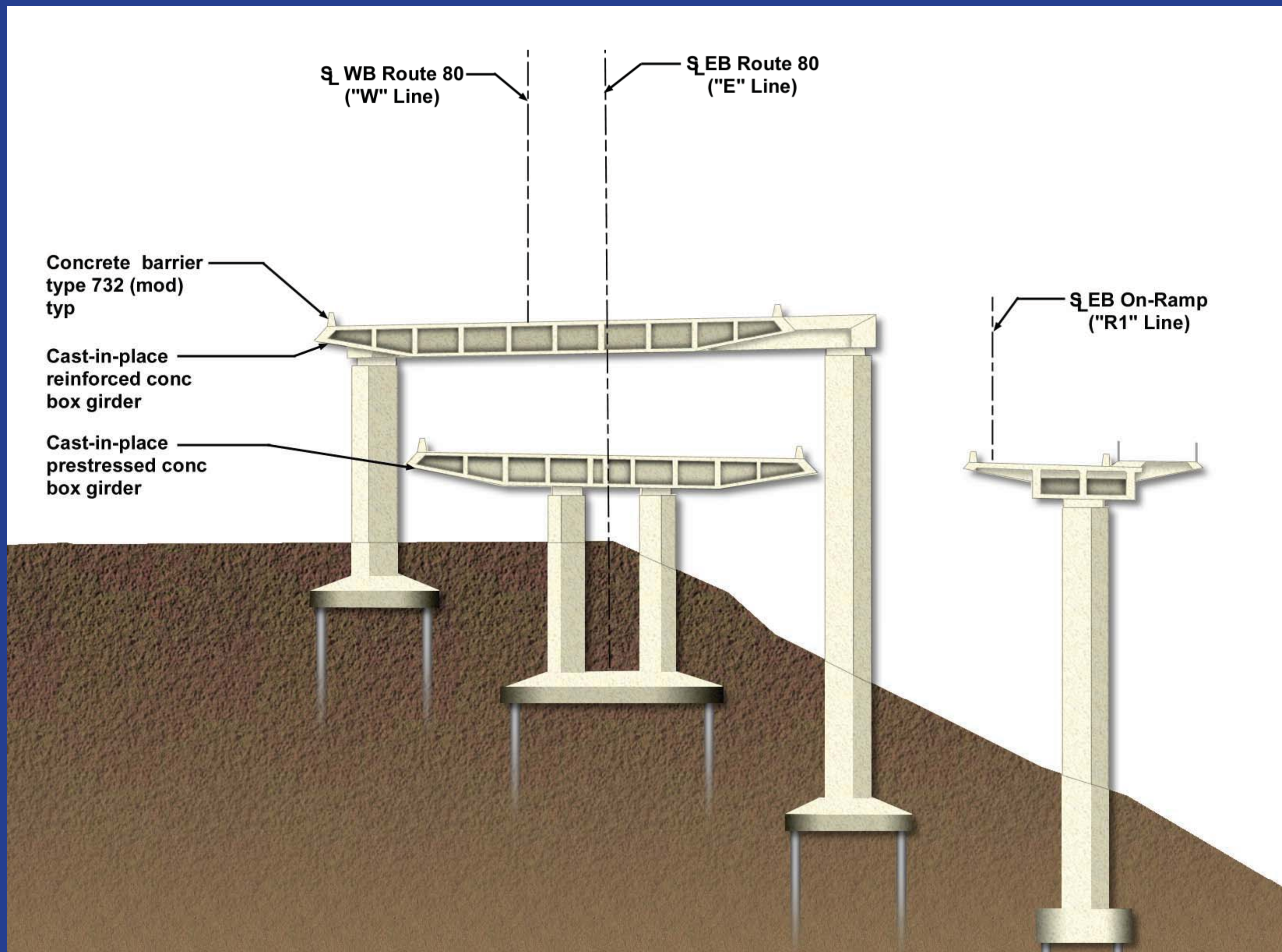
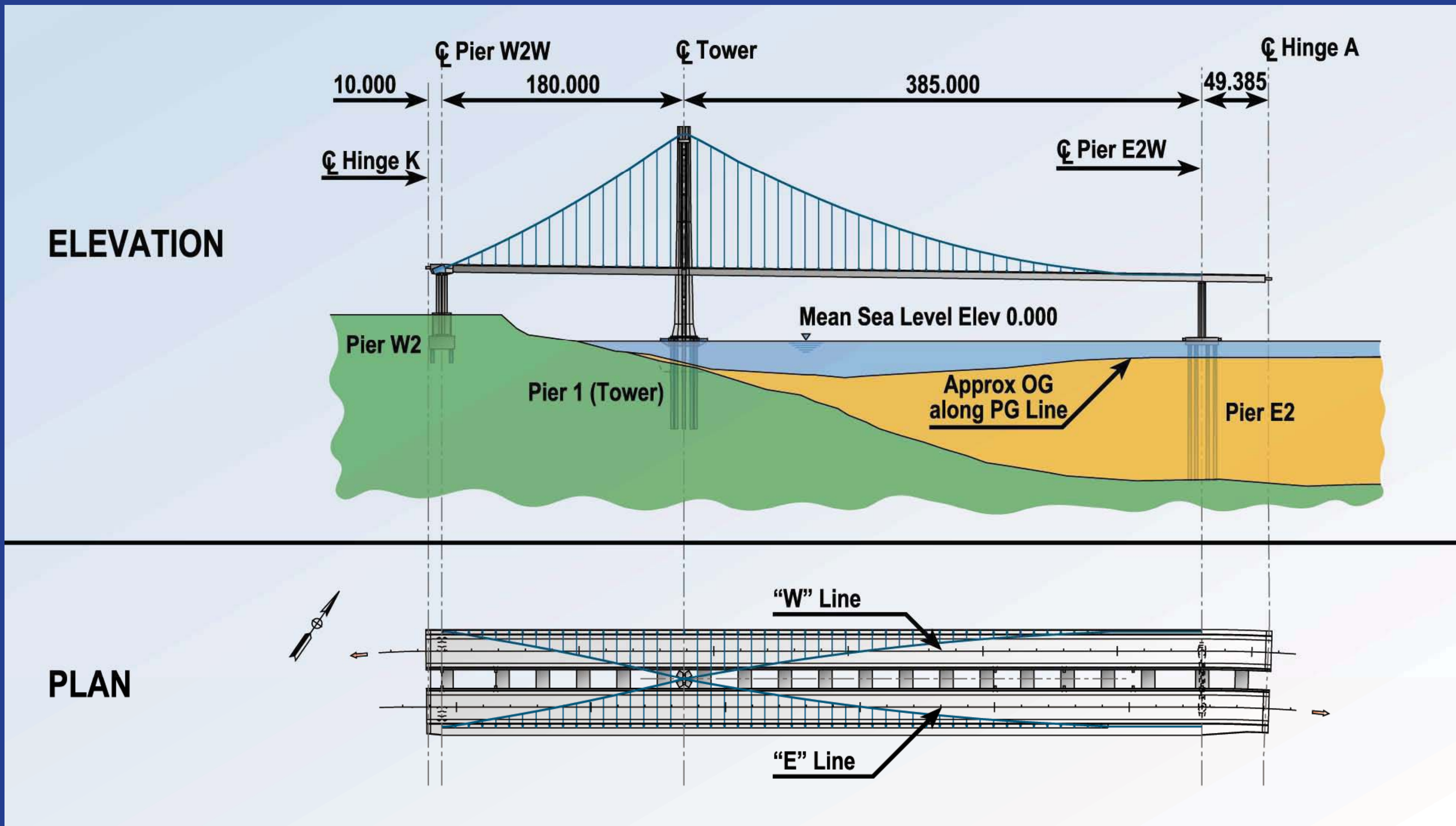


Figure 3 YBI TRANSITION STRUCTURE--Cross Section

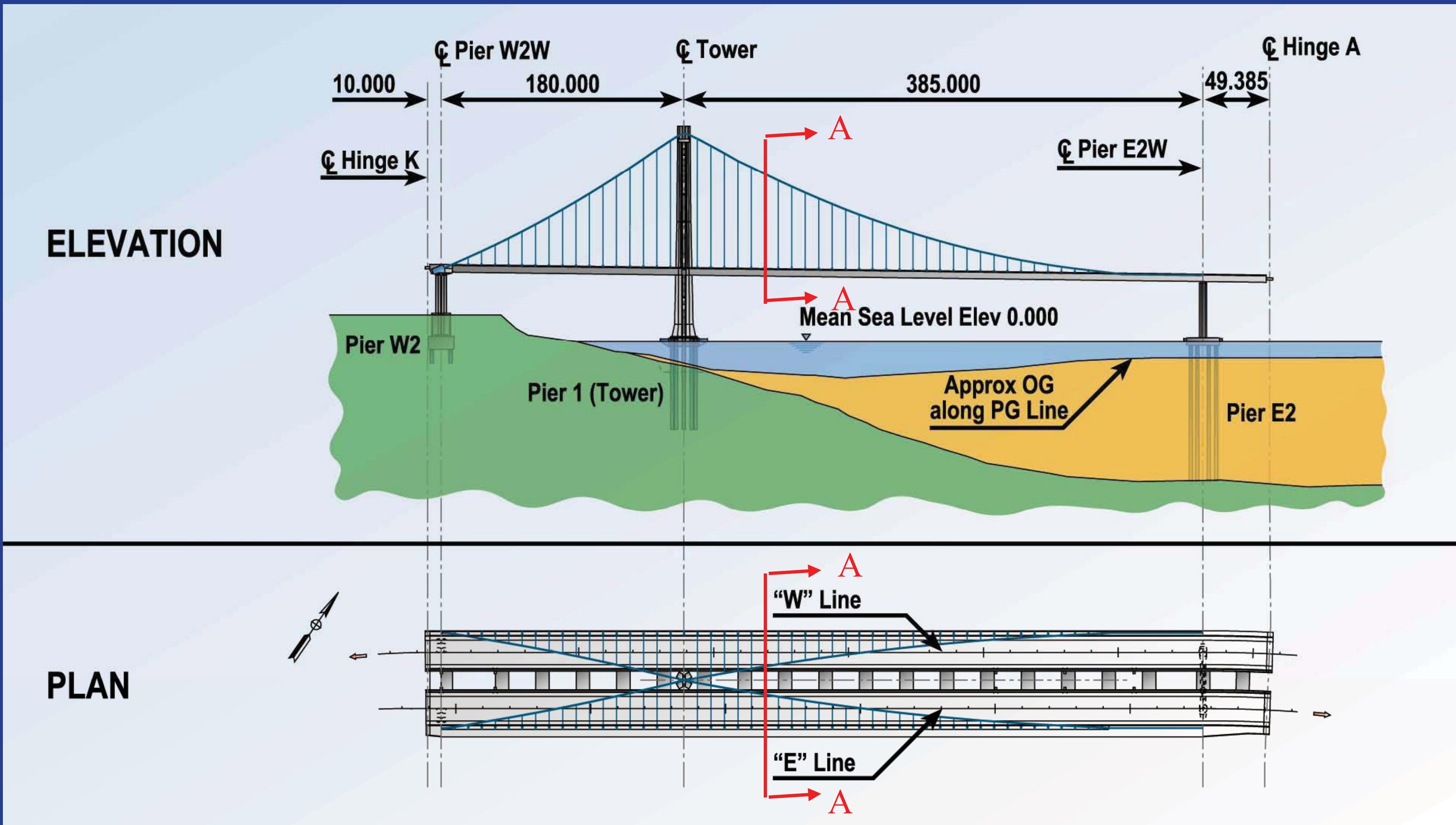
APPENDIX F

Elevation and Plan View of SAS



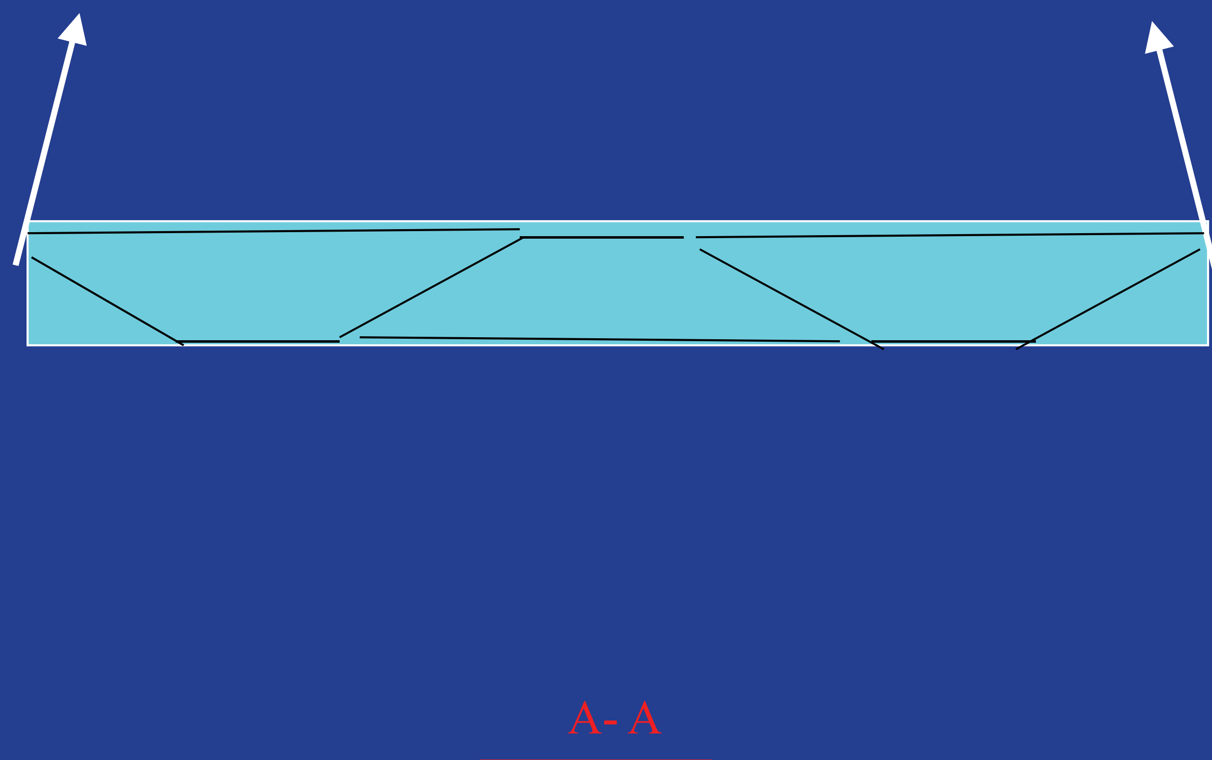
APPENDIX F

Elevation and Plan View of SAS

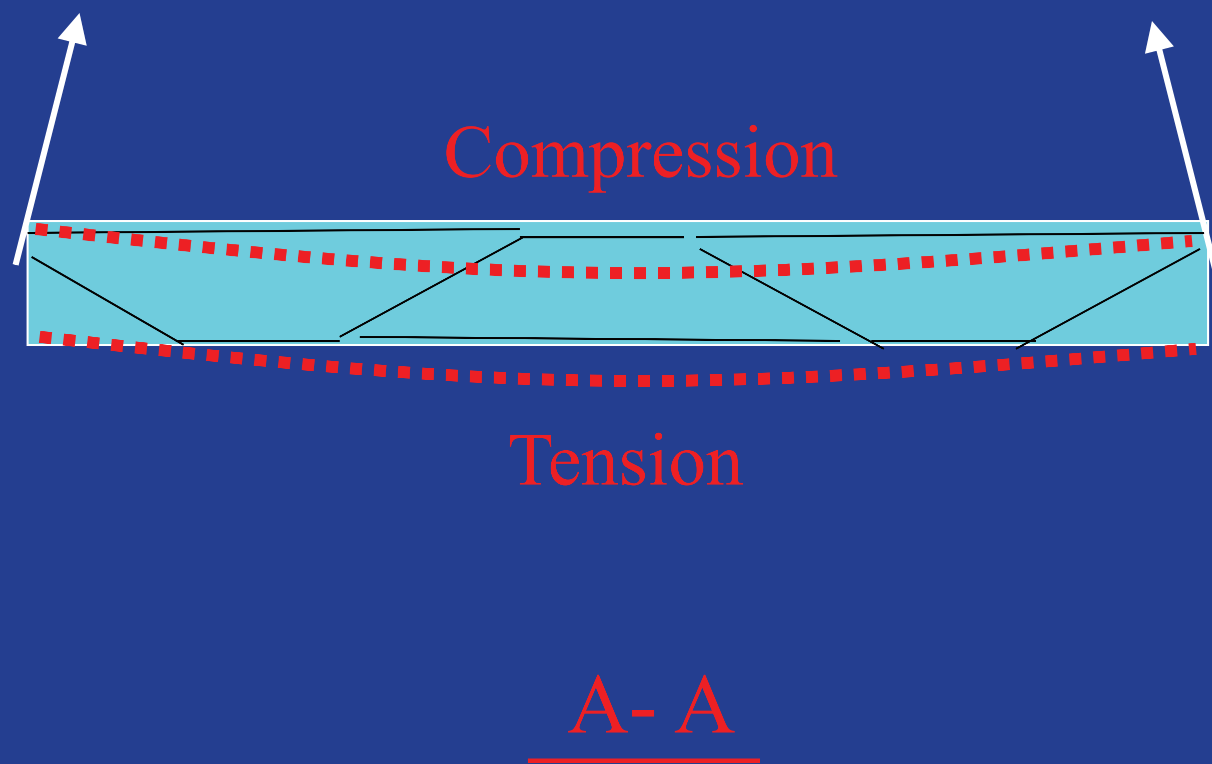


APPENDIX F

X-section of SAS



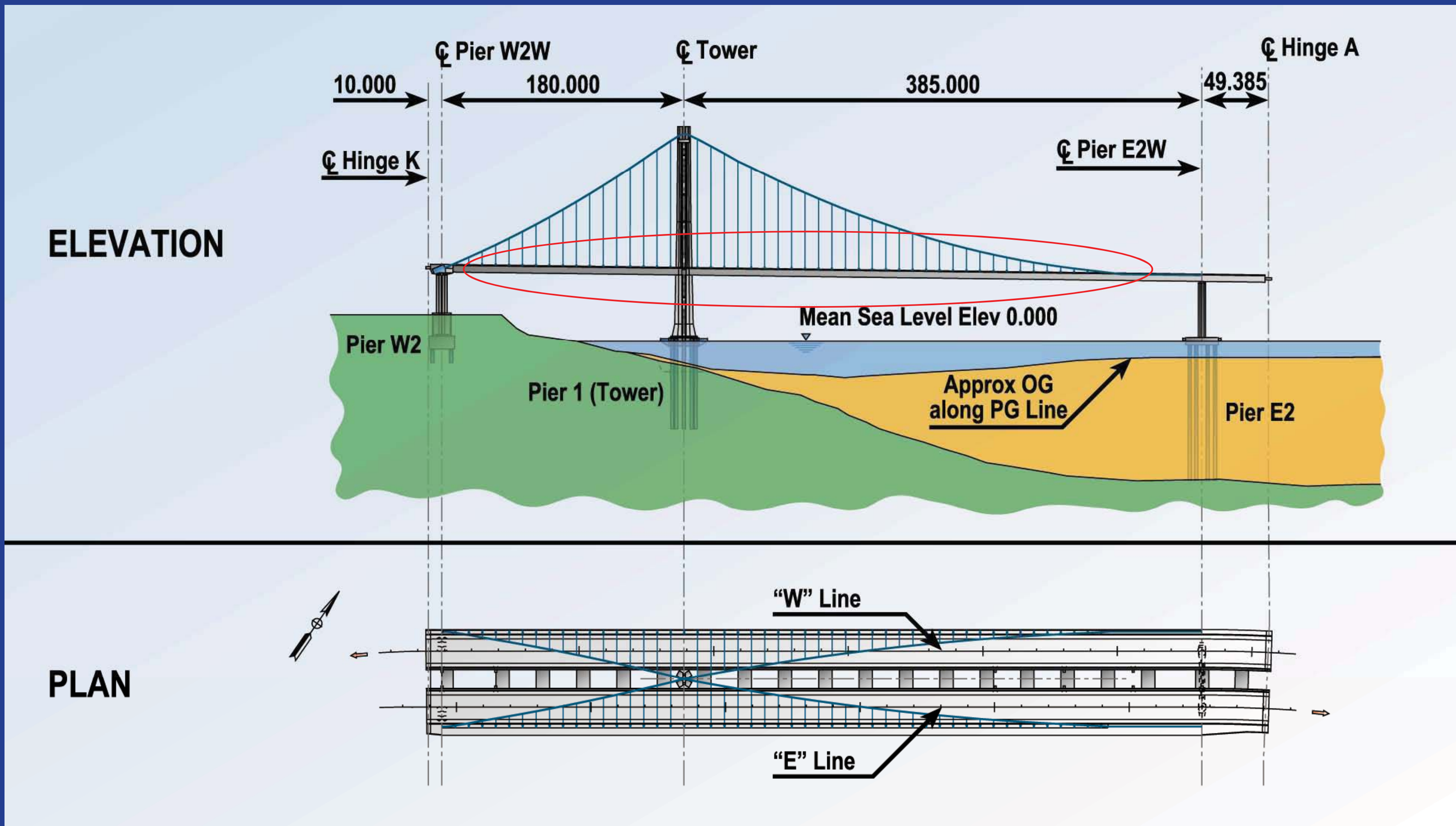
X-section of SAS



Consider Cross-Section of OBG

Consider wind flow and interaction

Elevation and Plan View of SAS

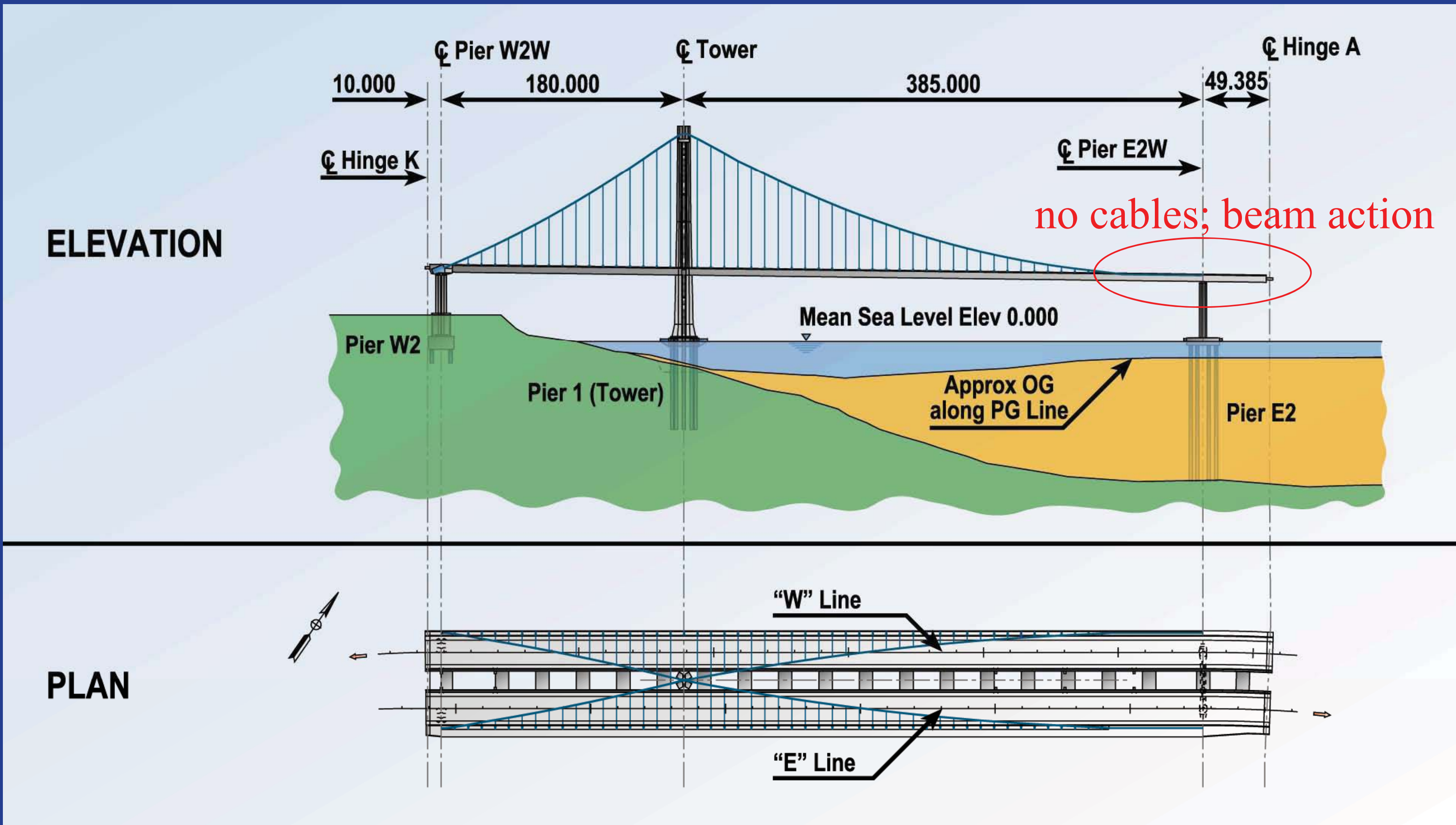


Similar to a prestressed beam on an elastic foundation

Self weight, vehicles, and wind drive it up and down

APPENDIX F

Elevation and Plan View of SAS

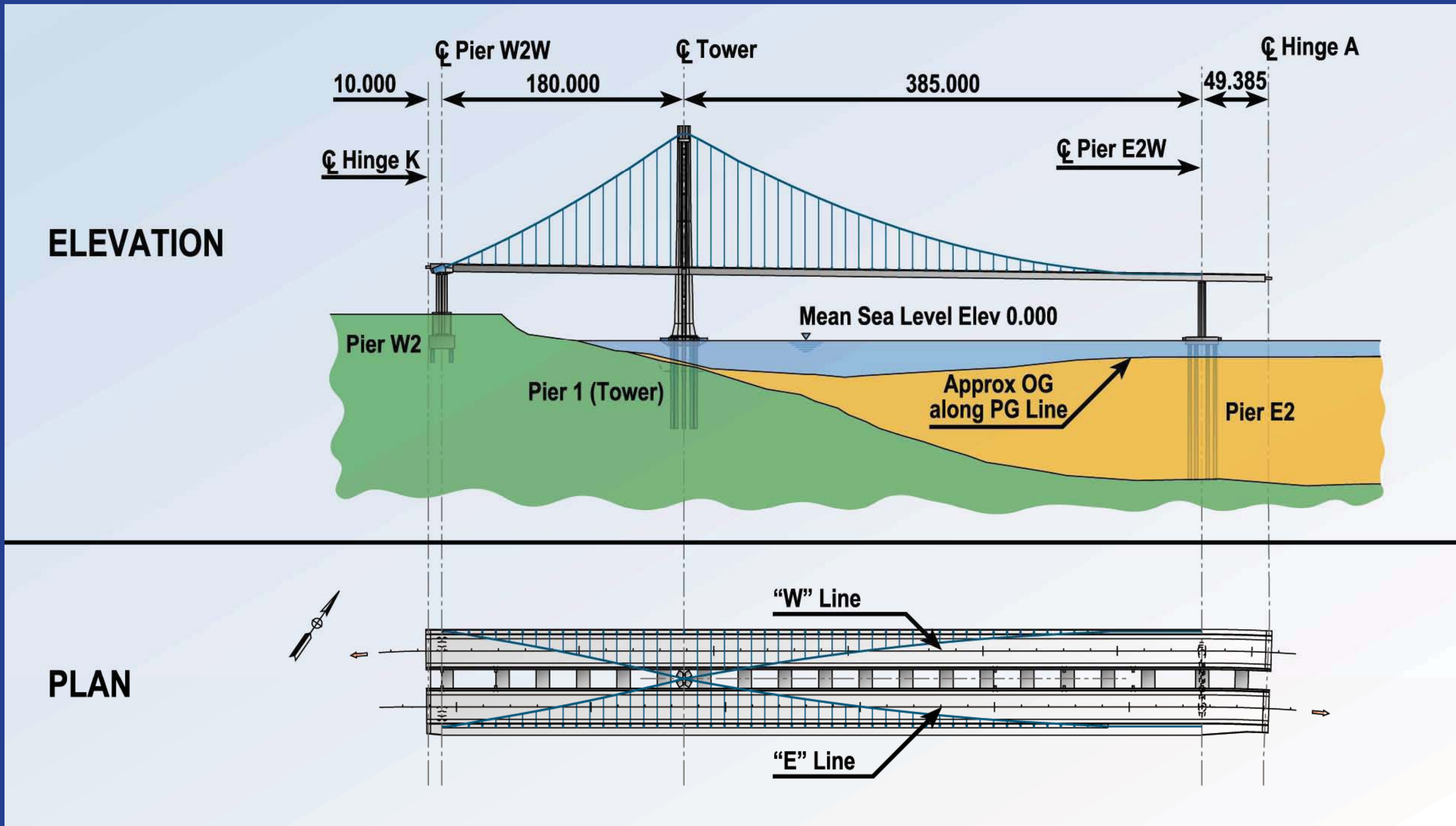


APPENDIX F

East end

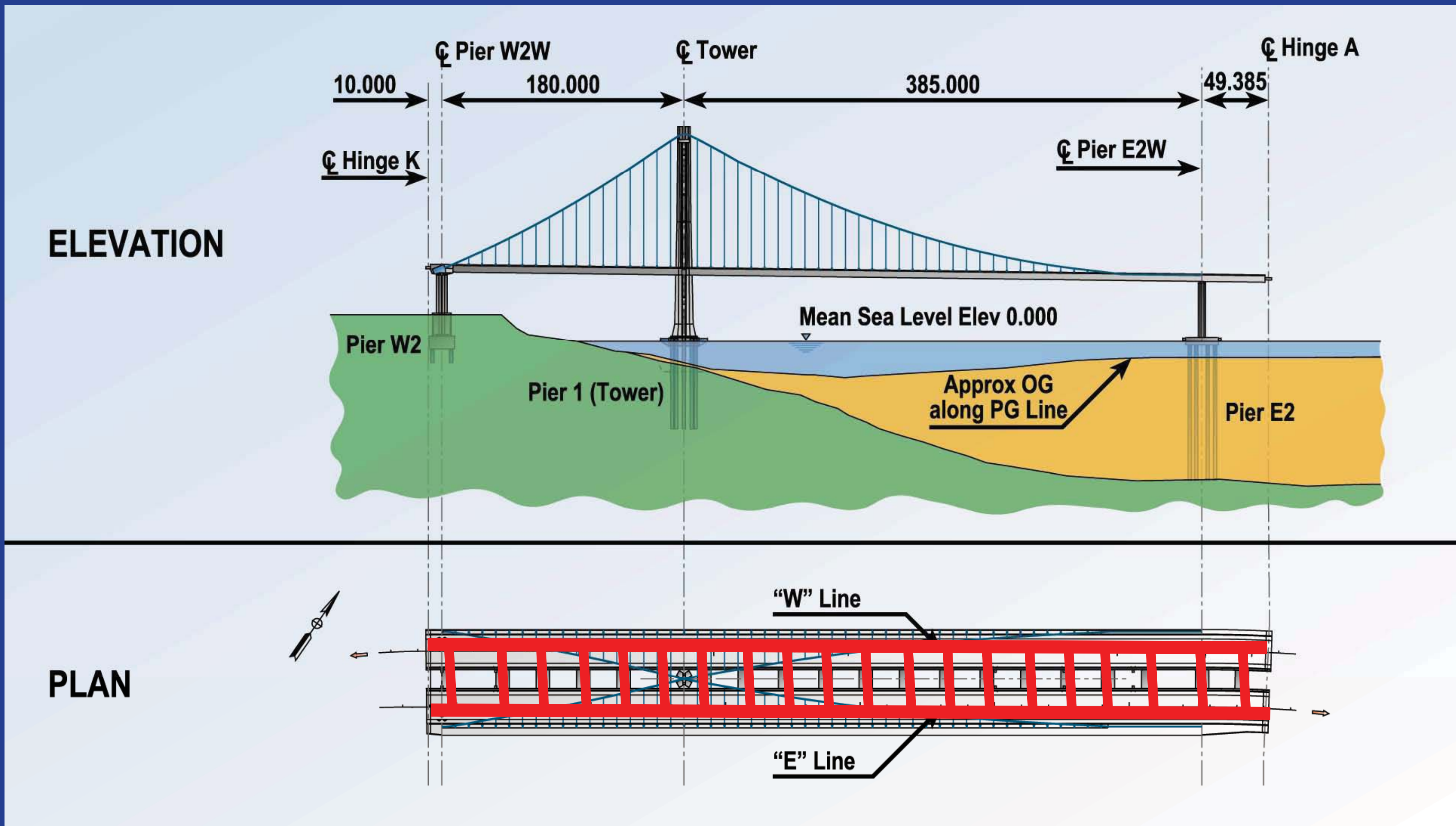
- Beam action is in long. and trans. directions
- Anchorage has a complex load path (FEM)

Elevation and Plan View of SAS



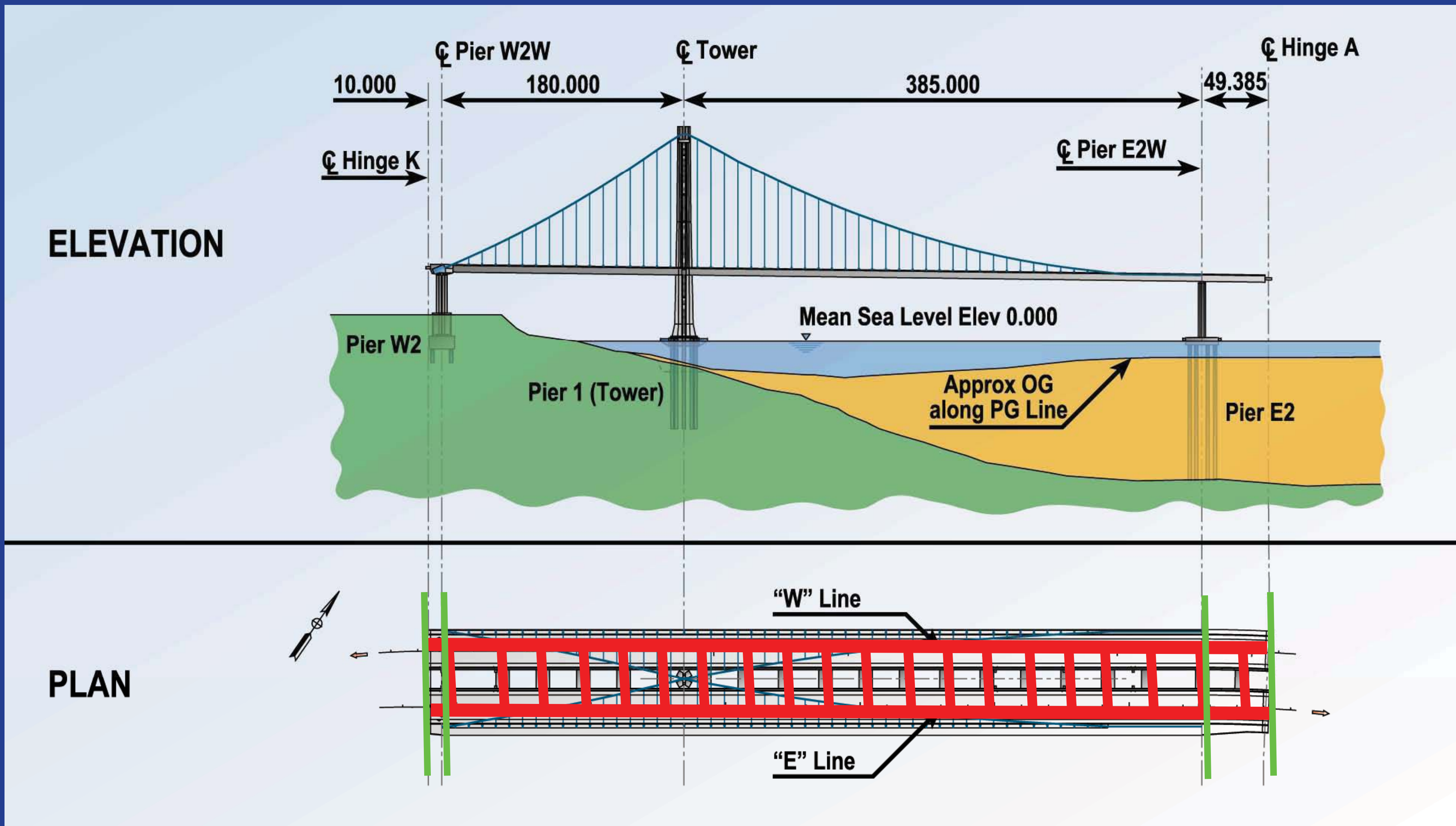
Consider lateral system

Elevation and Plan View of SAS



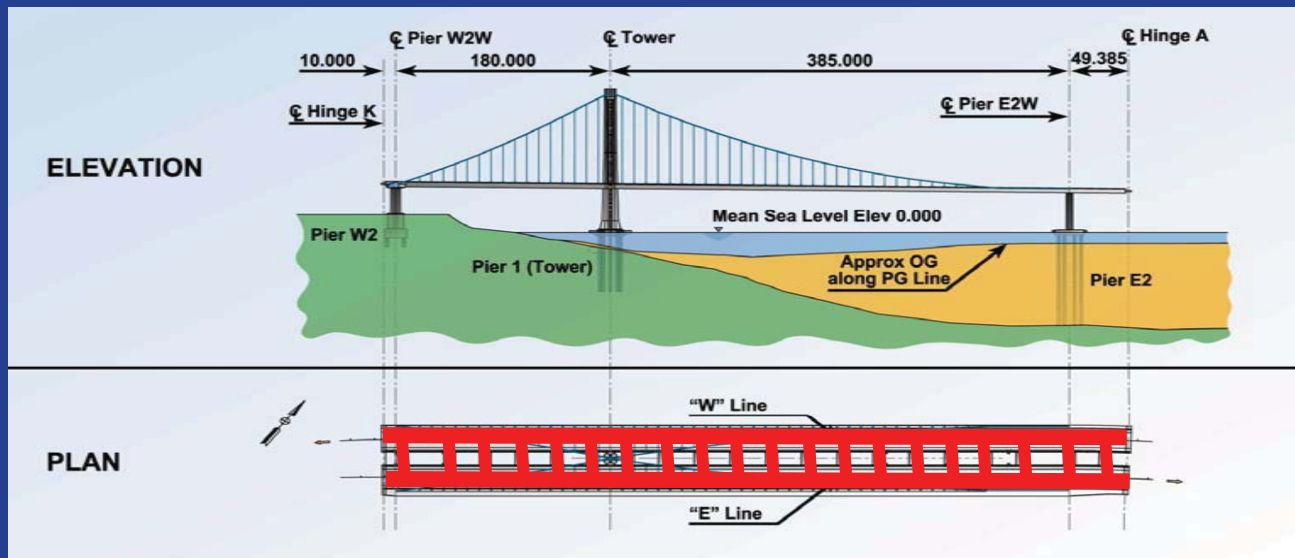
APPENDIX F

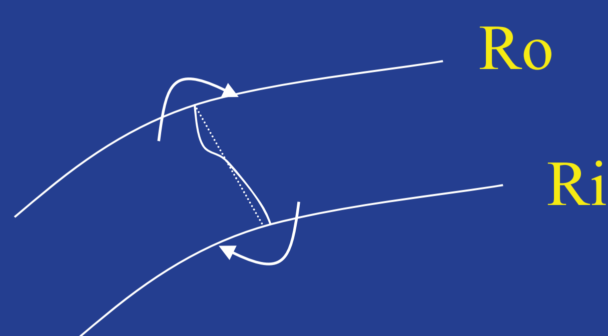
Elevation and Plan View of SAS



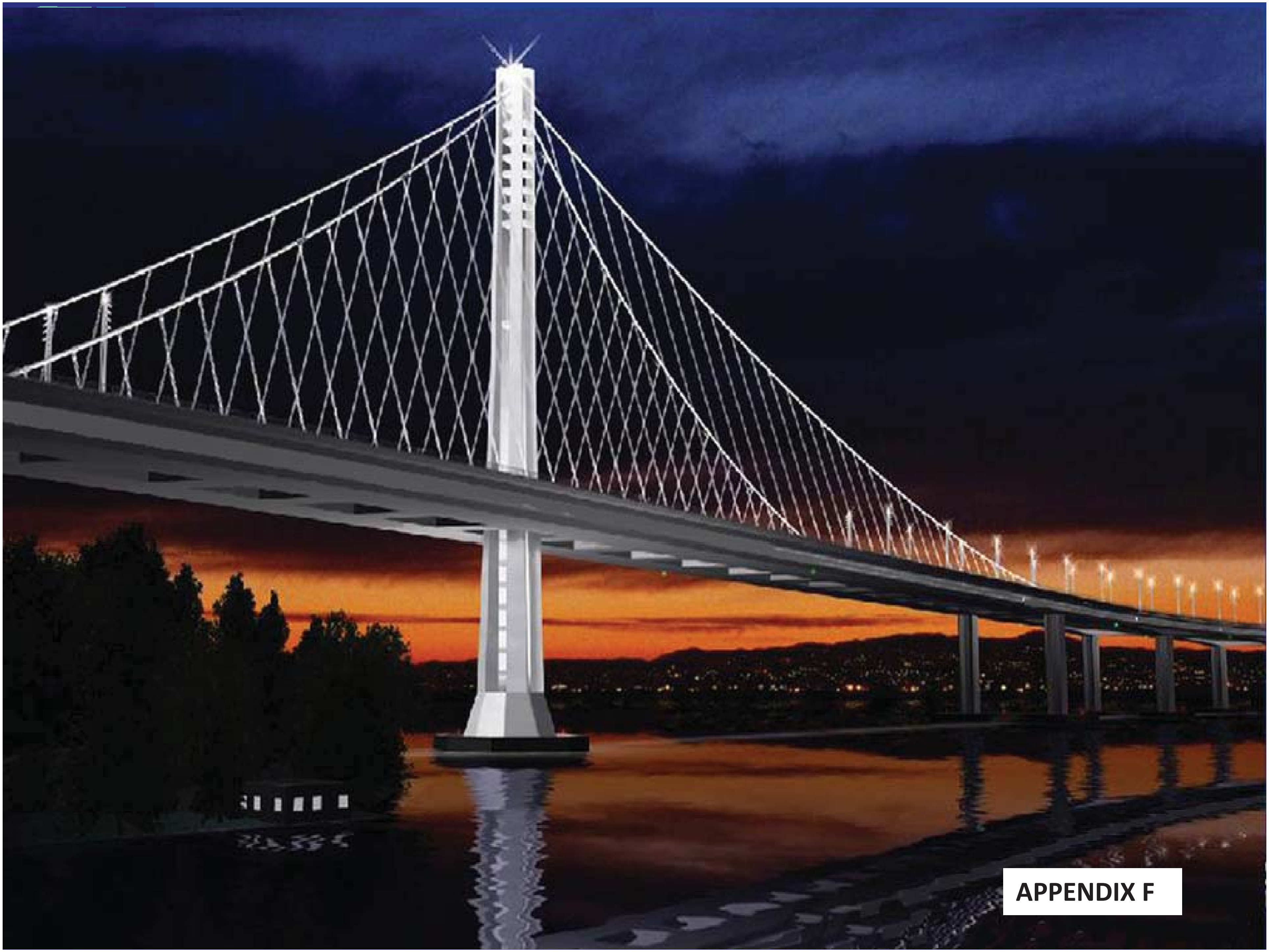
Vierendeel Truss
with a pretty long span

Elevation and Plan View of SAS





APPENDIX F


APPENDIX F

Loading to Consider?

- Consider fatigue conditions ($\sim 10^6$)
- ~service type loadings (not extreme loadings)
- ~unfactored DL, LL, & ~ 50 mph wind?)
- Self-weight (DL)
- Vehicular loadings (LL)
- Repeated wind (~0.3*WL)

APPENDIX F

Loading to Consider?

- DL
- DL+LL+(0.3)WL
- DL – (0.3)WL

APPENDIX G

OBG-Cross Beam Transverse Tension Mapping (Lifts 2-12)

Service Loading

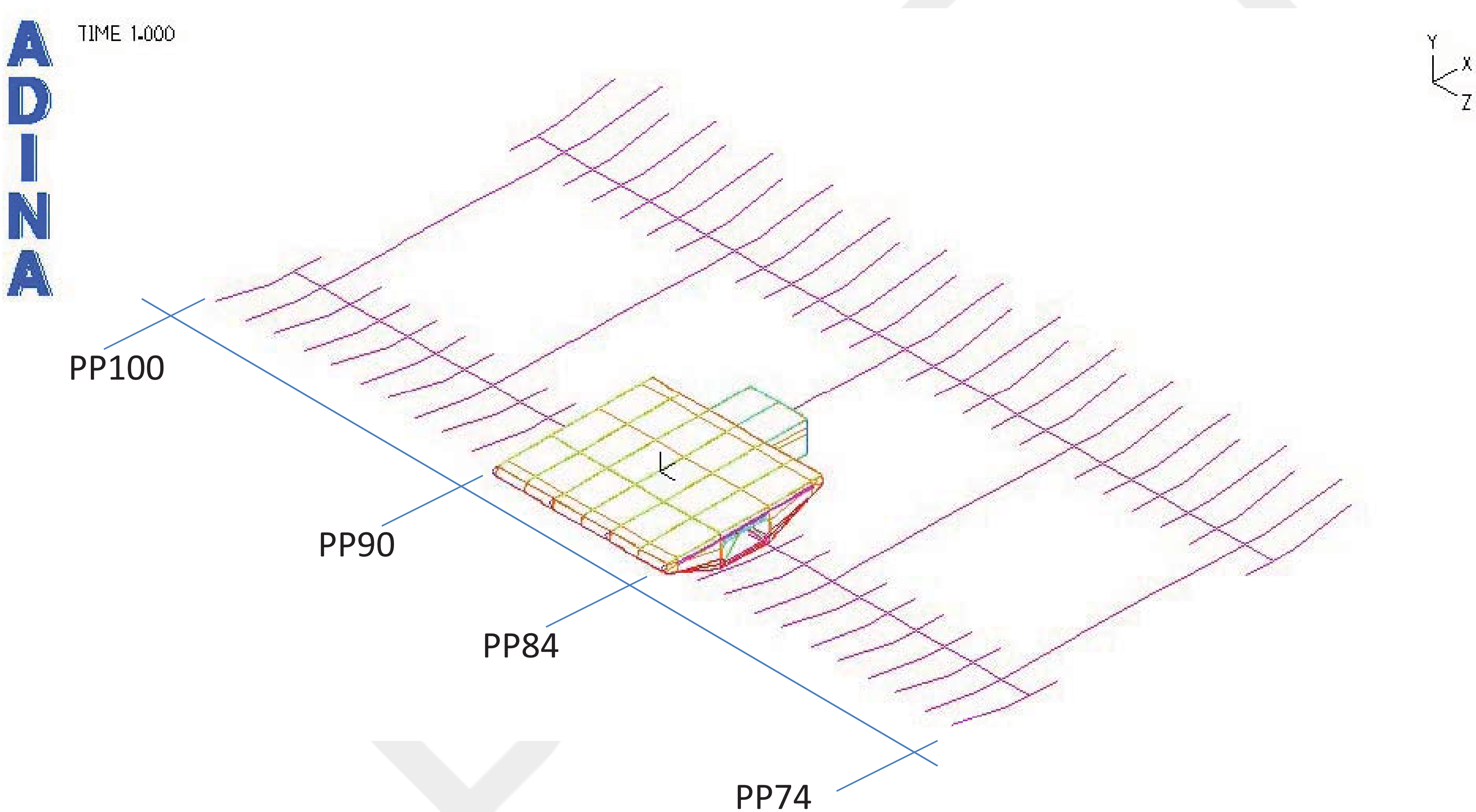
- Tension Mapping for Service Loads
  - Loads Considered:
    - Dead Load
    - Global Live Load (OBG)
    - Local Live Load (Deck)
    - Wind Load
  - Unfactored Loads
  - No Impact (Except for Local Live Load)

Check Criteria

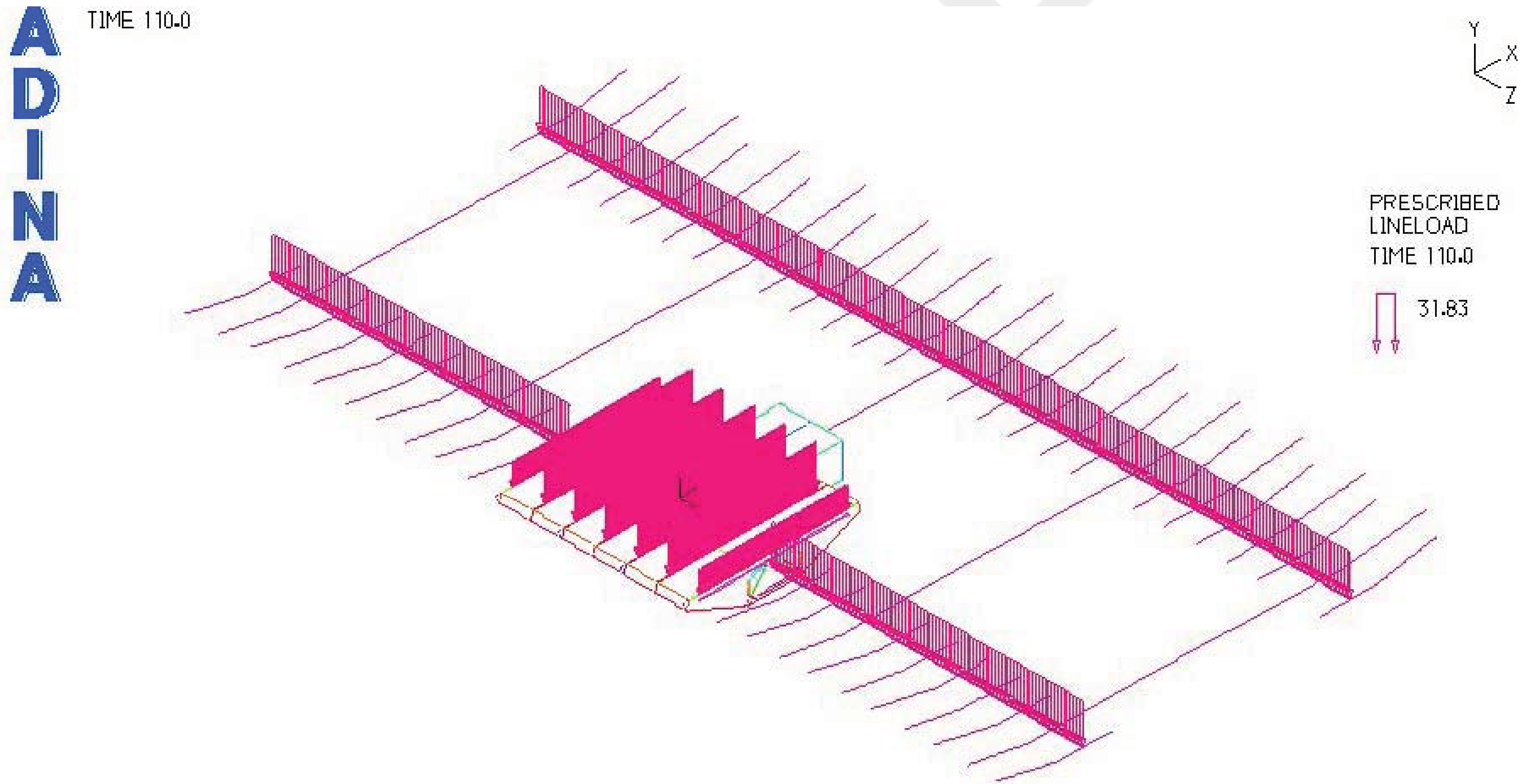
- Demand ≤ Capacity
- Safety Factor should be used when determining weld capacity
  - (eg. Per ASD, $\sigma < 0.6Fy$)

Design Life = 150 Years

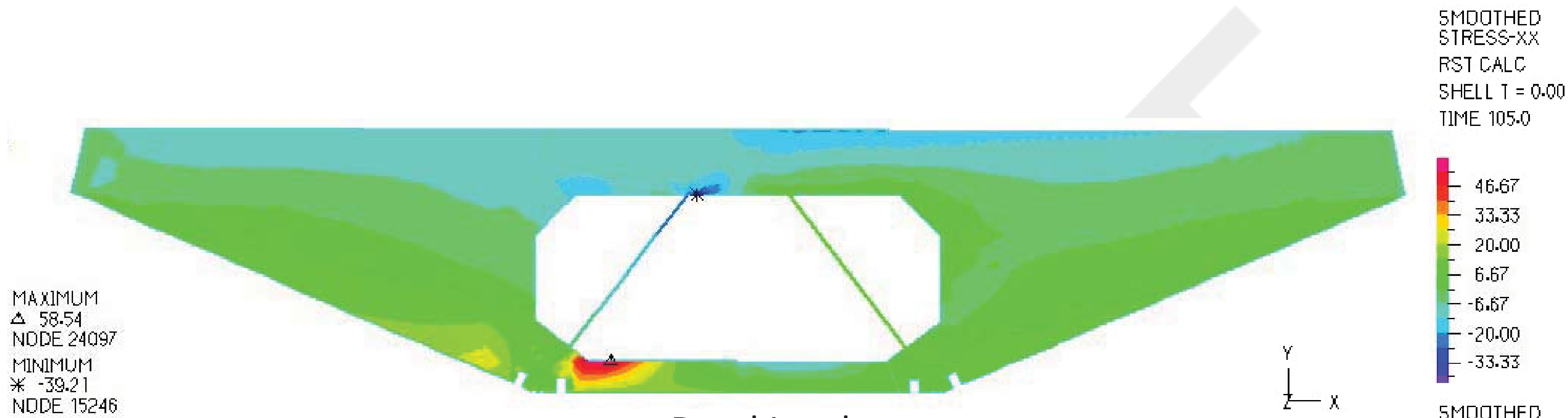
	Number of Cycles
Wind Load	~5 million
Global Live Load	~5 million
Fatigue Live Load	>1 billion



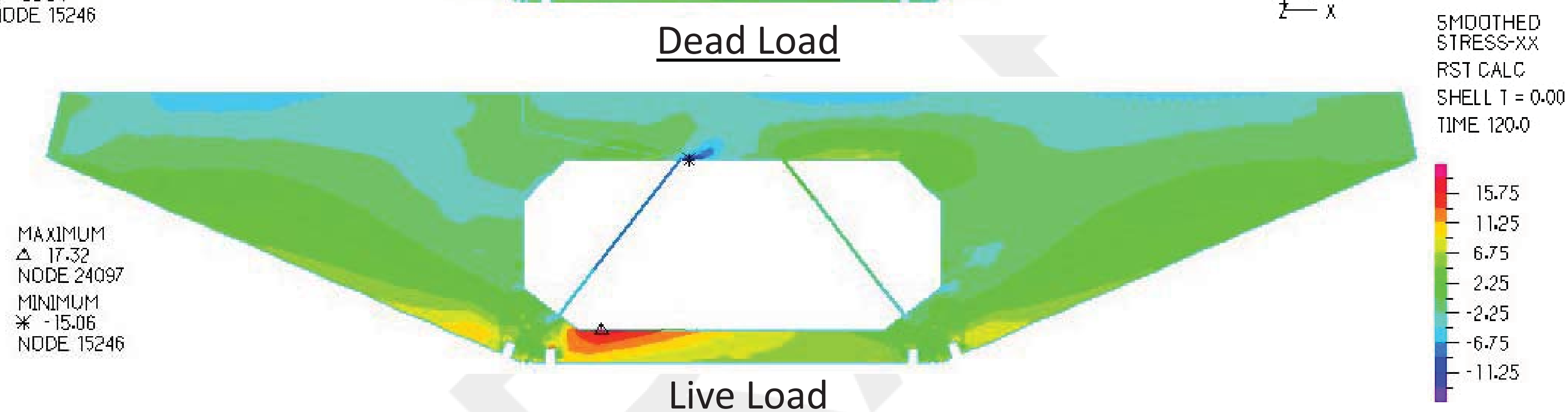
Model Scope



Load Pattern (Live Load Case)



Dead Load

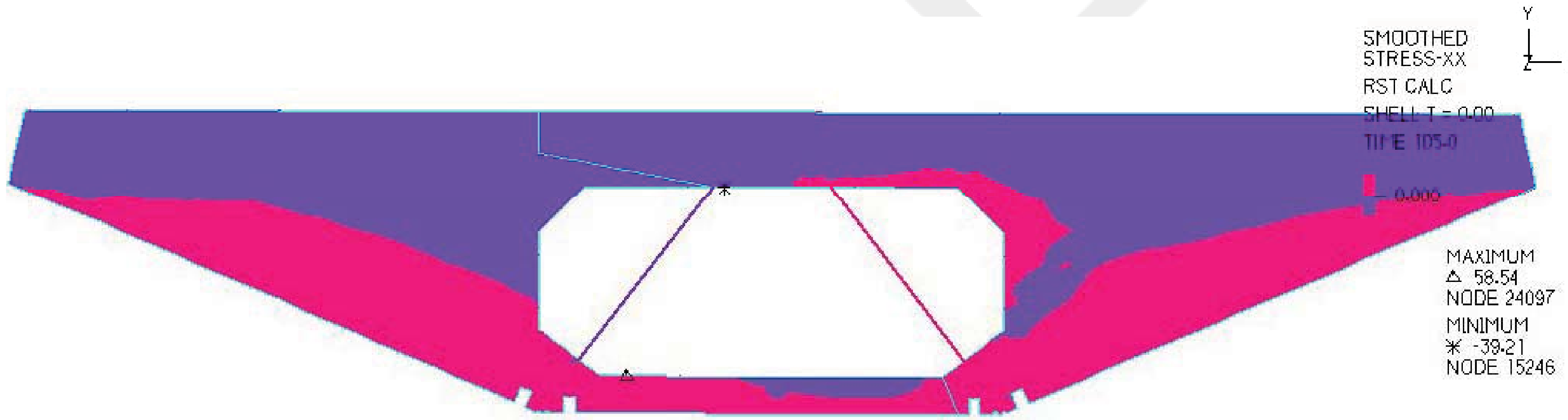


Live Load

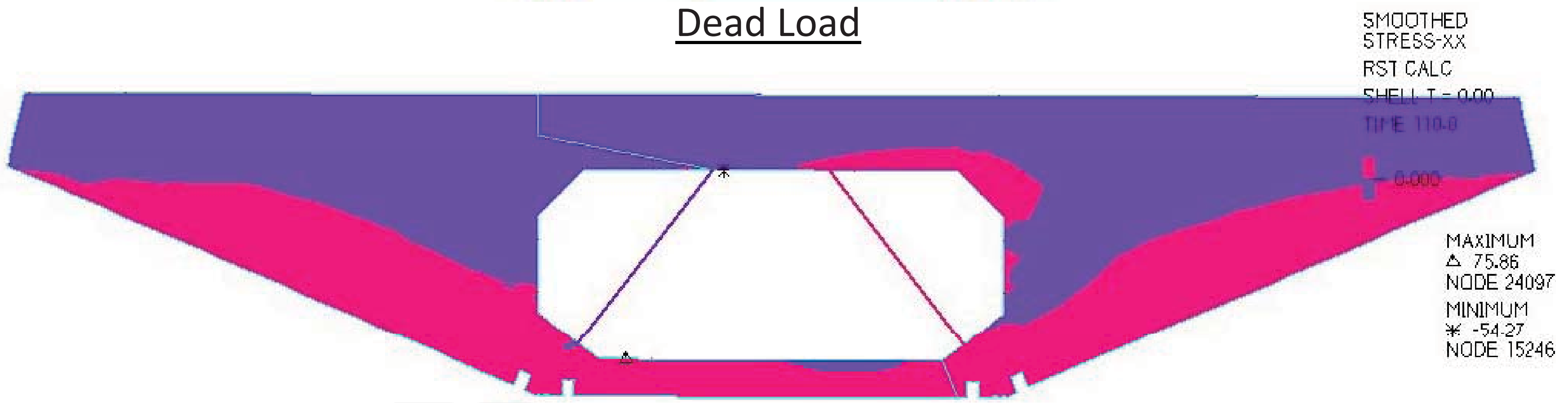
2x Wind Combo

Transverse Stresses (Floorbeam – No Cross Beam)

APPENDIX G

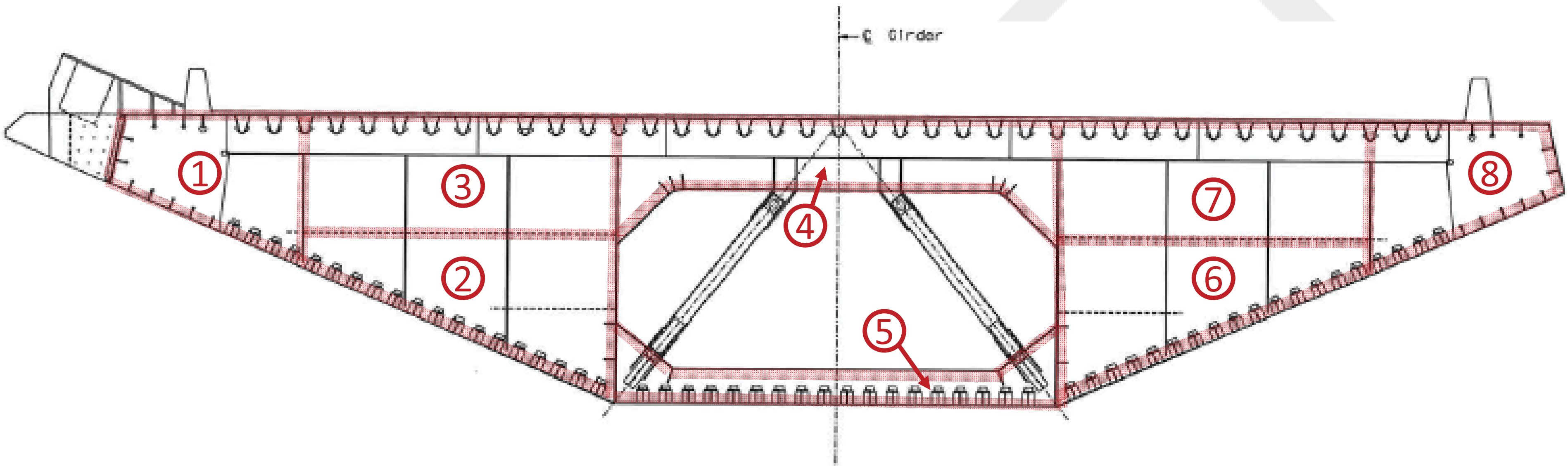


Dead Load



Dead + Live Load

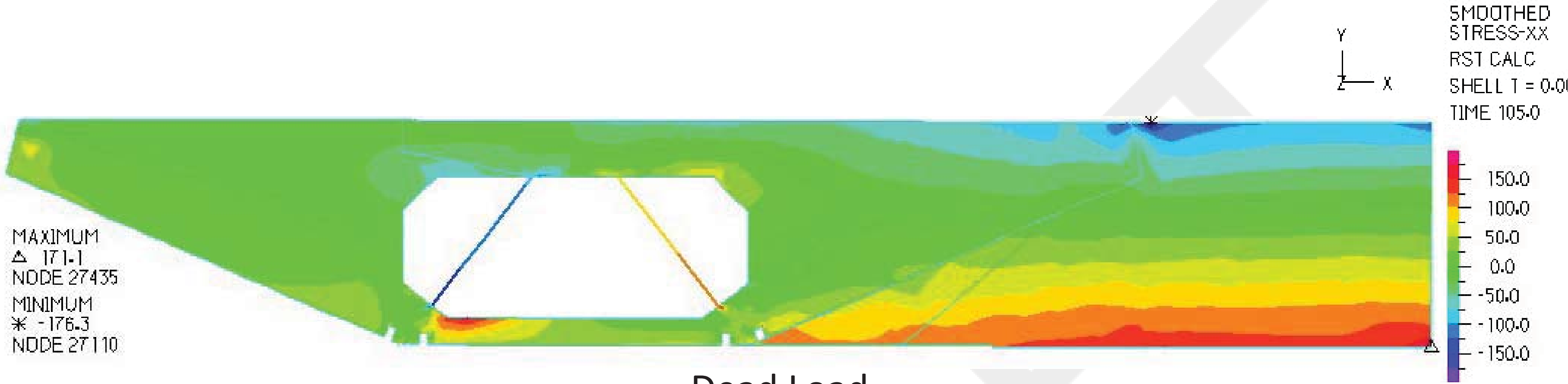
Transverse Tension Stresses (Floorbeam – No Cross Beam)



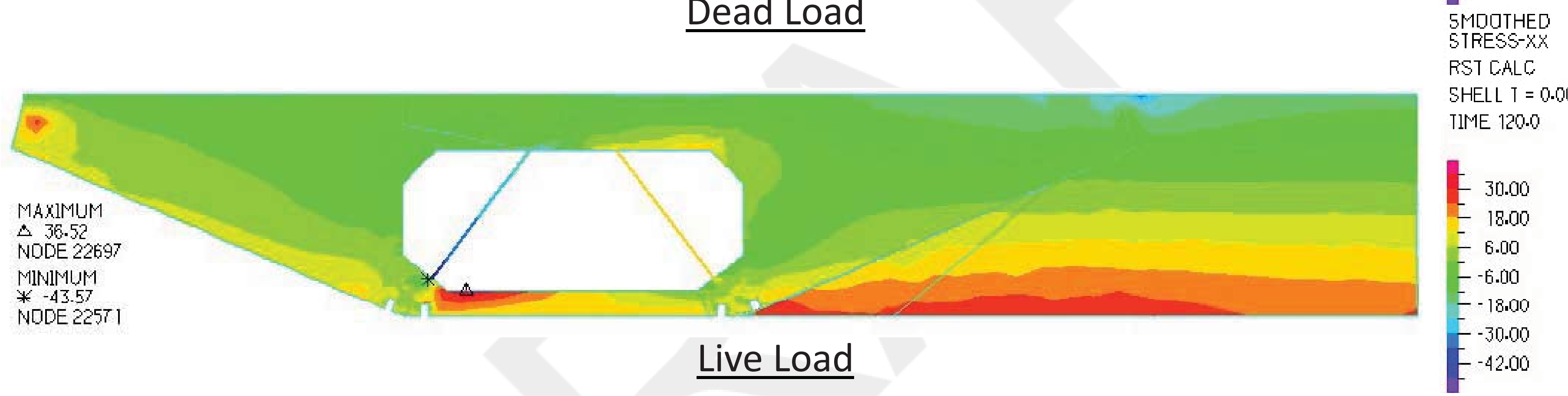
Stresses (MPa): Floorbeam - No Cross Beam

Zone	DL Stress	Global LL Range	Wind Range
1. Outboard Corner	20 (T)	5	10
2. Outboard Incline	30 (T)	15	5
3. Outboard Top - Typ.	10 (C)	10	10
4. Outboard Top - Ctr.	40 (C)	15	10
5. Bottom Soffit	60 (T)	20	20
6. Inboard Incline	10 (T)	10	5
7. Inboard Top - Typ.	20 (C)	10	5
8. Inboard Corner	10 (T)	10	5

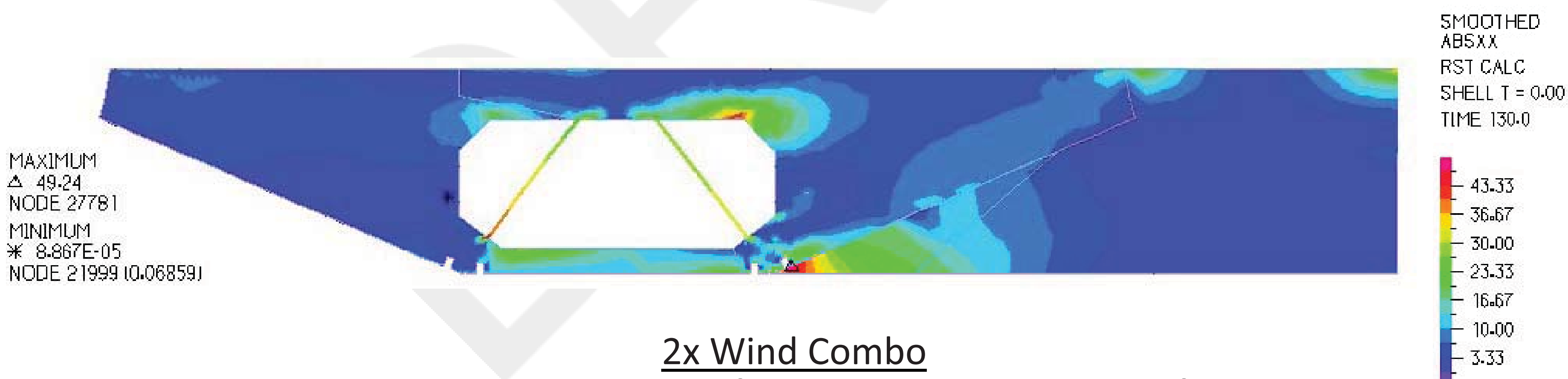
Transverse Stress by Zone: Floorbeam – No Cross Beam



Dead Load

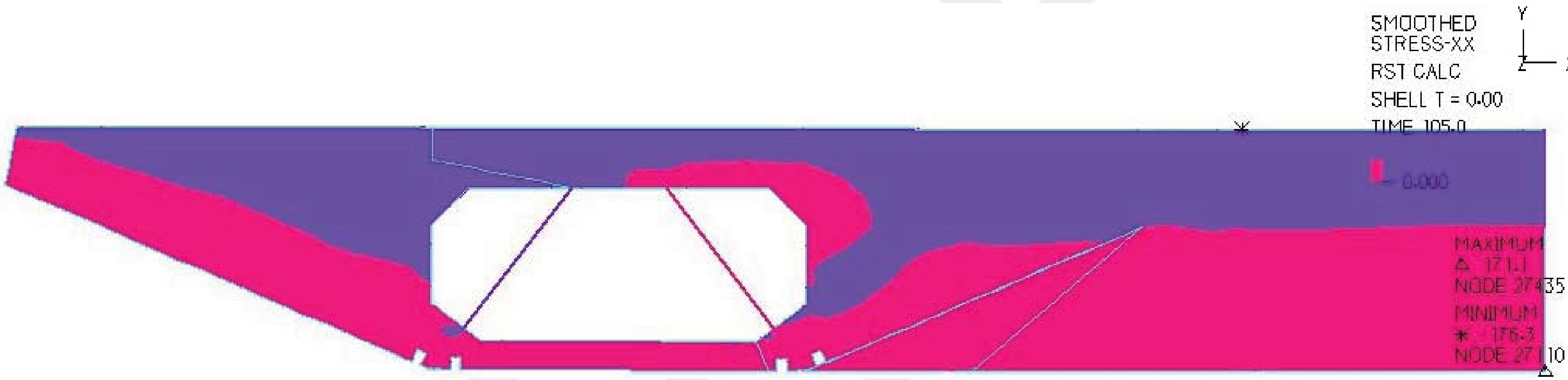


Live Load

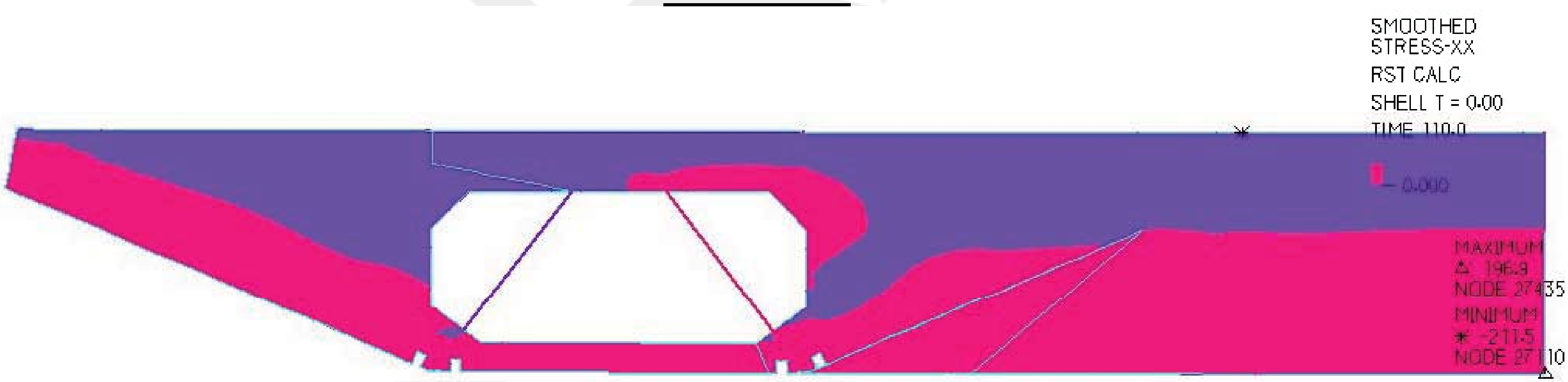


2x Wind Combo

Transverse Stresses (Floorbeam At Cross Beam)

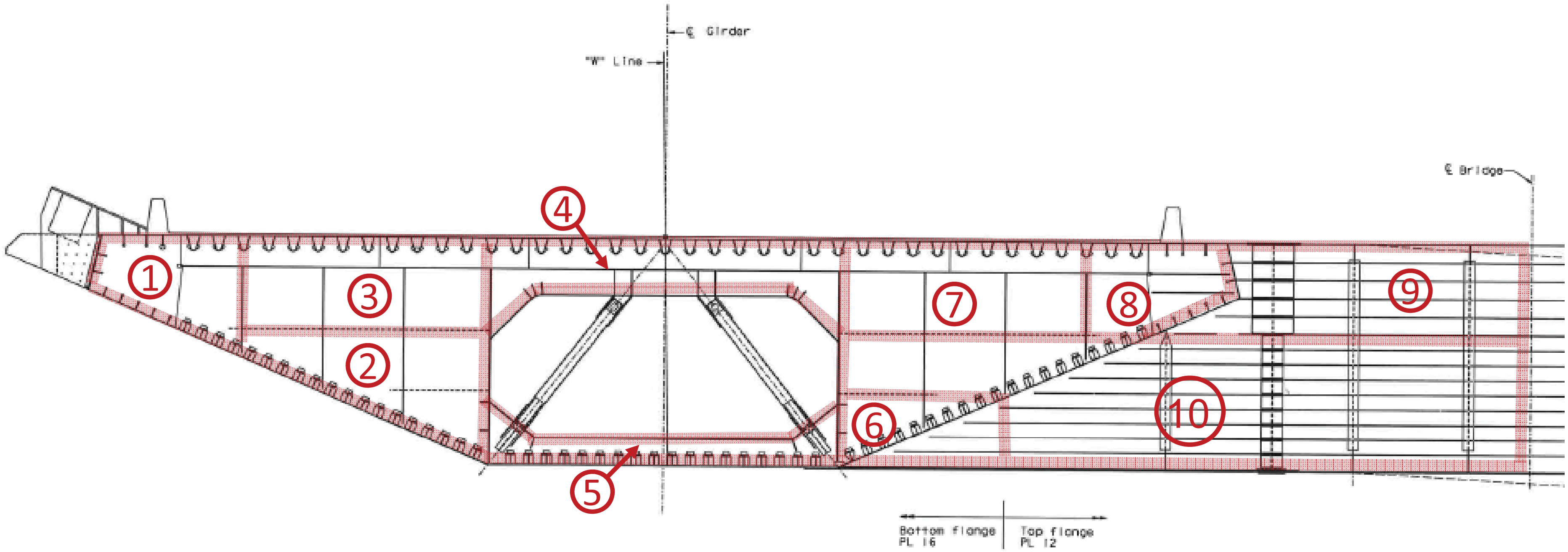


Dead Load



Dead + Live Load

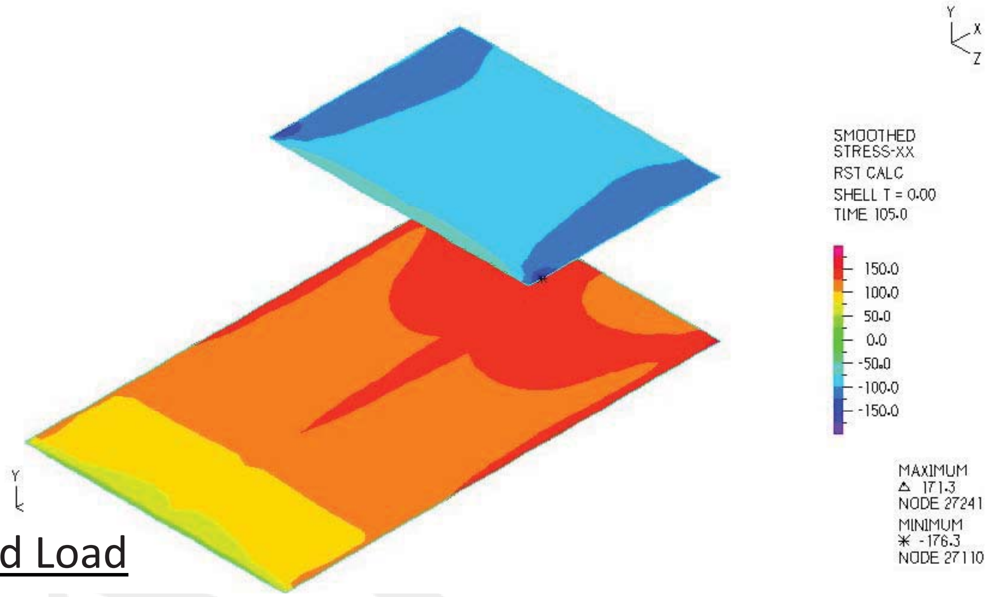
Transverse Tension Stresses (Floorbeam At Cross Beam)



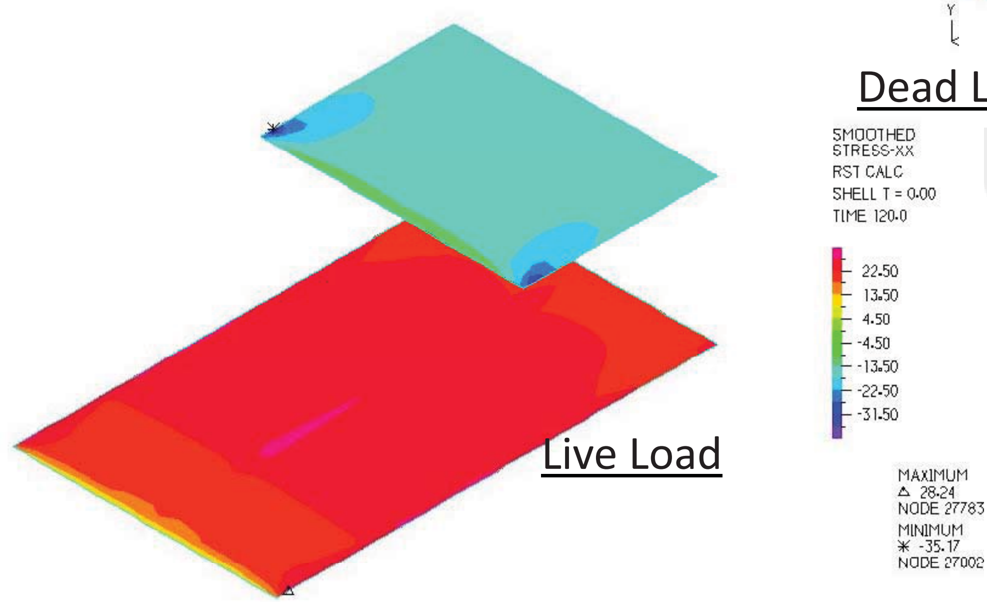
Stresses (MPa): Floorbeam - At Cross Beam

Zone	DL Stress	Global LL Range	Wind Range
1. Outboard Corner	75 (T)	30	10
2. Outboard Incline	50 (T)	15	5
3. Outboard Top - Typ.	25 (C)	10	10
4. Top Center	100 (C); 75 (T)	20	40
5. Bottom Soffit	170 (T)	40	25
6. Inboard Incline Corner	125 (T)	35	50
7. Inboard Top - Typ.	75 (T)	10	30
8. Inboard Corner	175 (C)	40	20
9. CB Web - Top	175 (C)	40	30
10. CB Web - Bot	170 (T)	40	20

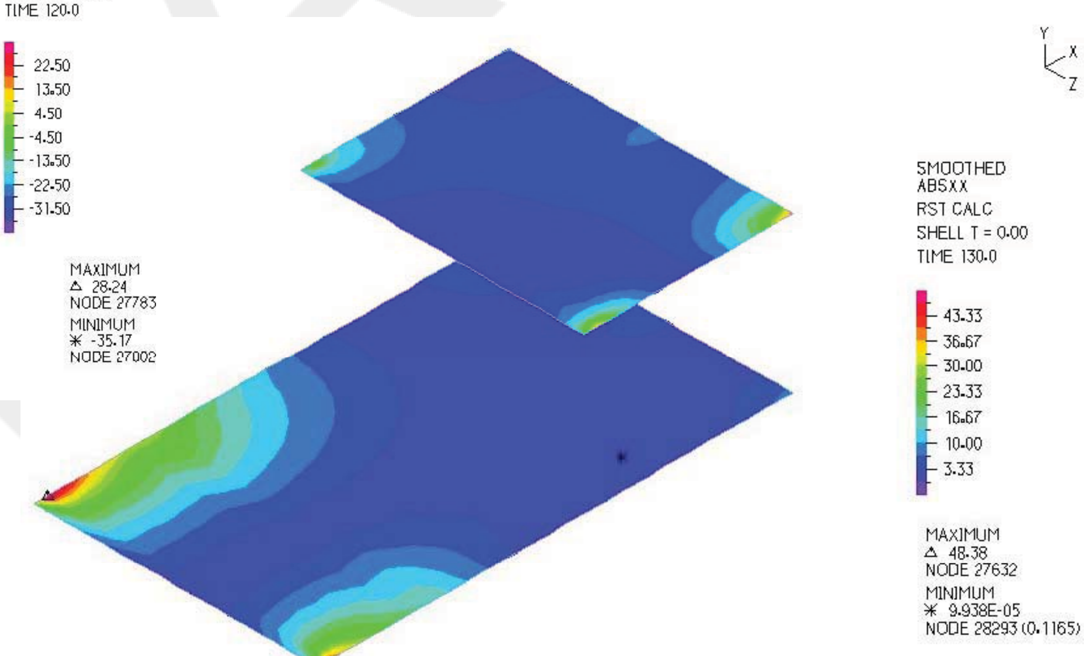
Transverse Stress by Zone: Floorbeam – At Cross Beam



Dead Load

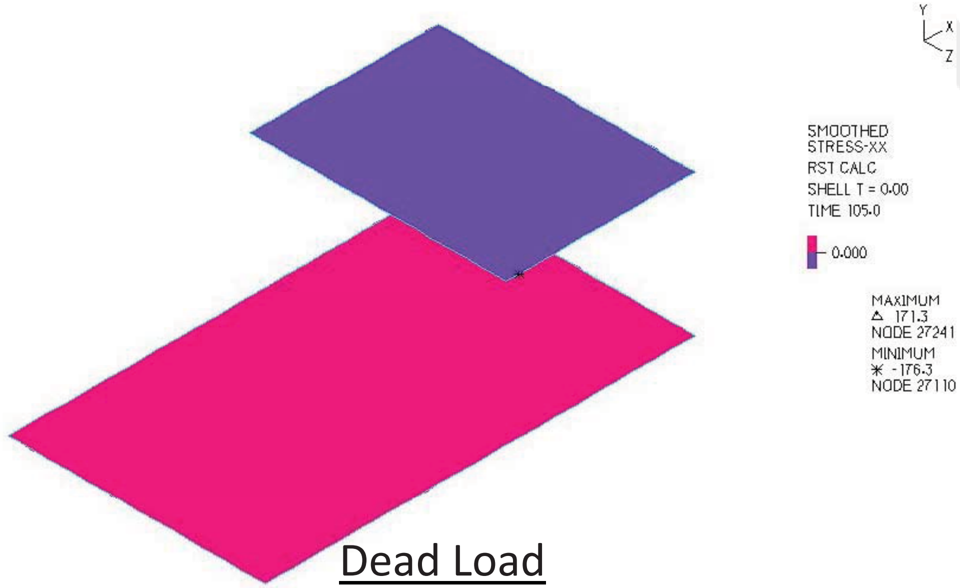


Live Load

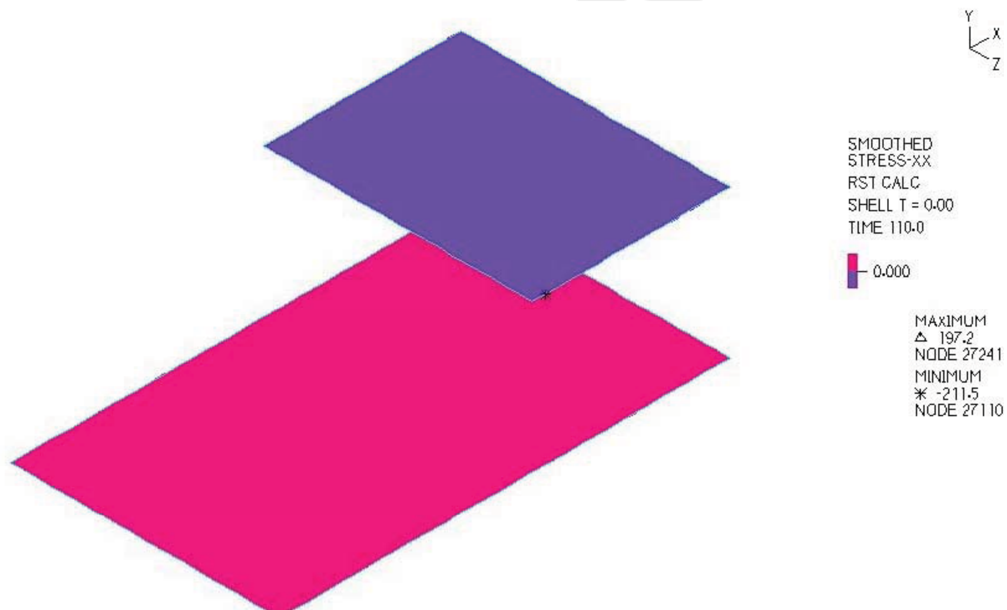


2x Wind Combo

Transverse Stresses (Cross Beam Flanges)

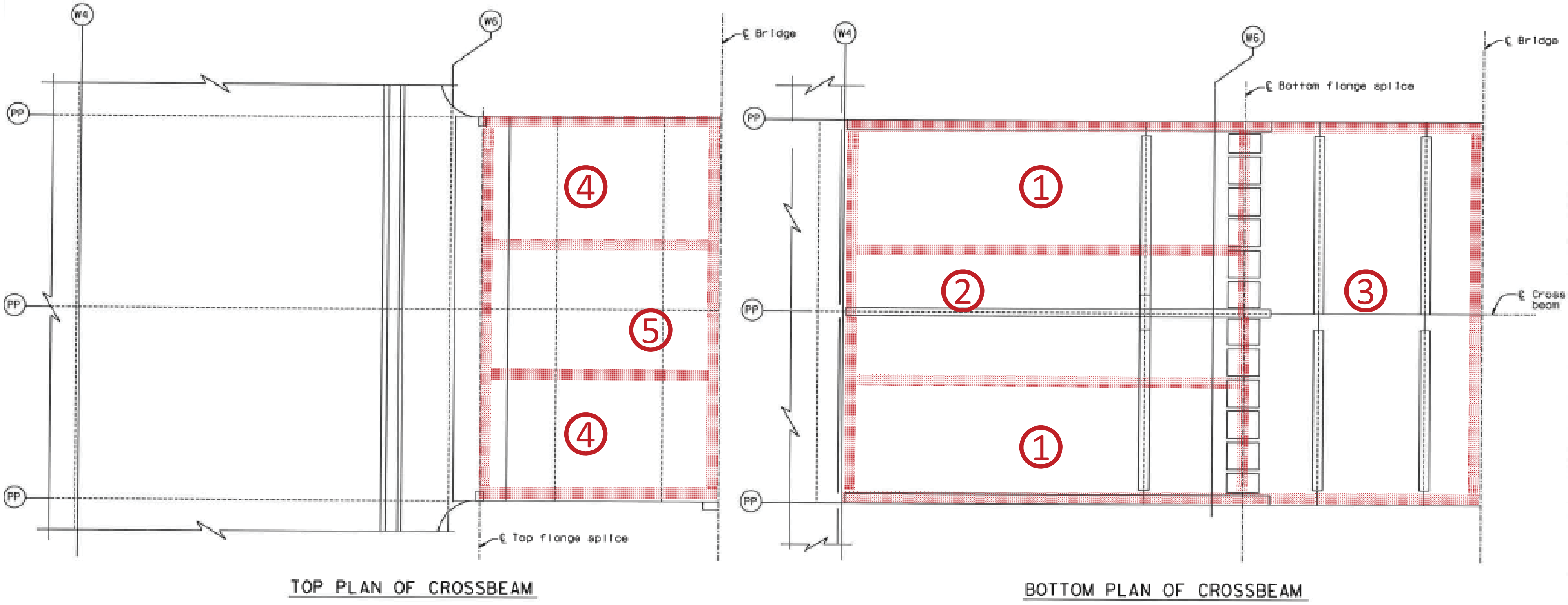


Dead Load



Dead + Live Load

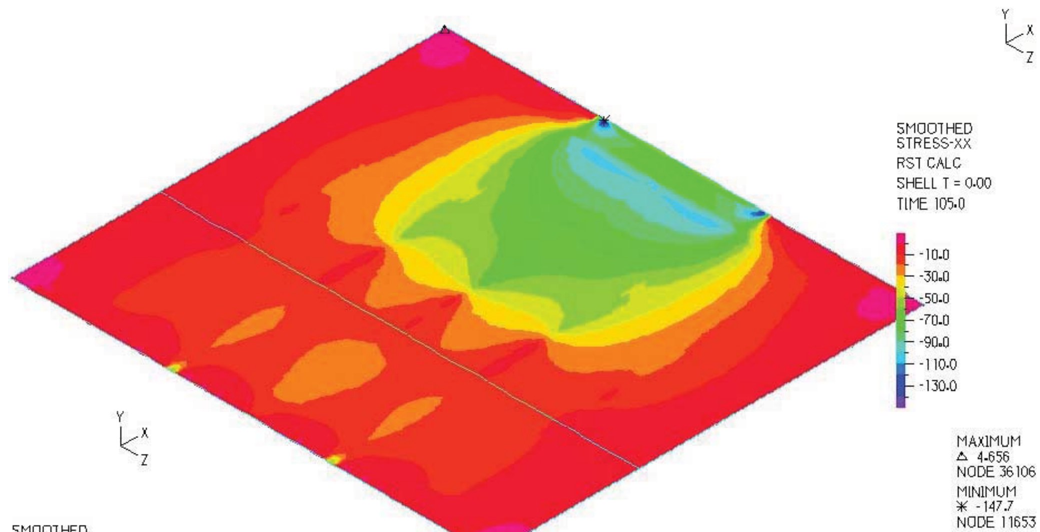
Transverse Tension Stresses (Cross Beam Flanges)



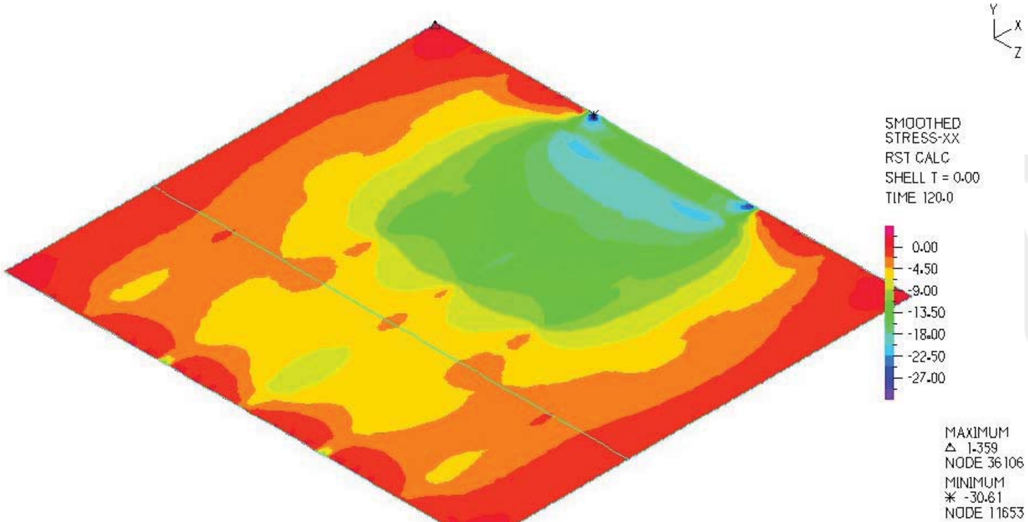
Stresses (MPa): Cross Beam Flanges

Zone	DL Stress	Global LL Range	Wind Range
1. Bot Flange @OBG, Outer	130 (T)	30	50
2. Bot Flange @OBG, Middle	170 (T)	25	10
3. Bot Flange @CL Bridge	175 (T)	25	5
4. Top Flange, Outer	180 (C)	35	40
5. Top Flange, Middle	100 (C)	15	15

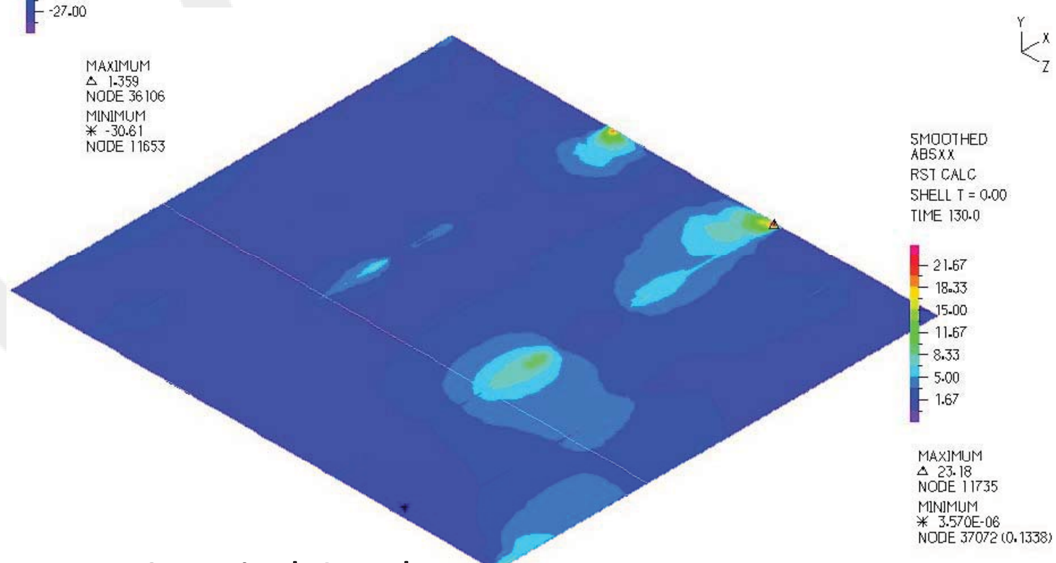
Transverse Stress by Zone: Cross Beam Flanges



Dead Load



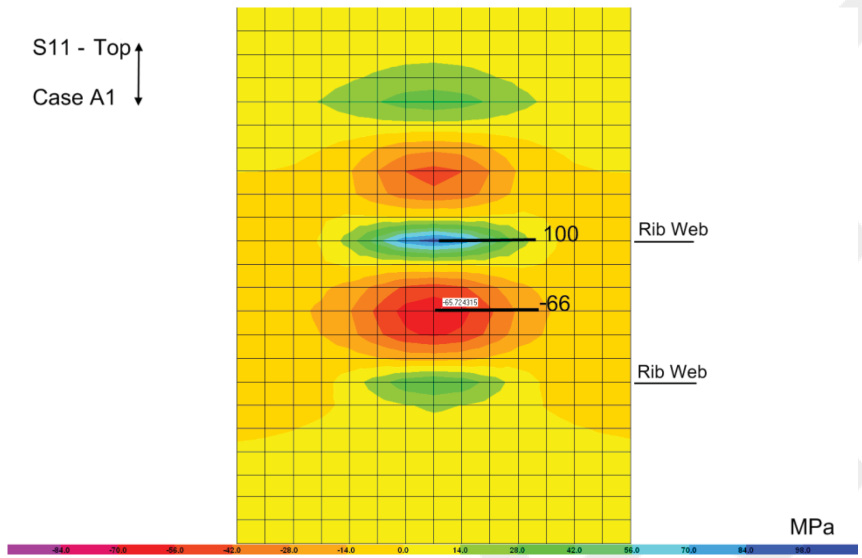
Live Load



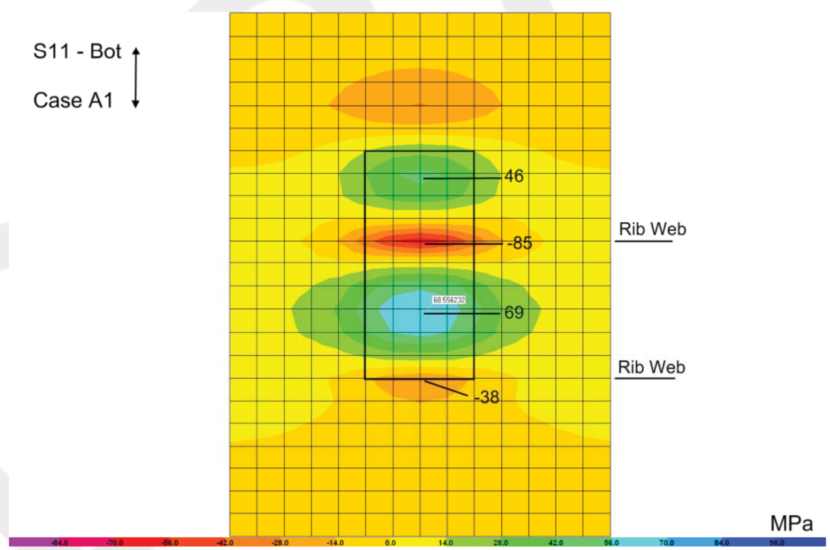
2x Wind Combo

Transverse Stresses (Top Deck PL)

APPENDIX G

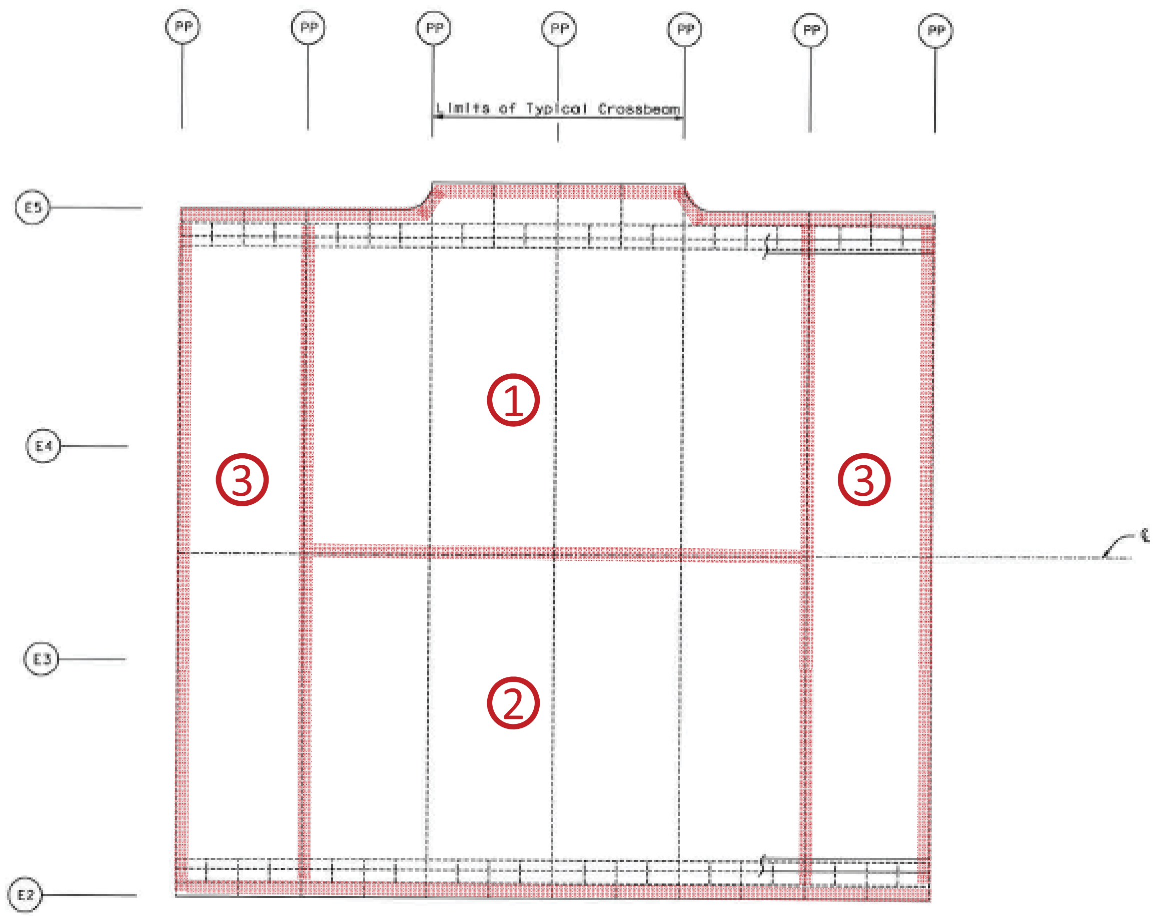


Top fiber of deck



Bottom fiber of deck

Transverse Stresses (Top Deck PL, Local LL Effects at any Location Between Floorbeams)

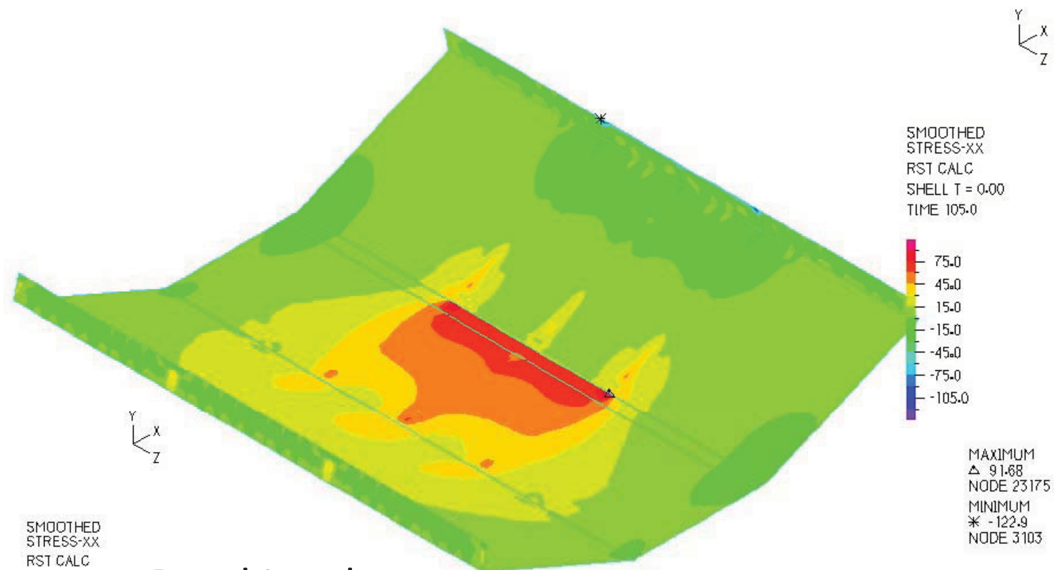


Stresses (MPa): Top Deck Plate

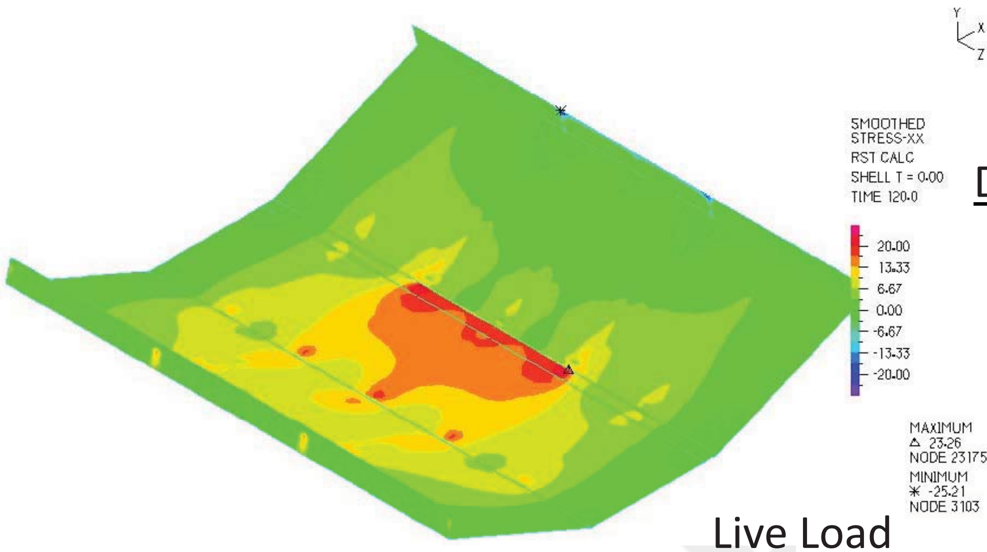
Zone	DL Stress	Global LL Range	Local LL Range	Wind Range
1. CB + 1PP, Inboard	150 (C)	35	100	25
2. CB + 1PP, Outboard	80 (C)	20	100	15
3. Typical*	15 (C)	10	100	10

*Zone 3 extends to the bounds of zones 1 and 2 of the adjacent CB

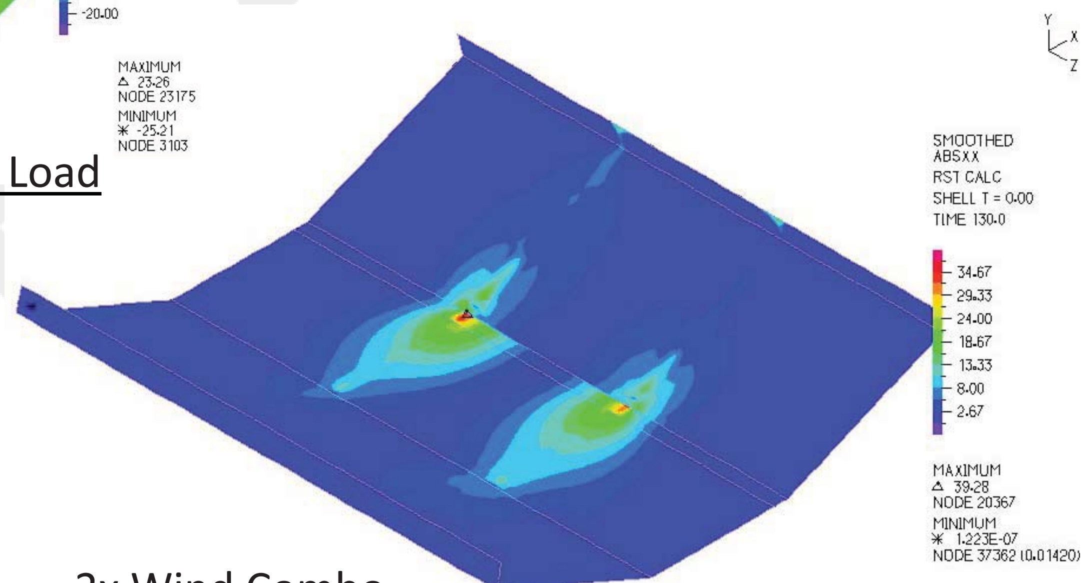
Transverse Stress by Zone: Top Deck Plate



Dead Load

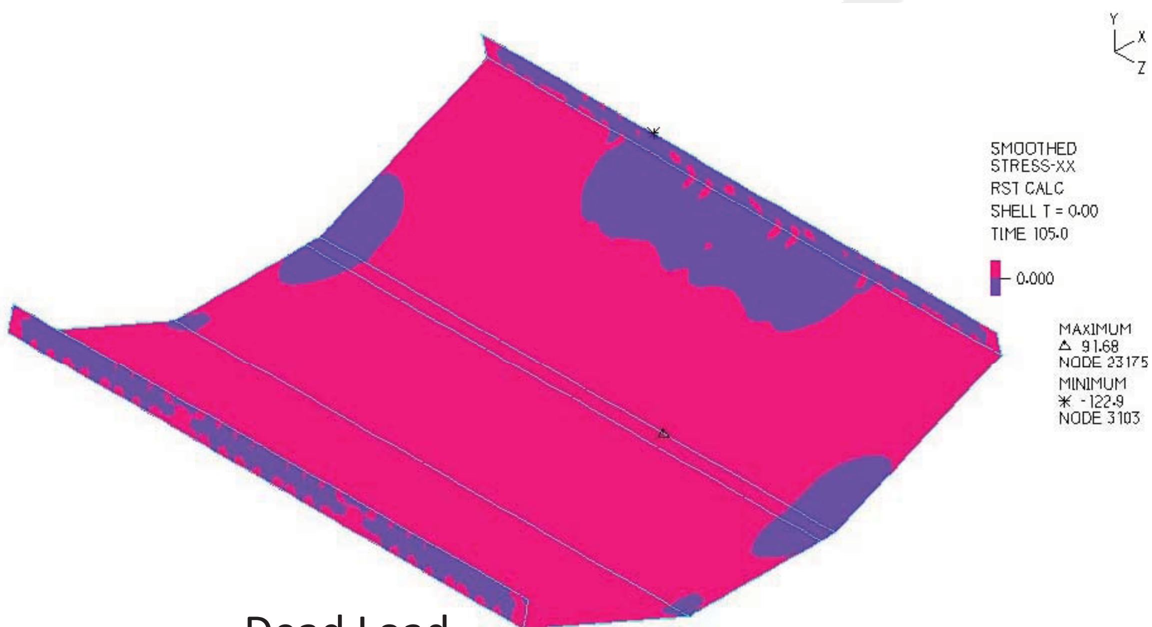


Live Load

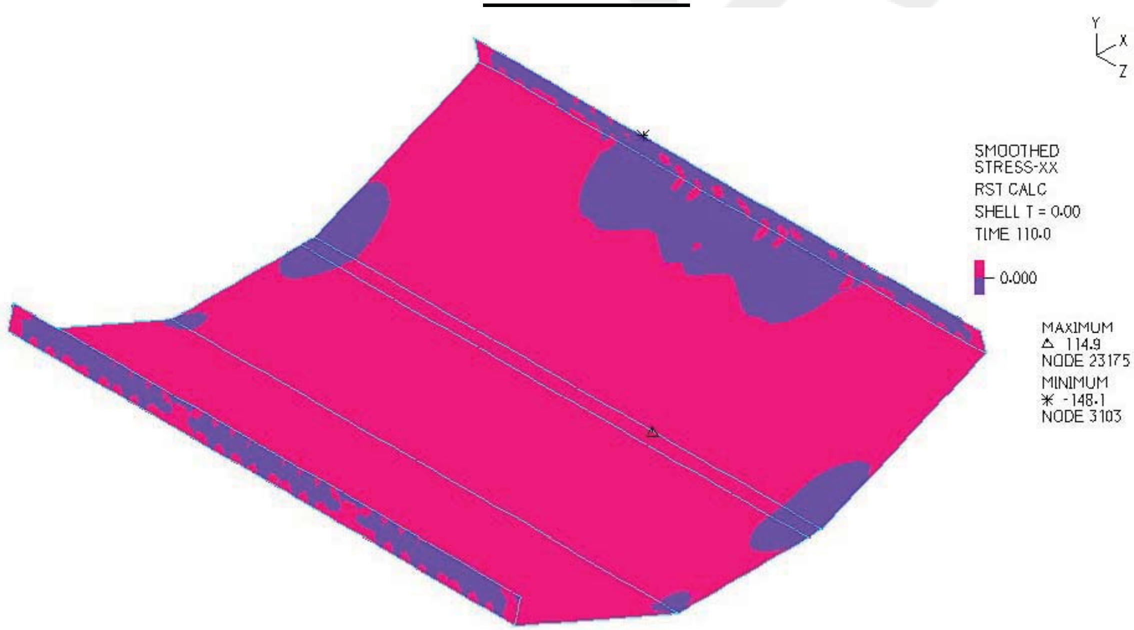


2x Wind Combo

Transverse Stresses (OBG Bottom Faces)

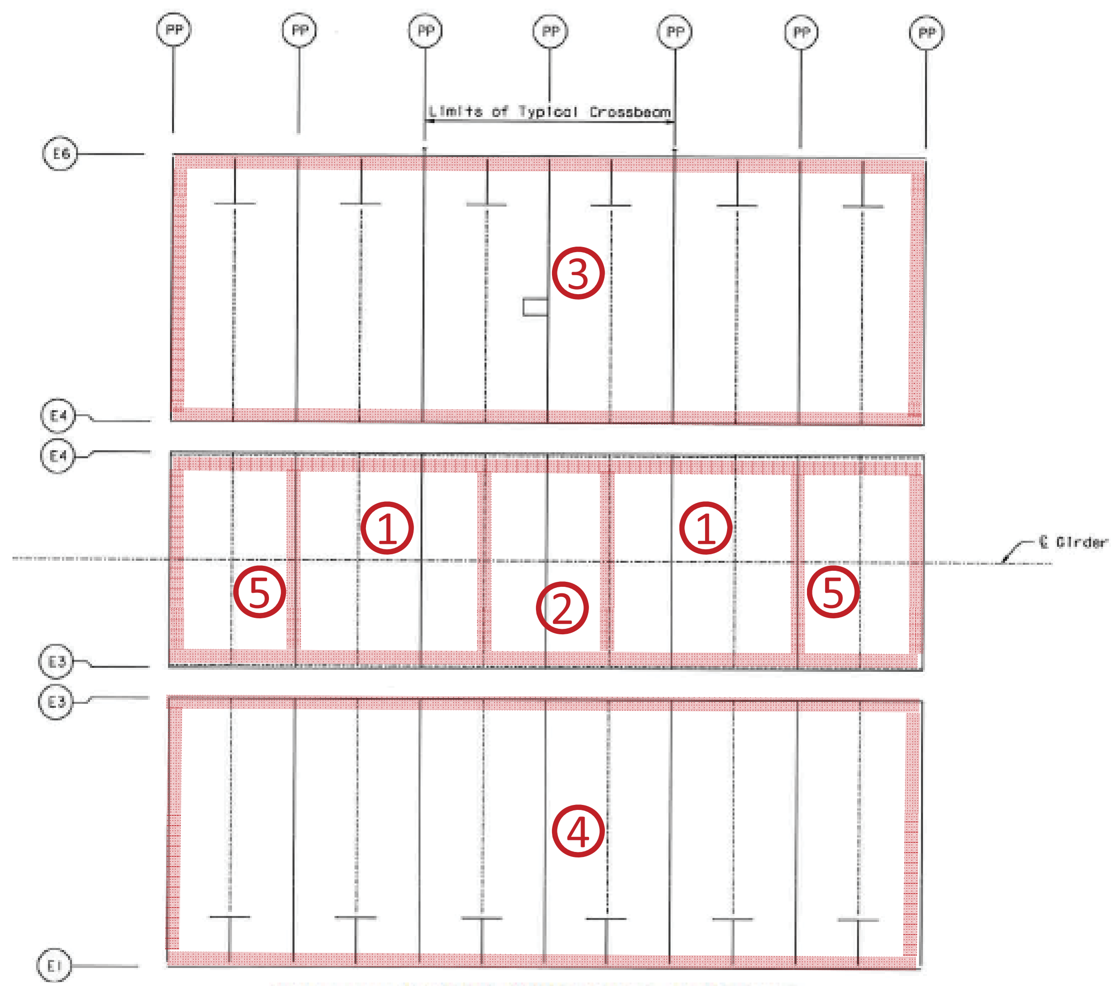


Dead Load



Dead + Live Load

Transverse Tension Stresses (OBG Bottom Faces)



Stresses (MPa): OBG Bottom Faces

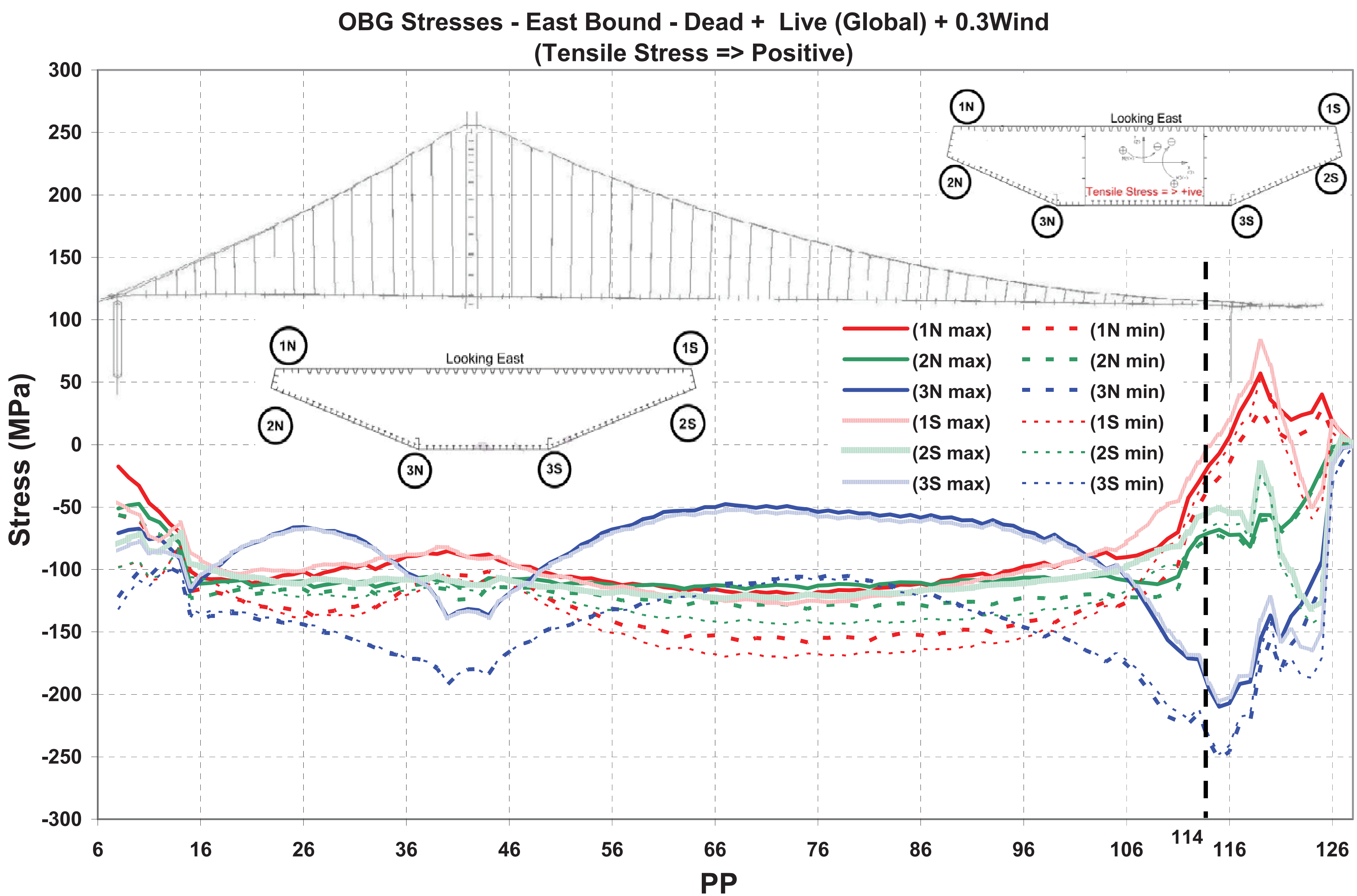
Zone	DL Stress	Global LL Range	Wind Range
1. Bot Soffit, Outer CB Webs + 1PP	95 (T)	25	40
2. Bot Soffit, Middle CB Web	90 (T)	25	15
3. Inboard Inclined Face	60 (T)	15	20
4. Outboard Inclined Face	50 (T)	20	10
5. Bot Soffit - Typ.*	35 (T)	15	5

*Zone 5 extends to the bounds of zone 1 of the adjacent CB

Transverse Stress by Zone: OBG Bottom Faces

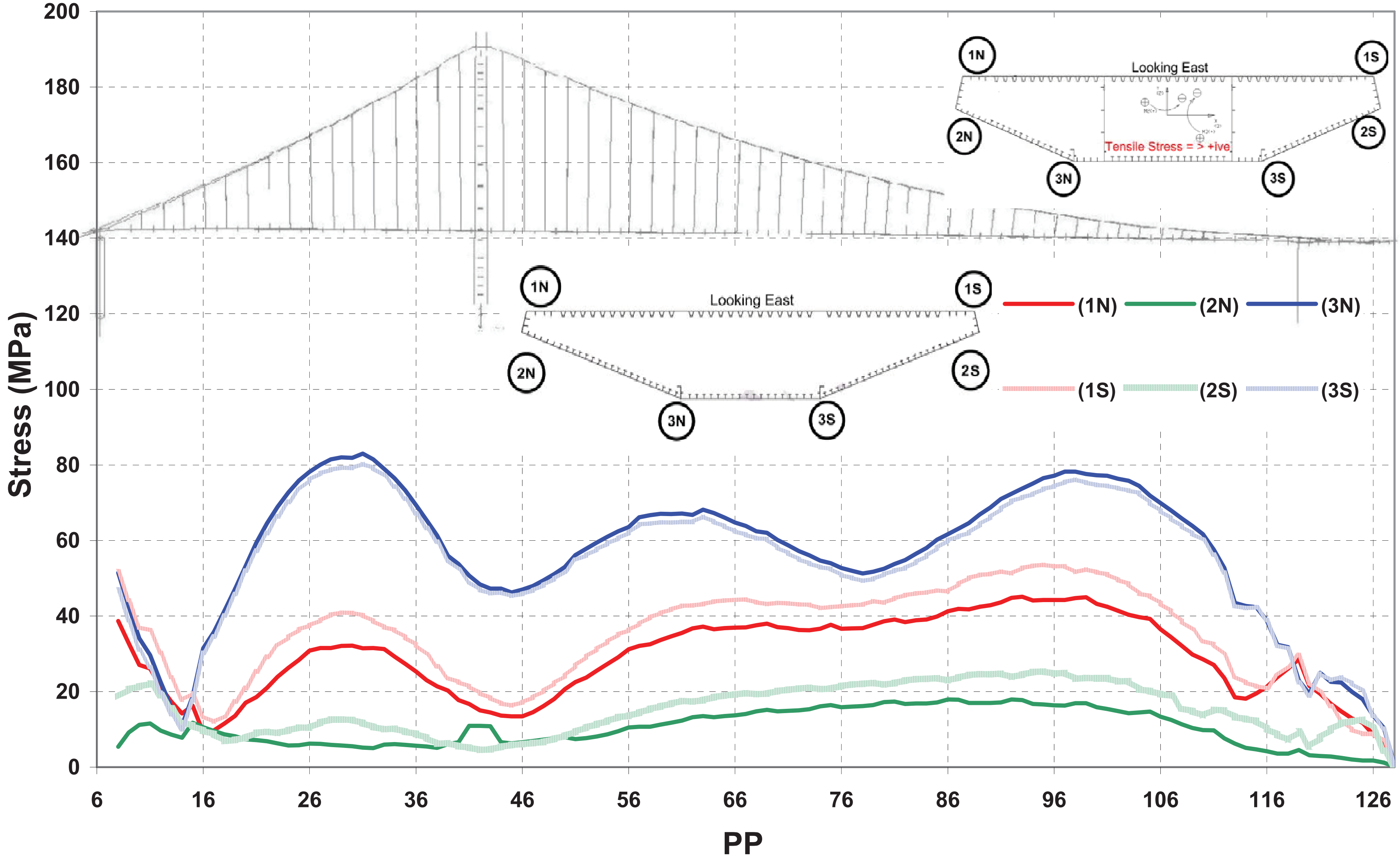
OBG-Cross Beam Longitudinal Tension Mapping (Lifts 2-12*)

*Approximate values also given for Lifts 1, 13, and 14

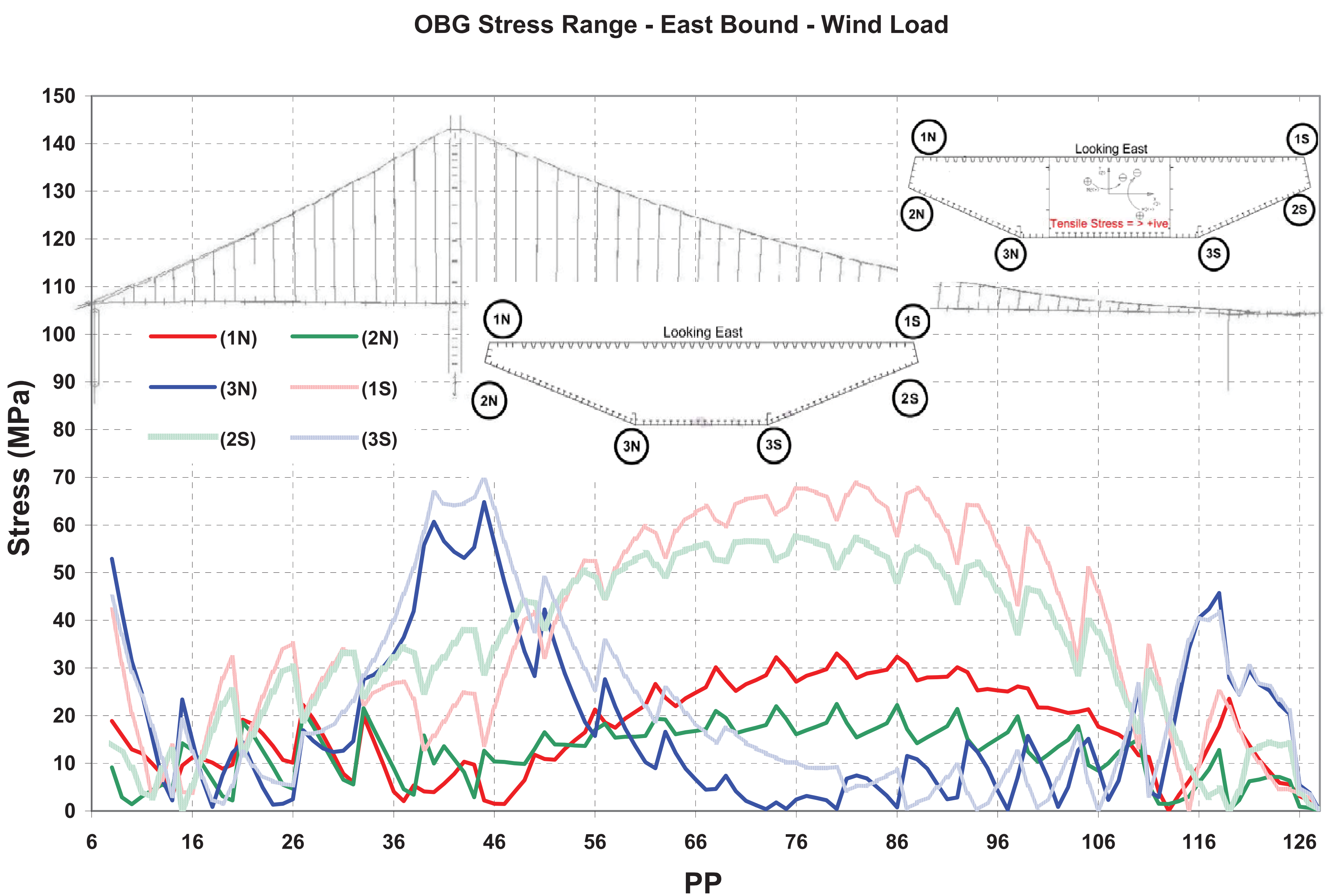


Longitudinal Stresses – EB OBG (DL + LL + 0.3 WL)

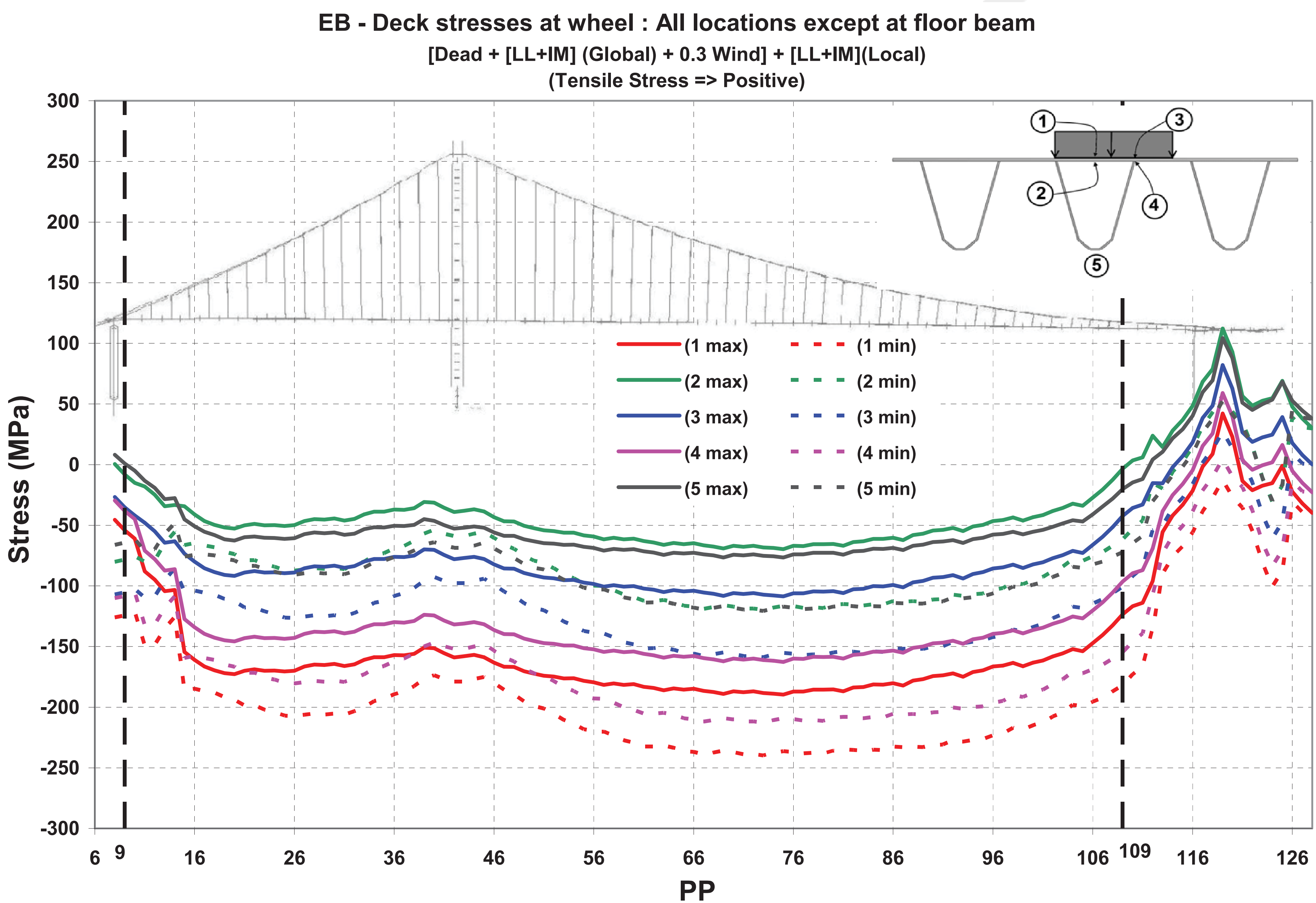
OBG Stress Range - East Bound - Live Load (Global)



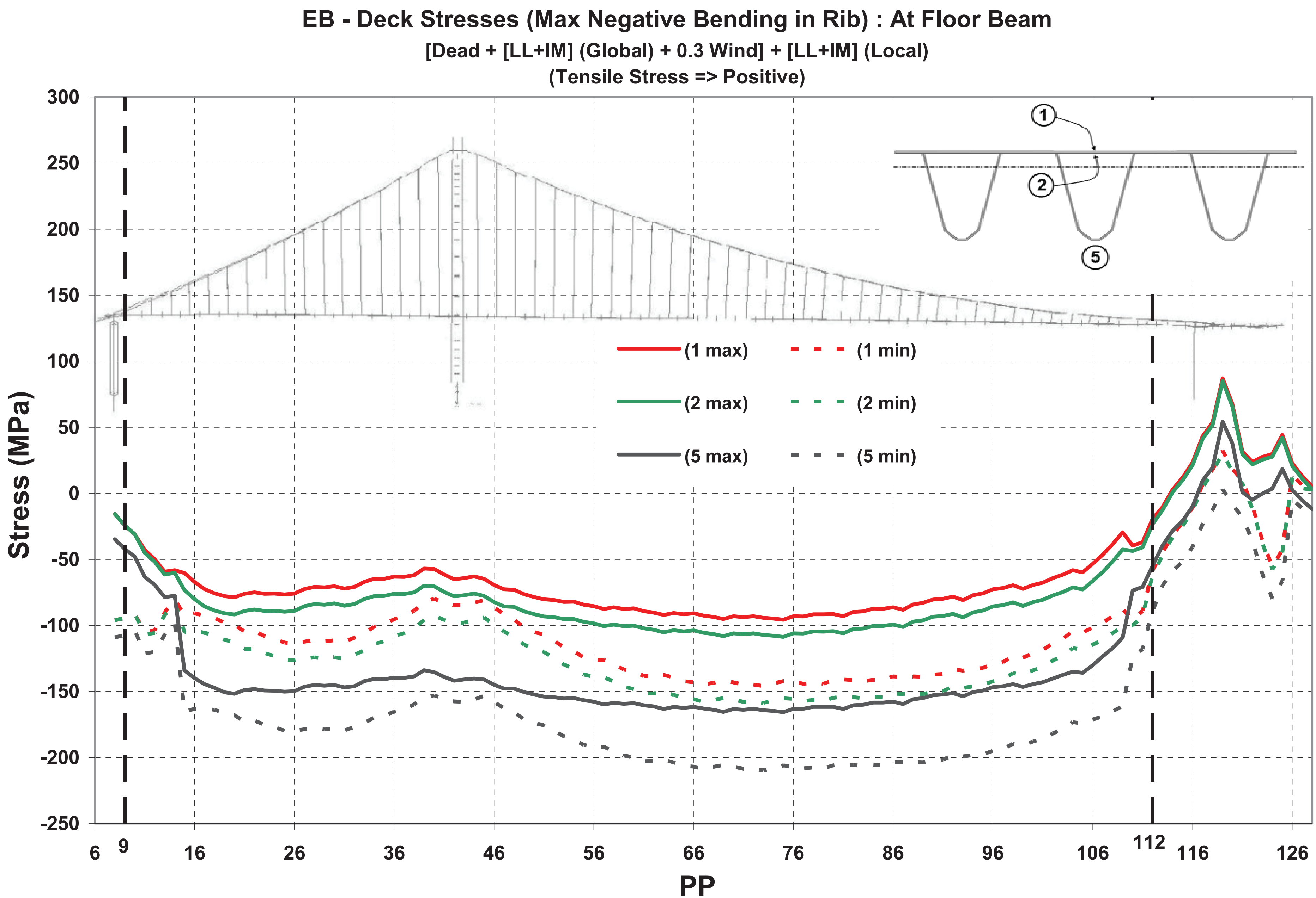
Longitudinal Stresses – EB OBG Stress Range (Global Live Load)



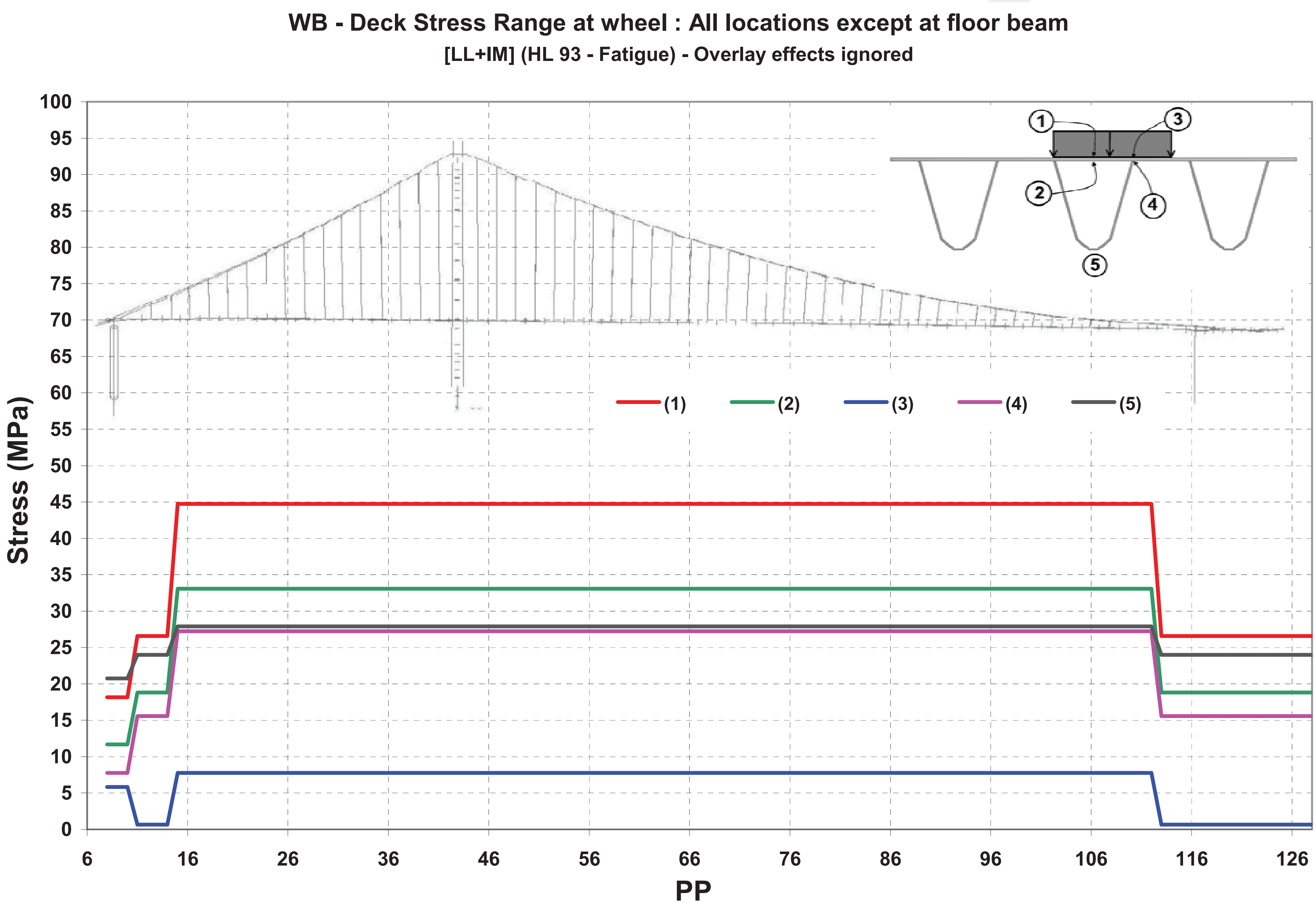
Longitudinal Stresses – EB OBG Stress Range (Wind Load)



Longitudinal Stresses – EB Deck (DL + LL + 0.3 WL) All Locations except Floorbeams



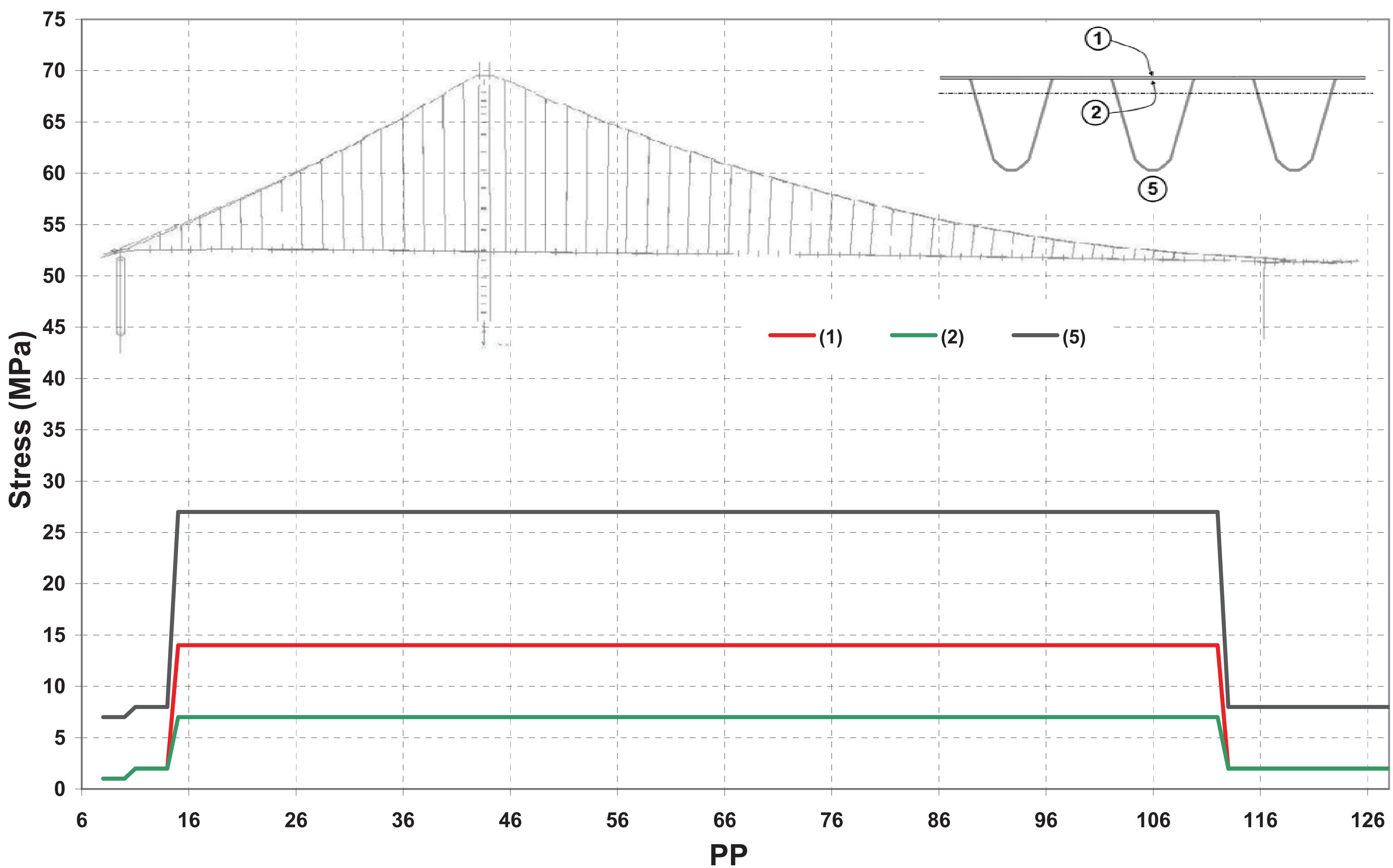
Longitudinal Stresses – EB Deck (DL + LL + 0.3 WL) At Floorbeams



Longitudinal Stresses – WB/EB Deck Stress Range (Fatigue LL) All Locations except Floorbeams

WB - Deck Stress Range (Max Negative Bending in Rib) : At Floor Beam

[LL+IM] (HL 93 - Fatigue) - Overlay effects ignored



Longitudinal Stresses – WB/EB Deck Stress Range (Fatigue LL) At Floorbeams

APPENDIX H

CONTRACT CHANGE ORDER NO. 22 SUPPL. NO. ---

ROAD 04-SF-80-13.2, 13.9 SHEET 2 OF 8 SHEETS

FEDERAL NO.(S) ______ CONTRACT NO.: **04-0120F4**

To **American Bridge / Fluor Enterprises Inc., A Joint Venture**, Contractor

You are hereby directed to make herein described changes from the plans and specifications or do the following described work not included in the plans and specifications of the contract.

NOTE: This change order is not effective until approved by The Chief Engineer.

Description of work to be done, estimate of quantities, and prices to be paid. Segregated between additional work at contract price and force account. Unless otherwise stated, rates for rental equipment cover only such time as equipment is actually used and no allowance will be made for idle time.

CHANGE REQUESTED BY THE **ENGINEER**

The last percentage shown is the net accumulated increase or decrease from the original quantity in the Engineer's Estimate.

2. Replace the fifth paragraph of Section 10-1.44, "CABLE TIE-DOWN," with the following (changes shown in *bold italics*):

   "In addition to the requirements in Section 50-1.02 "Drawings," of the Standard Specifications, cable tie-down anchor working drawings shall include, but are not limited to, the following:

   1. Details of proposed corrosion protection measures.
   2. Details and sequence of monostrand stressing operation to avoid mechanical interlocking between strands.
   3. Details and sequence of operations for detensioning and replacing individual ~~tendons~~ ***strands within a tendon.***
   4. Repair procedure for the sheathing.
   5. Material specifications and calculations."

4. Replace the nondestructive testing table of the Special Provisions, Section 10-1.59, "STEEL STRUCTURES," subsection "INSPECTION AND TESTING," with the following (changes shown in *bold italics*):

COMPONENT	Weld Type			Extent & Type of Testing			Notes
	CJP	PJP	Fillet	RT	UT	MT	
1.BOX GIRDER 1.1 Box Shell							
Transverse splice weld shop (Deck plate: A) field	X X			5%	100% 100%	 100%	
Transverse splice weld shop (Side plate: B,F) field	X X			5%	100% 100%	 100%	
Transverse splice weld shop (Bottom plate: D) field	X X			5%	100% 100%	 100%	
Transverse splice weld shop (Side plate: C,E,G,H,I,L,M,N, "K" &"Vertical") field	X X				** **		
Longitudinal weld: Deck plate: A	X				100%		
Longitudinal splice weld (Bottom plate: D)	X				100%		
Longitudinal splice weld (Side plate: C,E,G,H,I,L,M,N, "K" &"Vertical")	X				100%		(B & F are n/a)
Box corner welds	X	 X	 X		100%	 100%	
Closed rib splice	X				100%		
Closed rib to shell plate:		X			15%	10%	UT Shall include at least 15% of the tack welds
Stiffener (open rib) to box plate			X			10%	

CONTRACT CHANGE ORDER NO. 22 SUPPL. NO. ---

ROAD 04-SF-80-13.2, 13.9 SHEET 3 OF 8 SHEETS

COMPONENT	Weld Type			Extent & Type of Testing			Notes
	CJP	PJP	Fillet	RT	UT	MT	
Floorbeam to Deck plate	X				100%		
			X			50%	
Floorbeam to other box shell plates							
At Crossbeam penetrations	X				100%		
		X	X			25%	
Elsewhere			X			10%	
Longitudinal Shear Plate to Deck Plate			X			25%	
Longitudinal Shear Plate to other Box shell plates			X			10%	
Deck plate to drain plates	X				15%		
Deck plate transverse splice at Seismic Joint	X			5%	100%		
		X			100%	100%	
1.2. Box Internal Stiffening							
Floorbeam splice:							
Bottom 1 m	X				100%		
Remainder of lower half	X				50%		
Upper half	X				15%		
Floorbeam web / Diaphragm to skin plate stiffener	X	X	~~X~~		100%	25%	
			X			100%	
Floorbeam web to floorbeam web stiffener	X				100%		
		X	X			25%	
Diaphragm plate to closed rib	X				~~100%~~	100%	See Note 14
		X				100%	
Ground end of diaphragm to closed rib weld for full length of grinding plus 50mm each end	X	X	X			100%	Additional to NDT specified for weld
Longitudinal Shear Plate to Floorbeam	X	X			100%		
			X			15%	
Longitudinal Shear Plate Vertical splice	X				**		
Longitudinal Shear Plate to top and bottom plate	X		X			15%	
1.3. Girder at Piers							
All SPCM welds	X				100%	100%	
		X	X			100%	
Non-SPCM Welds	Per Sections 1.1, 1.2 & 1.5 of this Table						
Saddle Grillage welds	X				25%		
		X	X			25%	
Saddle welds	X				25%		
		X	X			25%	
1.4 Other box welds							
SPCM Cable Bracket welds	X				100%	100%	
		X	X			100%	
Deviation & Jacking Frame Saddles: Plates to Castings	X				100%	100%	
		X	X			25%	
Deviation & Jacking Frame Saddles: Plate welds	X				100%		
		X				100%	
			X			25%	
Other Welds in SPCMs	X				100%	100%	
		X	X			100%	

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

HC-5 (Rev. 5/93)

CONTRACT CHANGE ORDER NO. 22 SUPPL. NO. ---

ROAD 04-SF-80-13.2, 13.9 SHEET 4 OF 8 SHEETS

COMPONENT	Weld Type			Extent & Type of Testing			Notes
	CJP	PJP	Fillet	RT	UT	MT	
Other welds	X	 X	 X		25%	 10%	
Ends of welds at locations of required grinding for full length of grinding plus 50 mm each end	X	X	X			100%	Additional to NDT specified for weld
2. CROSSBEAM							
All SPCM Welds	X	 X	 X		100%	100% 100%	
Other welds	X	 X	 X		25%	 10%	
Ends of welds at locations of required grinding for full length of grinding plus 50 mm each end	X	X	X			100%	Additional to NDT specified for weld
3. TOWER							
Skin plate butt welds: Horizontal	X				100%	25%	
Skin plate butt welds: Vertical	X	 X			100% 25%	25% 25%	
Longitudinal Stiffener butt welds	X				100%		
Longitudinal stiffener to skin plate	X	 X	 X		100% 25%	 25% 25%	
Diaphragm butt welds	X				100%		
Diaphragm to Skin Plate	X	 X	 X		100% 25%	 25% 25%	
Diaphragm to Longitudinal Stiffener (incl. Fit Lugs)	X	 X	 X		100%	 100% 25%	
Tower Strut Welds & Cross Bracing Welds	X	X	 X		100%	100% 100%	
Grillage welds	X	X	 X		***	*** 25%	
Tower Saddle welds	X	 X	 X		100%	100% 100% 25%	
Skin Plate to Tower Base Plate	X	 X			25%	 50%	
Bearing Stiffener Welds at Tower Base Anchor Bolt Assemblies	X	 X	 X		25%	 25%	
Other Tower welds	X	 X	 X		25%	 10%	
Tower Base Shear Plates to the Skin Plate	X	X			****	****	
4. OTHER WELDS NOT SPECIFIED ABOVE							
Welds in SPCMs	X	 X	 X		100%	100% 100%	
Other welds	X	 X	 X		25%	 10%	

COMPONENT	Weld Type			Extent & Type of Testing			Notes
	CJP	PJP	Fillet	RT	UT	MT	
Ends of welds at locations of required grinding for full length of grinding plus 50mm each end	X	X	X			100%	Additional to NDT specified for weld

5. Revise Note 9 and add Note 14 to the Special Provisions, following the nondestructive testing table in Section 10-1.59, "STEEL STRUCTURES," subsection "INSPECTION AND TESTING," as follows:

Notes:

"9) No UT examination is required for PJP weld sizes up to 25 mm except for the closed rib PJP welds. For PJP weld sizes greater than 25 mm, UT examination shall confirm that the specified minimum weld size has been achieved. UT examination is not required provided all of the following conditions are met:

~~(a) Minimum weld size, excluding reinforcement, is increased by a minimum of 5 mm over that required by the contract plans; and the remaining root face still satisfies minimum requirement of the standard weld joint detail in AWS D1.5;~~

~~(b)~~ (a) Specific inspection hold points are established after the root pass is completed and after the weld is completed, in which the QC inspector completes and documents 100% visual inspection and 100% magnetic particle testing. These hold points are in addition to the continuous QC inspections required elsewhere in these specifications. Visual Inspection and MT of the root pass shall be performed with the weld joint at the preheat temperature but not to exceed 287° C (550° F)."

"14) With respect to the welds between the OBG diaphragm and the closed ribs, in addition to 100% MT of the completed and ground weld, the Contractor shall also MT the second side preparation after back gouging and before welding the second side."

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APPENDIX I

San Francisco Oakland Bay Bridge-East Span Seismic Safety Project

SAS Steel Fabrication Expert Panel Review of Orthotropic Deck Fabrication in China.

November 2010

Contents

Appendices

List of Figures

1. Introduction

A SAS Steel Fabrication Expert Panel (Panel) has been established. The Panel consists of four (4) experts with technical knowledge in various disciplines including welding, metallurgy and fracture mechanics. The Panel was requested to review and provide advice on the quality being achieved in the fabrication of the Orthotropic Box Girder (OBG) for the SFOBB Self Anchored Suspension (SAS) Bridge. This report summarizes the findings during the November 2010 visit to ZPMC, Changxing Island, China and provides recommendations for future work. Since this meeting, there continues to be weekly and monthly conference meetings and bimonthly meetings in China which are recorded in separate live meeting notes, containing a commentary of actions and resolutions.

2. Mission Statement

The following Mission Statement for the Panel's work has been developed jointly as follows:

> ***Provide on-call technical guidance to give reasonable assurance that the product will conform to the requirements of the Contract Specifications and the AWS D1.5 Bridge Welding Code as requested by the Department for the Orthotropic Box Girder (OBG)***

3. Fabrication Facilities

ZPMC, a world class fabrication facility on the Changxing Island, has proven to be very capable of manufacturing the SAS Bridge in readiness for the site erection phase of the project. There has been no need for the Contractor to establish a sub assembly yard near to the erection site in the Bay Area. This has meant that the quality of the fabrication and the people involved are responsible for providing a finished product that is in conformance with the contract documents.

Even though ZPMC has international experience in terms of manufacturing its own products, the SAS Project has required ZPMC to fabricate steelwork to American design and workmanship standards. This challenge has been met by both the Contractor (ABFJV) and the Department (Caltrans) providing a significant level of management and supervision based at the fabrication facility. The result of this supervision has ensured that the bridge fabrications delivered by ZPMC have satisfied the requirements of the contract documents.

4. Organization

The Panel performed an investigation into the current organizational structure that has been put in place for The East End,OBG fabrication to insure that quality is maintained at a high level on this project in China. The Organization Chart of the QA/QC inspection lead personnel is shown in Figure 1.

Primary QC responsibility lies with ABFJV (yellow shading in Figure 1) and the fabricator ZPMC (green shading in Figure 1). QA responsibility lies with Caltrans (brown shading in Figure 1). Each area of fabrication has an ABFJV inspector and a Caltrans inspector to provide a shop floor integration of QC and QA that can inspect and quickly identify problems, make corrections and obtain QA verification inspection and acceptance in a very short time. The ABFJV inspectors report to the project Foreign QC manager for ABFJV, Steve Lawton and Caltrans inspectors report to Caltrans Mahlon Lindenmuth. When issues arise regarding quality, these two individuals interface to provide fast, efficient and timely solutions to moving the fabrication inspection forward. This means of inspection also lends itself to making the Contract Change Order (CCO) 77 Green Tagging process work. The CCO 77 Green Tag was introduced on this project to enable full traceability of parts, subcomponents or component assembly to be accepted at the time of completion of the QC inspection rather than waiting until all components and subassemblies are assembled into the final shipping part.

For this project there has been assembled a large team of fabrication inspectors (QC) and verification inspectors (QA). ABFJV QC inspectors are interspersed with ZPMC QC inspectors to perform visual and NDT of welded assemblies. Such an arrangement allows for the transfer of knowledge and techniques between the ZPMC and ABFJV inspectors. Still, there are more opportunities for improvement in the accuracy of QC inspection.

On average, Caltrans QA verification finds that the number of missed indications by ZPMC QC inspectors are considerably higher than can be expected; thus for critical welds, ABFJV QC is performing inspections that were previously the responsibility of ZPMC. This proactive measure by ABFJV QC has reduced the number of defects that heretofore have been missed by ZPMC. This provides an improvement in the overall quality of product. Additionally, the number of times a defective weld is reworked may also drop, saving in both time and labor cost.

ZPMC's Quality Control (QC) has not been fully effective in detecting transverse cracks or other weld discontinuities. However the combined effort of the QC team together with the Quality Assurance (QA) and overlying management commitment to quality has resulted in the required quality being met.

ZPMC needs to improve its efficiency and implement improvements from the lessons learned in order to significantly reduce the QA / QC rejectable findings, i.e. achieve the required standard the first time.

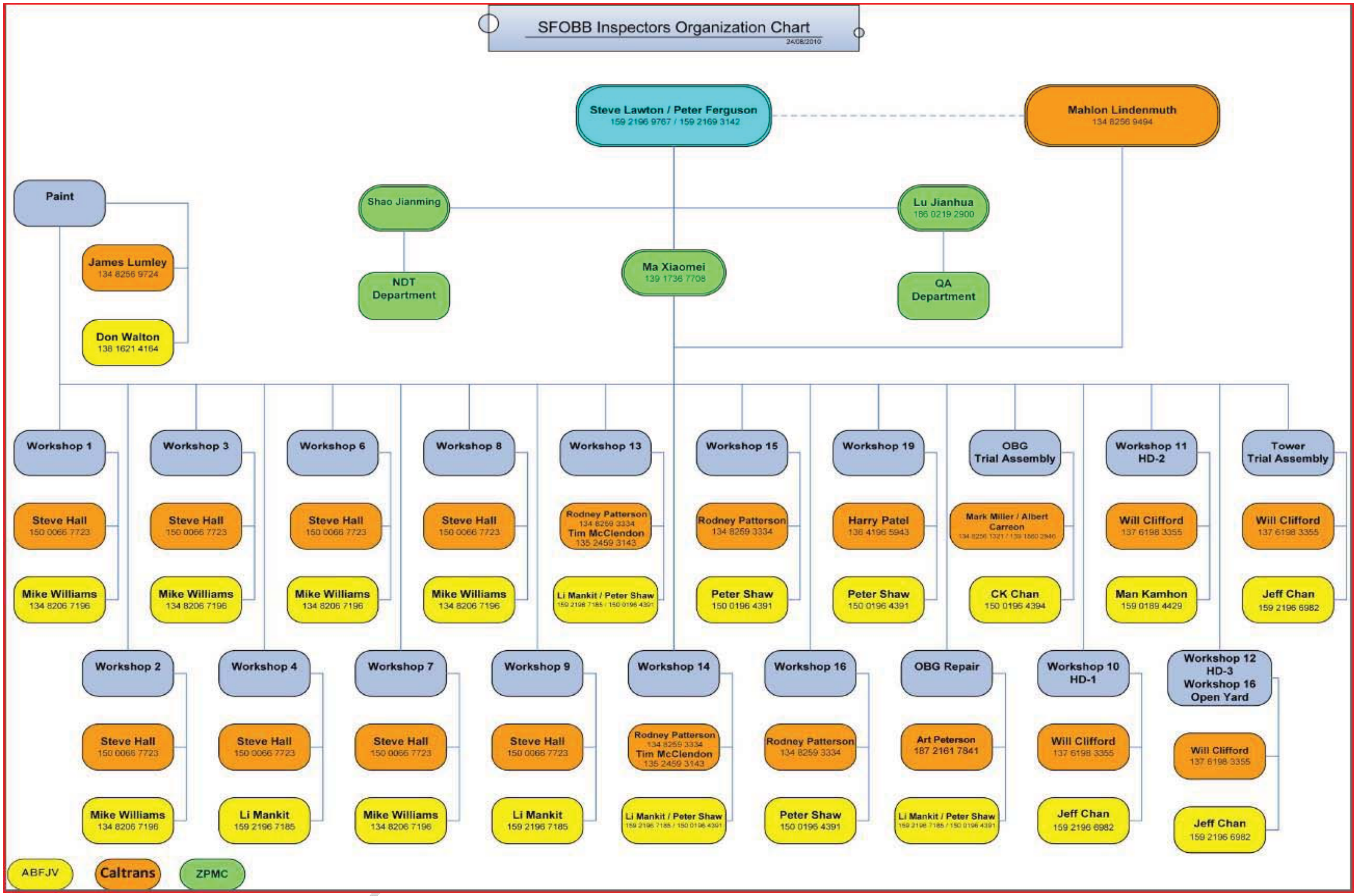

Figure 1 - SFOBB Inspectors Organization Chart

5. Process Development

The SAS Bridge has required significant investment by ZPMC, ABFJV and the Department in the development of the design and construction methods to meet the challenges of this world class structure. The developments have been in part to ensure the bridge fulfils the design intent but also mitigates construction interface risks. For example:

a. The Tower fabrications were welded in rotating jigs to enable the individual tower shafts to be indexed 21 times to enable weld sequencing for distortion control and maximize welding in the 1G and 1F positions (flat).
b. Gang milling of the Tower splice connections to ensure matched fit up and alignment.
c. The introduction of Phased Array Ultrasonic Testing (PAUT) to verify and size indications found by conventional Ultrasonic Testing (UT) in the closed rib deck panel welds.
d. Consolidation on a single type and make of nondestructive testing (NDT) equipment thereby minimizing discrepancies, for example UT machines and probes procured from a single source in the USA.
e. Models and Mock-ups have been constructed for Tower shafts, Orthotropic Box Girder (OBG) Deck Panel, Lift 13A at Pier E2 including Saddle Grillage, Anchorage Plate, Hinge A Floorbeams & Bulkhead, Barrier Rail, Bike Path Rail.
f. Construction of new shop space to accommodate the Tower and Orthotropic Box Girder (OBG) fabrication and painting. These new workshops contain equipment and capacity to meet the requirements of the SAS Bridge project.
g. Revisions to the shop drawings following reviews of manufacturing methods and fabrication sequences, together with lessons learned from the mock-ups.
h. Application of best practice dimensional control for jig fabrication.
i. Trial erection of all major fabrications prior to shipment to ensure fit up criteria is met in advance of the erection on site.

6. Special Procedures

The Special Provisions of the Caltrans Contract Documents require that the Contractor provide written detailed procedures for the fabrication and erection of complex assemblies that have been identified in the Special Provisions.

Specific procedures have been or are in the process of being developed for multiple items including all full-scale mock-ups that are required by the Special Provisions. In addition to developing these required procedures additional procedures have been developed for the following applications.

1. Repair welds
2. New welds
3. Heat straightening procedure for small out of tolerance conditions that does not need engineering approval
4. Heat straightening procedure for large out of tolerance conditions that need engineering approval
5. Critical Weld Repair (CWR), this procedure is for repairing cracks, base metal, third time repairs and seismic performance critical members with depth greater than 65%.
6. Weld Repair Report (WRR) for non-critical weld repairs.
7. All nondestructive inspection
8. Fillet weld gaps (Submittal 200)
9. Free hand flame cutting

It is not the intent of this Panel to make in depth comments on the content of these procedures. Rather, they are being highlighted to show the extent and detail that has been used to control various fabrication operations.

The continual development of fabrication and erection procedures has contributed to the improvement in the quality of the assemblies and the ease of erecting and bolting or welding of the assemblies at the project site.

7. Evaluation of Transverse Indications in OBG

OBG segments were fabricated with CJP, PJP and fillet welds. The cover passes and two-sided welds on the outside shell of the OBG segments were SAW CJP welds made with AWS A5.17 Electrode Specified as F48A3-EM12K. FCAW CJP root passes were backgouged before welds were made on the second side with AWS A5.20 Electrode Specified as E71T-1. These welds were ultrasonically tested in accordance with the AWS D1.5 Bridge Welding Code – Clause 6 Part C and the Contract Special Provisions.

PJP corner welds were reinforced in the corners as required by the Code for Corner and T weld joints [AWS D1.5, Note f for Figures 2.4 and 2.5 – details of Welded Joints for CJP and PJP Groove Welds]. These welds were made primarily using the FCAW Welding Process in accordance with the AWS D1.5 Bridge Welding Code. They were visually inspected and nondestructively tested using magnetic particle testing with acceptance criteria per Clause 6 Part D of the Code and the Contract Special Provisions

The Scanning Pattern "D" Ultrasonic Testing (UT) procedure was developed to address transverse linear indications that display planar characteristics with significant flaw height dimensions, as described in AWS D1.5-2002, Section 6.26.3.2. The purpose of the procedure was to provide acceptance and rejection criteria for planar discontinuities not addressed within AWS D 1.5-2002, Section 6.26.3.1, and Table 6.3 for Tensile Stress. Standard AWS ultrasonic testing procedures detailed within the Code do not specifically address planar discontinuities that display "Walking Images" as the transducer is moved towards and away from the discontinuity. The Code provides direction in Section 6.26.3.2 (3) to further evaluate this type of indication and Section 6.13.2 provides general guidance for the development of a specific testing procedure to evaluate discontinuities not addressed by the Code. These general guidelines were followed in the development of the approved procedure and its implementation on the contract. The criteria of this procedure requires the repair of "walking" transverse indications with defect ratings equal to or less than 6 dB of a Class "B" category flaw as defined in AWS D1.5, Table 6.3. This procedure and the utilization of scanning pattern "D" is in accordance with AWS D1.5-2002 and satisfies the requirement for further evaluation of planar type flaws.

Nondestructive inspection of the ZPMC welds demonstrated the presence of transverse crack-like indications. Samples containing rejectable transverse crack-like indications were removed from production welds. Metallographic and fractographic analyses were conducted on the indications. The analyses demonstrated the root cause of the cracks was the presence of hydrogen in the deposited weld metal.

The findings of the laboratory investigation were used to recommend modifications to the welding procedure that would minimize, and possibly eliminate, the hydrogen induced cracks. The recommended procedure is presented in Appendix A. These recommendations were presented to ZPMC. After extensive deliberations, ZPMC agreed to incorporate a modified, less restrictive, weld procedure than was recommended. Appendix B contains the ABFJV letter directing ZPMC to follow portions of the recommended procedure contained in Appendix A.

The use of the modified welding procedure along with other modifications decreased, but did not eliminate, the number and frequency of occurrence of the rejectable transverse crack-like indications. This observation is demonstrated in Figures 2 & 3 which present the number of rejectable transverse crack-like indications as a function of time.

The decrease in the number and frequency of occurrence of transverse crack-like indications may be attributed to:

1. changes in welding procedure
2. greater supervision of the ZPMC welders

The data in Figures 2 and 3 demonstrate that rejectable transverse crack-like indications continue to be present in welds. The root cause for the presence of these indications may be the use of pre-heat below the recommended values by the filler metal manufacturer [Hyundai] and the lack of adequate post weld thermal treatment. To rectify this problem, ABFJV and the Department are planning to substitute ESAB Dual Shield 70 Ultra Plus wire for the presently used Hyundai Supercore 71H wire.

At this stage in the project, ZPMC should be, but has not been, consistently producing initial welds with zero rejectable transverse crack-like indications.

Although some rejectable crack-like indications continue to be present in ZPMC welds, all rejectable crack-like indications that have been found throughout the project have been repaired and re-inspected by ZPMC, ABFJV and Caltrans. When the welds have been repaired, inspected and found to be free of rejectable indications, they are accepted by ZPMC, ABFJV and the Department and green tagged.

Once the bridge is placed in service, the Panel was told to assume that all welds in Lifts 1 through 12 are subjected to predominantly compression stresses. The Panel developed recommendations for Lifts 13 and 14 which contain some members subjected to tensile cyclical stresses. These recommendations are presented in Section 8 of this report. These recommendations should decrease the number and frequency of rejectable indications to a minimum and may eliminate their formation.

The performance of structural members in Lifts 1 through 12 that are determined to be subjected to tensile stresses should be investigated once the maximum and cyclic tensile stress magnitudes are determined.

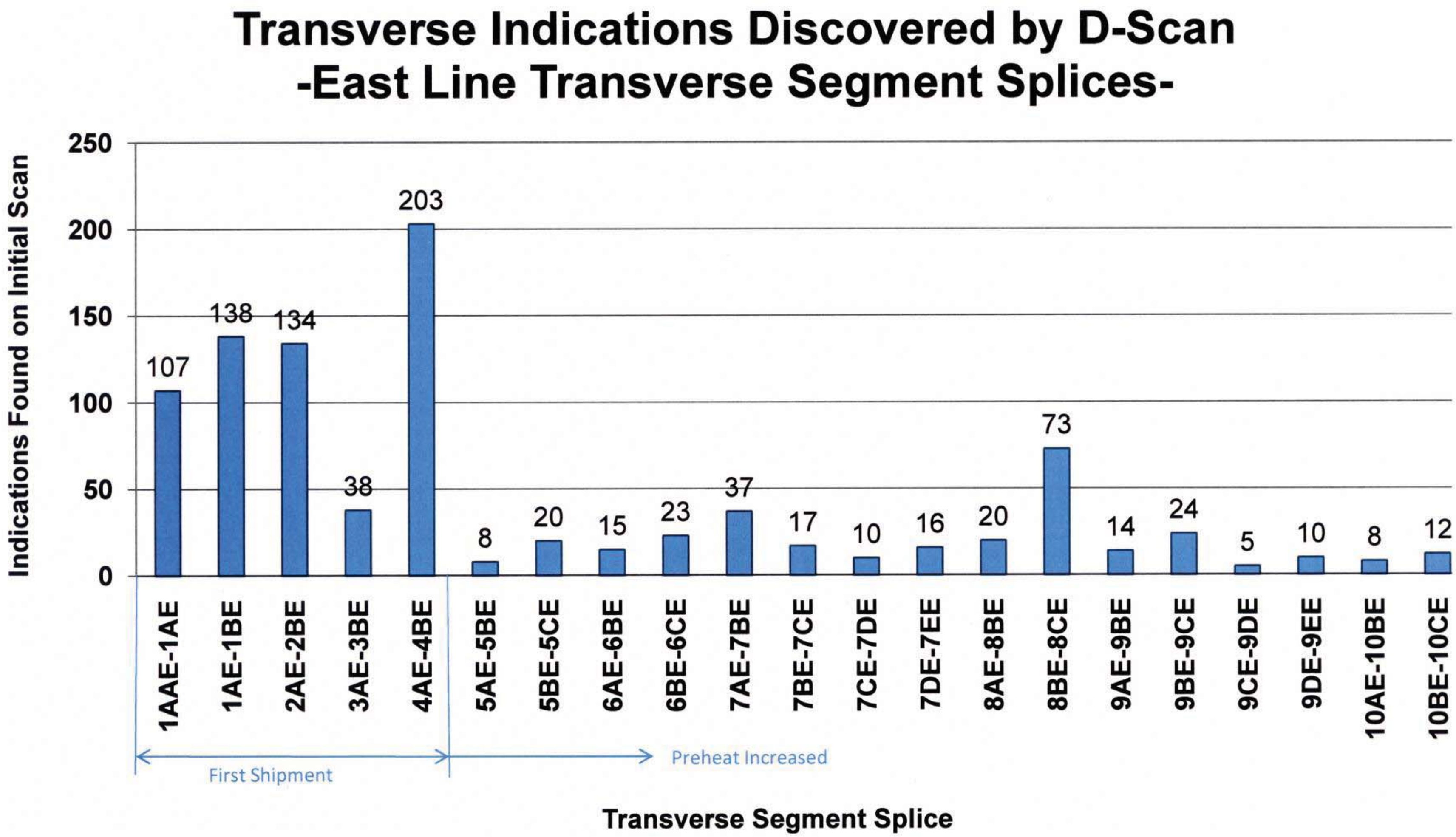

Figure 2 - Transverse Indications Discovered by D-Scan - East Line Transverse Segment Splices

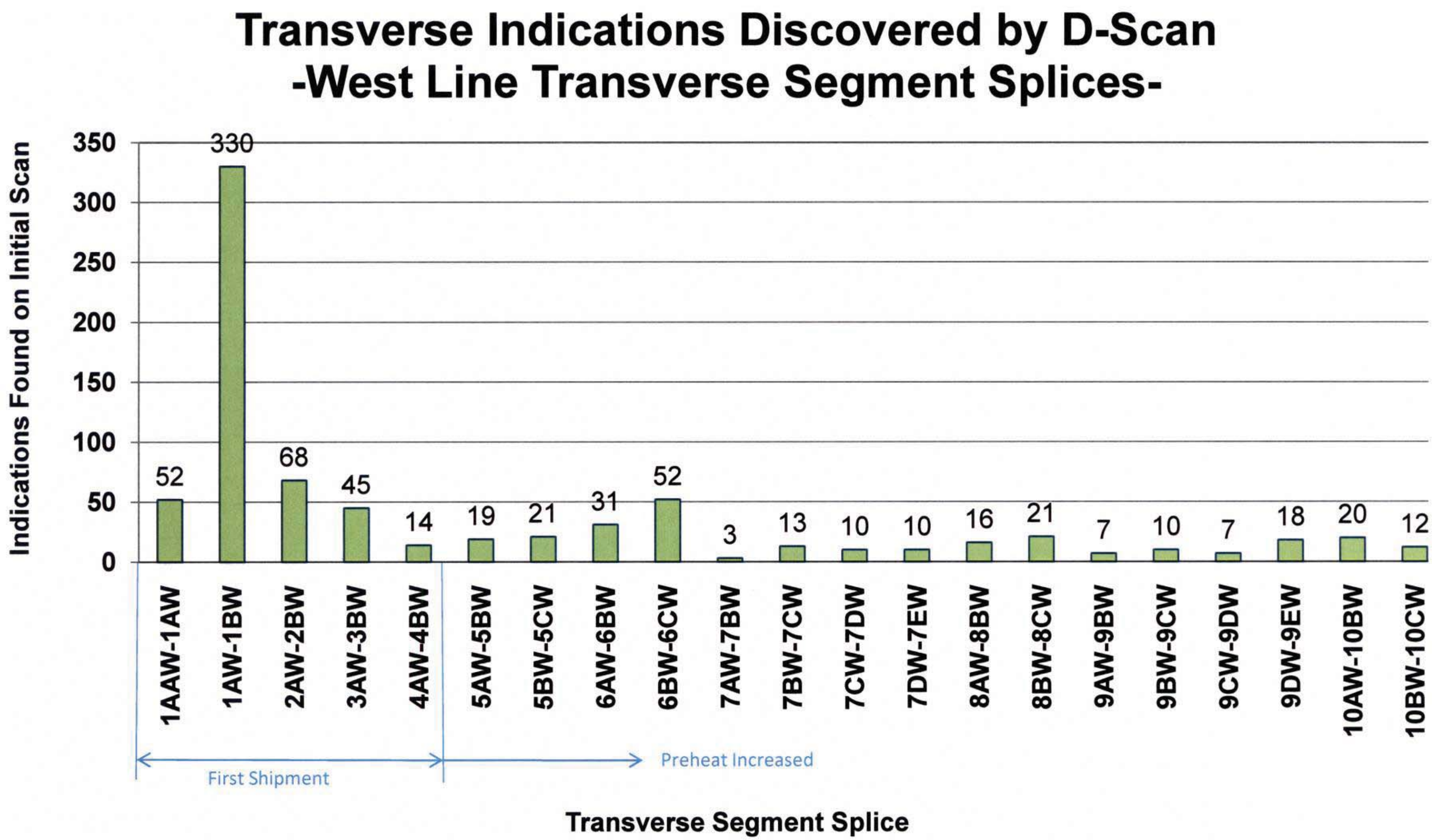

Figure 3 - Transverse Indications Discovered by D-Scan - West Line Transverse Segment Splices

8. Suggested recommendations for future welds

Rejectable transverse crack-like indications continue to be found in CJP and in fillet welds. The indications, when found, have resulted in extensive repairs. Thus, there are more opportunities for improvement in the accuracy of QC inspection. On average, Caltrans QA verification finds that the number of missed indications by ZPMC QC inspectors are considerably higher than are to be expected; thus for critical welds, ABFJV QC is performing inspections that were previously the responsibility of ZPMC.

East end OBG Lifts 13 and 14 contain members subjected to tensile cyclical stresses. Therefore, in order to minimize, and possibly eliminate the formation of rejectable transverse crack-like indications in East end OBG Lifts 13 and 14, the Panel recommends the following for welds to be made from November 30, 2010 forward. These recommendations are based on the continued assumption that AWS Code requirements for good workmanship are met. These requirements include, but are not limited to ensuring that moisture, oil and other contaminants that can form diffusible hydrogen in the deposited weld metal are not present when the weld is made.

Previously Presented Recommendations

1. Follow the 'Welding Procedure Requirements for New Welds,' [October 2009] that was developed by ABFJV/Caltrans and issued under a covering ABFJV letter dated November 9, 2009.

2. Implement the use of ESAB FCAW Electrodes and Ar – CO_2 Mix Shielding Gas per CCO164 dated September 21, 2010, for all FCAW welding [see Appendix C and D]. The Panel recommends implementation by November 30, 2010.

Additional Recommendations from the Panel

1. In addition to conformance with ABFJV letter dated November 9, 2009, the 'Welding Procedure Requirements for New Welds' procedure is to apply to ALL remaining SMAW, FCAW and SAW welds.

2. Conformance with ABFJV letter dated November 9, 2009, the 'Welding Procedure Requirements for New Welds' procedure is to apply to all welds not just to the skin plate welds.

3. Verify that the Fracture Critical Requirements of Clause 12 of the AWS D1.5 Bridge Welding Code are enforced if more than two (2) weld repairs are made in the same location.

4. Remove from the project welders who consistently make welds with rejectable discontinuities as determined by ABFJV.

5. An ABFJV CWI shall be available during all welding checking compliance at intervals no greater than 30 minutes.

6. The performance of structural members in Lifts 1 through 12 that are determined to be subjected to tensile stresses should be investigated once the maximum and cyclic tensile stress magnitudes are determined.

7. All external skin CJP welds shall be ground flush and UT inspected using Scanning Pattern D with + 6 dB above Class B acceptance criteria [acceptance criteria in Table 6.3 – UT Acceptance / Rejection Criteria – Tensile Stress in addition to the standard UT requirements of the AWS D1.5 Code [see Appendix E].

8. The Engineer may relax the UT Acceptance / Rejection Criteria to the standard requirements of the AWS D1.5 Code - if it can be demonstrated that rejectable transverse crack-like indications are no longer occurring.

9. Conclusions

- ZPMC, a world class fabricator with its facility on the Changxing Island, is very capable of manufacturing the SAS Bridge.

- The continual development of fabrication and erection procedures has contributed to the improvement in the quality of the OGB segment fabrication, and the ease of erecting and bolting or welding of the assemblies at the project site.

- More consistency of interfacing between ZPMC QC and ZPMC production needs to be implemented across the various fabrication departments.

- Rejectable indications continue to occur in CJP, PJP and fillet welds. ZPMC QC has not been fully effective in detecting transverse cracks or other weld discontinuities. QC needs to reduce the number of missed indications during inspections. Proactive measures by ABFJV QC that provide direct oversight and direction to ZPMC QC has begun to improve the detection of defects that heretofore have been missed. Because of this change, fewer inspections have to be performed before welds are acceptable.

- Continued diligence in QA oversight needs to occur until such time as QC can demonstrate an ability to find all rejectable indications This provides an improvement in overall quality of products.

- The recommendations in this report for OBG Lifts 13 and 14 should significantly reduce the number and frequency of rejectable indications and, with good workmanship practices, may eliminate their formation.

Appendices

Appendix A – Welding Procedure Requirements for New Welds prepared in October 2009.

Appendix B – ABFJV letter dated November 9, 2010 Application of Welding Procedure Requirements for New Welds.

Appendix C – Contract Change Order CCO 164 Use of ESAB welding wire.

Appendix D – ABFJV letter dated September 17, 2010 Use of Welding Electrodes – ESAB Dual Shield Ultra Plus.

Appendix E – UT Inspection Procedure using Scanning Pattern D with + 6 dB.

Appendix A – Welding Procedure Requirements for New Welds prepared in October 2009.

WELD PROCEDURE REQUIREMENTS FOR NEW WELDS

1. **Scope.**

   a. This procedure is to be used for ***all*** new and totally replaced welds that are being made in conformance with the AWS D1.5 Bridge Welding Code, the Caltrans Special Provisions and this Welding Procedure.

   b. Successful welding is achievable only when careful application of ***all*** of the welding requirements in the AWS D1.5 Bridge Welding Code, the Caltrans Special Provisions and this Welding Procedure are carried out using good workmanship practices and the latest industry standard of care.

   c. Positive controls and verification's tests provide proof that the workmanship and welding is performed in accordance with the Contract Documents (see 1b).

   d. Provide reports that show everyone that all work has been inspected and is acceptable to the contract requirements as specified in Caltrans Special Provisions, CCO-22 and any additional requirements contained in this procedure.

2. **Assembly.**

   a. All flame cut surfaces shall be ground smooth to remove all dross and flame cutting contaminants before fit-up.

   b. All weld joint surfaces shall be ground to bright metal immediately before welding.

   c. All weld joints shall be fit up in accordance with the approved WPS and AWS D1.5 Bridge Welding Code.

   d. All tack welding shall be done by AWS D1.5 Code Certified Tack Welders or Welders in accordance with the welding process and position required to make the weld.

   e. All tack welding shall be performed in accordance with an approved WPS and as amended by this procedure.

   f. Preheat shall be applied in such a manner to provide a minimum temperature in the area of the weld of 165°C.

   g. It is preferred that the welder places tack welds on the side of the weld joint that will be back gouged if the weld joint is CJP without backing or on welds that are made with non-steel backing.

   h. Weld backing shall be continuous for the full length of each weld made with the backing; any splices made in steel backing shall be a CJP welded inline with an approved WPS and 100% inspected by VT and RT or UT prior to fitting to the base metal.

   i. Surface of the steel backing and the faying surface of the base metal shall be cleaned to bright metal before fitting the steel backing.

   j. The maximum gap between the steel backing and the base metal at the weld root shall be 2mm.

   k. Faying surface of the base metal shall be cleaned to bright metal before fitting the ceramic backing.

Page **1** of **4**

WELD PROCEDURE REQUIREMENTS FOR NEW WELDS

l. Ceramic backing shall be dry, not damaged and free from any contaminates.

m. Weld joints that have steel backing which is not removed shall require the backing to be seal welded in the weld joint using SMAW electrodes if there is any evidence that the root weld pass has porosity or other weld defects caused by the weld melting into the back-up bar faying surface.

3. Preparation for Welding.

a. For SMAW welding processes the maximum diffusible hydrogen electrode permitted to be used is H4.

b. For SAW and FCAW welding process the maximum diffusible hydrogen electrode-flux combination permitted to be used is H8.

c. All welding shall be strictly controlled by the Lead CWI.

d. SMAW (E7018-H4) electrodes shall be received in hermetically sealed containers or shall be dried at least one hour at temperatures between 370°C and 425°C before being used.

e. When a container of SMAW electrodes is first opened, the electrodes will be moved to a rod holding oven and allowed to heat at 120°C for 4 hours prior to use on the structure.

f. FCAW electrodes shall be received in moisture resistant packages that are undamaged. These packages shall remain effectively sealed against moisture until the electrode is required for use.

g. FCAW electrode storage and handling shall be as described in AWS D1.5, clause 12.6.7.

h. FCAW electrodes not in use for more than 4 hours shall be covered and returned to the filler metal storage area and kept warm and dry until further use.

i. FCAW electrodes not consumed within 24 hours of accumulated exposure shall not be used on this project.

j. SAW electrodes and fluxes shall be handled and stored as described in AWS D1.5, Clause 12.6.6.

k. Preheating using electric strip heaters to provide a continual preheat before and during welding are preferred.

l. Alternatively, preheating using gas preheating torches shall be applied to the weld joint and surrounding area in such a way that the entire area to be welded and all adjacent material out to a distance of 75mm in any direction is heated to the value shown in AWS D1.5, clause 12.14 (Table 12.3 or Table 12.4 as appropriate). Preheat temperature is always stated as a minimum value.

m. Preheat shall utilize the use of electric heaters and blankets and be applied in such a manner to provide a minimum temperature in the area of the weld of 140°C at all times until the weld joint is post weld thermal treated. (This includes applying preheat for CJP welds made from both sides and backgouged.)

n. Preheat temperatures to be checked by "Tempilstik: crayon or calibrated digital thermometer.

WELD PROCEDURE REQUIREMENTS FOR NEW WELDS

4. Welding.

a. All welding shall be performed in accordance with an approved WPS and as amended by this procedure.

b. All welding shall be done by AWS D1.5 Code Certified Welders in accordance with the welding process and position required to make the weld.

c. The CWI shall verify that the welder understands that all starts and stops are to be ground before an arc is struck on them to remove weld craters and provide a means to tie the next weld pass into the end of the weld.

d. Before welding over previously deposited metal, all slag shall be removed and the weld and adjacent base metal shall be brushed clean.

e. Preheat shall be maintained in accordance with Section 3.k.~ 3.n. of this procedure.

f. All welding is to be with stringer beads except that vertical welding may utilize a weave limited to 20mm maximum width.

g. The cover pass for vertical welds may weave the full width of the joint provided no slag is trapped between passes.

h. The thickness of the weld layers in groove welds, except root and surface layers, shall not exceed 6 mm. When the root opening is 12 mm or greater, a multiple-pass split-layer technique shall be used.

i. Welding groove faces exceeding 16mm in width shall be filled using the split-layer technique.

j. Where practical starting or stopping of the welding arc at the ends of the weld joint shall be done on run-on / off tabs.

k. Optionally for welds longer than 10m in length, welds may be divided into approximately equal segments so that individual segments do not exceed 10m in length. Each weld segment will be considered as a separate weld for purposes of applying preheat and post weld heating. For the top deck panel the weld shall be divided in to three equal lengths and sequence-welded so that the entire weld is not preheated or post weld heated at one time.

l. Groove welds specified to be welded using a block sequence are to employ cascading at the end for tie-in. Such ends are to be scarfed and ground to sound metal to remove porosity, valleys or slag. The cascade shall be at an angle between 30° and 45°.

m. All cascaded ends shall be 100% VT and MT inspected after grinding and before welding is begun on adjacent increments.

n. Weld beads that are convex to a degree that their intersection to adjacent parallel beads or joint faces result in vee-shaped indentations or valleys shall be ground and opened so that the weld will not trap slag or prevent proper fusion when the next pass is made.

WELD PROCEDURE REQUIREMENTS FOR NEW WELDS

5. Postweld Thermal Treatment.

a. After welding is completed but before the temperature falls below that of the preheat temperature, post heat shall be applied to maintain the temperature in the area of the weld at 165^0C - 225°C.

b. Post weld heating shall be maintained for a minimum of 1.5 hours for material base metal thickness of 25mm or less.

c. For material thickness over 25mm, post heating times will be increased by 1/2 hour for each increment of 12 mm or fraction thereof.

d. After the post weld heating time has been reached the repair shall be cooled by removing the heating source and leaving the blankets in place.

6. Non Destructive Testing.

a. All back gouged groove welds are to have their gouged areas ground to bright metal and inspected 100% by VT and MT examination before welding may begin from the second side.

b. All cascaded ends shall receive 100% VT and MT inspection after grinding.

c. Final RT, UT, MT and Visual inspections shall only commence when at least 48 hours have passed after the post weld thermal treatment weld area has cooled to ambient temperature.

d. Final RT, UT, MT and Visual inspections shall be conducted inline with the contract requirements as specified in Caltrans Special Provisions and CCO-22.

e. In addition to ZPMC – UT procedure the weld area shall also be UT Inspected per the Transverse Segment Assembly Splice Ultrasonic Testing Procedure.

f. All inspection activities shall be documented which includes backgouge inspections.

g. All welding parameters shall be verified and recorded.

h. ZPMC shall document and provide results of all inspections conducted.
   i. VT of excavation and 25mm either side of the weld joint axis.
   ii. MT of excavation and 25mm either side of the weld joint axis.
   iii. Interpass cleaning.
   iv. VT of weld area.
   v. MT of weld area.
   vi. UT of weld area.

APPENDIX I

Appendix B – ABFJV letter dated November 9, 2010 Application of Welding Procedure Requirements for New Welds.

American Bridge / FLUOR
A JOINT VENTURE

375 Burma Road
Oakland, CA 94607 USA
Phone 510-808-4600
Fax 510-808-5601

November 9, 2009

AFC-ZPM-LTR-000583

Attention: **Mr. Li Jianghua**
Mr. Lu Jianhua

ZPMC
Steel Structure Department
Room 203, Building 2
Shanghai, China 200125

PROJECT: **San Francisco Oakland Bay SAS Bridge Superstructure**
Caltrans Contract No. 04-0120F4
ABF Job No. 660110

Subject: **Application of Weld Procedure Requirements for New Welds**

Mr. Li, Mr. Lu:

American Bridge / Fluor Enterprises Inc., A Joint Venture (ABFJV) is hereby directing Zhenhua Port Machinery Co., LTD (ZPMC) to follow the attached "Weld Procedure Requirements for New Welds" on new major completed joint penetration (CJP) welds using FCAW process in OBG segment and trial assembly. They include transverse segment splice welds, corner assembly longitudinal welds, corner assembly to OBG welds and OBG corners welds split during trial assembly.

The referenced weld procedure was drafted by ABFJV/CT in light of the recent findings of transverse indications in some welds mentioned above. ABFJV/CT also held a joint meeting with ZPMC to discuss this procedure last month. ABFJV believes the steps described in the referenced weld procedure are necessary in order to reduce the possibility of having transverse indications in new welds. Until alternative method is found to eliminate such transverse indications or the indications are proved no harm to the structural integrity, ZPMC shall continue using this weld procedure in new FCAW welding.

If you have any questions, please do not hesitate to contact me.

Sincerely,

American Bridge Company / Fluor Enterprises Inc., A Joint Venture
FOR Thomas Nilsson
General Manager - Fabrication

ABF *Building San Francisco Bay's New Signature Suspension Bridge*

Appendix C – Contract Change Order CCO 164 Use of ESAB welding wire.

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Page 1 of 1

CONTRACT CHANGE ORDER

Change Requested by: Engineer

CCO: 164 **Suppl. No. 0** **Contract No. 04 – 0120F4** **Road** SF-80-13.2/13.9 **FED. AID LOC.:**

To: **AMERICAN BRIDGE/FLUOR ENTERPRISES INC A JOINT VENTURE**

You are directed to make the following changes from the plans and specifications or do the following described work not included in the plans and specifications for this contract. ***NOTE: This change order is not effective until approved by the Engineer.***

Description of work to be done, estimate of quantities and prices to be paid. (Segregate between additional work at contract price, agreed price and force account.) Unless otherwise stated, rates for rental of equipment cover only such time as equipment is actually used and no allowance will be made for idle time. This last percentage shown is the net accumulated increase or decrease from the original quantity in the Engineer's Estimate.

Extra Work at Force Account:

Procure ESAB weld wire and consumable gasses (Argon & CO2) for use in the East End Orthotropic Box Girder fabrication, as directed by the Engineer.

Labor, equipment and material authorized by the Engineer, as necessary, will be paid in accordance with the provisions of Section 4-1.03D, "Extra Work" of the Standard Specifications and Section 5-1.24, "Force Account Payment" of the Special Provisions.

Estimated Cost of Extra Work at Force Account……………………………………………………$400,000.00

Estimated Cost: Increase ☒ **Decrease** ☐ **Est. $400,000.00**

By reason of this order the time of completion will be adjusted as follows: 0 days

Submitted by
Signature Kannu Balan **Resident Engineer** Kannu Balan, Senior T.E. **Date** 9-9-10

Approval Recommended by
Signature **Supervising Bridge Engineer** William Casey, Sup. B.E. **Date** 9-9-10

Engineer Approval by
Signature Michael Flom **Principal Transportation Engineer** Peter Siegenthaler, Prin. T.E. **Date** 9-21-10

We the undersigned contractor, have given careful consideration to the change proposed and agree, if this proposal is approved, that we will provide all equipment, furnish the materials, except as otherwise be noted above, and perform all services necessary for the work above specified, and will accept as full payment therefor the prices shown above.

NOTE: If you, the contractor, do not sign acceptance of this order, your attention is directed to the requirements of the specifications as to proceeding with the ordered work and filing a written protest within the time therein specified.

Contractor Acceptance by
Signature (Print name and title) Michael D. Flowers Project Director **Date** 9-21-10

Appendix D – ABFJV letter dated September 17, 2010 Use of Welding Electrodes – ESAB Dual Shield Ultra Plus.

American Bridge / FLUOR
A JOINT VENTURE

375 Burma Road
Oakland, CA 94607 USA
Phone 510-808-4600
Fax 510-808-5601

September 17, 2010

AFC-ZPM-LTR-000643

Attention: **Mr. Wu Yun**

ZPMC
Steel Structure Department
Room 203, Building 2
Shanghai, China 200125

PROJECT: **San Francisco Oakland Bay SAS Bridge Superstructure**
Caltrans Contract No. 04-0120F4
ABF Job No. 660110

SUBJECT: **Use of Welding Electrode - ESAB Dual Shield 70 Ultra Plus**

Mr. Wu,

American Bridge / Fluor Enterprises Inc., A Joint Venture (ABFJV) is responding to Shanghai Zhenhua Heavy Industry Co., Ltd. (ZPMC)'s letter 20100906-01 dated September 6, 2010 regarding ZPMC's concerns about the use of the weld wire ESAB Dual Shield 70 Ultra Plus. Below is ABFJV's response:

1. The previous welding using the Hyundai Supercored 71H, which has been tested to date according to project specifications, has been accepted. Therefore ZPMC's work is complete and adheres to the quality standard of this project.
2. Caltrans has confirmed their position in a letter on August 6 that was given to ZPMC. Please see the attached letter. ABFJV confirms that no re-inspection of previously accepted welds will be performed in line with Caltrans letter.
3. ABFJV will be responsible for any delay that might arise from the use of the ESAB wire as long as the delay is attributable to the use of the ESAB wire. However, ABFJV reserves the right to reverse the decision to use the ESAB wire if it shown to be detrimental to the project.
    a. ABFJV also directs ZPMC to start using the ESAB wire for the transverse joints between the segments in OBG Lift 11 to measure if there is a difference in the weld quality before the use is extended to the welding of OBG Lifts 13 and 14.
4. The cost of the gas and wire is undertaken by ABFJV and Caltrans.

If you have any further questions, please do not hesitate to call me.

Sincerely,

American Bridge Company / Fluor Enterprises Inc., A Joint Venture
Thomas Nilsson
General Manager - Fabrication

ABF Building San Francisco Bay's New Signature Suspension Bridge

上海振华重工(集团)股份有限公司 ZPMC
SHANGHAI ZHENHUA HEAVY INDUSTRY CO., LTD.
地址：中华人民共和国上海浦东南路3470号 ADDRESS: 3470 PUDONG NAN-LU, SHANGHAI 200125, P.R.CHINA
Postcode(邮编): 200125 Telephone(电话): +86 21 58396666 Fax(传真): +86 21 58399555 E-mail(电子邮件): mail@zpmc.com

To: American Bridge/Fluor Enterprises Inc A Joint Venture
375 Burma Road
Oakland, CA 94607
Fax: (510) 808-4601

Attn: Mr. Thomas Nilsson
Mr. Sam Choy

Date: 6th Sept, 2010
Ref: 20100906-01

Subject: San Francisco/Oakland Bay SAS Bridge Superstructure
Response to ABF-ZPM-LTR-000569

Dear Sir(s),

Your letter ABF-ZPM-LTR 000 569 is in receipt, thank you.

Regarding changing wire issue, ZPMC notes the attached letter from Caltrans clearly stated that the previous welding with Hyundai Supercored 71H is complied with the welding quality, request ABF's letter to show same wording. Besides, ZPMC re-request the formal letter from AB/F shall clarity following issues based on the previous meetings with AB/F:

1、The welding quality of the previous Hyundai Supercored 71H is complied and the quality is good.

2、The previous accepted welds are complied with the special provisions and shall not do any re-inspection later by neither ABFJV nor CT.

3、AB/F is responsible to any project delay if new problems come out due to switching to new ESAB wire, such as wire or gas supply problem or quality problems of the welds, including the cost of the repairs.

4、To make sure the cost of gas and wire is undertaken by AB/F or CT.

Please give definite response ASAP, since ZPMC is ready to start the following works right now:

1、ZPMC has contacted the Linder Gas supply company and will visit to get several bottles of gas back to the island for the PQR test.

2、ZPMC will carry out the PQR test for the ESAB wire and Linder gas according to the parameters provided by AB/F. Please arrange to witness. The WPS will submit to AB/F and CT for approval afterwards.

3、After the PQR and WPS be approved, ZPMC will organize the training under the help by AB/F and ESAB welding engineers, to make sure the welders are aware of the relative skills.

4、After that, start to use in some of the production components.

ZPMC is expecting ABFJV's formal reply before we proceed further.

If you have any question, please let us know as soon as possible.

Thank you for your continued support and cooperation in advance.

Regards,

Wu Yun
ZPMC/Project Manager

Appendix E – UT Inspection Procedure using Scanning Pattern D with + 6 dB.

San Francisco Oakland Bay Bridge, 04-0120F4

Ultrasonic Testing Procedure for Compliance with AWS D1.5-2002, Section 6.26.3.2

Detection of Transverse Planar Discontinuities with Significant Flaw Height Dimension

ABF/CT Pattern "D" UT Procedure 001, Revision 1

16 November, 2009

John Kinsey

Approved by: John Kinsey, ASNT ACCP Level III

Caltrans Quality Assurance Level III

Thomas W Lawton

Approved by: Steve Lawton, ASNT ACCP Level III

ABF Quality Control Manager

1.0 Scope

1.1 The purpose of this procedure is to provide the Engineer accurate and consistent information regarding discontinuities of a transverse planar nature and to identify transverse cracks for repair.

Note: "Ultrasonically tested welds are evaluated on the basis of a discontinuity reflecting ultrasound in proportion to its effect on the integrity of the weld" ... "As the orientation of such discontinuities, relative to the sound beam, deviates from the perpendicular, dB ratings which do not allow direct, reliable evaluation of the welded joint integrity may result": AWS D1.5; 2002 (6.26.3.2).

This procedure establishes the minimum requirements for Scanning Pattern 'D' Ultrasonic Testing (UT) of Transverse Segment Assembly Splices and Edge Plate to Deck Plate Corner Welds in members between 14mm and 35mm in thickness. This procedure is intended to be used to detect and characterize planar discontinuities with significant flaw height dimension as described in AWS D1.5-2002, Section 6.26.3.2. Use of this procedure will provide a standard means of collecting and reporting information relating to the existence of suspected planar discontinuities. The acceptance criteria for certain discontinuities are established in AWS D1.5-2002, Section 6.26.3.1, and Table 6.3. Other discontinuities detected by this procedure are to be evaluated for acceptance in accordance with Section 8 of this procedure.

2.0 Reference Documents

2.1 The following documents in effect at the date of issuance or revisions of this procedure apply herein:

ASNT – *Recommended Practice NO. SNT-TC-1A, 2006*

ANSI/AASHTO/AWS – *D1.5 Bridge Welding Code, 2002*

3.0 Definitions

3.1 The following definitions apply to the context specified herein:

Written Practice: A written procedure for the training and certification of NDT Personnel approved by the Engineer.

Level II: A person who by training and experience meets the requirements for certification as a Level II according to an approved *Written Practice.*

Level III: A person currently possessing a valid ASNT Level III Certificate, and who meets the requirements for certification as a Level III according to an approved *Written Practice.*

4.0 Personnel

4.1 Personnel performing UT inspection shall be qualified to Level II Technician in accordance with the written practice and comply with ASNT – *Recommended Practice No. SNT-TC-1A.* Personnel shall receive additional training specific to this procedure from an ASNT Level III or a duly appointed representative.

5.0 Equipment

5.1 Equipment Requirements: The Ultrasonic instrument shall be the pulse-echo type suitable for use with transducers oscillating at frequencies between 1 and 6 megahertz. The display shall be "A" scan rectified video trace unless other display methods are approved by the Engineer. Such other display methods may be approved for use provided they demonstrate the ability to adequately detect the minimum allowable discontinuity before being considered.

5.2 Horizontal Linearity: The horizontal linearity of the test equipment shall be qualified, every 40 hours of equipment use, over the full sound path distance to be used in testing in accordance with AWS D1.5, 2002, Section 6.22.1.

5.3 Requirements for Test Instruments: Test instruments shall include internal stabilization so that after warm-up, no variations in response greater than +/- 1dB occur with a supply voltage change of 15% nominal or, in the case of a battery, throughout the charge operating life. There shall be an alarm or meter to signal a drop in battery voltage prior to instrument shut-off due to battery exhaustion.

5.4 Calibration of Test Instruments: The test instrument shall have a calibrated gain control (attenuator) adjustable in discreet 1dB steps over a range of at least 60dB. The accuracy of the attenuator settings shall be within plus or minus 1dB. The instrument shall be qualified every two months as described in AWS D1.5, Section 6.22.2. A record of such qualification shall be maintained for each test instrument.

5.5 Display Range: The dynamic range of the test instruments display shall be such that a difference of 1dB of amplitude can easily be detected on the display.

5.6 Angle-Beam Search Units: Angle-beam search units shall consist of a transducer and an angle wedge. The unit may be comprised of two separate elements or may be an integral unit. The transducer shall be standard transducers recognized by the AWS D1.5 Code.

5.6.1 Frequency: The transducers used for determining significant flaw height dimension shall have a frequency between 2 and 2.5MHz, inclusive.

5.6.2 Transducer Dimensions: The transducer crystal shall be square or rectangular in shape and may vary from 15mm to 25mm in width and from 15mm to 20mm in height. The maximum ratio of width to height shall be 1.2 to 1.0, and the minimum ratio 1.0 to 1.0.

5.6.3 Angle: The search unit shall produce a sound beam of 70° in the material being tested within +/- 2°.

5.6.4 Marking: Each search unit shall be marked to clearly indicate the frequency of the transducer, nominal angle of refraction, and index point.

5.6.5 Internal Reflections: Maximum allowable internal reflections from the search unit shall be verified every 40 hours as described in AWS D1.5, 2002, Section 6.22.3.

5.7 Couplant: A coupling material shall be used between the search unit and test material. The couplant shall be either glycerin or cellulose gum, and water mixture of a suitable consistency. A wetting agent may be added if needed. Commercially available couplant, such as Ultra-Gel, may be used. Couplant used during calibration shall be the same as used during testing.

5.8 Reference Standards:

5.8.1 IIW and DS Standard: The International Institute of Welding (IIW) ultrasonic reference block shall be used for distance, angle, and sensitivity calibrations during testing. The use of alternative blocks for distance calibration shall be approved by the responsible ASNT Level III's.

6.0 Surface Preparation

6.1 Welded surfaces to be inspected shall be ground smooth and flush to a surface contour allowing intimate coupling. All surfaces to which a search unit is applied shall be free of weld spatter, paint, loose scale, dirt, grease, oil (other than that used as couplant) and shall have a contour allowing intimate coupling.

7.0 Procedure

7.1 **Calibration for Longitudinal Testing**

7.1.1 Depth: The transducer shall be coupled to a step block to obtain reflections from multiple depths. The instrument shall be adjusted to produce indications with +/-2% of the actual thickness of the material to be tested.

7.1.2 Sensitivity Calibration: The sensitivity shall be adjusted at a location free of indications so that the first back reflection from the far side of the plate will be 50% to 80% of the full screen height.

7.2 **Calibration for Angle-Beam (Shear Wave) Testing**

7.2.1 Horizontal Sweep: The horizontal sweep shall be adjusted to represent the actual sound path distance by using the IIW Block or alternate blocks approved by the ASNT Level III. The distance calibration shall be made using either the 125mm scale or 250mm scale on the display screen. The screen range for testing shall be set based on material thickness as specified in Table 1.

7.2.2 Index Point: The exit point of the transducer shall be verified and marked on the transducer during Horizontal Sweep Calibration.

7.2.3 Angle: Verify that the beam angle is within +/- 2° of the nominal beam angle by placing the search unit in position for 70°. Move the search unit back and forth over the line indicative of the beam angle until the signal from the radius is maximized, then compare the sound entry point on the search unit with the angle mark on the calibration block (tolerance +/- 2°).

7.2.4 Sensitivity: Calibrate the sensitivity by placing the search unit in position A, and adjust the maximized signal from the 1.5mm hole to obtain a horizontal zero reference level of 40% of full screen height. This resulting dB value is used for the "B" Reference Level in the UT form.

7.3 **Straight-Beam (Longitudinal) Scanning**

7.3.1 The base metal immediately adjacent to the weld joints subject to the requirements of this procedure shall receive Straight-Beam examination to ascertain material thickness and confirm the absence of laminar reflectors.

7.4 **Shear Wave Scanning**

7.4.1 Scanning Sensitivity: Scanning level sensitivity shall be determined by adding the dB value prescribed in the attached Table 1 to the standard zero reference level used for flaw evaluation ("B" on the ultrasonic test report). The reference level is attained by adjusting the calibrated gain control of the ultrasonic instrument, so that a maximized horizontal trace deflection is adjusted to 40% of full screen height, in conformance with 7.2.4. Additional sound is added to the zero reference level for scanning as stated in Table 1.

7.4.2 Angle: A 70° (plus or minus 2°) refracted shear wave shall be used for scanning and evaluation.

7.4.3 Screen range for a given material thickness shall be set in accordance with Table 1.

7.4.4 Scanning Pattern: The primary scanning pattern shall be scanning pattern "D" as described in AWS D1.5 Section 6.24, with the transducer placed directly over the weld axis. Other scanning movements and patterns as described in AWS D1.5, Section 6.24 shall be used to further evaluate and characterize reflectors detected with pattern "D". Scanning pattern "D" shall be performed with the search unit pointed in both opposing directions while directly over the weld axis, so as to achieve a two-direction evaluation of the weld along its axis.

7.4.5 Scanning shall focus on detecting planar discontinuities in the first and second legs of the sound path. Discontinuities shall be evaluated in the first leg of sound as much as is possible, however, the top quarter (portion closest to the search unit) of the material thickness shall be tested with the final leg of sound progressing from Face "B" towards Face "A", in accordance with AWS D1.5, 2002 Table 6.2 (General Notes).

7.4.5.1 Discontinuities found in the first leg of sound shall be evaluated per Section 7.4.6 and Section 8 of this procedure.

7.4.5.2 Second Leg scanning and evaluation shall focus on planar discontinuities found within the top quarter thickness of the weld. The top quarter thickness is examined in this manner to ensure detection of flaws existing within the near field (*for the purpose of this procedure, near field shall be defined as the first quarter of weld, based on material thickness).* See Table 1 of this procedure for second leg area of interest and relevant reflector depth range relative to suspect discontinuity locations.

7.4.5.3 Discontinuities found in the last 1/4 of the second leg of sound path (first quarter of weld closest to the search unit) shall be evaluated per Section 7.4.6 and Section 8 of this procedure. Reflectors found outside the first leg of sound, and not within the second leg's area of interest, as defined by Table 1 of this procedure, shall be evaluated as non-relevant reflectors and disregarded.

Note: The presence of attachment welds and un-ground weld reinforcement on the opposing face may produce non-relevant reflectors due to geometry. The Ultrasonic Technician should ensure that all noted second leg reflectors are within the weld or heat affected zone and that non-relevant reflectors are not identified as defects. The exclusion of the first three quarters of second leg sound path from the evaluation should normally prevent non-relevant reflectors from inadvertent identification as defects.

7.4.6 The transducer shall be manipulated to produce a maximum response from the suspect reflector. Scanning Movement "B" shall be utilized on top of the weld (moving towards and away from the discontinuity), to verify that the signal at scanning level, will travel approximately one screen division on the display while maintaining a screen height equal to or greater than reference amplitude (approximately 20% of the material thickness sound path distance). This is sometimes referred to as a "walking image" and is an indication of significant flaw height. Walking transverse indications revealing a defect rating greater than

6dB over a Class "B" category flaw, (medium flaw) as specified in AWS D1.5 Table 6.3, shall be deemed acceptable without repair.

8.0 Evaluation

8.1 Characterization: Discontinuities shall be observed to determine if they possess the characteristics of planar type discontinuities as follows:

8.1.1 Sound is reflected at its maximum only from Scanning Pattern "D". Discontinuities shall be further evaluated to determine whether they can be observed ultrasonically by using testing patterns symmetrically around the weld axis. Discontinuities found using scanning patterns perpendicular to the weld axis in addition to Scanning Pattern "D" are indicative of volumetric discontinuities and shall only be noted if they do not meet the standard acceptance requirements of AWS D1.5, Table 6.3. If indications do not meet the criteria of AWS 1.5, Table 6.3, the standard approved project UT procedure shall apply.

8.1.2 Discontinuities found only by utilization of Scanning Pattern "D" are indicative of transverse planar type discontinuities. Discontinuities found in conformance with 8.1.1 and 7.4.6 shall be marked on the weld, at the discontinuity location. The following information shall be marked adjacent to the weld with a line drawn to the spot marked on the weld signifying the exact defect location. The information shall be reported on the report form: Depth (maximized signal depth), Sound Path Distance, Indication Level, Reference Level, Attenuation Factor, Indication Rating, Length, Date and identification of technician (Lot Number). The information shall be presented as follows:

a	=	Angle
T	=	Thickness of Plate
d	=	Depth
L	=	Length
SP	=	Sound Path
A	=	Indication Level
B	=	Reference Level
C	=	Attenuation Factor
D	=	Indication Rating

Date Day-Month-Year
Technician Identification Number

8.2 Length: The length of the discontinuity shall be determined using the following methods:

8.2.1 The search unit shall be moved to one end of the discontinuity while keeping the indication visible on the display at all times until the indication drops 50% (6dB) below the maximized defect rating for defects exceeding the criteria of AWS

D1.5 Table 6.3. 2. The search unit should then be moved back towards the discontinuity until the indication height reaches the maximum height for a given scanning level and then drops to 50% as performed at the opposite end of the defect. That location shall be marked on the end of the discontinuity directly in line with the centerline of the search unit.

8.2.2 For defects categorized as Class A, B and C defects in accordance with AWS D1.5 Table 6.3, the length shall be determined utilizing the standard code prescribed 6dB drop method as described in AWS D1.5 section 6.23.2.

8.2.3 The distance between the marks placed on the ends of the discontinuity, shall be recorded as the discontinuity length on the UT report.

8.3 Location: Distance from Y shall be measured and recorded on the UT report. Distance from "Y" in all cases shall conform to the approved drawing Y location.

8.4 Evaluation: Planar discontinuities with significant flaw height dimension requiring repair shall be reported. In addition, indications exceeding the threshold for rejection by AWS D1.5 Table 6.3 shall be marked and reported for repair.

9.0 Reports

9.1 A report, which clearly identifies the work and the area of inspection, shall be completed by the UT Technician at the time of inspection. The report form shall conform to AWS D1.5, Annex VII, Part B, and Form VII-11.

9.2 All relevant information included in the report shall be filled in by the UT Technician and submitted to the ASNT Level III upon completion of inspection activities at the end of each day. See Ultrasonic Transverse Indication Evaluation Report.

Table 1

Angle (Degrees)	Material Thickness	1st Leg Sound Path	Scanning Level 1st Leg	2nd Leg Sound Path	Scanning Level 2nd Leg	2nd Leg Area of Interest	Relevant 2nd Leg Depth	Screen Range (All Legs)
68	14	37.37	Ref. + 20dB	74.75	Ref. + 25dB	65.40-74.75mm	0mm-3.5mm	75mm
68	16	42.71	Ref. + 20dB	85.42	Ref. + 25dB	74.75-85.42mm	0mm-4mm	90mm
68	18	48.05	Ref. + 20dB	96.10	Ref. + 25dB	84.09-96.10mm	0mm-4.5mm	100mm
68	20	53.39	Ref. + 20dB	106.78	Ref. + 25dB	93.43-106.78mm	0mm-5mm	110mm
68	22	58.73	Ref. + 20dB	117.46	Ref. + 25dB	102.77-117.46mm	0mm-5.5mm	120mm
68	25	66.74	Ref. + 25dB	133.47	Ref. + 35dB	116.79-133.47mm	0mm-6.25mm	135mm
68	28	74.75	Ref. + 25dB	149.49	Ref. + 35dB	130.80-149.49mm	0mm-7mm	150mm
68	35	93.43	Ref. + 25dB	186.86	Ref. + 35dB	163.50-186.86mm	0mm-8.75mm	190.0mm
Angle (Degrees)	Material Thickness	1st Leg Sound Path	Scanning Level 1st Leg	2nd Leg Sound Path	Scanning Level 2nd Leg	2nd Leg Area of Interest	Relevant 2nd Leg Depth	Screen Range (All Legs)
69	14	39.07	Ref. + 20dB	78.13	Ref. + 25dB	68.35-78.13mm	0mm-3.5mm	80.0mm
69	16	44.65	Ref. + 20dB	89.29	Ref. + 25dB	78.12-89.29mm	0mm-4mm	90mm
69	18	50.23	Ref. + 20dB	100.46	Ref. + 25dB	87.88-100.46mm	0mm-4.5mm	110mm
69	20	55.81	Ref. + 20dB	111.62	Ref. + 25dB	97.65-111.62mm	0mm-5mm	115mm
69	22	61.39	Ref. + 20dB	122.78	Ref. + 25dB	107.41-122.78mm	0mm-5.5mm	125mm
69	25	69.76	Ref. + 25dB	139.52	Ref. + 35dB	122.08-139.52mm	0mm-6.25mm	140mm
69	28	78.13	Ref. + 25dB	156.26	Ref. + 35dB	136.72-156.26mm	0mm-7mm	160mm
69	35	97.66	Ref. + 25dB	195.33	Ref. + 35dB	170.90-195.33mm	0mm-8.75mm	200mm
Angle (Degrees)	Material Thickness	1st Leg Sound Path	Scanning Level 1st Leg	2nd Leg Sound Path	Scanning Level 2nd Leg	2nd Leg Area of Interest	Relevant 2nd Leg Depth	Screen Range (All Legs)
70	14	40.93	Ref. + 20dB	81.87	Ref. + 25dB	71.62-81.87mm	0mm-3.5mm	85mm
70	16	46.78	Ref. + 20dB	93.56	Ref. + 25dB	81.86-93.56mm	0mm-4mm	95mm
70	18	52.63	Ref. + 20dB	105.26	Ref. + 25dB	92.08-105.26mm	0mm-4.5mm	110mm
70	20	58.48	Ref. + 20dB	116.95	Ref. + 25dB	102.32-116.95mm	0mm-5mm	120mm
70	22	64.32	Ref. + 25dB	128.65	Ref. + 35dB	112.56-128.65mm	0mm-5.5mm	130mm
70	25	73.10	Ref. + 25dB	146.19	Ref. + 35dB	127.90-146.19mm	0mm-6.25mm	150mm
70	28	81.87	Ref. + 25dB	163.73	Ref. + 35dB	143.25-163.73mm	0mm-7mm	165mm
70	35	102.33	Ref. + 25dB	204.67	Ref. + 35dB	179.07-204.67mm	0mm-8.75mm	205mm
Angle (Degrees)	Material Thickness	1st Leg Sound Path	Scanning Level 1st Leg	2nd Leg Sound Path	Scanning Level 2nd Leg	2nd Leg Area of Interest	Relevant 2nd Leg Depth	Screen Range (All Legs)
71	14	43.00	Ref. + 20dB	86.00	Ref. + 25dB	75.25-86.00mm	0mm-3.5mm	90mm
71	16	49.14	Ref. + 20dB	98.29	Ref. + 25dB	85.99-98.29mm	0mm-4mm	100mm
71	18	55.29	Ref. + 20dB	110.58	Ref. + 25dB	96.74-110.58mm	0mm-4.5mm	115mm
71	20	61.43	Ref. + 20dB	122.86	Ref. + 25dB	107.50-122.86mm	0mm-5mm	125mm
71	22	67.57	Ref. + 25dB	135.15	Ref. + 35dB	118.24-135.15mm	0mm-5.5mm	140mm
71	25	76.79	Ref. + 25dB	153.58	Ref. + 35dB	134.36-153.58mm	0mm-6.25mm	155mm
71	28	86.00	Ref. + 25dB	172.01	Ref. + 35dB	150.5-172.01mm	0mm-7mm	175mm
71	35	107.50	Ref. + 25dB	215.01	Ref. + 35dB	188.12-215.01mm	0mm-8.75mm	220mm
Angle (Degrees)	Material Thickness	1st Leg Sound Path	Scanning Level 1st Leg	2nd Leg Sound Path	Scanning Level 2nd Leg	2nd Leg Area of Interest	Relevant 2nd Leg Depth	Screen Range (All Legs)
72	14	45.30	Ref. + 20dB	90.61	Ref. + 25dB	79.27-90.61mm	0mm-3.5mm	95mm
72	16	51.78	Ref. + 20dB	103.55	Ref. + 25dB	90.59-103.55mm	0mm-4mm	105mm
72	18	58.25	Ref. + 20dB	116.50	Ref. + 25dB	101.92-116.50mm	0mm-4.5mm	120mm
72	20	64.72	Ref. + 25dB	129.44	Ref. + 35dB	113.26-129.44mm	0mm-5mm	130mm
72	22	71.19	Ref. + 25dB	142.39	Ref. + 35dB	124.58-142.39mm	0mm-5.5mm	145mm
72	25	80.90	Ref. + 25dB	161.80	Ref. + 35dB	141.57-161.80mm	0mm-6.25mm	165mm
72	28	90.61	Ref. + 25dB	181.22	Ref. + 35dB	158.55-181.22mm	0mm-7mm	185mm
72	35	113.26	Ref. + 25dB	226.52	Ref. + 35dB	198.20-226.52mm	0mm-8.75mm	230mm

APPENDIX I

APPENDIX J

Note:
1) Caltrans QA comments are shown in *blue*.
2) ABFJV QC comments, if any, are shown in *red*.

WELD PROCEDURE REQUIREMENTS FOR NEW WELDS

1. **Scope.**

   a. This procedure is to be used for new and totally replaced welds that are being made in conformance with the AWS D1.5 Bridge Welding Code, the Caltrans Special Provisions and this Welding Procedure.

   b. Successful welding is achievable only when careful application of ***all*** of the welding requirements in the AWS D1.5 Bridge Welding Code, the Caltrans Special Provisions and this Welding Procedure are carried out using good workmanship practices and the latest industry standard of care.

   c. Positive controls and verification's tests provide proof that the workmanship and welding is performed in accordance with the Contract Documents (see 1b).

   d. Provide reports that show everyone that all work has been inspected and is acceptable to the contract requirements as specified in Caltrans Special Provisions, CCO-22 and any additional requirements contained in this procedure.

2. **Assembly.**

   a. All flame cut surfaces shall be ground smooth to remove all dross and flame cutting contaminants before fit-up.

   Comments: Project requirements AWS section 3.2.1

   b. All weld joint surfaces shall be ground to bright metal immediately before welding.

   Comments: Project requirement AWS section 3.3 *The term immediate can be loosely interpreted, but the weld prep shall be ground to bright metal before welding*

   c. All weld joints shall be fit up in accordance with the approved WPS and AWS D1.5 Bridge Welding Code.

   Comments: Project requirement AWS section 3.3

   d. All tack welding shall be done by AWS D1.5 Code Certified Tack Welders or Welders in accordance with the welding process and position required to make the weld.

   Comments: Project requirement.

e. All tack welding shall be performed in accordance with an approved WPS and as amended by this procedure.

Comments: Project requirement

f. Preheat shall be applied in such a manner to provide a minimum temperature in the area of the weld of 165°C.

Comments: Contractor means and methods for the elevated pre-heat temperature. Only happened on the transverse seams OBG segment to segment welds in trial assembly, Floor Beam Flange to Deck Plate Diaphragm and Longitudinal diaphragm to bottom plate only if the weld was cut out for fit-up adjustments in trial assembly

g. It is preferred that the welder places tack welds on the side of the weld joint that will be back gouged if the weld joint is CJP without backing or on welds that are made with non-steel backing.

Comments: Contractor means and methods. Most of the tacking was completed in inside the groove welds, this is not the side of the backgouge, contrary to what is said in this item.

Weld backing shall be continuous for the full length of each weld made with the backing; any splices made in steel backing shall be a CJP welded inline with an approved WPS and 100% inspected by VT and RT or UT prior to fitting to the base metal.

Comments: Project requirement, AWS-D1.5 section 3.13.2.

h. Surface of the steel backing and the faying surface of the base metal shall be cleaned to bright metal before fitting the steel backing.

Comments: Contractor means and method. The surface exposed in the groove must be bright metal, but not the faying surface.

i. The maximum gap between the steel backing and the base metal at the weld root shall be 2mm.

Comments: Project requirements, AWS section 3.13.5

j. Faying surface of the base metal shall be cleaned to bright metal before fitting the ceramic backing.

Comments: Contractor means and methods. Roughly prepped by grinding, not necessarily bright metal on the ceramic side of the joint

k. Ceramic backing shall be dry, not damaged and free from any contaminates.

Comments: Contractor means and methods. ABFJV would consider this contract.

l. Weld joints that have steel backing which is not removed shall require the backing to be seal welded in the weld joint using SMAW electrodes if there is any evidence that the root weld pass has porosity or other weld defects caused by the weld melting into the back-up bar faying surface.

Comments: Contractor means and methods. No major welding where the backing is left in place on the OBG. If the backing were left in place, this requirement was not complied with across the board. If ZPMC chose to weld the whole joint with SMAW they would adhere to this requirement. If the joint was to be welded with FCAW, then the root was welded with FCAW not SMAW as stated above if backing was left in place.

3. Preparation for Welding.

a. For SMAW and FCAW welding processes the maximum diffusible hydrogen electrode permitted to be used is H4.

Comments: Contractor means and methods. SMAW is H4, FCAW was not H4

b. For SAW welding process the maximum diffusible hydrogen electrode-flux combination permitted to be used is H8.

Comments: Contractor means and methods. Yes

c. All welding shall be strictly controlled by the Lead CWI.

Comments: Contractor means and methods. Yes Note: This is a contract requirement when welding Fracture Critical (SPCM)

d. SMAW (E7018-H4) electrodes shall be received in hermetically sealed containers. Handling and storage of the electrodes shall be as described in the AWS D1.5, Clause 12.6.5.

Comments: Project requirements.

e. When a container of SMAW electrodes is first opened, the electrodes will be moved to a rod holding oven and allowed to heat at 120°C for 4 hours prior to use on the structure.

Comments: Contractor means and methods. The AWS D1.5 section 4.5.2 requirements amended to include baking time to SMAW electrode. Yes, all SMAW are placed in holding oven and later distributed into heated rod cans for use in the workshop or outside.

f. FCAW electrodes shall be received in moisture resistant packages that are undamaged. These packages shall remain effectively sealed against moisture until the electrode is required for use.

Comments: Project requirements, AWS D1.5 section 4.1.3 and 12.6.7.2.

g. FCAW electrode storage and handling shall be as described in AWS D1.5, clause 12.6.7.

Comments: Project requirements.

h. FCAW electrodes not in use for more than 4 hours shall be covered and returned to the filler metal storage area and kept warm and dry until further use.

Comments: Contractor means and methods. *Yes, however there have been cases where ABFJV have found some not in use in the workshop, but all in all, most of the time this is complied with.*

FCAW electrodes not consumed within 24 hours of accumulated exposure shall not be used on this project.

Comments: Contractor means and methods. *Yes*

i. SAW electrodes and fluxes shall be handled and stored as described in AWS D1.5, Clause 12.6.6.

Comments: Project requirements.

j. Preheating using electric strip heaters to provide a continual preheat before and during welding are preferred.

Comments: Contractor means and methods. *Yes, flame heat is used at times, but most welds are using electric resistance heat pads*

k. Alternatively, preheating using gas preheating torches shall be applied to the weld joint and surrounding area in such a way that the entire area to be welded and all adjacent material out to a distance of 75mm in any direction is heated to the value shown in AWS D1.5, clause 12.14 (Table 12.3 or Table 12.4 as appropriate). Preheat temperature is always stated as a minimum value.

Comments: Project requirements, AWS D1.5 section 4.2.7. *Yes*

l. Higher preheat values may be required if the joint has a high degree of restraint.

Comments: Project requirements, AWS D1.5 section 4.2. *Yes*

m. Preheat shall be applied in such a manner to provide a minimum temperature in the area of the weld of 165°C at all times until the weld joint is post weld thermal treated. (This includes applying preheat for CJP welds made from both sides and backgouged.)

Comments: Contractor means and methods. *Only happened on the transverse seams OBG segment to segment welds in trial assembly, Floor Beam Flange to Deck Plate Diaphragm and Longitudinal diaphragm to bottom plate only if the weld was cut out for fit-up adjustments in trial assembly*

Preheat temperatures to be checked by "Tempilstik: crayon or calibrated digital thermometer.

Comments: Contractor means and methods. *Yes*

4. Welding.

a. All welding shall be performed in accordance with an approved WPS and as amended by this procedure.

Comments: Project requirements.

b. All welding shall be done by AWS D1.5 Code Certified Welders in accordance with the welding process and position required to make the weld.

Comments: Project requirements.

c. The CWI shall verify that the welder understands that all starts and stops are to be ground before an arc is struck on them to remove weld craters and provide a means to tie the next weld pass into the end of the weld.

Comments: Contractor means and methods. *Not all starts and stops are ground. To answer the question, the CWI understands, however, the CWI does not and cannot observe each and every weld pass.*

d. Before welding over previously deposited metal, all slag shall be removed and the weld and adjacent base metal shall be brushed clean.

Comments: Project requirements, AWS D1.5 section 3.11.1.

e. Preheat shall be maintained in accordance with Section 3 k~ 3 of this procedure.

Comments: Contractor means and methods. *Yes*

f. All welding is to be with stringer beads except that vertical welding may utilize a weave limited to 20mm maximum width.

Comments: Project requirements, AWS D1.5 section 3.2.2.2.

g. The cover pass for vertical welds may weave the full width of the joint provided no slag is trapped between passes.

Comments: Contractor means and methods. Yes, at time.

Welding groove faces exceeding 15mm in width shall be filled using the split layer technique.

Comments: Contractor means and methods. *The recommendation reduced the requirement of AWS D1.5 section 4.14.5 by 1 mm for FCAW process.* *This one contradicts the g. above…....* *The answer is yes*

h. Where practical starting or stopping of the welding arc at the ends of the weld joint shall be done on run-on / off tabs.

Comments: Project requirement, AWS D1.5 section 3.12.1.

i. For welds longer than 10m in length, welds shall be divided into approximately equal segments so that individual segments do not exceed 10m in length. Each weld segment will be considered as a separate weld for purposes of applying preheat and post weld heating. For the top deck panel the weld shall be divided in to three equal lengths and sequence-welded so that the entire weld is not preheated or post weld heated at one time.

Comments: Contractor means and methods. Yes

j. Groove welds specified to be welded using a block sequence are to employ cascading at the end for tie-in. Such ends are to be scarfed and ground to sound metal to remove porosity, valleys or slag. The cascade shall be at an angle between 30° and 45°.

Comments: Contractor means and methods. AWS D1.5 provide such recommendations however the implementation is based on the fabricator preference to minimize distortion. Yes

k. All cascaded ends shall be 100% VT and MT inspected after grinding and before welding is begun on adjacent increments.

Comments: Contractor means and methods. No, this did not happen. However, there were not many cascaded type welds that I recall on the OBG. If there were it did not happen.

Weld beads that are convex to a degree that their intersection to adjacent parallel beads or joint faces result in vee-shaped indentations or valleys shall be ground and opened so that the weld will not trap slag or prevent proper fusion when the next pass is made.

Comments: Project requirement, AWS D1.5 section 4.14.6. At the welders discretion.

Postweld Thermal Treatment.

a. After welding is completed but before the temperature falls below that of the preheat temperature, post heat shall be applied to maintain the temperature in the area of the weld at 165^0C - 225°C.

Comments: Contractor means and methods. No, not all the time. It was only employed on the OBG transverse seam. These are large welds with relatively thin material that will cool below the pre-heat temperature before you can set up the PWHT. Especially, for example when you weld the 27 meter long deck weld and the requirement in 4i above is telling us to make separate welds. Basically once the welding was complete, ZPMC set up the PWHT. It was a best effort.

b. Post weld heating shall be maintained for a minimum of 1.5 hours for material base metal thickness of 25mm or less.

Comments: Contractor means and methods. *Yes*

c. For material thickness over 25mm, post heating times will be increased by 1/2 hour for each increment of 12 mm or fraction thereof.

Comments: Contractor means and methods. *Yes*

d. After the post weld heating time has been reached the repair shall be cooled by removing the heating source and leaving the blankets in place.

Comments: Contractor means and methods. *No blankets, they left the heating source in place. Just turn off the power to the electrical heat resistance pads.*

5. Non Destructive Testing.

a. All back gouged groove welds are to have their gouged areas ground to bright metal and inspected 100% by VT and MT examination before welding may begin from the second side.

Comments: Contractor means and methods. *No, only happened occasionally, most of the time it was CT performing the MT.* *However, ABFJV are doing this now on lift 13 and 14*

b. All cascaded ends shall receive 100% VT and MT inspection after grinding.

Comments: Contractor means and methods. *No*

c. Final RT, UT, MT and Visual inspections shall only commence when at least 48 hours have passed after the post weld thermal treatment weld area has cooled to ambient temperature.

Comments: Contractor means and methods. *Yes*

d. Final RT, UT, MT and Visual inspections shall be conducted inline with the contract requirements as specified in Caltrans Special Provisions and CCO-22.

Comments: project requirements. *Yes*

e. In addition to ZPMC – UT procedure the weld area shall also be UT Inspected per the Transverse Segment Assembly Splice Ultrasonic Testing Procedure.

Comments: Contractor means and methods. *Yes*

f. All inspection activities shall be documented which includes backgouge inspections.

Comments: Project requirements. ABFJV have not formally documented on MT reports as this inspection was for information only. But ABFJV informally documented and would be able to produce reports if needed.

g. All welding parameters shall be verified and recorded.

Comments: Project requirements.

h. ZPMC shall document and provide results of all inspections conducted.
   i. VT of excavation and 25mm either side of the weld joint axis.
   ii. MT of excavation and 25mm either side of the weld joint axis.
   iii. Interpass cleaning.
   iv. VT of weld area.
   v. MT of weld area.
   vi. UT of weld area.

Comments: Project requirements. Interpass cleaning is not a documented inspection. Every weld pass is not monitored.

APPENDIX K

EXHIBIT 3.1S1 - Supplemental Data to New FCAW Welding Process Statistics Since March 31, 2011 Report

New FCAW Weld Process Weld Tracking - UT with D Scan Results

Item	Lift	Description	Welds	Type of Weld	Length of Weld (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Remarks	Hydrogen Present	Length of Discontinuities (mm)	Reject Rate	Location
							Root	Fill+Cap	Back Gouging	Back Side						
1	12CE	SP-EP Holdback	SP-EP-E11 Holdback Areas @ FS12	CJP	1,600	21-Apr-11	FCAW	FCAW	Yes	SMAW	3	No TLI's recorded.	No	55	3.4%	Trial Assembly
2	12CE	SP-EP Holdback	SP-EP-E16 Holdback Areas @ FS12	CJP	700	21-Apr-11	FCAW	FCAW	Yes	SMAW	2	No TLI's recorded.	No	30	4.3%	Trial Assembly
3	13AE-13BE	BP to SP-E13 Holdback	SEG3007AC-012, SEG3009A-008	CJP	1,950	08-May-11	FCAW	FCAW	Yes	SMAW	4	4 TLI's recorded. Investigation of 4 TLI's revealed 1 slag inclusion and 3 porosities.	No	40	2.1%	Bay 14
4	13AE-13BE	BP to SP-E14 Holdback	SEG3007AC-004, SEG3009A-001	CJP	1,350	08-May-11	FCAW	FCAW	Yes	SMAW	1	No TLI's recorded.	No	8	0.6%	Bay 14
5	13AE-13BE	DP to EP-E5 Holdback	SEG3007AB-095, CA3013-001	CJP	1,300	11-May-11	FCAW	FCAW	Yes	SMAW	1	No TLI's recorded.	No	20	1.5%	Bay 14
6	13AE-13BE	SP to EP-E16 Holdback	SEG3007AB-024, CA3013-004	CJP	1,050	14-May-11	FCAW	FCAW	Yes	SMAW	3	No TLI's recorded.	No	120	11.4%	Bay 14
7	13AE-13BE	DP-A1, A10	OBE13-002	CJP	26,433	11-May-11	FCAW	FCAW	Yes	SMAW	14	4 TLI's recorded. Investigation of 4 TLI's revealed 2 porosity, 1 slag inclusion and 1 found nothing.	No	280	1.1%	Bay 14
8	13AE-13BE	BP-D14+D6+D13	OBE13B-001, 002, 003	CJP	17,254	12-May-11	FCAW	FCAW	Yes	SMAW	43	17 TLI's recorded. Investigation of 17 TLI's revealed 9 porosities and 8 slag inclusions.	No	924	5.4%	Bay 14
9	13AE-13BE	SP-C4-5	OBE13E-003	CJP	6,309	11-May-11	FCAW	FCAW	Yes	SMAW	7	No TLI's recorded.	No	448	7.1%	Bay 14
10	13AE-13BE	SP-E7-8	OBE13D-004, 003	CJP	7,448	08-May-11	FCAW	FCAW	Yes	SMAW	8	5 TLI's recorded. Investigation of 5 TLI's revealed 1 slag inclusion, 2 porosity and 2 nothing.	No	130	1.7%	Bay 14
11	13AE-13BE	EP-F9	OBE13-001	CJP	2,628	07-May-11	FCAW	FCAW	Yes	SMAW	6	No TLI's recorded.	No	170	6.5%	Bay 14
12	13AE-13BE	KP	OBE13AD-004, 005	CJP	4,234	15-May-11	FCAW	FCAW	Yes	SMAW	11	1 TLI recorded. Investigation of 1 TLI revealed slag inclusion.	No	305	7.2%	Bay 14
13	13AE-13BE	VP	OBE13AD-001	CJP	2,194	18-May-11	FCAW	FCAW	Yes	SMAW	6	No TLI's recorded.	No	170	7.7%	Bay 14
14	13BE-13CE	DP-A1, A10	OBE13A-009	CJP	19,945	20-Feb-11	FCAW	SAW	No	N/A	17	9 TLI's recorded. Investigation of 9 TLI's revealed 2 dog plate areas (deficiencies corrected), 6 nothing found, 1 slag inclusion.	No	428	2.1%	Bay 14

1) TLI - Transverse Linear Indication.
2) Investigations are peformed during excavations on selected TLI's. All rejectable discontinuities, whether investigated or not, are repaired.
3) For UT of welds which are not scanned with "Pattern D" please refer to a separate tracking sheet.

EXHIBIT 3.1S1 - Supplemental Data to New FCAW Welding Process Statistics Since March 31, 2011 Report

New FCAW Weld Process Weld Tracking - UT with D Scan Results

Item	Lift	Description	Welds	Type of Weld	Length of Weld (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Remarks	Hydrogen Present	Length of Discontinuities (mm)	Reject Rate	Location
							Root	Fill+Cap	Back Gouging	Back Side						
15	13BE-13CE	E7 Holdback	OBE13C-003 Holdback	CJP	300	22-Feb-11	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
16	13BE-13CE	E8	OBE13C-003, 004	CJP	2,300	22-Feb-11	FCAW	FCAW	Yes	SMAW	3	1 TLI recorded. Investigation of 1 TLI found nothing.	No	80	3.5%	Bay 14
17	13BE-13CE	F9	OBE13A-008	CJP	2,625	17-Feb-11	FCAW	FCAW	Yes	FCAW	8	2 TLI's recorded. Investigation of 2 TLI's revealed 1 nothing and 1 slag inclusion.	No	245	9.3%	Bay 14
18	13BE-13CE	SP-EP-E16 Holdbacks	CA3013A-006, CA3014A-101	CJP	300	26-Feb-11	FCAW	FCAW	Yes	SMAW	1	1 TLI recorded. Investigation found nothing.	No	10	3.3%	Bay 14
19	13CE	BP-SP-E14 Holdback @ FS13	SEG3011A-003	CJP	550	25-May-11	FCAW	FCAW	Yes	SMAW	2	1 TLI recorded. Investigation revealed porosity.	No	35	6.4%	Bay 14
20	13AW	SP-EP-W11 (C4-B3)	SEG3013AA-112, 113	CJP	3,047	05-Mar-11	FCAW	FCAW	Yes	SMAW	1	No TLI's recorded.	No	35	1.1%	Bay 14
21	13AW	DP3117A+DP3116A	SEG3013-012	CJP	14,098	07-Apr-11	FCAW	SAW	No	N/A	11	No TLI's recorded.	No	370	2.6%	Bay 14
22	13AW	DP3120A+DP3119A	SEG3013-009	CJP	14,097	14-Mar-11	FCAW	SAW	No	N/A	9	No TLI's recorded.	No	210	1.5%	Bay 14
23	13AW	DP3123A+DP3122A	SEG3013-006	CJP	14,097	05-Apr-11	FCAW	SAW	No	N/A	6	No TLI's recorded.	No	200	1.4%	Bay 14
24	13AW	DP3125A+DP3124A	SEG3013-004	CJP	14,097	10-Apr-11	FCAW	SAW	No	N/A	22	No TLI's recorded.	No	935	6.6%	Bay 14
25	13AW	SP to EP-W19 (C4+H15)+G17	AH3001-001, 002	CJP	12,650	24-Mar-11	FCAW	FCAW	Yes	SMAW	2	No TLI's recorded.	No	50	0.4%	Bay 14
26	13AW	SP to SP-W19 (C4+H15)	AH3001-003	CJP	12,770	23-Dec-10	FCAW	FCAW	Yes	SMAW	16	No TLI's recorded.	No	500	3.9%	Bay 14
27	13AW-13BW	DP-A1, A2, A10	OBW13-001	CJP	26,406	14-May-11	FCAW	FCAW	Yes	SMAW	30	No TLI's recorded.	No	260	1.0%	Bay 14
28	13AW-13BW	BP-D14+D6+D13	OBW13B-001, 003, 005	CJP	17,254	12-May-11	FCAW	FCAW	Yes	SMAW	30	13 TLI's recorded. Investigation of 3 TLIs found nothing. No investigation of other 10 TLIs.	No	1545	9.0%	Bay 14
29	13AW-13BW	SP-C4-5	OBW13E-003	CJP	6,681	13-May-11	FCAW	FCAW	Yes	SMAW	13	4 TLI's recorded. Investigation of 4 TLIs revealed 1 porosity and 3 found nothing.	No	830	12.4%	Bay 14

1) TLI - Transverse Linear Indication.
2) Investigations are peformed during excavations on selected TLI's. All rejectable discontinuities, whether investigated or not, are repaired.
3) For UT of welds which are not scanned with "Pattern D" please refer to a separate tracking sheet.

EXHIBIT 3.1S1 - Supplemental Data to New FCAW Welding Process Statistics Since March 31, 2011 Report

New FCAW Weld Process Weld Tracking - UT with D Scan Results

Item	Lift	Description	Welds	Type of Weld	Length of Weld (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Remarks	Hydrogen Present	Length of Discontinuities (mm)	Reject Rate	Location
							Root	Fill+Cap	Back Gouging	Back Side						
30	13AW-13BW	SP-E7-8	OBW13D-003, 004	CJP	7,448	12-May-11	FCAW	FCAW	Yes	SMAW	6	No TLI's recorded.	No	120	1.6%	Bay 14
31	13AW-13BW	EP-F9	OBW13-002	CJP	2,628	12-May-11	FCAW	FCAW	Yes	SMAW	4	3 TLI's recorded. Investigation of 3 TLIs revealed 2 slag inclusion and 1 porosity.	No	50	1.9%	Bay 14
32	13AW-13BW	VP	OBW13AD-001	CJP	1,989	11-May-11	FCAW	FCAW	Yes	SMAW	5	2 TLI's recorded. No investigation performed.		95	4.8%	Bay 14
33	13AW-13BW	KP+DP Stiff.	OBW13AD-005, 004	CJP	4,108	13-May-11	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Trial Assembly
34	13BW	SP-SP-W17 (I16+H15)	AH3002-027	CJP	5,600	24-Mar-11	FCAW	FCAW	Yes	SMAW	6	No TLI's recorded.	No	200	3.6%	Bay 14
35	13BW	SP-EP-W19 (G17+I16)	AH3002-025	CJP	5,500	24-Mar-11	FCAW	FCAW	Yes	SMAW	5	No TLI's recorded.	No	150	2.7%	Bay 14
36	13BW	SP-EP-W19 (G17+H15)	AH3002-024	CJP	2,123	24-Mar-11	FCAW	FCAW	Yes	SMAW	2	1 TLI recorded. Investigation found nothing.	No	28	1.3%	Bay 14
37	13BW	DP3133A+DP3132A	SEG3014-006	CJP	9,940	21-Mar-11	FCAW	SAW	No	N/A	5	No TLI's recorded.	No	90	0.9%	Bay 14
38	13BW	DP3130A+DP3129A	SEG3014-009	CJP	9,845	26-Jan-11	FCAW	SAW	No	N/A	2	No TLI's recorded.	No	70	0.7%	Bay 14
39	13BW	DP3136A+DP3135A	SEG3014-003	CJP	10,060	17-Mar-11	FCAW	SAW	No	N/A	5	No TLI's recorded.	No	115	1.1%	Bay 14
40	13BW	DP3138A+DP3137A	SEG3014-001	CJP	5,238	10-Apr-11	FCAW	SAW	No	N/A	1	No TLI's recorded.	No	30	0.6%	Bay 14
41	13BW-13CW	SP-E8	OBW13C-006	CJP	2,300	26-Mar-11	FCAW	FCAW	Yes	SMAW	1	No TLI's recorded.	No	40	1.7%	Bay 14
42	13BW-13CW	DP-A1, A10	OBW13A-016	CJP	19,940	18-Mar-11	FCAW	SAW	No	N/A	16	3 TLI's recorded. Investigation of 3 TLI's revealed 1 porosity and 2 found nothing.	No	445	2.2%	Bay 14
43	13CW	DP3145A+DP3146A	SEG3015-004	CJP	12,447	22-Mar-11	FCAW	SAW	No	N/A	3	No TLI's recorded.	No	80	0.6%	Bay 14
44	13CW	DP3143A+DP3142A	SEG3015-007	CJP	12,368	25-Jan-11	FCAW	SAW	No	N/A	3	No TLI's recorded.	No	160	1.3%	Bay 14
45	13CW	DP3149A+DP3148A	SEG3015-001	CJP	12,547	17-Mar-11	FCAW	SAW	No	N/A	5	No TLI's recorded.	No	120	1.0%	Bay 14
46	13CW	SP-EP-W19 (I16+G17) SP3115A+EP3026A	AH3003-001	CJP	10,250	23-Mar-11	FCAW	FCAW	Yes	SMAW	10	No TLI's recorded.	No	590	5.8%	Bay 14
47	13CW	SP-SP-W17 (H15+I16) SP3113A+SP3115A	AH3003-002	CJP	10,351	23-Mar-11	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
48	13CW	BP-SP-W13 Holdback @ FS13	SEG3015A-008	CJP	800	22-May-11	FCAW	FCAW	Yes	SMAW	1	No TLI's recorded.	No	20	2.5%	Bay 14
49	13CW	BP-SP-W14 Holdback @ FS13	SEG3015A-012	CJP	910	22-May-11	FCAW	FCAW	Yes	SMAW	3	No TLI's recorded.	No	45	4.9%	Bay 14

1) TLI - Transverse Linear Indication.
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3) For UT of welds which are not scanned with "Pattern D" please refer to a separate tracking sheet.

EXHIBIT 3.1S1 - Supplemental Data to New FCAW Welding Process Statistics Since March 31, 2011 Report

New FCAW Weld Process Weld Tracking - UT with D Scan Results

Item	Lift	Description	Welds	Type of Weld	Length of Weld (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Remarks	Hydrogen Present	Length of Discontinuities (mm)	Reject Rate	Location
							Root	Fill+Cap	Back Gouging	Back Side						
50	13CW	SP-EP-W16 Holdback @ FS13 (E8+F9)	CA3016A-102	CJP	550	30-May-11	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Trial Assembly
51	14E	DP-EP-E5 Holdback @ FS13	SEG3019*-012	CJP	600	25-May-11	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Trial Assembly
52	14E	SP-EP-E16 (E8-F9) (SP3116A-EP3027A)	SEG3019AL-294 Holdback Area @ FS13	CJP	500	26-May-11	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Trial Assembly
53	14E	SP-EP-E16 (M7-L18) (SP3116F-EP3027E)	SEG3019AZ-017	CJP	3,502	09-Mar-11	FCAW	FCAW	Yes	SMAW	11	1 TLI recorded. Investigation revealed porosity.	No	315	9.0%	Bay 14
54	14E	BP-SP-E13 Holdback @ FS13	SEG3019A-009	CJP	550	25-May-11	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Trial Assembly
55	14E	SA3338A+SA3338C	SEG3019AV-049	CJP	2,414	03-Apr-11	FCAW	FCAW	No	N/A	1	No TLI's recorded.	No	20	0.8%	Bay 14
56	14E	FB3291A+SA8008A	SEG3019B-001, SEG3019C-001	CJP	7,918	04-Apr-11	FCAW	FCAW	Yes	SMAW	5	1 TLI recorded. Investigation revealed slag inclusion.	No	135	1.7%	Bay 14
57	14E	FB3290A+BP3082A	SEG3019C-105	CJP	227	04-Apr-11	FCAW	FCAW	Yes	FCAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
58	14W	DP3168A+DP3169A	SEG3020*-002	CJP	18,255	18-May-11	FCAW	SAW	No	N/A	13	No TLI's recorded.	No	515	2.8%	Bay 14
59	14W	DP3171A+DP3172A	SEG3020*-005	CJP	18,115	18-May-11	FCAW	SAW	No	N/A	8	No TLI's recorded.	No	210	1.2%	Bay 14
60	14W	DP3174A+DP3175A	SEG3020*-008	CJP	17,939	19-May-11	FCAW	SAW	No	N/A	8	No TLI's recorded.	No	190	1.1%	Bay 14
61	14W	DP3177A+DP3183A	SEG3020*-011	CJP	17,800	19-May-11	FCAW	SAW	No	N/A	17	No TLI's recorded.	No	1080	6.1%	Bay 14
62	14W	SP-EP-W16 (M7+F9) SP3140E+EP3030D	SEG3020AZ-019	CJP	5,235	15-May-11	FCAW	FCAW	Yes	SMAW	7	5 TLI's recorded. Investigation of 5 TLI's revealed 3 with porosity and 2 found nothing.	No	93	1.8%	Bay 14
63	14W	DP to EP-W5 Holdbacks	SEG3020AG-001	CJP	900	27-May-11	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Trial Assembly
64	14W	DP to EP-W20	SEG3020*-012, 021	CJP	12,700	11-Apr-11	FCAW	FCAW	Yes	SMAW	39	3 TLI's recorded. Investigation of 3 TLI's revealed 1 slag and 2 porosities.	No	1810	14.3%	Bay 14
65	14W	DP to EP-W20	SEG3020*-013	CJP	5,743	17-May-11	FCAW	FCAW	Yes	SMAW	11	No TLI's recorded.	No	430	7.5%	Bay 14
66	14W	DP to EP-W20	SEG3020*-014	CJP	1,346	17-May-11	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
67	14W	BP to SP-W3	SEG3020A*-014	CJP	3,719	20-Dec-10	FCAW	FCAW	Yes	SMAW	2	No TLI's recorded.	No	60	1.6%	Bay 14
68	14W	BP to SP-W13	SEG3020AY-014, 015, 016	CJP	11,032	20-Dec-10	FCAW	FCAW	Yes	SMAW	4	No TLI's recorded.	No	102	0.9%	Bay 14
69	14W	BP to SP-W13 Holdback @ FS13	SEG3020AX-004	CJP	1,650	22-May-11	FCAW	FCAW	Yes	SMAW	7	2 TLI's recorded. Invertigation of 2 TLI's revealed 1 porosity and 1 slag.	No	195	11.8%	Bay 14

1) TLI - Transverse Linear Indication.
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3) For UT of welds which are not scanned with "Pattern D" please refer to a separate tracking sheet.

EXHIBIT 3.1S1 - Supplemental Data to New FCAW Welding Process Statistics Since March 31, 2011 Report

New FCAW Weld Process Weld Tracking - UT with D Scan Results

Item	Lift	Description	Welds	Type of Weld	Length of Weld (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Remarks	Hydrogen Present	Length of Discontinuities (mm)	Reject Rate	Location
							Root	Fill+Cap	Back Gouging	Back Side						
70	14W	BP to SP-W14	SEG3020AL-004, 007	CJP	9,956	31-Dec-10	FCAW	FCAW	Yes	SMAW	1	No TLI's recorded.	No	20	0.2%	Bay 14
71	14W	BP to SP-W14	SEG3020AZ-001	CJP	5,839	22-Dec-10	FCAW	FCAW	Yes	SMAW	7	No TLI's recorded.	No	180	3.1%	Bay 14
72	14W	BP to SP-W14 Holdback @ FS13	SEG3020AL-001	CJP	1,600	22-May-11	FCAW	FCAW	Yes	SMAW	6	No TLI's recorded.	No	220	13.8%	Bay 14
73	14W	BP to SP-W4	SEG3020AZ-002	CJP	3,685	22-Dec-10	FCAW	FCAW	Yes	SMAW	9	No TLI's recorded.	No	365	9.9%	Bay 14
74	14W	SP-SP-W17 (I16+H5)	SEG3010AW-089	CJP	15,844	19-Mar-11	FCAW	FCAW	Yes	SMAW	16	No TLI's recorded.	No	605	3.8%	Bay 14
75	14W	SP-SP-W18 (I16+N5)	SEG3010AW-092	CJP	6,935	16-Mar-11	FCAW	FCAW	Yes	SMAW	2	No TLI's recorded.	No	70	1.0%	Bay 14
76	14W	SP-EP-W19 (I16+G17)	SEG3020AH-002~004	CJP	16,549	22-May-11	FCAW	FCAW	Yes	SMAW	23	1 TLI's recorded. Investigation revealed porosity.	No	530	3.2%	Bay 14
77	14W	SP-EP-W16 (M7+L18) (SP3140F+EP3030E)	SEG3020AZ-020	CJP	3,572	19-May-11	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Trial Assembly
78	14W	SP-EP-W16 Holdback @ FS13	SEG3020AG-063	CJP	700	30-May-11	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Trial Assembly
79	14W	FB3348A+ SP3140F/41F/42F/43C (FB-M7)	SEG3020C-056	CJP	10,263	17-Mar-11	FCAW	FCAW	Yes	FCAW	9	6 TLI's recorded. Investigation of 6 TLI's revealed 6 porosities.	No	120	1.2%	Bay 14
80	14W	FB3345A+SP3138A	SEG3020B-054	CJP	9,218	21-Mar-11	FCAW	FCAW	Yes	FCAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
81	14W	FB3347A+SA8509A	SEG3020B-055, SEG3020C-057	CJP	7,618	10-May-11	FCAW	FCAW	Yes	FCAW	5	5 TLI's recorded. Investigation of 5 TLI's revealed 5 porosities.	No	450	5.9%	Bay 14
82	14W	FB3350A+FB3345A (PP128.7-W3)	SEG3020B-053	CJP	4,833	26-Mar-11	FCAW	FCAW	Yes	FCAW	1	1 TLI recorded. Investigation revealed porosity.	No	10	0.2%	Bay 14
83	14W	SA3416A+SA3416C Blockout PL Butt Weld	SEG3020AV-007	CJP	2,414	29-Apr-11	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Trial Assembly
84	14W	EP3029A+VP3018A (G17+VP)	SEG3020AH-001	CJP	1,200	31-May-11	FCAW	FCAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Trial Assembly
85	14W	AP3016A+AP3017A	SEG3020AQ-030	CJP	9,980	17-Apr-11	FCAW	SAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
86	14W	AP3020A+AP3021A	SEG3020AP-002	CJP	9,980	5-Mar-11	FCAW	SAW	Yes	SMAW	0	No TLI's recorded.	No	0	0.0%	Bay 14
				Total	632,940									18,606		

Note:

1) TLI - Transverse Linear Indication.
2) Investigations are peformed during excavations on selected TLI's. All rejectable discontinuities, whether investigated or not, are repaired.
3) For UT of welds which are not scanned with "Pattern D" please refer to a separate tracking sheet.
4) Average Value of Reject Rate as reported in Exhibit 3.1S1:

Reject Rate = Total Length of Discontinuities / Total Length of Weld
Reject Rate = 18,606 / 632,940
Reject Rate = 2.94%

EXHIBIT 3.1S1 - Supplemental Data to New FCAW Welding Process Statistics Since March 31, 2011 Report

Chart for D Scan Results

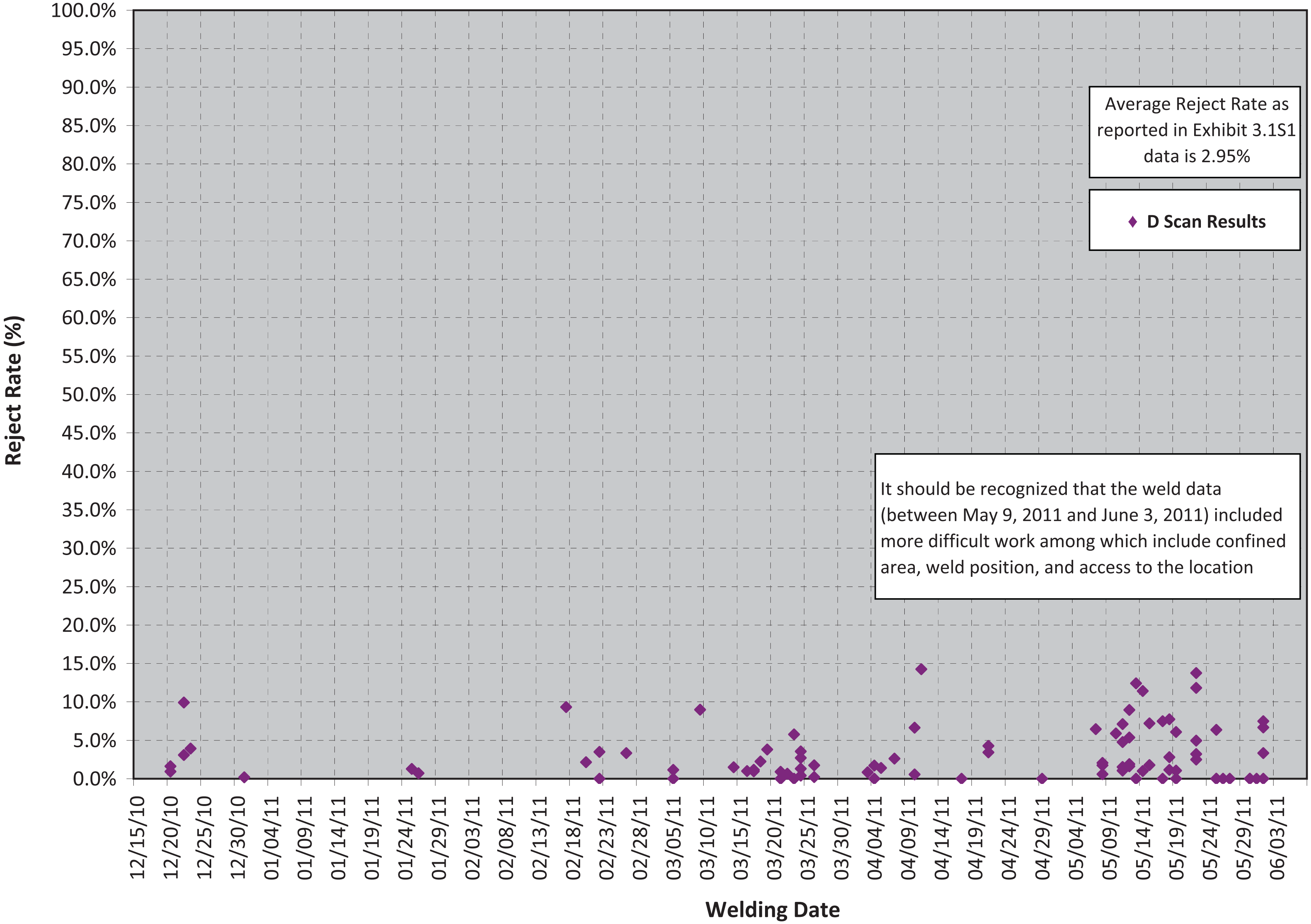


EXHIBIT 3.1S1 - Supplemental Data to New FCAW Welding Process Statistics Since March 31, 2011 Report

New FCAW Weld Process Weld Tracking - Lift 13 & 14 CJP Welds in Bay 14 - UT with E Scan Results

Lift	Type of Weld	Welding Position	Welding Complete Date	Length of Weld that is UT Tested (mm)	Number of Rejectable Discontinuities	Length of Discontinuities (mm)	Reject Rate (2)	Location
Lift 13 & 14	CJP	1G	28/03-03/04/11	7,862	6	1,060	13.48%	Bay 14
Lift 13 & 14	CJP	1G	04/04-10/04/11	64,171	78	2,840	4.43%	Bay 14
Lift 13 & 14	CJP	1G	11/04-17/04/11	17,147	6	190	1.11%	Bay 14
Lift 13 & 14	CJP	1G	18/04-24/04/11	0	0	0		Bay 14
Lift 13 & 14	CJP	1G	25/04-01/05/11	7,618	12	940	12.34%	Bay 14
Lift 13 & 14	CJP	1G	02/05-08/05/11	881	0	0	0.00%	Bay 14
Lift 13 & 14	CJP	1G	09/05-15/05/11	850	3	150	17.65%	Bay 14
Lift 13 & 14	CJP	1G	16/05-22/05/11	90,303	61	2,738	3.03%	Bay 14
Lift 13 & 14	CJP	1G	23/05-29/05/11	0	0	0		Bay 14
Lift 13 & 14	CJP	1G	30/05-05/06/11	0	0	0		Bay 14
Lift 13 & 14	CJP	1G	06/06-12/06/11	0	0	0		Bay 14
Lift 13 & 14	CJP	1G	13/06-19/06/11	0	0	0		Bay 14
Lift 13 & 14	CJP	1G	20/06-26/06/11	0	0	0		Bay 14
			Total	188,832		7,918		

Note:

1) All rejectable discontinuities, whether investigated or not, are repaired.

2) Average Value of Reject Rate as reported in Exhibit 3.1S1

Reject Rate = Total Length of Discontinuities / Total Length of Weld

Reject Rate = 7,918 / 188,832

Reject Rate = 4.19%

EXHIBIT 3.1S1 - Supplemental Data to New FCAW Welding Process Statistics Since March 31, 2011 Report

New FCAW Weld Process Weld Tracking - Lift 13 & 14 CJP Welds in Bay 14 - UT with E Scan Results

Lift	Type of Weld	Welding Position	Welding Complete Date	Length of Weld that is UT Tested (mm)	Number of Rejectable Discontinuities	Length of Discontinuities (mm)	Reject Rate (2)	Location
Lift 13 & 14	CJP	2G	28/03-03/04/11	0	0	0		Bay 14
Lift 13 & 14	CJP	2G	04/04-10/04/11	8,145	5	135	1.66%	Bay 14
Lift 13 & 14	CJP	2G	11/04-17/04/11	53,756	78	2,730	5.08%	Bay 14
Lift 13 & 14	CJP	2G	18/04-24/04/11	12,579	9	350	2.78%	Bay 14
Lift 13 & 14	CJP	2G	25/04-01/05/11	0	0	0		Bay 14
Lift 13 & 14	CJP	2G	02/05-08/05/11	8,696	19	3,000	34.50%	Bay 14
Lift 13 & 14	CJP	2G	09/05-15/05/11	14,818	28	563	3.80%	Bay 14
Lift 13 & 14	CJP	2G	16/05-22/05/11	34,439	55	1,910	5.55%	Bay 14
Lift 13 & 14	CJP	2G	23/05-29/05/11	0	0	0		Bay 14
Lift 13 & 14	CJP	2G	30/05-05/06/11	0	0	0		Bay 14
Lift 13 & 14	CJP	2G	06/06-12/06/11	0	0	0		Bay 14
Lift 13 & 14	CJP	2G	13/06-19/06/11	45	0	0	0.00%	Bay 14
Lift 13 & 14	CJP	2G	20/06-26/06/11	45	0	0	0.00%	Bay 14
			Total	132,522		8,688		

Note:

1) All rejectable discontinuities, whether investigated or not, are repaired.
2) Average Value of Reject Rate as reported in Exhibit 3.1S1

Reject Rate = Total Length of Discontinuities / Total Length of Weld
Reject Rate = 8,688 / 132,522
Reject Rate = 6.56%

EXHIBIT 3.1S1 - Supplemental Data to New FCAW Welding Process Statistics Since March 31, 2011 Report

New FCAW Weld Process Weld Tracking - Lift 13 & 14 CJP Welds in Bay 14 - UT with E Scan Results

Lift	Type of Weld	Welding Position	Welding Complete Date	Length of Weld that is UT Tested (mm)	Number of Rejectable Discontinuities	Length of Discontinuities (mm)	Reject Rate (2)	Location
Lift 13 & 14	CJP	3G	30/11-5/12/10	20,638	31	1,970	9.55%	Bay 14
Lift 13 & 14	CJP	3G	28/03-03/04/11	18,110	37	1,575	8.70%	Bay 14
Lift 13 & 14	CJP	3G	04/04-10/04/11	8,040	18	800	9.95%	Bay 14
Lift 13 & 14	CJP	3G	11/04-17/04/11	820	0	0	0.00%	Bay 14
Lift 13 & 14	CJP	3G	18/04-24/04/11	4,154	4	120	2.89%	Bay 14
Lift 13 & 14	CJP	3G	25/04-01/05/11	33,388	35	2,750	8.24%	Bay 14
Lift 13 & 14	CJP	3G	02/05-08/05/11	6,200	17	780	12.58%	Bay 14
Lift 13 & 14	CJP	3G	09/05-15/05/11	4,352	8	313	7.19%	Bay 14
Lift 13 & 14	CJP	3G	16/05-22/05/11	11,580	22	960	8.29%	Bay 14
Lift 13 & 14	CJP	3G	23/05-29/05/11	4,080	3	80	1.96%	Bay 14
Lift 13 & 14	CJP	3G	30/05-05/06/11	12,455	8	350	2.81%	Bay 14
Lift 13 & 14	CJP	3G	06/06-12/06/11	0	0	0		Bay 14
Lift 13 & 14	CJP	3G	13/06-19/06/11	15,562	11	400	2.57%	Bay 14
Lift 13 & 14	CJP	3G	20/06-26/06/11	3,562	0	0	0.00%	Bay 14
			Total	142,941		10,098		

Note:

1) All rejectable discontinuities, whether investigated or not, are repaired.

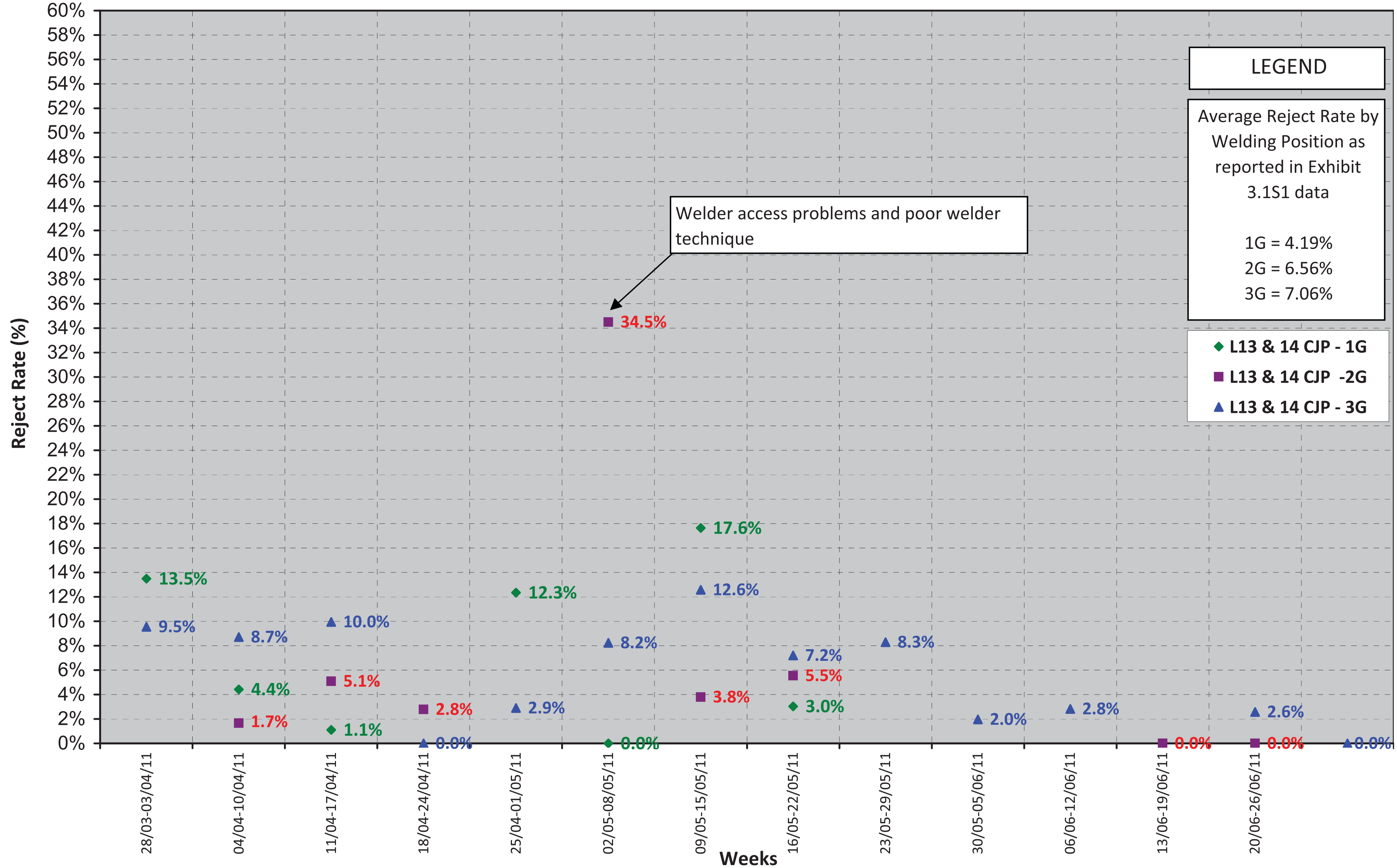
2) Average Value of Reject Rate as reported in Exhibit 3.1S1

Reject Rate = Total Length of Discontinuities / Total Length of Weld

Reject Rate = 10,098 / 142,941

Reject Rate = 7.06%

Chart for UT with E Scan Results of Lift 13 & 14 CJP Welds in Bay 14



New FCAW Weld Process Weld Tracking - Other Welds - UT Results

Lift	Weld I.D.	Type of Weld	Weld Length (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Crack-like Indications after Investigation (each)	Length of Discontinuities (mm)	Reject Rate (2)
					Root	Fill+Cap	Back Gouging	Back Side				
OBE13	3003TR1-001-001	CJP	200	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR1-001-002	CJP	250	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR1-001-003	CJP	250	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR1-001-004	CJP	250	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR1-001-005	CJP	165	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR1-001-008	CJP	800	4/20/2011	FCAW	FCAW	YES	FCAW	1	0	55	6.88%
OBE13	3003TR1-001-011	CJP	250	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR1-001-012	CJP	200	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR1-001-013	CJP	250	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR1-001-014	CJP	165	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR1-001-015	CJP	250	4/20/2011	FCAW	FCAW	YES	FCAW	1	0	10	4.00%
OBE13	3003TR1-001-016	CJP	9492	4/20/2011	FCAW	FCAW	YES	FCAW	4	0	700	7.37%
OBE13	3003TR2-001-017	CJP	200	5/8/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR2-001-018	CJP	250	5/8/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR2-001-019	CJP	250	5/8/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR2-001-020	CJP	250	5/8/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR2-001-021	CJP	165	5/8/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR2-001-024	CJP	800	5/8/2011	FCAW	FCAW	YES	FCAW	1	0	25	3.13%
OBE13	3003TR2-001-025	CJP	9325	5/8/2011	FCAW	FCAW	YES	FCAW	7	0	560	6.01%
OBE13	3003TR2-001-028	CJP	200	5/8/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR2-001-029	CJP	250	5/8/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR2-001-030	CJP	250	5/8/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR2-001-031	CJP	165	5/8/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE13	3003TR2-001-032	CJP	250	5/8/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%

New FCAW Weld Process Weld Tracking - Other Welds - UT Results

Lift	Weld I.D.	Type of Weld	Weld Length (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Crack-like Indications after Investigation (each)	Length of Discontinuities (mm)	Reject Rate (2)
					Root	Fill+Cap	Back Gouging	Back Side				
OBE14	3004TR1-001-001	CJP	200	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE14	3004TR1-001-002	CJP	250	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE14	3004TR1-001-003	CJP	250	4/20/2011	FCAW	FCAW	YES	FCAW	1	0	15	6.00%
OBE14	3004TR1-001-004	CJP	250	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE14	3004TR1-001-005	CJP	165	4/20/2011	FCAW	FCAW	YES	FCAW	1	0	15	9.09%
OBE14	3004TR1-001-008	CJP	9986	4/20/2011	FCAW	FCAW	YES	FCAW	12	0	900	9.01%
OBE14	3004TR1-001-009	CJP	800	4/20/2011	FCAW	FCAW	YES	FCAW	1	0	75	9.38%
OBE14	3004TR1-001-012	CJP	250	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE14	3004TR1-001-013	CJP	250	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE14	3004TR1-001-014	CJP	165	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE14	3004TR1-001-015	CJP	250	4/20/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE14	3004TR1-001-016	CJP	200	4/20/2011	FCAW	FCAW	YES	FCAW	1	0	15	7.50%
OBE14	3004TR1-002-001	CJP	200	7/15/2011	FCAW	FCAW	YES	FCAW	1	0	25	12.50%
OBE14	3004TR1-002-002	CJP	250	7/15/2011	FCAW	FCAW	YES	FCAW	1	0	10	4.00%
OBE14	3004TR1-002-003	CJP	250	7/15/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE14	3004TR1-002-004	CJP	250	7/15/2011	FCAW	FCAW	YES	FCAW	1	0	10	4.00%
OBE14	3004TR1-002-005	CJP	165	7/15/2011	FCAW	FCAW	YES	FCAW	1	0	10	6.06%
OBE14	3004TR1-002-008	CJP	9986	7/15/2011	FCAW	FCAW	YES	FCAW	7	0	1565	15.67%
OBE14	3004TR1-002-009	CJP	800	7/15/2011	FCAW	FCAW	YES	FCAW	4	0	400	50.00%
OBE14	3004TR1-002-012	CJP	250	7/15/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE14	3004TR1-002-013	CJP	250	7/15/2011	FCAW	FCAW	YES	FCAW	1	0	25	10.00%
OBE14	3004TR1-002-014	CJP	165	7/15/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE14	3004TR1-002-015	CJP	250	7/15/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBE14	3004TR1-002-016	CJP	200	7/15/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW13	3009TR1-001-001	CJP	200	4/13/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW13	3009TR1-001-002	CJP	250	4/13/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW13	3009TR1-001-003	CJP	250	4/13/2011	FCAW	FCAW	YES	FCAW	1	0	30	12.00%
OBW13	3009TR1-001-004	CJP	250	4/13/2011	FCAW	FCAW	YES	FCAW	3	0	45	18.00%
OBW13	3009TR1-001-005	CJP	165	4/13/2011	FCAW	FCAW	YES	FCAW	1	0	10	6.06%
OBW13	3009TR1-001-008	CJP	800	4/13/2011	FCAW	FCAW	YES	FCAW	1	0	80	10.00%
OBW13	3009TR1-001-009	CJP	10076	4/13/2011	FCAW	FCAW	YES	FCAW	8	0	2100	20.84%
OBW13	3009TR1-001-012	CJP	200	4/13/2011	FCAW	FCAW	YES	FCAW	1	0	10	5.00%
OBW13	3009TR1-001-013	CJP	250	4/13/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW13	3009TR1-001-014	CJP	250	4/13/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW13	3009TR1-001-015	CJP	165	4/13/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW13	3009TR1-001-016	CJP	250	4/13/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%

New FCAW Weld Process Weld Tracking - Other Welds - UT Results

Lift	Weld I.D.	Type of Weld	Weld Length (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Crack-like Indications after Investigation (each)	Length of Discontinuities (mm)	Reject Rate (2)
					Root	Fill+Cap	Back Gouging	Back Side				
OBW13	3009TR2-001-017	CJP	200	5/12/2011	FCAW	FCAW	YES	FCAW	1	0	15	7.50%
OBW13	3009TR2-001-018	CJP	250	5/12/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW13	3009TR2-001-019	CJP	250	5/12/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW13	3009TR2-001-020	CJP	250	5/12/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW13	3009TR2-001-021	CJP	165	5/12/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW13	3009TR2-001-024	CJP	800	5/12/2011	FCAW	FCAW	YES	FCAW	1	0	125	15.63%
OBW13	3009TR2-001-025	CJP	9908	5/12/2011	FCAW	FCAW	YES	FCAW	5	0	780	7.87%
OBW13	3009TR2-001-028	CJP	200	5/12/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW13	3009TR2-001-029	CJP	250	5/12/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW13	3009TR2-001-030	CJP	250	5/12/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW13	3009TR2-001-031	CJP	250	5/12/2011	FCAW	FCAW	YES	FCAW	1	0	35	14.00%
OBW13	3009TR2-001-032	CJP	165	5/12/2011	FCAW	FCAW	YES	FCAW	1	0	10	6.06%
OBW14	3010TR1-001-001	CJP	200	7/24/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW14	3010TR1-001-002	CJP	250	7/24/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW14	3010TR1-001-003	CJP	250	7/24/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW14	3010TR1-001-004	CJP	250	7/24/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW14	3010TR1-001-005	CJP	165	7/24/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW14	3010TR1-001-008	CJP	800	7/24/2011	FCAW	FCAW	YES	FCAW	1	0	65	8.13%
OBW14	3010TR1-001-009	CJP	9986	7/24/2011	FCAW	FCAW	YES	FCAW	6	0	485	4.86%
OBW14	3010TR1-001-012	CJP	200	7/24/2011	FCAW	FCAW	YES	FCAW	1	0	15	7.50%
OBW14	3010TR1-001-013	CJP	250	7/24/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW14	3010TR1-001-014	CJP	250	7/24/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW14	3010TR1-001-015	CJP	165	7/24/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW14	3010TR1-001-016	CJP	250	7/24/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW14	3010TR1-002-001	CJP	200	4/13/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW14	3010TR1-002-002	CJP	250	4/13/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW14	3010TR1-002-003	CJP	250	4/13/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW14	3010TR1-002-004	CJP	250	4/13/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW14	3010TR1-002-005	CJP	165	4/13/2011	FCAW	FCAW	YES	FCAW	1	0	10	6.06%
OBW14	3010TR1-002-008	CJP	800	4/13/2011	FCAW	FCAW	YES	FCAW	1	0	100	12.50%
OBW14	3010TR1-002-009	CJP	9986	4/13/2011	FCAW	FCAW	YES	FCAW	3	0	650	6.51%
OBW14	3010TR1-002-012	CJP	200	4/13/2011	FCAW	FCAW	YES	FCAW	1	0	15	7.50%
OBW14	3010TR1-002-013	CJP	250	4/13/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW14	3010TR1-002-014	CJP	250	4/13/2011	FCAW	FCAW	YES	FCAW	1	0	15	6.00%
OBW14	3010TR1-002-015	CJP	165	4/13/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
OBW14	3010TR1-002-016	CJP	250	4/13/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%

EXHIBIT 3.1S1 - Supplemental Data to New FCAW Welding Process Statistics Since March 31, 2011 Report

New FCAW Weld Process Weld Tracking - Other Welds - UT Results

Lift	Weld I.D.	Type of Weld	Weld Length (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Crack-like Indications after Investigation (each)	Length of Discontinuities (mm)	Reject Rate (2)
					Root	Fill+Cap	Back Gouging	Back Side				
Skyway Traveler Rail	3017TR1-001-001	CJP	200	9/1/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3017TR1-001-002	CJP	200	9/1/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3017TR1-001-004	CJP	250	9/1/2011	FCAW	FCAW	YES	FCAW	1	0	10	4.00%
	3017TR1-001-005	CJP	250	9/1/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3017TR1-001-006	CJP	165	9/1/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3017TR1-001-007	CJP	250	9/1/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3017TR1-001-010	CJP	278	9/1/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3017TR1-001-011	CJP	800	9/1/2011	FCAW	FCAW	YES	FCAW	3	0	125	15.63%
	3017TR1-001-017	CJP	278	9/1/2011	FCAW	FCAW	YES	FCAW	1	0	50	18.02%
	3017TR1-001-018	CJP	19738	9/1/2011	FCAW	FCAW	YES	FCAW	14	0	2500	12.67%
	3017TR2-001-001	CJP	200	9/1/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3017TR2-001-002	CJP	200	9/1/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3017TR2-001-004	CJP	250	9/1/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3017TR2-001-005	CJP	250	9/1/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3017TR2-001-006	CJP	165	9/1/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3017TR2-001-007	CJP	250	9/1/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3017TR2-001-010	CJP	278	9/1/2011	FCAW	FCAW	YES	FCAW	2	0	40	14.41%
	3017TR2-001-011	CJP	800	9/1/2011	FCAW	FCAW	YES	FCAW	1	0	65	8.13%
	3017TR2-001-017	CJP	278	9/1/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3017TR2-001-018	CJP	19629	9/1/2011	FCAW	FCAW	YES	FCAW	16	0	1875	9.55%

EXHIBIT 3.1S1 - Supplemental Data to New FCAW Welding Process Statistics Since March 31, 2011 Report

New FCAW Weld Process Weld Tracking - Other Welds - UT Results

Lift	Weld I.D.	Type of Weld	Weld Length (mm)	Date of Welding Completed	New FCAW Wire Used				Number of Rejectable Discontinuities	Crack-like Indications after Investigation (each)	Length of Discontinuities (mm)	Reject Rate (2)
					Root	Fill+Cap	Back Gouging	Back Side				
Skyway Traveler Rail	3018TR1-001-001	CJP	200	8/19/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3018TR1-001-002	CJP	200	8/19/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3018TR1-001-004	CJP	250	8/19/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3018TR1-001-005	CJP	250	8/19/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3018TR1-001-006	CJP	165	8/19/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3018TR1-001-007	CJP	250	8/19/2011	FCAW	FCAW	YES	FCAW	1	0	10	4.00%
	3018TR1-001-011	CJP	800	8/19/2011	FCAW	FCAW	YES	FCAW	6	0	95	11.88%
	3018TR1-001-012	CJP	181	8/19/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3018TR1-001-017	CJP	278	8/19/2011	FCAW	FCAW	YES	FCAW	1	0	20	7.21%
	3018TR1-001-018	CJP	18765	8/19/2011	FCAW	FCAW	YES	FCAW	1	0	900	4.80%
	3018TR2-001-001	CJP	200	9/4/2011	FCAW	FCAW	YES	FCAW	1	0	15	7.50%
	3018TR2-001-002	CJP	200	9/4/2011	FCAW	FCAW	YES	FCAW	1	0	15	7.50%
	3018TR2-001-004	CJP	250	9/4/2011	FCAW	FCAW	YES	FCAW	1	0	10	4.00%
	3018TR2-001-005	CJP	250	9/4/2011	FCAW	FCAW	YES	FCAW	1	0	25	10.00%
	3018TR2-001-006	CJP	165	9/4/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3018TR2-001-007	CJP	250	9/4/2011	FCAW	FCAW	YES	FCAW	1	0	10	4.00%
	3018TR2-001-011	CJP	800	9/4/2011	FCAW	FCAW	YES	FCAW	3	0	75	9.38%
	3018TR2-001-012	CJP	181	9/4/2011	FCAW	FCAW	YES	FCAW	0	0	0	0.00%
	3018TR2-001-017	CJP	278	9/4/2011	FCAW	FCAW	YES	FCAW	1	0	25	9.01%
	3018TR2-001-018	CJP	18765	9/4/2011	FCAW	FCAW	YES	FCAW	12	0	1125	6.00%
		Total	190,369								16,000	

1) All rejectable discontinuities, whether investigated or not, are repaired.
2) Average Value of Reject Rate as reported in Exhibit 3.1S1

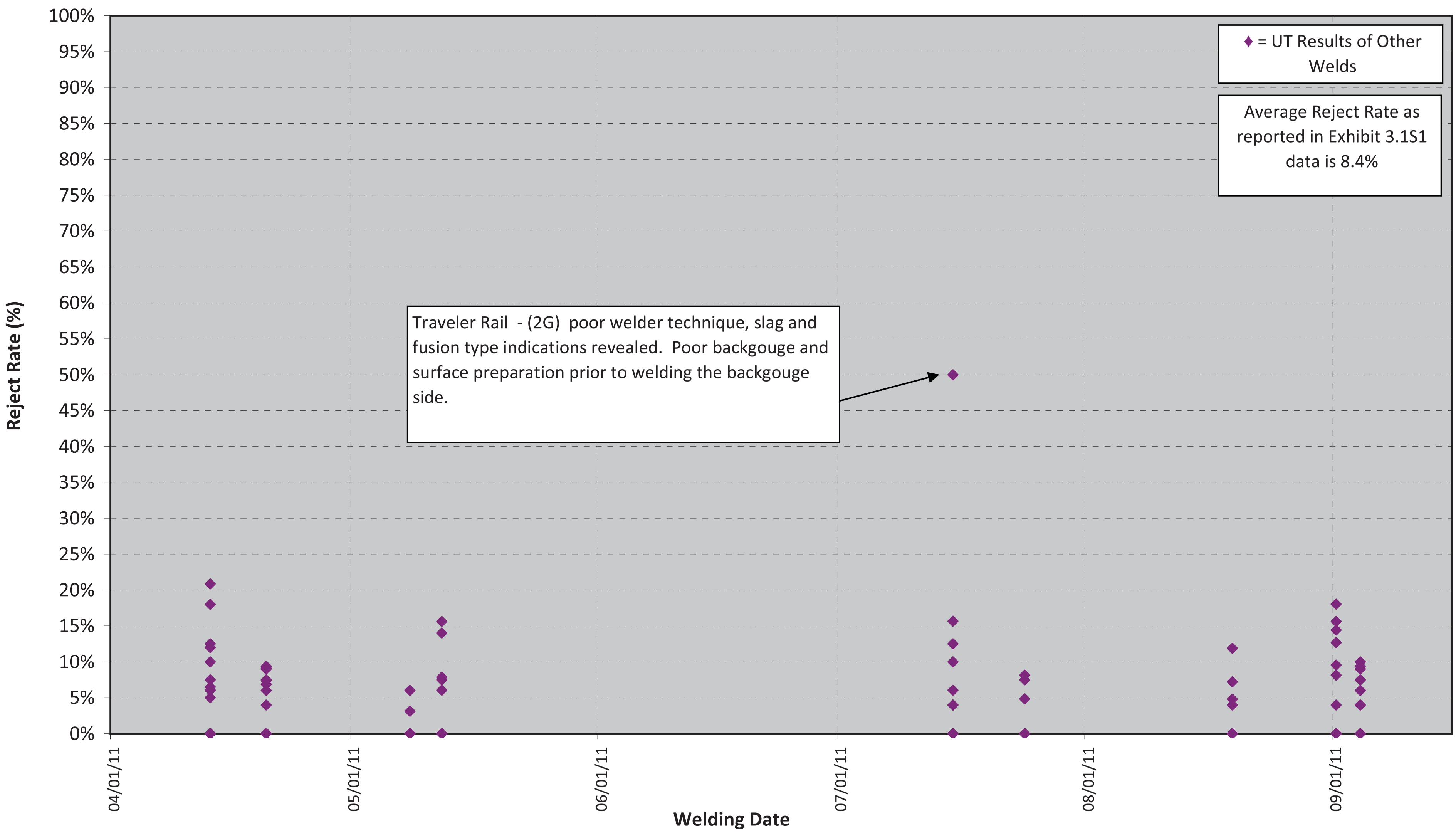
Reject Rate = Total Length of Discontinuities / Total Length of Weld that is UT Tested

Reject Rate = 16,000/190,369

Reject Rate = 8.40%

EXHIBIT 3.1S1 - Supplemental Data to New FCAW Welding Process Statistics Since March 31, 2011 Report

Other Welds - UT Results



APPENDIX L

EXHIBIT 4.2S1 - Crossbeams 17 - 19 Bottom Corner Weld UT Summary

CB#	Description	Weld ID	Scan Pattern	ZPMC NDT Results (2)		ABFJV / CT NDT Results (3)					Remarks
				Rejected Indications per Table 6.3 of AWS D1.5 Code (1)		ABFJV UT Date	Rejected TLI Indications (1)		Other Rejected Non-TLI Indications (1)		
				No.	dB Rating		No.	dB Rating (5)	No.	dB Rating (5)	
17	DP-SP-E	CB3001A-017-002	A,B,C,D	See Note 4		11-Mar-11	7	+9, +14, +10, +16, +16, +17, +17	0		All rejectable indications found were repaired, retested and cleared
	DP-SP-W	CB3001A-017-014	A,B,C,D	See Note 4		11-Mar-11	8	+16, +17, +17, +17, +16, +16, +16, +17	1	+10	All rejectable indications found were repaired, retested and cleared
	BP-SP-E	CB3001A-017-005	A,B,C,D	See Note 4		10-Mar-11	5	+12, +13, +17, +15, +15	2	+10, +10	All rejectable indications found were repaired, retested and cleared
	BP-SP-W	CB3001A-017-017	A,B,C,D	See Note 4		11-Mar-11	3	+16, +17, +15	4	+8, +9, +8, +10	All rejectable indications found were repaired, retested and cleared
	DP-SP-E Holdback Areas	CB3001A-017-001, 003	A,B,C,D	See Note 4		14-Mar-11	0		5	+10, +5, +9, +9, +10	All rejectable indications found were repaired, retested and cleared
	DP-SP-W Holdback Areas	CB3001A-017-013, 015	A,B,C,D	See Note 4		14-Mar-11	0		1	+6	All rejectable indications found were repaired, retested and cleared
	BP-SP-W Holdback Areas	CB3001A-017-016, 018	A,B,C,D	See Note 4		14-Mar-11	0		3	+10, +10, +10	All rejectable indications found were repaired, retested and cleared
	BP-SP-E Holdback Areas	CB3001A-017-004, 006	A,B,C,D	See Note 4		14-Mar-11	0		1	+7	All rejectable indications found were repaired, retested and cleared

NDT Using Scanning Pattern "D"

NDT Using Scanning Pattern "E"

Rejectable Indications Found by ZPMC QC Post Initial Weld NDT

Rejected Transverse Linear Indications (TLIs) Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Other Rejected Non-TLI Indications Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Notes:
(1) - All rejectable indications found were repaired, retested and cleared.
(2) - ZPMC QC NDT performed upon completion of initial welds. ZPMC repairs all rejectable indications. ZPMC QC re-inspects the weld until cleared.
(3) - ABFJV / CT NDT performed once weld is cleared by ZPMC QC. If required, ZPMC then makes repairs and ABFJV/CT re-inspects weld until cleared.
(4) - Due to integration of the QC inspection process with ABFJV and ZPMC, weld inspections performed after October 2010 are only recorded under the ABFJV/CT column
(5) - ABFJV/CT Scanning Pattern D evaluation perfomed using acceptance critera to be 6dB above Class B under Table 6.3 of AWS D1.5 Code.

EXHIBIT 4.2S1 - Crossbeams 17 - 19 Bottom Corner Weld UT Summary

CB#	Description	Weld ID	Scan Pattern	ZPMC NDT Results (2): Rejected Indications per Table 6.3 of AWS D1.5 Code (1) No.	ZPMC NDT Results (2): Rejected Indications per Table 6.3 of AWS D1.5 Code (1) dB Rating	ABFJV / CT NDT Results (3): ABFJV UT Date	Rejected TLI Indications (1) No.	Rejected TLI Indications (1) dB Rating (5)	Other Rejected Non-TLI Indications (1) No.	Other Rejected Non-TLI Indications (1) dB Rating (5)	Remarks
18	DP-SP-E	CB3002A-018-002	A,B,C,D	See Note 4		20-Nov-10	0		0		
	DP-SP-W	CB3002A-018-020	A,B,C,D	See Note 4		20-Nov-10	1	+16	4	+10, +10, +10, +11	All rejectable indications found were repaired, retested and cleared
	BP-SP-E	CB3002A-018-005	A,B,C,D	See Note 4		20-Nov-10	2	+14, +13	1	+7	All rejectable indications found were repaired, retested and cleared
	BP-SP-W	CB3002A-018-023	A,B,C,D	See Note 4		20-Nov-10	3	+17, +17, +15	14	+10, +10, +9, +10, +9, +10, +10, +8, +10, +6, +8, +10, +9, +10	All rejectable indications found were repaired, retested and cleared
	DP-SP-E Holdback Areas	CB3002A-018-001, 003	A,B,C,D	See Note 4		16-Jun-11	1	+15	1	+8	All rejectable indications found were repaired, retested and cleared
	DP-SP-W Holdback Areas	CB3002A-018-021, 023	A,B,C,D	See Note 4		16-Jun-11	0		0		
	BP-SP-W Holdback Areas	CB3002A-018-022, 024	A,B,C,D	See Note 4		16-Jun-11	0		2	+9, +10	All rejectable indications found were repaired, retested and cleared
	BP-SP-E Holdback Areas	CB3002A-018-004, 006	A,B,C,D	See Note 4		16-Jun-11	0		1	+10	All rejectable indications found were repaired, retested and cleared

NDT Using Scanning Pattern "D"

NDT Using Scanning Pattern "E"

Rejectable Indications Found by ZPMC QC Post Initial Weld NDT

Rejected Transverse Linear Indications (TLIs) Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Other Rejected Non-TLI Indications Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Notes:
(1) - All rejectable indications found were repaired, retested and cleared.
(2) - ZPMC QC NDT performed upon completion of initial welds. ZPMC repairs all rejectable indications. ZPMC QC re-inspects the weld until cleared.
(3) - ABFJV / CT NDT performed once weld is cleared by ZPMC QC. If required, ZPMC then makes repairs and ABFJV/CT re-inspects weld until cleared.
(4) - Due to integration of the QC inspection process with ABFJV and ZPMC, weld inspections performed after October 2010 are only recorded under the ABFJV/CT column
(5) - ABFJV/CT Scanning Pattern D evaluation perfomed using acceptance critera to be 6dB above Class B under Table 6.3 of AWS D1.5 Code.

EXHIBIT 4.2S1 - Crossbeams 17 - 19 Bottom Corner Weld UT Summary

CB#	Description	Weld ID	Scan Pattern	ZPMC NDT Results (2) Rejected Indications per Table 6.3 of AWS D1.5 Code (1) No.	ZPMC NDT Results (2) dB Rating	ABFJV / CT NDT Results (3) ABFJV UT Date	Rejected TLI Indications (1) No.	Rejected TLI Indications (1) dB Rating (5)	Other Rejected Non-TLI Indications (1) No.	Other Rejected Non-TLI Indications (1) dB Rating (5)	Remarks
19	BP-SP-E	CB3003A-019-017	A,B,C,D	See Note 4		08-Dec-10	0		3	+11, +10, +11	All rejectable indications found were repaired, retested and cleared
	BP-SP-W	CB3003A-019-002	A,B,C,D	See Note 4		07-Dec-10	0		0		
	DP-SP-E	CB3003A-019-014	A,B,C,D	See Note 4		07-Dec-10	3	+17, +16, +14	15	+7, +10, +7, +10, +9, +9, +10, +10,+10, +10,+10, +10,+10, +10,+10	All rejectable indications found were repaired, retested and cleared
	DP-SP-W	CB3003A-019-005	A,B,C,D	See Note 4		08-Dec-10	5	+16, +17, +17, +17, +17	39	+10, +9, +10, +9, +10, +9, +9, +10,+10, +10,+10, +10,+10, +10,+7,+10, +10, +8, +5, +3, +10, +10, +11,+11, +10,+1, +10,+10, +11,+11, +10, +11, +11, +4, +11, +11, +11, +11, +11	All rejectable indications found were repaired, retested and cleared
	DP-SP-E Holdback Areas	CB3003A-019-013, 015	A,B,C,D	See Note 4		19-Jun-11	0		0		
	DP-SP-W Holdback Areas	CB3003A-019-004, 006	A,B,C,D	See Note 4		19-Jun-11	0		0		
	BP-SP-W Holdback Areas	CB3003A-019-001, 003	A,B,C,D	See Note 4		19-Jun-11	0		0		
	BP-SP-E Holdback Areas	CB3003A-019-016, 018	A,B,C,D	See Note 4		19-Jun-11	0		0		

NDT Using Scanning Pattern "D"

NDT Using Scanning Pattern "E"

Rejectable Indications Found by ZPMC QC Post Initial Weld NDT

Rejected Transverse Linear Indications (TLIs) Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Other Rejected Non-TLI Indications Found by ABFJV / CT Post ZPMC QC Clearance of the Weld

Notes:
(1) - All rejectable indications found were repaired, retested and cleared.
(2) - ZPMC QC NDT performed upon completion of initial welds. ZPMC repairs all rejectable indications. ZPMC QC re-inspects the weld until cleared.
(3) - ABFJV / CT NDT performed once weld is cleared by ZPMC QC. If required, ZPMC then makes repairs and ABFJV/CT re-inspects weld until cleared.
(4) - Due to integration of the QC inspection process with ABFJV and ZPMC, weld inspections performed after October 2010 are only recorded under the ABFJV/CT column
(5) - ABFJV/CT Scanning Pattern D evaluation perfomed using acceptance critera to be 6dB above Class B under Table 6.3 of AWS D1.5 Code.

APPENDIX M

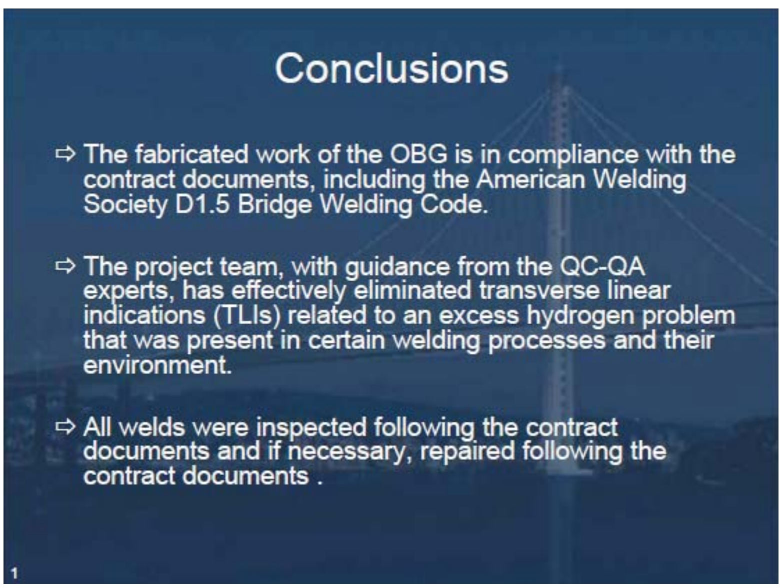
Minutes from the Joint Meeting with the Toll Bridge Program Oversight Committee (TBPOC) - Toll Bridge Seismic Safety Peer Review Panel (TBSSPRP) - QA/QC Expert Consultants
FINAL – Dated 4/25/11 – (rev-1)

Meeting Date: April 7, 2011

Topic of Discussion: QA/QC for the Fabrication in China

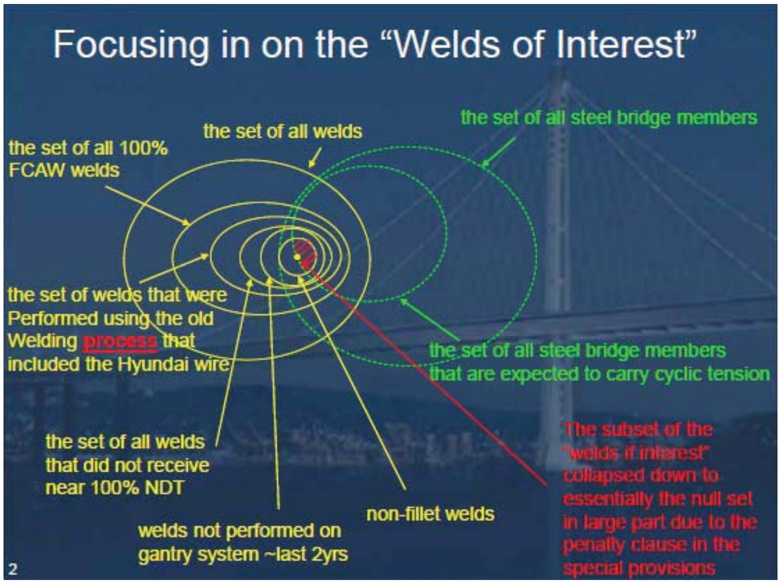
Attendees:
TBPOC: Steve Heminger, Andre Boutros, Cindy McKim (phone)
PMT: Andy Fremier, Stephen Maller, Tony Anziano
TBSSPRP: Joe Nicolleti, John Fisher, I. M. Idriss
QA/QC Expert Consultants: David McQuaid, Don Rager, John Barsom, Alan Cavendish-Tribe
Others: Dina Noel, Peter Lee, Jason Weinstein, Brian Maroney, Ken Terpstra, Bill Casey, Mazen Wahbeh, Jon Tapping, Ade Akinsanya, Peter Siegenthaler, Francisco Carpio, Karen Wang, Steve Lawton, Thomas Nilsson, Brian Petersen, Peter van der Waart, Marwan Nader, Rick Land

1. Brian Maroney presented the following slide presentation summarizing the conclusions drawn from the SAS Project Team's response to the QA/QC Expert Panel Recommendations (November 2010).
    - Slide 1: Conclusions

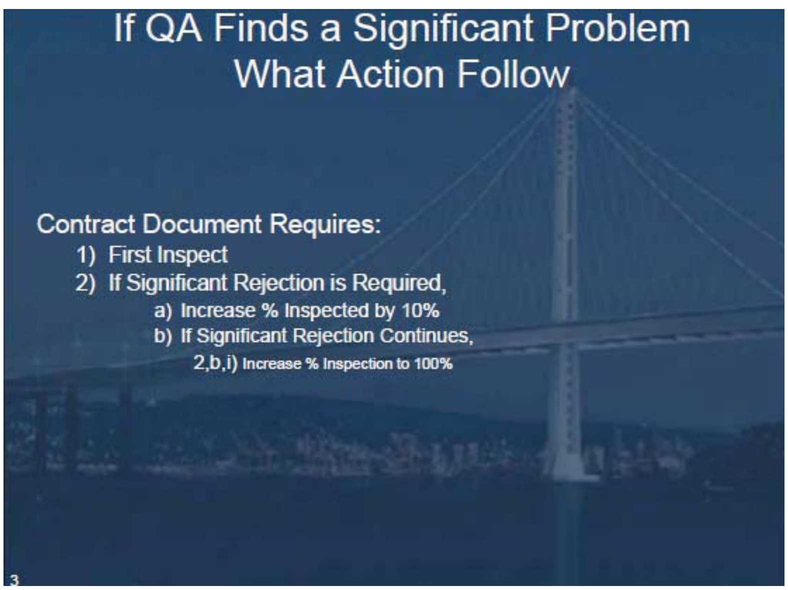


Brian Maroney displayed hardcopies of the Contract Plans, Special Provisions, Standard Specifications and AWS D1.5 Bridge Welding Code. He emphasized that the bridge was constructed and inspected in accordance with the above mentioned documents.

- Slide 2: Focusing in on the "Welds of Interest"



- Slide 3: If QA Finds a Significant Problem, What Actions Follows



The above information was referenced from the Contract Special Provisions Section 10-1.59 which states:

"If unacceptable discontinuities are found in a joint with a specified percentage of testing of NDT less than 100%, including RT examination of butt weld repairs, the repairs shall be completed and then re-examined by the same NDT method along with an additional 50mm at each end of the weld repair, for a minimum total additional length of 100mm for the repair re-examination. Two additional previously untested segments, each at least 10% of the total weld length, on each side of the repair, for a total additional length of 20%, shall be tested with the same NDT method. If additional unacceptable discontinuities are found as a result of this testing, then 100% of the remaining untested portion of the weld shall be tested with the same NDT method. All weld repairs shall be tested with the same NDT method that located the original defect."

- Slide 4: Consisted of photos of the technology used for the non-destructive testing (i.e. Ultrasonic Testing and Magnetic Particle Testing) of the welds placed during fabrication

2. QA/QC Expert Panel Comments:
   - Provided a brief overview of the QA/QC Panel's role and involvement since November 2010

3. Seismic Safety Peer Review Panel Comments:
   - Seismic Safety Peer Review Panel was kept abreast of this matter by Brian Maroney throughout the process.
   - The "Project Team Response Report to QA/QC Expert Panel Recommendations" is a complex document to initially understand. However, the Project Team met with the SSPRP on April 6th and covered the material with the group thoroughly and answered all questions raised.
   - It was noted that the SSPRP supports the following excerpt of the Executive Summary from the Project Team's Response and suggested that these sentences be emphasized in bold type:

     "In all cases, detected rejectable indications, including TLIs, were removed and welds repaired as required by the Contract Documents. After review of all data, it has been demonstrated that the investigated welds have in general been of high quality with very low rejection (and repair) percentages due in large part to the highly automated welding process at ZPMC."
   - It was noted that the steel fabrication of this bridge has been inspected to the highest level of inspection of any bridge.

4. Toll Bridge Program Oversight Committee Comments:
   - (Andre Boutros) - Caltrans and the QA/QC Panel support the welds as they meet and at most times exceed the Contract Specifications. The question was asked to the SSPRP and the QA/QC Panel if these welds were good. Both parties responded that the welds were good.
   - (Steve Heminger) - Do we have bridge welds that we expect more than normal maintenance in the future?

     The SSPRP responded that the welds on the bridge were built and tested to and beyond the requirements in the Welding Code and therefore the State can expect superior performance from the welds.
   - (Steve Heminger) - Looking backwards, did you feel pressure of making these conclusions knowing that you may have to go back and repair welds at the job site? The Panel responded no. They were confident with the completed work leaving China. Also, the code is very distinct on what to do for critical weld

repairs. The completed and accepted fabricated work is in compliance with the Contract Documents and to the AWS D1.5 Bridge Welding Code.

- (Steve Heminger) - In regard to the tension members in #6 of the Panel's recommendations and the Panel's Statement Letter, is the Panel satisfied? The Panel responded that back in November 2010, the tension/compression question came up to understand the bridge. That info was provided. However, to determine the structural performance of the bridge is beyond the group's role, it is the role of the Engineer of Record. The fabricator's role is to provide a quality weld.
  Marwan Nader (Design JV) clarified that the Contract Documents clearly stated which members are in tension. However, all tension and compression welds were inspected to the tension criteria in the AWS D1.5 Bridge Welding Code.
- (Steve Heminger) - Was it the Panel's preference that these recommendations were to be implemented sooner? The Panel responded that typically it is the intent that once a recommendation report is submitted, implementation or a response follows.
  Brian Petersen responded that ABFJV has implemented the recommendations over time. Many of the recommendations were already built into the Contract Documents. Others were adopted over time. ABFJV did not at any point compromise quality but continued the effort to improve quality over time.
- (Steve Heminger) - Will ZPMC use this new welding process in future jobs? ABFJV responded that ZPMC has accepted the process and they are now seeing the benefits. Production graphs shared by ZPMC are showing low rejection rates with this new welding process.
- (Steve Heminger) - Why is the tower not included in the discussion? The group responded that China did not have the same challenges with the tower welds. ZPMC aggressively approached the tower fabrication. In addition, tower welds are in compression and therefore are not considered an issue.

5. Summary Comments-
   - The TBSSPRP has reviewed the conditions and information associated with the welding that came into question following the Nov 2010 QA/QC draft report as well as documented data formally organized by the Project Team. The TBSSPRP has specifically interacted with both the QA/QC experts and the Project Team.
   - The TBSSPRP supports the QA/QC expert consultants' and the Project Team's conclusions that the SFOBB SAS OBG welds are in compliance with the Contract Documents, including the AWS D1.5 Bridge Welding Code and therefore can be expected to perform well.

6. Closing Comments:
   - The PMT and TBPOC expressed their gratitude and appreciation to the team for their efforts.

7. Smith Emery Technology Demonstration-
   Smith Emery came in to present to the TBPOC and TBSSPRP Members the physical demonstration of the technology used for inspection of the welds. It was noted that if there was a systemic hydrogen problem, it would be detected.

SAS Steel Fabrication Monthly Review Meeting
Location: China
Draft Notes – 06/08/11 and 06/09/11

1. Introductions –All

2. Status of Action Items from the Draft Report Guideline Discussion
   - Status of TLI's with new FCAW weld process – Steve Lawton
     Refer to the attachments.
     Steve Lawton walked the group through the data of the recent welds.
     It was reported that there were no new hydrogen-related TLI's discovered to date.
     (ACTION) Add the following footnote: It was noted that the "TLI" terminology is defined as any indication as detected by the project specific D-scan procedure regardless of orientation in the weld.
     (ACTION) ABF to continue with the data gathering of the UT results for the new FCAW weld process and to provide a final update of the data once all welds are complete and accepted.
     (ACTION) Steve Lawton to provide information on the 3G weld position for week 16 (reference page 11 of 24). Provide call out note on the graph.

   - Recent NCRs – T-Joint
     It was noted that QA found longitudinal indications located at the toe of the weld by MT inspection after ZPMC/ABFJV QC inspected and accepted the weld. By contract, Contractor is required to perform 25-100% MT inspection depending on the specific area. It was noted that some of the indications found by QA were not in the areas that were previously inspected by ZPMC/ABFJV QC.
     (ACTION) As a corrective action, ZPMC/ABFJV QC will perform 100% MT inspection on all T-Joint (CJP, PJP, Fillets) welds performed in trial assembly and segment assembly.
     (Panel Comment) The entire QC/QA process is working very well and resulting in a quality product.

3. Closing of SAS Steel Fabrication Expert Panel Monthly Review Meetings
   - Project Team Response Report (and supplemental)
     (ACTION) Karen to prepare the Final Project Team Response Report to include the following:
     - Incorporate SSPRP comments
     - Supplement- Meeting documentation from April 7, June 8/9, August meetings
     - Supplement- Meeting materials distributed (weld inspection data) from June 2011 and August 2011 meetings

   - Closing SAS Steel Fabrication Expert Panel Meeting – 9am, August 25, 2011 at ABF Conference Room, Pier 7
     - Draft Agenda
       1. Review of Status of TLI's with new FCAW weld process
       2. Closing Statements from QC, QA and QA/QC Panel
       3. Bridge Tour

APPENDIX N

California Department of Transportation and
American Bridge / Fluor Enterprises, Inc., A Joint Venture
375 Burma Road
Oakland, California 94607

November 3, 2011

Dear Ladies and Gentlemen:

Project: **San Francisco Oakland Bay SAS Bridge Superstructure**
Subject: **Closing Statement by the QA/QC Fabrication Expert Panel**

We, the QA/QC Expert Panel, have reviewed all data for welds of interest through November 3, 2011. It is our understanding that the steel orthotropic box girder (OBG) fabrication welding is complete and no further relevant weld data is expected.

The final submittal of welding data confirms the validity of our recommendations. Full implementation of these recommendations achieved the expected weld quality acceptance rate. Additionally, the project team's effort to implement the recommendations of the Panel has achieved positive results on the quality of fabrication and accelerated the delivery of the OBG to the erection site.

The Panel endorses the final Project Team Report, dated November 3, 2011. The Panel concludes that its prior findings, set forth in its letter dated March 29, 2011, remain in effect and are fully applicable to the updated final Project Team Report, dated November 3, 2011.

Sincerely,

QA/QC Fabrication Expert Panel:

John M Barsom — Dr. J. Barsom

Alan Cavendish-Tribe — Mr. A. Cavendish-Tribe, CEng., FWeldI.

David L. McQuaid — Mr. D. McQuaid, P.E.

Mr. D. Rager, P.E.

SAS Steel Fabrication Monthly Review Meeting
Location: Oakland
Draft Notes – 11/3/11

1. Introductions –All

2. Goals/Objectives

3. Review of Supplemental Weld Data to March 31, 2011 Report (S.Lawton/M. Wahbeh)

   Steve Lawton (QC Manager) presented the supplemental data to the group, including the QA/QC Expert Panel, and concluded that all rejectable indications were repaired.

   Mazen Wahbeh (Department Lead QA) concurred with the data presented and the conclusions drawn from the data.

   The Panel has reviewed the supplemental weld data to the March 31, 2011 Report and accepts the presented information and agrees with the conclusions drawn from the data.

   (ACTION) Add a cloud note to page 6 of 16 of Appendix K
   "It should be recognized that the weld data (between May 9, 2011 and June 3, 2011) included more difficult work among which include confined area, weld position, and access to the location."

   (ACTION) Show the Appendix K graphs to have the same scales as in Appendix D.

   (ACTION) In Appendix K, pages 1-5, revise the 3rd to the last column to read "length of discontinuities" to match the wording of Appendix D.

   (ACTION) In Appendices E and L, all pages, Exhibit 4.2 and 4.2S1, change sub-column titles to:
   - "Rejected TLI Indications"
   - "Rejected Non-TLI Indications"

   Adjust legend in the footnotes to be consistent with the above edits.

   (ACTION) In Appendix D, page 1 of 13, Reference pg 2-4 Row, change "defect" to indication. (Perform search and replace word for entire document)

   (ACTION) Remove the color background from all tables on Exhibits 3.1 and 3.1S1

   (ACTION) Final report to show final changes without revision triangles.

4. Review of Changes to March 31, 2011 Project Team Report
   (ACTION) Final November 3, 2011 Report will incorporate all changes discussed and agreed to in today's 11/3/11 QA/QC meeting. Final report will not show revision triangles.

5. Closing of SAS Steel Fabrication Expert Panel Monthly Review Meetings
   - Meeting Notes - QA/QC Expert Panel Final Statements
   - Draft of Final Statement Letter from Panel
     QA/QC Panel provided a signed final statement letter that will be inserted in the November 3, 2011 Final Project Team Report.

   (ACTION) Final November 3, 2011 Report will be distributed to the group by November 11, 2011.

6. Thank You/Closing
   This meeting successfully completes the assessment of quality of the SFOBB SAS OBG steel fabrication by the QA/QC Expert Panel and Project Team. No further meetings are needed.