

MAR 4 1985

Docket No. 50-482

MEMORANDUM FOR: B. Joe Youngblood, Chief  
Licensing Branch #1  
Division of Licensing

FROM: B. D. Liaw, Chief  
Materials Engineering Branch  
Division of Engineering

SUBJECT: REVIEW OF REGION IV AND REGION I FINAL  
DRAFT INSPECTION REPORTS OF WOLF CREEK  
STRUCTURAL STEEL WELDING

The Materials Engineering Branch, Division of Engineering, has reviewed Region I and Region IV draft inspection reports on Wolf Creek structural steel welding. We find the reports adequately cover the subject and that our comments were appropriately reflected in the final drafts.

We also believe the Region IV report is consistent with our review of the applicant's submittal dated February 18, 1985. We agree with the conclusions of the reports and believe that reasonable and adequate steps were taken to assure the structural integrity of these steel weldments. We consider the issue resolved.

B. D. Liaw, Chief  
Materials Engineering Branch  
Division of Engineering

cc: H. Denton  
D. Eisenhut  
H. Thompson  
J. P. Knight  
R. Denise, Region IV  
T. Novak  
W. Johnston

E. Sullivan  
S. Pawlicki  
P. O'Connor  
C. Y. Cheng  
W. Hazelton  
R. Klecker

Contact: D. Smith  
X-24553

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MTEB Wolf Creek Files

8 50380476 XA 258P.  
OFC : DE:MTEB : DE:MTEB : DE:MTEB :  
NAME : D. Smith : W. Hazelton : B. D. Liaw :  
DATE : 3/4/85 : 3/4/85 : 3/4/85 :

OFFICIAL RECORD COPY

A/22



12/16

"Specific over layer, formal calculation will be made under the following conditions. 1) If specification allows structure as executed. 2) If it is necessary to make the existing calculation down head in order to show that a connection is acceptable. and 3) If a sophisticated analysis is used that is not considered a common structural engineering method.

Notes: "Steel Design" (Lambert Fall 2012)  
③ "Design 2. Welded Structures" C. Blodgett, 8th Print  
sec. 5.4

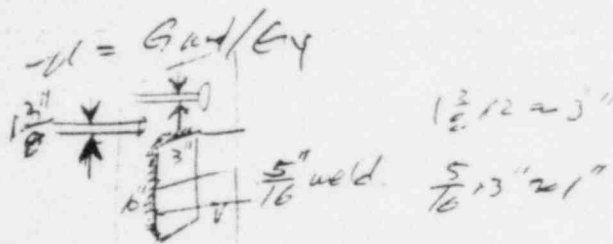
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Bending calculation of the embedded plate  
and bolts calculation showed that there  
is an adequate ductility interest -  
(to a ductility ratio of 10 allowed  
where as calculated value shown <sup>largest</sup> among  
4 beam connection calculated in Reactor Building  
is less than 8. It uses a conservative  
bending calculation since the weld stress  
is assumed not to yield when beam end  
rotation experience full amount of  
simply support end calculation.

Most likely way of load path is  
that. When the moment is built up  
to the support because of restraint of  
clip to angle edge due to eccentric  
return weld, the moment will be  
transmitted to the embedded plate and to  
the anchor bolts. If the embedded plate  
plus anchor bolts stiffness exceed that  
of clip angle weld then the weld begins



to yield first until it goes to plastic range  
and eventually begin to tear. However it  
is a self limiting action and moment  
begin to be reduced in proportion to the <sup>upper</sup>  
amount of tear and opening of clip angle edge.  
Test (in Ref 2) did not show total failure  
of the support by means of shear failure with  
to partially failed weld. (check)



So far Cat 3 only 2 cases.

44-24 pressure support

" 25 containment cooler

appr. date.

NO. 25

Then cal # & approval

9/1/02

Mike Stuchfield: Sup for Manual QA

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P. Carrat; Staff to Chief Eng

10/6/84 Ivany; Eng Guy Sup Daniel KGEF.  
Civil

Reactor field weld

Cont - Aux. - Main to Con connection

Check danger  
connect

100% accessible, fire proof.

building scaffolding.

inaccessible, in concrete imbedded

3rd Sg Conn will be com end of this week.

AB labor

Sit back larger than AZSC so custom design

1500 joints. → exp.

2nd 100 examined

2nd input completion.

Batch C. Conn. Work on Daniel

① missing will be redone

② exist deficient will be reworked if required  
by missing weld.

No formal cal for. cal conn. for single connections

Cal Hubert to G.C. Fouts 11/5/84

Paint qualification

HCR does not say if it is painted

(All Reactor Building, Some Aux painted)  
no complete inventory

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NCR 15N-20509-CW

? Scope; Safety Equip Support?

Site & HQ NCR jurisdiction.

all disposition →

procedures.

prog Inst.

EDP1-2.14-01

"Licensing at the Halfway Site"

EPA 461-01

NCR

Grav Sup. →

Pres. Cont.

R.H.(Site)

Cont. → Dry in HA

5/16  
Daniel Conner  
x BTB → Fabrication  
Sivan ✓

## 1) Structural Connection.

- a) J Brown. ID in the field. } all the site.  
b) Someone at the site check procedure.

a) Example: Recheck Girth checks back all the listing  
at { AB <sup>(K)</sup>, CIBES <sup>(MISC)</sup>, Erecting Day, Fieldwork Day, Fabrication Details.  
Baldwin, COX Day. " " "

Control Bldg. C223 K6711-X1 E13  
internal column.

At site all the FER & NCR were reviewed to see if any change.

Let Day Steve Note calls for all friction connection otherwise noted

Daniel has listing "Structural Steel Drawing Vert. Check List"  
Cross Check with list of Days by B.



137/12 dispositioned

as of 10/6. 37 NCR items have been generated & 12 have been dispositioned.

PE : L. Roton DU.  
" : Z. M. Horst.

NCR/DR # 154 20494 CW

Reactor Bldg. Cooler Support Floor.

154 20509 CW.

missy weld & deficiencies

pressure support + some other (miss materials)

154 20568 CW

typical standard joint NCRs.

20569 CW

"

20551

+ field weld

654-8333

11/13. Brown, Lee, Kim, Irving, PMC (Rafondo)

Embed:

1) Reaction & eccentricity but no fixed moments.


2) Composite beam.

3) E (204). Central Bldg. 1' slab embedded into wall

conc. is

4) Only near the bldg. <sup>most has no</sup> conc slab.

5) No specific cal on disposition of weld over run.

6) Typical angle 6x4 

7) Mount is self limiting.

8) Shear Stud.

9) No WF is frame into 8" wall (interior)

10) inspected 12" wall (interior) detail.

Cal # 02-47-F Rev. 0. 7/11/75 (Job 10460)

11) " Embedded Ass for Beam Conn "

12) There is a case where seat & angles are both

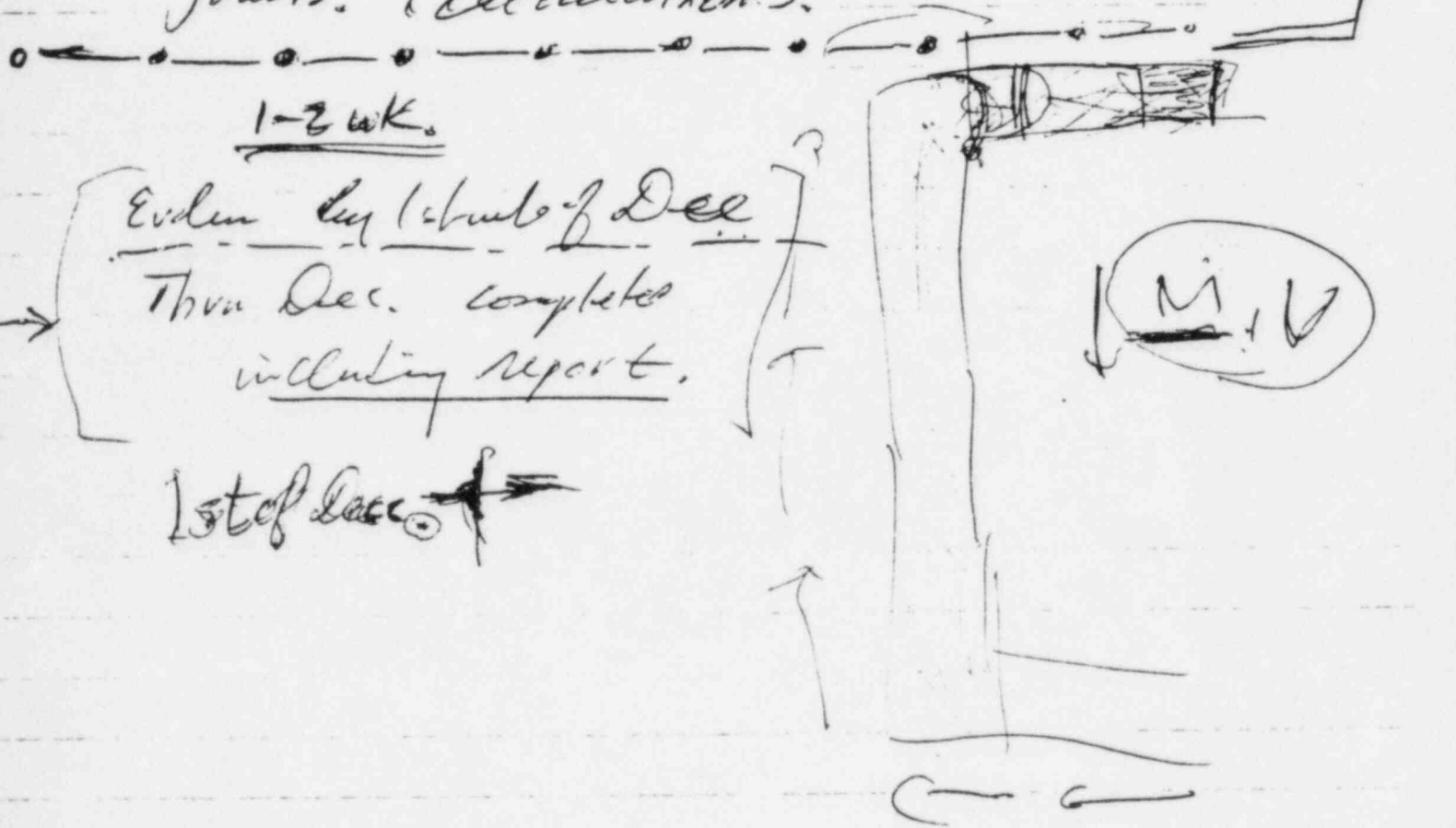
supplied

Comm. #meat 5

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① Documentation of natural of own size web  
on composite section (connection)

② Document of natural of non composite  
joints. (Calculation).



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## Structural Person

e.g. • select crucial joints in structure to analyse - someone to say OK.

• Understand Structural Methods if OK

• Overwelding and effects of it.

Put on more filler material than called for. Different structure will crack when loaded.

1wke effort -  $\frac{1}{2}$  at G, buy +  $\frac{1}{2}$  at - its

Sullivan  
Cholakis  
Kno

10/16

NAC Ins. 6/11-9/28 Report 10/26

Document Reconciliation Task; 8/13/84

Inspection Verification plan; 8/17/84

JH. A. Call to Martin 9/18/84 Report.

CAR-19 10/17/84 Comment 100% insp.

Reply 10/24/84 Comment 100%.



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## Deficient Weld Disposition:

a) All the undersized welds (more than 6") are ~~being~~ evaluated to see if design or actual loadings can be accommodated with as built weld. Deficient dispositioning.

b) One run of connection weld have been not to one being dispositioned without qualitative evaluation. The staff was unable to follow the reasoning of <sup>the</sup> disposition. Predicted to perform qualitative analysis <sup>to support them</sup> before dispositioning it. ~~than as "one run is"~~ They will take two type of it.

The evaluation will be in two categories; one for the composite beam connection where steel beam support concrete support slab (typically 12" thick reinforced concrete) and in this case in addition to usual AISC field weld connection of beam to embedded plate, the slab is also

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this type of connection covers about 90% of field weld connection. The other type of weld connection is the ones without concrete slab. They are mostly in the reactor building.

In the former case, they will make a generic evaluation of the connection to justify NCR disposition of the run run weld. For the conventional joint w/o slab, they will go thru all the joint and select several worst condition welds reflecting size of column and to load (or span length) and evaluate actual ~~but~~ stress in the anchor bolts in the imbedded plate to see if added moment due to weld can run can be accommodated w/o undue structural damage. (They wish to discuss their preliminary results with the staff in early December. The approach the Berthel is taking as of today is acceptable to the staff.)

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Bob Taylor; 50% Gurn;  
50% Site;

① what connections using  
100% same sym joint & connections [check  
right on]

② Natural Basis for selection  
joints are interrelated. →  
Betchel is doing

③ Record: Joint is inspected  
23 mil pins  
20-30 mil flush.

David Smith

④ { Ground Fix for welding }

← [ Go to Gundersen; ] → Tomorrow  
9:00  
10 am!

Arts Martin. See Blue Wolf Creek.  
FTS 728-8153

11-9-84

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The threshold for the acceptance of weld deviations from the requirements of AWS D1.1 is :

All weld deviations which result in a violation of the design allowable stresses specified in the SNUPPS Civil-Structural Design Criteria 10466-C-0 are unacceptable and the weld will be repaired.

Missing welds and missing portions of weld (greater than 1 inch nominally) are unacceptable regardless of the stress levels in the joint and the welds will be installed unless specifically approved otherwise by the engineer.

Defects (cracks, lack of fusion, undercut, etc.) which jeopardize the integrity of the joint are unacceptable and will be repaired. The engineer will perform a case by case review of each weld inspection report in order to identify those defects which require repair.

Two generic exceptions to the requirements of AWS D1.1 are allowed by Bechtel Specifications 10466-C-122 (Erection of Structural Steel) and 10466-C-132 (Erection of Miscellaneous Metal):

Undercut shall not exceed 1/32 inch.

Fillet welds need not satisfy the convexity limitations of ASW D1.1, Section 3.6.1 provided that all other parameters of acceptable weld profile are maintained.

Bechtel Specifications 10466-C-122 and 10466-C-132 also provide the following clarifications and interpretations of AWS D1.1 requirements:

Fillet welds shall be specified size with full throat and legs of uniform size as defined by Section 8.15 of AWS D1.1. Oversize of welds shall be minimized as much as practical, and in no case shall exceed 100 percent or 3/8 inch greater than specified, whichever is less.

Unequal leg fillets are acceptable provided the smaller leg meets or exceeds the minimum specified requirements.

Continuous welds are acceptable in place of intermittent welds.

Field Change Request 1-0076-W provides the following interpretation of AWS D1.1:

The limitation in AWS D1.1-75, paragraph 2.7.1.2(2), on the maximum size of a fillet weld along edges of metal 1/4" or more in thickness, is intended for design purposes only. It is not intended as a limitation on the amount of weld deposited in the field and should not be used as a weld inspection criteria. The maximum weld size for inspection purposes is governed by paragraph 3.1.4 unless otherwise noted on design drawings or in design specifications.

Welds which conform to AWS D1.1 the three previous paragraphs are not reported as rejectable by the ongoing reinspection program and no case-by-case evaluation of these weld attributes is being performed.

Structurally significant joints are field welded joints which support or potentially support safety related equipment and building components. These joints are identified on the structural steel (American Bridge Company) and miscellaneous steel (Cives Steel Company) erection detail and field work drawings, and Bechtel detail drawings (C-OX drawing series). The locations and details of field welded joints required for the erection of the structural and miscellaneous steel in the Wolf Creek plant are shown on these drawings.

The structurally significant joints includes all field welded joints with the exception of:

1. handrails
2. toeplates
3. grating
4. checked plate
5. stairs and supporting steel
6. ladders
7. monorails
8. temporary construction welds



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*internal draft*

The reported conditions although not desirable from a design standpoint, do not detract from the structural integrity of the structural beam or the connection. Since the beam flanges are not restrained (as in a moment connection) the end fixity is not established by the presence of additional weld. Some minor partial fixity may result above that provided by a properly welded connection, but this is judged to have minimal effect on the behavior of the connections, especially in the majority of cases where a composite concrete slab is provided. Local deformations may develop at the connection to allow for end rotation of the beam but this is considered acceptable. Therefore, the reported conditions are acceptable to use-as-is.

*Run now of added support to return to design*



Memo For: Tom Westerman  
From: Bill Johnson

Subject: Allegation 4-84-A-15 (Q4-84-018)

Attached is a copy of the K&E report on their investigation. OI might want to review this to determine whether additional investigative effort is required.

I do not believe that any additional inspection effort is required on this allegation.

Note that we should inform the allegor of the outcome of our review. Please let me know if OI is ready to close this, and, if requested, I will contact allegor.

Bill Johnson

On 12/17/84 DEBARK INDICATES K&E REPORT WAS SATISFACTORY

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5 Cat. 2

ALLEGATION REVIEW

Date: March 12, 1985

CASE NUMBER	4-84-A-015
DATE OPENED	02/07/84
FACILITY NAME	Wolf Creek 50-482
SUBJECT	Harrassment of QC Inspectors
SOURCE OF ALLEGATION	Employee
NUMBER OF ALLEG. ASSIGNED TO	01
CROSS REF. NO.	Q4-84-018
ACTION SCHEDULED	01 review
FIRST/LAST NAME	R. Herr
DATE ASSIGNED	
REPORT NUMBER	1st: 2nd: 1st:
FTS NUMBER	8-728-8100
DUE DATE	
ALLEGATION SUBSTANT	
SORT CODE	C
DATE CLOSED	
ACTION OFFICE	RIV
MAN HOURS	
REPORT PREPARATION	
ASSIST	

DETAILS: Mechanical/welding QC inspector was harassed for writing NCR dealing with improper welding amperage by superintendent. RIV to contact alleger with regard to turning allegation over to licensee for review. OI has indicated an interest. Report of Inquiry Q4-84-18 issued 4/11/84. KG&E Report provided for OI review and then returned to Licensee. Supplemental Q4-84-185 issued and closes all OI interest. Need to contact alleger. Supplemental Q issued by OI on 2/15/85 which closes OI case. Need to contact alleger.

REFERENCE: OIR4-84-A-0027.

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ALLEGATION REVIEW

Date: February 28, 1985

CASE NUMBER 4-83-A-075  
DATE OPENED 10/05/83  
FACILITY NAME Wolf Creek  
50-482

SUBJECT Intimidation of craft  
& workmanship problems

SOURCE OF ALLEGATION R. Shaneyfelt-sheet-  
metal worker  
K. Rowell-Welder

NUMBER OF ALLEG. 3  
ASSIGNED TO RPS C  
CROSS REF. NO.  
ACTION SCHEDULED Inspection

FIRST/LAST NAME W. Johnson  
DATE ASSIGNED 10/05/83  
REPORT NUMBER 1st:  
2nd:  
Lst:  
8-728-8100

FTS NUMBER  
DUE DATE  
ALLEGATION SUBSTANT  
SORT CODE C  
DATE CLOSED  
ACTION OFFICE RIV  
MAN HOURS  
REPORT PREPARATION  
ASSIST

DETAILS: Allegation divides into 3 categories:

- a. Intimidation
- b. unauthorized plug welds
- c. overtorquing of bolts

Initial investigation is to be conducted by KG&E with SRI monitoring. Quality-related allegations appear to have substance (preliminary). KG&E has verbally requested that a copy of their investigation be considered 2.790. KG&E to provide formal letter requesting their investigation report to be considered 2.790. Copy of KG&E investigation report provided to OI and returned. Report discussed with KG&E on 2/7/84. KG&E final Report is available on site. Combine with 4-83-A-79. OI onsite 9/19/84 to evaluate KG&E Quality First Program from investigative standpoint. Technical inspection 50-482/84-33 closes out. Allegor to be contacted. Letter sent to Rowell on 2/5/85, returned with no forwarding address. No address for second allegor. OI memo of 2/5/85 to RIV EO closes OI interest.

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Cat 2

ALLEGATION REVIEW

Date: February 28, 1985

CASE NUMBER 4-84-A-058  
DATE OPENED 06/01/84  
FACILITY NAME Wolf Creek  
50-482  
  
SUBJECT QA Auditor concerned that  
adverse pers. actions  
taken because of Audit Fd  
Contractor Employee  
  
SOURCE OF ALLEGATION  
  
NUMBER OF ALLEG. 1  
ASSIGNED TO RPS "C"  
CROSS REF. NO.  
ACTION SCHEDULED Review Audit  
Findings and Adverse  
OI  
FIRST/LAST NAME J. Jaudon  
DATE ASSIGNED 06/06/84  
REPORT NUMBER 1st:  
2nd:  
Lst:  
FTS NUMBER 8-728-8100  
DUE DATE  
ALLEGATION SUBSTANT  
SORT CODE C  
DATE CLOSED  
ACTION OFFICE RIV  
MAN HOURS  
REPORT PREPARATION  
ASSIST

DETAILS: Allegor is concerned that there is a conspiracy against him because he was stepping on toes in his audit findings. He found in his audits that CWP's are used to open code pressure boundaries without QC inspection or meeting code requirements. The allegor was stated by KG&E to have been suspended while he was being investigated (by KG&E). Inspection of technical issues complete and to be issued in Inspection Report 50-482/84-23 (in preparation). Undated memo (R.G. Taylor) to file concludes that allegation could not be substantiated.

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