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| NINE MILE POINT NUCLEAR STATION Unit (1; 2 d | r 0=Both) : _1_Discipline : | Mechanica | <u>il</u> | |
| Title RPV Weld Flaw Evaluation Using GE Nuclear Energy NMP1 RPV Flaw | Calculation No. SOVESSELM030 | | | |
| Evaluation Handbook (GENE-B13-01805-124, Rev. 0) | (Sub)system(s) RXVE | Building RX | Floor Elev. 340' | Index No. SO |
| Originator(s) R. Corieri Checker(s) / Approver(s) A. Tsiriantis / L. P. Prunotto | | | | |
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| Rev | Description | Change No. | By | Date | Chk | Date | App | Date |
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| 0 | Initial Issue | 1M00805 | RC | 5/24/99 | AT | 5.25.99 | (488 | 5/25/99 |
| 1 | SEE PACES 3,4+ Added ATTACH. J | 1M00861 | RC | 919199 | +A | 9.13.99 | an: | 9/13/99 |
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Safety Class (SR / NSR / Qxx) : SR

Computer Output/Microfilm Filed Separately (Yes / No / NA): NA

Superseded Document(s) : _N/A_

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Document Cross Reference(s) - For additional references see page(s) :_N/A_

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NUCLEAR ENGINEERING

CALCULATION CONTINUATION SHEET.

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| | Section X involution Curves that are used to determine the allowable flaw sizes. The Reference 1 flaw handbook contains a series of flaw evaluation curves that are used to determine the allowable flaw sizes. The Reference 1 flaw handbook also contains flaw evaluation worksheets in Section B of the handbook. Completed flaw evaluation worksheets including the flaw evaluation curves for each flaw evaluated to the criteria in the flaw handbook are included as attachments to this calculation. The flaw evaluation provided in the Reference 1 report, includes fatigue crack growth and irradiation embrittlement for up to both 20.3 and 28 effective full power years (EFPY). In general, inside surface flaws were found to be limiting for vessel shell welds. Evaluations were also performed for subsurface flaws for all selected weld regions. The Reference 1 analysis uses the most limiting loading for Normal (Level A), Upset (Level B), Emergency (Level C). Explored (Level D) and Test conditions. | | | | | | | | | | | | | | | | | | |
| | comb vesse analy psig press up co value Load | ination el welds sis. Th for 28 ure-ten ondition s, K _{la} , c ing asso | of low c. Lea le mini EFPY. hperato s, sind lue to bociated | operatin k test co mum sp Bolt-up ure curve the the higher m I with the | ng temp onditior ecified o cond es. The nermal netal se e analy | beratur ns, and leak te itions mal tr stress rvice te ses ind | res ar d bolt est ter were ransie es ar empe clude | nd hig up c mper anal ents c re me eratur | gh sa condit ature yzed Juring ore t es. | fety fa ions is 24 at a g norr han c | actor at th 7°F a serv nal o offset | s, an e fla at 11 ice f pera by | e the nge 95 p lemp tion the | e mos region sig fo eratu are b assoc | i limiti ns, wo r 20.3 re of ounde iated | ng op ere co 3 EFP 100°F ed by f highe | erating onsider Y and consi the lea the lea | i cond ed fo 260°i istent istent k tes ure to | ditions for r fractur F at 119 with th t and bo oughnes |
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| | CALCULATIO | ON CONTINU | JATION SHEET | Page4 (Next5) |
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| line Mile Point Nuclear Station | Unit: | 1 | | Disposition: |
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| ef. The analysis methods follow factors, K ₁ , were developed aspect ratio, a/L. These we safety factor of $\sqrt{10}$ for lea An upper bound on allowable ensure that ASME Code Se sizes is established by the standard, continued operatideveloped in this report. Variation of neutron flux a conservatism in determinin calculated for the vertical we <u>CALCULATION INPUTS:</u> The design inputs are inclued material property data for the contained in this calculation attachment to each flaw eva <u>CALCULATION ASSUMPT</u> The design inputs used by a applicable to NMP-1. <u>CALCULATION RESULTS</u> The two (2) subsurface flaw weld RVWD-099, have been Reference 1 Flaw Evaluation were determined to be acceed An additional evaluation ste confirm the flaws are accept flaw handbook for 28 EFPY IWA-3300 flaw proximity evaluation growth dimensions. Attachm growth and the current distaf flaws will not extend to the fully and the flaws will not extend to the flaws will not extend to the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and the fully and the flaws will not extend to the fully and the flaws will not extend to the fully and | w those prescribed as a function of the ere compared to the k test, or $\sqrt{2}$ for book test, or may size was estated in the primary steps of the allowable flated in the Reference the NMP-1 weld/plate are taken from the allowable flated with the highest of the NMP-1 weld/plate are taken from the allowable flated in the Reference the NMP-1 weld/plate are taken from the allowable flated in weld have taken from the allowable flated in the Reference for the SE Nuclear Energy test. The second test is evaluated in weld in the demonstrated to be in Handbook. Therefore the GE Level III to the GE Level | in ASME Code he flaw depth rai e allowable fractu- olt up, to determin ablished at 1/3 de ress requirement ion standards of tified if the flaw zimuth and elev w sizes. In the t adjusted RT _{NDT} e 1 GE Flaw Eval e material was de GERIS 2000 Ind in the Flaw Eval RVWD-140 and t e well within the a fore, the flaws are of plant life, i.e., f the GE Flaw Eval SE Engineering p UT examiners. Th hat adjacent flaws ombinations resul details of the eval v to the surface sl additional flaw pr | Section XI IWB-3600. Appl tio, a/t (surface flaw) or 2a/a ure toughness, K _{la} , incorpora e allowable flaw sizes. pth of the low alloy steel (LA s were met. A lower bound IWB-3500. If the flaw do satisfies the IWB-3600 acce vation was considered to m beltline region, the allowab values. uation Handbook. Updated m eveloped in the Reference a dication Evaluation Data She uation Handbook (Reference dication Evaluation Data She he seven (7) subsurface flaw allowable flaw size limits esta e acceptable per ASME XI, IV for 28 Effective Full Power Ye uation Handbook) was perfor rovided the fatigue crack gro the GE Level III then re-perform s do not link together betweet t when applying the projected uation. It is also evident from nown in the attached UT data roximity evaluations confirm t | ied stress intensity t (subsurface), and ating the Section XI S) wall thickness to d for allowable flaw bes not satisfy this eptance criteria, as remove any undue ole flaw sizes were neutron fluence and 2 report. Flaw data eets included as an e 1) are correct and ws evaluated in ablished in the NB-3600. The flaws ears (EFPY). med by GE to wths used in the med the ASME XI, n now and 28 d fatigue crack a sheets, that the the flaws are |



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| | | | | | ATTACHMENT A | | |
| | | | NINE MILE | POINT UN | IT 1 FLAW EVALU | ATION WORKSHEET | • |
| | | | | | Flaw ID: <u>55</u> | | |
| | | 1. | Determine Regior nearest weld. The junction between be conservatively | <u>n and Orient</u> e orientatior two welds, t used. | ation of Flaw. The is either [A]xial or he region with the r | weld region should be identifie [C]ircumferential. If the flaw is nore limiting acceptance criter | d by the at a ia should |
| | | | Region: Orienta | tion: <u>axial</u> | <u>D-140</u> | | |
| D | | 2. | Sketch Flaw Geor | <u>metry.</u> Use | the attached flaw sl | ketch to draw the flaw. | |
| | | 3. | <u>Classify Flaw.</u> Co proximity rule of IV | ombine flaws WA-3300, S | s in close proximity ection XI of the ASI | to other flaws and to the surface ME Code. Classify flaw as eith | ce per the ner: 、 |
| | | | Inside S Outside Subsur | Surface Surface face <u>F</u> | law is subsurface p y=s/a=2"/(.396/2)=1 | er table IWB-3510-1, NOTE (0.1>0.4, use Y=1.0 for Y>1.0 | <u>4)</u> |
| | | 4. | Determine Vessel surface, input 0 fo listed in Table A-1 | Wall Geom or clad thickr of Append | <u>etry.</u> If the flaw is oness, else enter the ix A for the specified | lassified as subsurface or outs analysis value for clad thickne d weld region. | side ess as |
| | | | Claddin Low All Total th | g Thickness oy Steel Thi ickness, t = | s, $t_{clad.} = 0$ (in ckness, $t_{LAS} = 7.94$ $t_{clad} + t_{LAS} = 7.94$ |) <u>B(</u> in) <u>B(</u> in) | |
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| 5. <u>5</u> | Nuclear Energy (Nine Mi <u>Size Flaw.</u> Calcula Iadding. Surface Flaws: | <u>A. Tsirigotis</u> le Point Unit ate flaw dept | 1 Flaw E Flaw II h, includ | Evaluation D: <u>55</u> ling any po | SOVESSELM030 GENE-I Worksheet cont'd) | 00 B13-01805-124, Rev. DRF # B13-02025-0 |
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| 5. <u>9</u> F | Nuclear Energy (Nine Mi <u>Size Flaw.</u> Calcula Iadding. Surface Flaws: | le Point Unit ate flaw dept | 1 Flaw E Flaw II h, includ | Evaluation D: <u>55</u> ling any po | GENE-I Worksheet cont'd) ortion of the flaw ex | B13-01805-124, Rev. 6 DRF # B13-02025-0 |
| 5. <u>5</u> c F F | <u>Size Flaw.</u> Calcula ladding. Surface Flaws: | ate flaw dept | Flaw II Flaw II h, includ | D: <u>55</u> | ortion of the flaw ex | ktending into the |
| 5. <u>5</u> c F F | <u>Size Flaw.</u> Calcula Iadding. Surface Flaws: | ate flaw dept | Flaw II h, includ | D: <u>55</u> ling any po | ortion of the flaw ex | xtending into the |
| 5. <u>5</u> c F | <u>Size Flaw.</u> Calcula ladding. Surface Flaws: | ate flaw dept | h, includ | ling any po | ortion of the flaw ex | stending into the |
| S F F | Surface Flaws: | • | | | | |
| | -law Depth, a = 1 | <u>N/A(</u> in) <u>N/A(</u> in) | Su Flav Hal Flav Disi in IV | ubsurface w Depth, 2 If Depth, a w Length, tance to S WA-3300, | Flaws: 2a = 0.396(in) = 0.198(in) L = 13.75(in) surface as defined S = 2(in) | |
| 6. <u>C</u> | Calculate Aspect F | Ratio of Flaw | - | | , | , |
| F | Flaw Aspect Ratio, | a/L = <u>0.0144</u> | | | | • |
| 7. <u> </u> d r(c | WB-3500 Flaw Ev lepth, a (surface) ecord the value b heck the box "Ac Unacceptable per | valuation. Fo and 2a (subs elow. If the f ceptable per 'IWB-3500" | or the gives surface), law dept IWB-350 and cont | ren a/L asp in accord th recorde 00" below. tinue to ste | Dect ratio, determin ance with IWB-351 d in step 5 is below Otherwise, check ap 8. | ne the allowable fla 10 of the Code and v the allowable values the box |
| Ľ | nside Surface Fl IWB-3500 A | aw: Ilowable Dep | bth = a = | <u>N/A(in)</u> | | |
| C | Dutside Surface IWB-3500 A | Flaw (top he llowable Dep | e ad, hea oth = a = | d flange, <u>N/A(</u> in) | vessel flange reg | ions only): |
| 9 | Subsurface Flaw IWB-3500 A 7 a | : Ilowable Dep <i>able IWB-35</i> =7.98*2.33% | oth = 2a : 10-1 allo 5=0.1859 | = <u>0.372(</u> ii owed a/t=2 9" | n) < 0.396" therefo 2.33% for Y=1.0 th | ore unacceptable p neas=7.98 therefor |
| | 6. <u>(</u> 1 7. <u> </u> 7. <u> </u> 7. <u> </u> | <u>Calculate Aspect F</u> Flaw Aspect Ratio, <u>IWB-3500 Flaw Ev</u> depth, a (surface) record the value b check the box "Act "Unacceptable per Inside Surface Fl IWB-3500 A Outside Surface Flaw IWB-3500 A Subsurface Flaw IWB-3500 A | 6. <u>Calculate Aspect Ratio of Flaw</u> Flaw Aspect Ratio, a/L = 0.0144 7. <u>IWB-3500 Flaw Evaluation</u>. For depth, a (surface) and 2a (substree of the value below. If the ficture condition the value below. If the ficture the box "Acceptable per "Unacceptable per IWB-3500" Inside Surface Flaw: IWB-3500 Allowable Dep Outside Surface Flaw: IWB-3500 Allowable Dep Subsurface Flaw: IWB-3500 Allowable Dep <i>Table IWB-35</i> a=7.98*2.33% | Dis in I 6. <u>Calculate Aspect Ratio of Flaw.</u> Flaw Aspect Ratio, $a/L = 0.0144$ 7. <u>IWB-3500 Flaw Evaluation.</u> For the giv depth, a (surface) and 2a (subsurface), record the value below. If the flaw depic check the box "Acceptable per IWB-350 "Unacceptable per IWB-3500" and cont Inside Surface Flaw: IWB-3500 Allowable Depth = a = Outside Surface Flaw: IWB-3500 Allowable Depth = a = Subsurface Flaw: IWB-3500 Allowable Depth = 2a <i>Table IWB-3510-1 allo</i> a=7.98*2.33%=0.1855 | Distance to S in IWA-3300, 6. <u>Calculate Aspect Ratio of Flaw.</u> Flaw Aspect Ratio, $a/L = 0.0144$ 7. <u>IWB-3500 Flaw Evaluation.</u> For the given a/L asy depth, a (surface) and 2a (subsurface), in accord record the value below. If the flaw depth recorde check the box "Acceptable per IWB-3500" below. "Unacceptable per IWB-3500" and continue to ste Inside Surface Flaw: IWB-3500 Allowable Depth = $a = N/A(in)$ Outside Surface Flaw (top head, head flange, IWB-3500 Allowable Depth = $a = N/A(in)$ Subsurface Flaw: IWB-3500 Allowable Depth = $2a = 0.372(in)$ Table IWB-3510-1 allowed a/t=2 a=7.98*2.33%=0.1859" | Distance to Surface as defined in IWA-3300, $S = 2_{(in)}$ 6. <u>Calculate Aspect Ratio of Flaw.</u> Flaw Aspect Ratio, $a/L = 0.0144$ 7. <u>IWB-3500 Flaw Evaluation.</u> For the given a/L aspect ratio, determin depth, a (surface) and 2a (subsurface), in accordance with IWB-35 record the value below. If the flaw depth recorded in step 5 is below check the box "Acceptable per IWB-3500" below. Otherwise, check "Unacceptable per IWB-3500" and continue to step 8. Inside Surface Flaw: IWB-3500 Allowable Depth = $a = N/A(in)$ Outside Surface Flaw (top head, head flange, vessel flange reg IWB-3500 Allowable Depth = $a = N/A(in)$ Subsurface Flaw: IWB-3500 Allowable Depth = $2a = 0.372(in) < 0.396"$ therefore Table IWB-3510-1 allowed $a/t=2.33\%$ for Y=1.0 th a=7.98*2.33%=0.1859" |



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| | (Nine M | ile Point Unit | 1 Flaw Evalua | ation V | Vorksheet cont'd) | |
| | | | Flaw ID: <u>55</u> | | | |
| AC | CEPTABILITY Accepta Unaccept Program DER# 14 | /: ble per IWB- btable per IW Activity requ - <i>1999-1451 I</i> | 3500 /B-3500 (Site (uired) <i>nitiated</i> | Correc | ctive Action | |
| 8. <u>IWI</u> nur cur allc box NC | <u>B-3600 Flaw E</u> nber from Sect ve for the spec wable value, c "Unacceptabl DTE: Outside st | valuation. Re tion 3.0. Rece tified orientat heck the box e per IWB-36 urface flaws f | ecord the appr ord the allowat ion. If the flaw "Acceptable p 500", and proce for vessel and | opriate ole flav depth oer IW eed to botton | e flaw acceptance di w depth, a or 2a, from n recorded in step 5 B-3600" below. Oth step 9. n head regions are r | iagram Figure m the appropriat is below the erwise, check th not considered |
| lim any | iting. Flaw spe y region below | ecific analysis the vessel fla | s would be requ ange. | uired i | if outside surface flav | ws were found i |
| Fig | ure # <u>D-12 for</u> | 28 EFPY (Er | nd of plant life) | <u> </u> | | |
| Ins | ide Surface F IWB-36 | l aw: 00 Allowable | Depth = a = | <u>N/A(</u> ii | n) | |
| Ou | tside Surface IWB-36 | Flaw (top ho 00 Allowable | ead, head flan Depth =.a = | nge, vo <u>N/A</u> (ii | essel flange region n) | is only): |
| Su | bsurface Flaw IWB-36 | /: 00 Allowable | Depth = 2a = | <u>0.9</u> (in | n) <i>>0.396" therefore</i> . | Acceptable |
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| Origin | ator/Date | ~ | × 1 | Checker/Date | • | Calculation No. | Revision |
|--------|-----------------|---------------------|---------------------------------|--|---------------------------------------|--|---|
| R. C | orieri | Kc | 5/24/91 | A. Tsirigotis | AT5.25,99 | S0VESSELM030 | . · 00 |
| lef. | GE | Nuclear | Energy (Nine M | ile Point Unit | 1 Flaw Evaluation | GENE-B1 [Worksheet cont'd) | 3-01805-124, Rev. 0)RF # B13-02025-00 |
| | | | | | Flaw ID: <u>55</u> | | |
| | | ACCEP | TABILITY Acce Una | 7: eptable per IV cceptable per | VB-3600 ⁻ IWB-3600 | (for <u>28</u> EFPY) | |
| | [`] 9. | From fig below 1 | jure identi /3 limit, fla | fied above, re w removal is | ecord the 1/3 wall t acceptable. Othe | hickness limit below. rwise, weld repair is | If flaw depth is necessary. |
| | | 1/3 Lim | it = <u>N/A(</u> in |) | | | |
| | | From st | ep 5 abov Flaw de 2a +s - | e: pth = a = <u>N/A</u> (clad thicknes | (surface) ss, if applicable) = | <u>N/A(</u> subsurface) | |
| | | Flaw de Flaw de | epth < 1/3 epth > 1/3 | Limit: Flaw re Limit: Weld re | emoval acceptabl epair required | e (No weld repair) | |
| | | | | | | | |
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GE Nuclear Energy

GERIS 2000 Indication Evaluation Data Sheet

Project : Nine Mile Point Unit-1 Weld ID : RV-WD-140 Patch ID : V2B-01

Flaw Throughwall Dimension = 0.396 Flaw Length "I" = 13.75 Surface Separation "S" = 2.00 Exam Data Sheet : 9-02 Ind. Data Sheet : 9-055 Indication : 55

"T" nominal = 7.13 "T" measured = 7.98 Clad "T" nominal = 0.22

ASME Section XI, 1983 Edition, Summer 83 Addenda TABLE IWB-3510-1 for 4" and Greater

| a/I | Surface % | Subsurface % | Surface % . | Subsurface % |
|------|-----------|--------------|-------------|--------------|
| 0.00 | 1.8 | 2.3 | 1.86 | 2.33 Y |
| 0.05 | 2.0 | 2.4 | ~ | ~ |
| 0.10 | 2.2 | 2.6 | ~ | ~ |
| 0.15 | 2.4 | 2.9 | ~ | ~ |
| 0.20 | 2.7 | 3.2 | ~ | - |
| 0.25 | 3.1 , | 3.6 | ~ | ~ |
| 0.30 | 3.5 | 4.1 . | ~ | ~ |
| 0.35 | 3.5 | 4.6 | ~ | ~ |
| 0.40 | 3.5 | 5.2 | ~ | ~ |
| 0.45 | 3.5 | 5.8 | ~ | ~ |
| 0.50 | 3.5 | 6.5 | ~ | ~ |
| | | - | Allowed | Allowed |
| | | | 1.86 | 2.33 |

| a = | 0.198 |
|-------------|-------|
| a/I value = | 0.014 |
| Y = | 1.000 |

Flaw is Subsurface

Allowed a/t = 2.33% a/t = 2.48%

Flaw is unacceptable by Table IWB-3510-1.

| nments : Flaw is axial. | |
|---------------------------------------|---------------------------|
| "T" Local measured = 8.20" with clad. | |
| SEPARATION "S" FROM NERSO | a OD EURFACE. CAM 5/10/99 |
| | |
| nalvet OB M | Paviawad Pur \b C D |
| | Neviewed by: |
| evel: The Date: 5/2/99 | Level: TTT Date: 5, 3,99 |
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GE Nuclear Energy

GENE-B13-01805-124, Rev. 0 DRF # B13-02025-00



Figure B-1. Form for Vessel Flaw Sketches.





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GENE-B13-01805-124,Rev.0 DRF-B13-025025-00



Figure D-12. Lower-Intermediate Course at 225 Deg, Subsurface Flaw



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| | Nine | Mile Po | oint N | luclear Sta | ation | | Unit: 1 | | | Dispos | ition: |
|---|---------------|------------------------|-------------------------------------|--|--|------------------------------------|---|---|--|--|-------------------------------|
| • | Origi R. (| inator/Date Corieri | ' Rc | 524/51 | Checke | r/Date irigoti | s AS. | 5-99 | Calculation No. | 0 | Revision 00 |
| | Ref. | GE | E Nucl | lear Energy | | | | | GEN | E-B13-01805-124 DRF # B13-0 | , Rev. 0 2025-00 |
| | | | | | | | ATTACH | MENT B | | | |
| | | | | NINE | MILE POIN | T UN | IIT 1 FLAV | / EVALU/ | ATION WORKSH | HEET | |
| | | | | | | I | Flaw ID: <u>9-</u> | <u>015+016</u> | | | |
| | | 1. | <u>Dete</u> near junc be c | ermine Re rest weld tion betw conservat | egion and C The orien een two we vely used. | <u>Drient</u> tatior elds, t | tation of Fl n is either [the region | <u>aw.</u> The v A]xial or [with the m | weld region shou C]ircumferential hore limiting acc | Ild be identified If the flaw is a eptance criteria | I by the at a a should |
| | | | | Re Ori | gion: <u>I</u> entation: <u>a</u> | <u> RVW</u> axial | <u>D-140</u> | | | | |
| | | 2. | <u>Ske</u> | tch Flaw | <u>Geometry.</u> | Use | the attach | ed flaw sk | etch to draw the | e flaw. | , |
| | • | 3. | <u>Clas</u> prox | sify Flaw kimity rule | c Combine of IWA-33 | flaw 00, S | s in close j Section XI o | proximity t of the ASN | o other flaws an /IE Code. Class | d to the surfactify flaw as eithe | e per the er: _. |
| | | - | | Ins Ou Su | ide Surface tside Surfa bsurface | e ce <u>F</u> | -law is sub y=s/a=2.2/ | <u>surface p</u> (0.424/2): | <u>er table IWB-35[.] =10.4>0.4, use y</u> | <u>10-1, NOTE (4)</u> / <u>=1.0</u> | L |
| | | 4. | <u>Dete</u> surfa liste | ermine Ve ace, inpu d in Table | essel Wall (t 0 for clad e A-1 of Ap | <u>Georr</u> thicki pend | netry. If the ness, else ix A for the | e flaw is c enter the specifiec | lassified as subs analysis value fo I weld region. | surface or outsi or clad thicknes | ide ss as |
| | | | | Cla Lov Tot | dding Thick w Alloy Stee al thicknes | knes: el Thi s, t = | s, t _{clad} = ickness, t _L t _{clad} + t _{LAs} | $AS = \frac{O(in)}{8.00}$ |) <u>)(</u> in) <u>)(</u> in) | | |
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| ine _: M | lile Poi | nt Nuclear Station | <u> </u> | Jnit: 1 | | Oslavlada - No | Disposition: |
|--------------------|----------------------------|--|--|--|---|---|--|
| Driginato | or/Date rieri | Rc 5124197 | Checker/Date A. Tsirigotis | A 5.2. | 5.99 | SOVESSELM030 | |
| əf. | GE | Nuclear Energy | <u> </u> | <u> </u> | | GENE-B1 | 3-01805-124, Rev. 0 DRF # B13-02025-00 |
| | | (Nine Mi | le Point Unit | 1 Flaw Eva | luation | Worksheet conุt'd) | |
| | | | Fla | aw ID: <u>9-01</u> | <u>5+016</u> | | |
| | 5. <u>8</u> | <u>Size Flaw.</u> Calcul cladding. | ate flaw dept | h, including | j any po | ortion of the flaw exte | nding into the |
| | | Surface Flaws: Flaw Depth, a = Flaw Length, L = | <u>N/A</u> (in) <u>N/A</u> (in) | Sub Flaw I Half D Flaw I Distar in IW/ | surface Depth, 2 Depth, a Length, Nce to S N-3300, | Flaws: a = 0.424(in) = 0.212(in) L = 3.0(in) urface as defined S = 2.20(in) | |
| | 6. <u>(</u> | Calculate Aspect I | Ratio of Flaw | ÷ . | | | |
| |] | Flaw Aspect Ratio, | a/L = <u>0.071</u> | | | | |
| | 7. <u> </u> c r c | WB-3500 Flaw Ev lepth, a (surface) ecord the value b check the box "Ac Unacceptable pe | valuation. Fo and 2a (subs elow. If the f ceptable per r IWB-3500" a | or the given surface), in flaw depth 1 IWB-3500" and continu | a/L asp accorda recorded below. ue to ste | bect ratio, determine ance with IWB-3510 d in step 5 is below t Otherwise, check th ep 8. | the allowable flav of the Code and he allowable valu ne box |
| | 1 | Inside Surface Fi IWB-3500 A | l aw: Illowable Dep | bth = a = | <u>N/A(</u> in) | | |
| | . (| Outside Surface IWB-3500 A | Flaw (top he | e ad, head 1 oth = a = | flange, <u>N/A(</u> in) | vessel flange regio | ns only): |
| | : | Subsurface Flaw IWB-3500 A | : Ilowable Dep | oth = 2a = | <u>0.396(</u> ir | ר)<0.424" Therefore | , unacceptable |
| | per | IWB-3510-1, alloy | ved a/t=2.48 | % for y=1.0 | tmeas | =8.00" therefore a=8 | *2.48%=0.198% |
| | | | | | | | |

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| Nine | e Mile Po | oint Nuclear Station | ι | Jnit: 1 | | Disposition: |
|------|------------------------|---|---|---|--|--|
| Orig | inator/Date Corieri | Re 5/24/99 | Checker/Date A. Tsirigotis | A5.75.99 | Calculation No. SOVESSELM030 | Revision 00 |
| Ref. | GE | Nuclear Energy | <u>, , , , , , , , , , , , , , , , , , , </u> | <u></u> | GENE-B1: D | 3-01805-124, Rev. 0)RF # B13-02025-00 |
| | | (Nine Mi | le Point Unit | 1 Flaw Evaluation | n Worksheet cont'd) | • · · · |
| | | | Fla | aw ID: <u>9-015+016</u> | 2 | |
| | × | ACCEPTABILITY | 7: ble per IWB-3 btable per IWI Activity requ 1999-1451 Ir | 3500 B-3500 (Site Cor ired) nitiated | rective Action | |
| | 8. | IWB-3600 Flaw Ev number from Sect curve for the spec allowable value, c box "Unacceptable | valuation. Reco ion 3.0. Reco ified orientation heck the box e per IWB-36 | ecord the appropr ord the allowable on. If the flaw de "Acceptable per 00", and proceed | iate flaw acceptance o flaw depth, a or 2a, fro pth recorded in step 5 IWB-3600" below. Oth to step 9. | diagram Figure om the appropriate is below the herwise, check the |
| | | NOTE: Outside su limiting. Flaw spe any region below | urface flaws fo cific analysis the vessel fla | or vessel and bot would be require | tom head regions are ed if outside surface fla | not considered aws were found in |
| | | Figure # <u>D-12</u> | | | | |
| | | Inside Surface F IWB-36 | law: 00 Aliowable | Depth = $a = N/2$ | <u> 4(in)</u> | |
| | | Outside Surface IWB-36 | Flaw (top h e 00 Allowable | ead, head flange Depth = a = <u>N/</u> | , vessel flange region <u>A(</u> in) | ns only): |
| | | Subsurface Flaw IWB-36 | /: 00 Allowable | Depth = 2a = <u>1.(</u> | <u>)(</u> in) <i>>0.424"</i> | |
| | | | | | | |
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| Originator/Date | | Checker/Date | | | Calculation No. | Revision |
|-----------------|--------------------------------------|--|--|----------------|---|--|
| R. Corieri | Rc 5/24/94 | A. Tsirigotis | A:5.25. | 99 | SOVESSELM030 | 00 |
| ief. GE Nu | clear Energy | | | - | GENE-B13- DF | 01805-124, Rev. 0 }F # B13-02025-00 |
| | (Nine M | ile Point Unit | 1 Flaw Evalu | ation | Worksheet cont'd) | |
| | | Fi | aw ID: <u>9-015</u> | <u>-016</u> | | |
| AC | CEPTABILITY | r: eptable per IV cceptable per | VB-3600 · IWB-3600 | | (for <u>28</u> EFPY) | · · |
| 9. Fro bel | m figure identi ow 1/3 limit, fla | fied above, re w removal is | ecord the 1/3 acceptable. | wall t Othe | hickness limit below. rwise, weld repair is ne | If flaw depth is ecessary. |
| 1/3 | | | | | | |
| Fro | om step 5 abov Flaw de 2a +s - | ė: pth = a = <u>N//</u> (clad thickne: | <u>(</u> surface) · ss, if applicab | le) = | <u>N/A(</u> subsurface) | |
| Fla Fla | w depth < 1/3 w depth > 1/3 | Limit: Flaw re Limit: Weld r | emoval acce epair require | ptabl d | e (No weld repair) | |
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GE Nuclear Energy

GERIS 2000 Indication Evaluation Data Sheet

Project : Nine Mile Point Unit-1 Weld ID : RV-WD-140 Patch ID : V2B-02A

Flaw Throughwall Dimension = 0.424 Flaw Length "I" = 3.00 Surface Separation "S" = 2.20 Exam Data Sheet : 9-05 Ind. Data Sheet : 9-015, 9-016 Indication : 15->16

"T" nominal = 7.13 "T" measured = 8.00 Clad "T" nominal = 0.22

Attachment No B Calc SOVESSEL WOZO Rev O Disp -

ASME Section XI, 1983 Edition, Summer 83 Addenda TABLE 1WB-3510-1 for 4" and Greater

| аЛ | Surface % | Subsurface % | Surface % | Subsurface % |
|------|-----------|--------------|-----------|--------------|
| 0.00 | 1.8 | 2.3 | ~ | ~ |
| 0.05 | 2.0 | 2.4 | 2.08 | 2.48 Y |
| 0.10 | 2.2 | 2.6 | - | ~ |
| 0.15 | 2.4 | 2.9 | ~ | . ~ |
| 0.20 | 2.7 | 3.2 | ~ | - |
| 0.25 | 3.1 | 3.6 | ~ | - |
| 0.30 | 3.5 | 4.1 | ~ | - |
| 0.35 | 3.5 | 4.6 | ~ | - |
| 0.40 | 3.5 | 5.2 | ~ | - |
| 0.45 | 3.5 | 5.8 | ~ | ~ |
| 0.50 | 3.5 | 6.5 | - | ~ |
| | | - | Allowed | Allowed |
| , | | | 2.08 | 2.48 |
| | | | | |

| a = | 0.212 |
|-------------|-------|
| a/I value = | 0.071 |
| Y = | 1.000 |

Flaw is Subsurface

Allowed a/t = 2.48% a/t = 2.65%

Flaw is unacceptable by Table IWB-3510-1.

| Comments : Flaw is axial. | | | | | |
|--|---|--|--|--|--|
| "T" Local measured = 8.22" with clad. | | | | | |
| Combined flaw indications 9-015 and 9-016 in accordance with IWA-3330. | | | | | |
| Separation "S" from vessel OD surface. | | | | | |
| Analyst: CF M Level: Date: <u>5/4/99</u> | Reviewed By: <u>JLC.</u> <u>J.</u> Level: <u>III</u> Date: <u>5-3-99</u> | | | | |

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GE Nuclear Energy

GENE-B13-01805-124, Rev. 0 DRF # B13-02025-00







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Attachment No

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Figure D-12. Lower-Intermediate Course at 225 Deg, Subsurface Flaw @ 28 EFPY

D-13

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CALCULATION CONTINUATION SHEET

| | Nine | e Mile Po | oint Ni | uclear Station | | Unit: 1 | | | Disposition: |
|--|--------------|------------------------|---------------------------------------|--|---|---|--|--|--|
| | Orig R. (| inator/Date Corieri | Re | 5/24/99 | Checker/Dat | , tis <i>A5.</i> 25 | . 99 | Calculation No. SOVESSELM030 | Revision 00 |
| | Ref. | GE | ENucle | ar Energy | <u></u> | <u> </u> | | GENE-B | 13-01805-124, Rev. 0 DRF # B13-02025-00 |
| | | | | | | ATTACHMI | ENT C | | |
| | | | | NINE MILE | POINT U | NIT 1 FLAW | EVALU | ATION WORKSHEE | ĒT |
| | | | | | | Flaw ID: 10 | 9/139 | | |
| | | 1. | <u>Dete</u> near junct be co | <u>rmine Region</u> est weld. The ion between t onservatively | and Orie orientatio wo welds used. | ntation of Flav on is either [A , the region w | <u>w.</u> The]xial or [ith the n | weld region should C]ircumferential. If nore limiting accept | be identified by the the flaw is at a ance criteria should |
| | | | | Region: Orientat | <u>RV-</u> ion: <u>circi</u> | WD-099 Imferential | | ` | |
| | | 2. | <u>Sket</u> | <u>ch Flaw Geor</u> | <u>netry.</u> Us | e the attached | d flaw sł | ketch to draw the fla | w. N/A |
| | | 3. | <u>Clas</u> proxi | <u>sify Flaw.</u> Co imity rule of IV | mbine flav VA-3300, | ws in close pr Section XI of | oximity the ASN | to other flaws and to ME Code. Classify | o the surface per the flaw as either: |
| | | | | Inside S Outside Subsurf | urface Surface ace | Flaw is subs y=s/a=3.5/.1 | <u>urface p</u> 98=17.0 | <u>er table IWB-3510-</u> 68>0.4, use y=1.0 | <u>1, Note (4)</u> |
| | | 4. | <u>Dete</u> surfa listec | rmine Vessel Ice, input 0 fo I in Table A-1 | <u>Wall Geo</u> r clad thic of Appen | metry. If the kness, else e dix A for the s | flaw is c nter the specified | lassified as subsurf analysis value for c I weld region. | ace or outside lad thickness as |
| | | | | Claddin Low Allo Total thi | g Thickne by Steel T ickness, t | ss, t _{clad} = hickness, t _{LAS} = t _{clad} + t _{LAS} : | $s = \frac{0.00}{7.20}$ = <u>7.20</u> | <u>0</u> (in) <u>0</u> (in) <u>0</u> (in) | |
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CALCULATION CONTINUATION SHEET

| Originator/Date R. Corieri Checker/Date A. Tsirigotis Checker/Date A. Tsirigotis Calculation No. SOVESSELM030 Ref. GE Nuclear Energy GENE-B13-01805-12 URF # B13- (Nine Mile Point Unit 1 Flaw Evaluation Worksheet cont'd) Flaw ID: 109/139 DRF # B13- (Nine Mile Point Unit 1 Flaw Evaluation Worksheet cont'd) Flaw ID: 109/139 5. Size Flaw. Calculate flaw depth, including any portion of the flaw extending int cladding. Subsurface Flaws: Flaw Depth, a = N/A(in) Flaw Length, L = | ition: |
|--|----------------------------------|
| GE Nuclear Energy GENuclear ENERGY GUENUCLEAR ENERGY <l< td=""><td>Revision 00</td></l<> | Revision 00 |
| (Nine Mile Point Unit 1 Flaw Evaluation Worksheet cont'd) Flaw ID: 109/139 5. <u>Size Flaw.</u> Calculate flaw depth, including any portion of the flaw extending intercladding. Surface Flaws: Subsurface Flaws: Flaw Depth, a = N/A(in) Flaw Depth, 2a = .396(in) Flaw Length, L = N/A(in) Half Depth, a = .198(in) Flaw Length, L = 6.75 (in) Distance to Surface as defined in IWA-3300, S = 3.5(in) 6. <u>Calculate Aspect Ratio of Flaw.</u> Flaw Aspect Ratio, a/L = .029 7. <u>IWB-3500 Flaw Evaluation</u>. For the given a/L aspect ratio, determine the allow depth, a (surface) and 2a (subsurface), in accordance with IWB-3510 of the Correcord the value below. If the flaw depth recorded in step 5 is below the allowar check the box "Acceptable per IWB-3500" below. Otherwise, check the box "Unacceptable per IWB-3500" and continue to step 8. Inside Surface Flaw: IWB-3500 Allowable Depth = a = <u>N/A(in)</u> Outside Surface Flaw (top head, head flange, vessel flange regions only): IWB-3500 Allowable Depth = a = <u>N/A(in)</u> | ł, Rev. 0 2025-00 |
| Flaw ID: 109/139 5. Size Flaw. Calculate flaw depth, including any portion of the flaw extending int cladding. Surface Flaws: Subsurface Flaws: Flaw Depth, a = N/A(in) Flaw Depth, 2a = .396(in) Flaw Length, L = N/A(in) Flaw Depth, a = .198(in) Flaw Length, L = 6.75 (in) Distance to Surface as defined in IWA-3300, S = 3.5(in) 6. Calculate Aspect Ratio of Flaw. Flaw Aspect Ratio, a/L = .029 7. IWB-3500 Flaw Evaluation. For the given a/L aspect ratio, determine the allow depth, a (surface) and 2a (subsurface), in accordance with IWB-3510 of the Corecord the value below. If the flaw depth recorded in step 5 is below the allowarcheck the box "Acceptable per IWB-3500" below. Otherwise, check the box "Unacceptable per IWB-3500" and continue to step 8. Inside Surface Flaw: IWB-3500 Allowable Depth = a = N/A(in) Outside Surface Flaw (top head, head flange, vessel flange regions only): IWB-3500 Allowable Depth = a = N/A(in) | |
| 5. <u>Size Flaw.</u> Calculate flaw depth, including any portion of the flaw extending introladding. Surface Flaws: Subsurface Flaws: Flaw Depth, a = N/A(in) Flaw Depth, 2a = .<u>396(in)</u> Flaw Length, L = N/A(in) Half Depth, a = .<u>198(in)</u> Flaw Length, L = 6.75 (in) Distance to Surface as defined in IWA-3300, S = <u>3.5(in)</u> 6. <u>Calculate Aspect Ratio of Flaw.</u> Flaw Aspect Ratio, a/L = .<u>029</u> 7. <u>IWB-3500 Flaw Evaluation.</u> For the given a/L aspect ratio, determine the allow depth, a (surface) and 2a (subsurface), in accordance with IWB-3510 of the Correcord the value below. If the flaw depth recorded in step 5 is below the allowar check the box "Acceptable per IWB-3500" below. Otherwise, check the box "Unacceptable per IWB-3500" and continue to step 8. Inside Surface Flaw: IWB-3500 Allowable Depth = a = <u>N/A(in)</u> Outside Surface Flaw (top head, head flange, vessel flange regions only): IWB-3500 Allowable Depth = a = <u>N/A(in)</u> | |
| Surface Flaws: Subsurface Flaws: Flaw Depth, a = N/A(in) Flaw Depth, 2a = .396(in) Flaw Length, L = N/A(in) Half Depth, 2a = .198(in) Flaw Length, L = N/A(in) Half Depth, a = .198(in) Flaw Length, L = 6.75 (in) Distance to Surface as defined INPACT INPACT Flaw Aspect Ratio of Flaw. Flaw Aspect Ratio, a/L = .029 7. IWB-3500 Flaw Evaluation. For the given a/L aspect ratio, determine the allow depth, a (surface) and 2a (subsurface), in accordance with IWB-3510 of the Correcord the value below. If the flaw depth recorded in step 5 is below the allowarcheck the box "Acceptable per IWB-3500" below. Otherwise, check the box "Unacceptable per IWB-3500" and continue to step 8. Inside Surface Flaw: IWB-3500 Allowable Depth = a = N/A(in) Outside Surface Flaw (top head, head flange, vessel flange regions only): IWB-3500 Allowable Depth = a = N/A(in) | the |
| 6. <u>Calculate Aspect Ratio of Flaw.</u> Flaw Aspect Ratio, a/L = .029 7. <u>IWB-3500 Flaw Evaluation.</u> For the given a/L aspect ratio, determine the allow depth, a (surface) and 2a (subsurface), in accordance with IWB-3510 of the Correcord the value below. If the flaw depth recorded in step 5 is below the allowa check the box "Acceptable per IWB-3500" below. Otherwise, check the box "Unacceptable per IWB-3500" and continue to step 8. Inside Surface Flaw: IWB-3500 Allowable Depth = a = <u>N/A(in)</u> Outside Surface Flaw (top head, head flange, vessel flange regions only): IWB-3500 Allowable Depth = a = <u>N/A(in)</u> | |
| Flaw Aspect Ratio, $a/L = .029$ 7. <u>IWB-3500 Flaw Evaluation</u> . For the given a/L aspect ratio, determine the allow depth, a (surface) and 2a (subsurface), in accordance with IWB-3510 of the Correcord the value below. If the flaw depth recorded in step 5 is below the allow check the box "Acceptable per IWB-3500" below. Otherwise, check the box "Unacceptable per IWB-3500" and continue to step 8. Inside Surface Flaw: IWB-3500 Allowable Depth = $a = N/A$ (in) Outside Surface Flaw (top head, head flange, vessel flange regions only): IWB-3500 Allowable Depth = $a = N/A$ (in) | |
| 7. <u>IWB-3500 Flaw Evaluation</u>. For the given a/L aspect ratio, determine the allow depth, a (surface) and 2a (subsurface), in accordance with IWB-3510 of the Correcord the value below. If the flaw depth recorded in step 5 is below the allowatcheck the box "Acceptable per IWB-3500" below. Otherwise, check the box "Unacceptable per IWB-3500" and continue to step 8. Inside Surface Flaw: IWB-3500 Allowable Depth = a = <u>N/A(in)</u> Outside Surface Flaw (top head, head flange, vessel flange regions only): IWB-3500 Allowable Depth = a = <u>N/A(in)</u> | |
| Inside Surface Flaw: IWB-3500 Allowable Depth = a = <u>N/A</u> (in) Outside Surface Flaw (top head, head flange, vessel flange regions only): IWB-3500 Allowable Depth = a = <u>N/A</u> (in) | ible flaw le and ple value |
| Outside Surface Flaw (top head, head flange, vessel flange regions only): IWB-3500 Allowable Depth = $a = \frac{N/A}{in}$ | |
| Outroute on Flour | |
| Subsurface Flaw: IWB-3500 Allowable Depth = $2a = 0.340(in) < 0.396$: per IWB-3510-1, all a/t=2.36% for Y=1.0 tmeas =7.20" therefore a=7.20*2.3 | wed 5%=.16 |
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CALCULATION CONTINUATION SHEET

| Origina | tor/Date | | Checker/Date | | Calculation No. | Revision | |
|---|-----------|---|---|--|---|------------------------------------|--|
| R. Co | prieri | Rc 5/24/99 | A. Tsirigotis | At 5.25.99 | S0VESSELM030 | 00 | |
| ef. | GEI | Nuclear Energy | | | GENE-B13-01 DRF | 1805-124, Rev. 0 # B13-02025-00 | |
| | | (Nine N | lie Point Unit | | worksheet cont d) | | |
| | | | F | law ID: <u>109/139</u> | | | |
| | | ACCEPTABILIT Accepta Unacce Prograr DER# 1 | Y: able per IWB-3 ptable per IWE n Activity requi | 500 3-3500 (Site Corr ired) <i>iitiated</i> | ective Action | , . , | |
| 8. <u>IWB-3600 Flaw Evaluation</u> . Record the appropriate flaw acceptance diagram Figure number from Section 3.0. Record the allowable flaw depth, a or 2a, from the appropriat curve for the specified orientation. If the flaw depth recorded in step 5 is below the allowable value, check the box "Acceptable per IWB-3600" below. Otherwise, check the box "Unacceptable per IWB-3600", and proceed to step 9. | | | | | | | |
| | | NOTE: Outside s imiting. Flaw sp any region below | surface flaws for ecific analysis I the vessel fla | or vessel and botto would be required nge. | om head regions are not I if outside surface flaws | t considered s were found ir | |
| | I | =igure # <u>D-3</u> | | | | | |
| | I | nside Surface I IWB-36 | Flaw: 600 Allowable | Depth = a = <u>N/A</u> | <u>(</u> in) | | |
| | (| Outside Surface IWB-36 | e Flaw (top he 500 Allowable | ead, head flange, Depth = a = <u>N/A</u> | vessel flange regions <u>(</u> in) | only): | |
| | : | Subsurface Flav IWB-36 | w: 500 Allowable | Depth = 2a = <u>1.20</u> | <u>0(</u> in) <i>>0.396</i> " | | |
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CALCULATION CONTINUATION SHEET

| Nine | e Mile Po | int Nuclear Station | Unit: 1 | | Disposition: |
|------|-------------|--|--|---|---------------------------------------|
| Orig | inator/Date | 26 5/24/97 | Checker/Date A Tsirigotis AC.2C.99 | Calculation No. SOVESSELM030 | Revision 00 |
| Ref. | GE | Nuclear Energy | | GENE-B13-0 DRI |)1805-124, Rev. 0 F # B13-02025-00 |
| | | (Nine M | ile Point Unit 1 Flaw Evaluation | Worksheet cont'd) | |
| | | | Flaw ID: 109/139 | | |
| , | | ACCEPTABILITY Acce Una | /: eptable per IWB-3600 cceptable per IWB-3600 | (for <u>28</u> EFPY) | |
| | 9. | From figure identi below 1/3 limit, fla | fied above, record the 1/3 wall two removal is acceptable. Othe | thicknéss limit below. If rwise, weld repair is ne | f flaw depth is cessary. |
| | | 1/3 Limit = <u>N/A(</u> in |) | | |
| | | From step 5 abov Flaw de 2a +s - | [,] e: pth = a = <u>N/A(</u> surface) (clad thickness, if applicable) = | <u>N/A</u> (subsurface) | · |
| | | Flaw depth < 1/3 Flaw depth > 1/3 | Limit: Flaw removal acceptab Limit: Weld repair required | le (No weld repair) | |
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GERIS 2000 Indication Evaluation Data Sheet

Project: Nine Mile Point Unit-1 Weld ID: RV-WD-099 Patch ID: C4-11 / C4-12 Exam Data Sheet: 1-15 / 1-16 Ind. Data Sheet: 1-109 / 1-139 · Indication: 109 / 139

Flaw Throughwall Dimension = 0.396 Flaw Length "I" = 6.75 Surface Separation "S" = 3.50

GE Nuclear Energy

"T" nominal = 7.13 "T" measured = 7.20 Clad "T" nominal = 0.22

Attachment No C Calc Sov∈SSELM030 Rev O Disp _____ Page <u>CS</u> of <u>C6</u>

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ASME Section XI, 1983 Edition, Summer 83 Addenda TABLE IWB-3510-1 for 4" and Greater

| a/I | Surface % | Subsurface % | Surface % | Subsurface % |
|------|-----------|--------------|-----------|--------------|
| 0.00 | 1.8 | 2.3 | 1.92 | 2.36 Y |
| 0.05 | 2.0 | 2.4 | · • | ~ |
| 0.10 | 2.2 | 2.6 | ~ | ~ |
| 0.15 | 2.4 | 2.9 | ~ | ~ |
| 0.20 | 2.7 | 3.2 | - | ~ |
| 0.25 | 3.1 | 3.6 | ~ | ~ |
| 0.30 | 3.5 | 4.1 | ~ | ~ |
| 0.35 | 3.5 | 4.6 | ~ | ~ |
| 0.40 | 3.5 | 5.2 | ~ | ~ |
| 0.45 | 3.5 | 5.8 | ~ | ~ |
| 0.50 | 3.5 | 6.5 | ~ | ~ |
| | | - | Allowed | Allowed |
| | | | 1.92 | 2.36 |

| a = | 0.198 |
|-------------|-------|
| a/I value = | 0.029 |
| Y = | 1.000 |

Flaw is Subsurface

Allowed a/t = 2.36% a/t = 2.75%

Flaw is unacceptable by Table IWB-3510-1.

| Separation "S" measured to OD surface. | |
|--|--|
| Throughwall dimension from data sheet 1- | 139. |
| Analyst \mathcal{A} Date: $\frac{5}{19}$ | Reviewed By: <u>Jh. C. J.: J</u> Level: <u>III</u> Date: <u>5-19-99</u> |

EXAM-DS4 V 2 7498







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| | Ń | | | к ^к , | CALCI | JLATIO | | TINU | JATION SHEET | | Page _D1_ (Next _D2) |
|---|------------|------------------------|--|---|---|--|--|---|---|--------------------------------|---|
| | Nine | e Mile P | oint Nuclear | Station | | Unit: 1 | | | | Di | sposition: |
| | Orig B. | inator/Date Corieri | P R 5 | 4/99 | Checker/Da | otis A | 5.25.9 | 19 | Calculation No. SOVESSELM030 | | Revision 00 |
| | Ref. | G | E Nuclear Ene | ergy | | | | | GENE-B | 13-0180 DBF # F | 5-124, Rev. 0 |
| | | | | | | | | | | | 510-02025-00 |
| | | | | | | ΑΤΤΑΟ | CHMEN | ΓD | | | |
| | | | NIN | E MILE | POINT | UNIT 1 FL | AW EV | ALUA | ATION WORKSHEE | T | |
| | | | | | | Flaw | ID: <u>1-11</u> | 2 | | | |
| | | 1. | Determine nearest we junction be be conserv | Region eld. The etween t atively | and Orie orientat wo weld: used. | entation o ion is eith s, the regi | <u>f Flaw.</u> er [A]xia on with t | The v Il or [the n | weld region should I C]ircumferential. If nore limiting accepta | be iden the flav ance cr | tified by the w is at a iteria should |
| | | | | Region: Orientat | <u>RV</u> ion: <u>circ</u> | -WD-099 cumferent | ial | | | | |
|) | | 2. | Sketch Fla | w Geon | netry. Us | se the atta | ached fla | aw sk | etch to draw the fla | w. N/A | ۱. |
| | 1 | 3. | <u>Classify Fl</u> proximity r | <u>aw.</u> Co ule of IV | mbine fla VA-3300 | aws in clos , Section 2 | se proxii XI of the | nity t ASN | to other flaws and to ME Code. Classify f | the su law as | urface per the either: |
| | | | 1 | nside S Outside Subsurf | urface Surface ace | <u>Flaw is s</u> y=s/a=3 | <u>subsurfa</u> 3.2/0.29 | <u>ice p</u> 7=10 | <u>er table IWB-3510-1 9.77>0.4, Use y=1.0</u> | I <u>, Note</u> | <u>(4)</u> |
| | | 4. | <u>Determine</u> surface, in listed in Ta | Vessel put 0 fo able A-1 | Wall Ge r clad thi of Appe | <u>ometry.</u> If ckness, el ndix A for | f the flav Ise enter the spe | v is c r the cifiec | lassified as subsurf analysis value for c I weld region. | ace or lad thic | outside kness as |
| | | | | Cladding Low Allo Total thi | g Thickno by Steel ⁻ ckness, f | ess, t _{clad} = Thickness t = t _{clad} + t | = 5, t _{LAS} = t _{LAS} = | <u>0.00</u> <u>7.20</u> <u>7.20</u> | <u>2</u> (in) <u>2</u> (in) <u>2</u> (in) | | |
|) | | | | | | | | | , | | |
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| NUCLEAR ENGINEERING | CALCULATION C | ONTINUATION SHEE | T Page _D2_ (Next _D3_) | | | | | |
|--|--|---|--|--|--|--|--|--|
| Nine Mile Point Nuclear | Station Unit: 1 | Calculation No. | Disposition: | | | | | |
| Ref. GE Nuclear Ener | gy | GENE | -B13-01805-124, Rev. 0 DRF # B13-02025-00 | | | | | |
| 1) | line Mile Point Unit 1 Flaw E | valuation Worksheet cont'd | i) | | | | | |
| , | Flaw ID: | <u>1-112</u> | | | | | | |
| 5. <u>Size Flaw.</u> cladding. | Calculate flaw depth, includir | ng any portion of the flaw e | extending into the | | | | | |
| Surface Flaws: Flaw Depth, $a = \underline{N/A}(in)$ Flaw Length, $L = \underline{N/A}(in)$ Subsurface Flaws: Flaw Depth, $2a = \underline{0.594}(in)$ Half Depth, $a = \underline{0.297}(in)$ Flaw Length, $L = \underline{1.25}(in)$ Distance to Surface as defined in IWA-3300, $S = \underline{3.20}(in)$ | | | | | | | | |
| 6. <u>Calculate A</u> | spect Ratio of Flaw. | | | | | | | |
| Flaw Aspec | Ratio, $a/L = 0.238$ | | , | | | | | |
| <u>IWB-3500 Flaw Evaluation</u>. For the given a/L aspect ratio, determine the allowable flaw depth, a (surface) and 2a (subsurface), in accordance with IWB-3510 of the Code and record the value below. If the flaw depth recorded in step 5 is below the allowable valu check the box "Acceptable per IWB-3500" below. Otherwise, check the box "Unacceptable per IWB-3500" and continue to step 8. | | | | | | | | |
| Inside Sur IWB- | face Flaw: 3500 Allowable Depth = a = | <u>N/A(in)</u> | | | | | | |
| Outside Surface Flaw (top head, head flange, vessel flange regions only): IWB-3500 Allowable Depth = $a = \frac{N/A}{in}$ | | | | | | | | |
| Subsurfac IWB- | e Flaw: 3500 Allowable Depth = 2a = <i>a/t=3.5%for y=1</i> . | = <u>0.504(</u> in)<0.594" per IWL .0 tmeas =7.20" therefore a | B-3510-1, allowed a=7.20*3.5%=0.252" | | | | | |
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| | | | | CALCULATION | | JATION SHEET | Page _D3_ (Next _ <i>D4</i>) | | |
|---|--|---|---|---|---|--|---|--|--|
| 5 | Nine | Mile Point Nuclear | Station | Unit: 1 | | D | isposition: | | |
| | Origi B. (| nator/Date | 497 | Checker/Date A. Tsirigotis | 5.25.99 | Calculation No. SOVESSELM030 | Revision 00 | | |
| | Ref. | GE Nuclear Ener | rgy | | | GENE-B13-0180 DRF # | 05-124, Rev. 0 B13-02025-00 | | |
| | ; ; | 1) | Nine Mi | le Point Unit 1 Flav Flaw | v Evaluation ID: <u>1-112</u> | Worksheet cont'd) | | | |
| | ACCEPTABILITY: Acceptable per IWB-3500 Unacceptable per IWB-3500 (Site Corrective Action Program Activity required) | | | | | | | | |
| | 1 | D |)ER# 1- | 1999-1640 Initiated | 1 | | | | |
| | | 8. <u>IWB-3600 I</u> number fro curve for th allowable v box "Unacc | Flaw Ex m Sect le spec value, cl ceptable | <u>valuation.</u> Record to ion 3.0. Record the ified orientation. If heck the box "Acce e per IWB-3600", a | the appropria allowable fla the flaw dep ptable per IV nd proceed t | ate flaw acceptance diagra aw depth, a or 2a, from th th recorded in step 5 is be VB-3600" below. Otherwi to step 9. | am Figure e appropriate elow the se, check the | | |
| | | NOTE: Ou limiting. Fl any region | tside su aw spe below ⁻ | urface flaws for ves cific analysis would the vessel flange. | sel and botto I be required | om head regions are not c I if outside surface flaws w | onsidered /ere found in | | |
| | | Figure # <u>D</u> | <u>-3</u> | | | | | | |
| | | Inside Sur اا | f ace F l WB-360 | law: 00 Allowable Depth | i=a= <u>N/A</u> | (in) | | | |
| | | Outside S ا | urface WB-360 | Flaw (top head, h 00 Allowable Depth | ead flange, = a = <u>N/A</u> | vessel flange regions or (in) | nly): | | |
| | | Subsurfac | e Flaw WB-360 | : 00 Allowable Depth | = 2a = <u>1.55</u> | <u>(</u> (in) <i>>0.594</i> | | | |
| | | | | | | | | | |

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| Nine Orig | Milo P | | | | | | (Next <u>05</u>) |
|--------------|---------------|-----------------------------------|--|--|---|---|---|
| Ong R | | | Disposition: | | | | |
| Ref. | Corieri GI | ి గించి E Nuclear Ener | Izul(49 rgy | A. Tsirigotis | AT5.25.99 | GENE-B13-018 | 00 05-124, Rev. 0 |
| | 9. | (f ACCEPTA | Nine Mi BILITY Acce Unac identif imit, fla <u>N/A</u> (in) | le Point Unit Pptable per IV cceptable per ied above, re w removal is | 1 Flaw Evaluation Flaw ID: <u>1-112</u> /B-3600 IWB-3600 ecord the 1/3 wall acceptable. Othe | DRF # Worksheet cont'd) (for <u>28</u> EFPY) thickness limit below. If fla | B13-02025-00 aw depth is ssary. |
| | | From step F 2 Flaw depth | 5 abov Flaw de 2a +s - (n < 1/3 l | e: pth = a = <u>N/A</u> (clad thicknes Limit: Flaw r e | (surface) ss, if applicable) = emoval acceptab | N/A(subsurface) Ie (No weld repair) | • |
| | | Flaw depth | n > 1/3 | Limit: Weld r | epair required | | |
| | | 9. | (I ACCEPTA 9. From figure below 1/3 I 1/3 Limit = From step F 2 Flaw depth Flaw depth | (Nine Mi ACCEPTABILITY △Acce □Unac 9. From figure identifi below 1/3 limit, fla 1/3 Limit = <u>N/A(in)</u> From step 5 abov Flaw de 2a +s - 0 Flaw depth < 1/3 I Flaw depth > 1/3 I | (Nine Mile Point Unit ACCEPTABILITY: Acceptable per IW Unacceptable per IW Unacceptable per 9. From figure identified above, re below 1/3 limit, flaw removal is 1/3 Limit = <u>N/A</u> (in) From step 5 above: Flaw depth = a = <u>N/A</u> 2a +s - (clad thicknes) Flaw depth < 1/3 Limit: Flaw re Flaw depth > 1/3 Limit: Weld re | <pre>(Nine Mile Point Unit 1 Flaw Evaluation Flaw ID: <u>1-112</u> ACCEPTABILITY:</pre> | ORF # (Nine Mile Point Unit 1 Flaw Evaluation Worksheet cont'd) Flaw ID: 1-112 ACCEPTABILITY: △Acceptable per IWB-3600 (for 28 EFPY) △Unacceptable per IWB-3600 (for 28 EFPY) △Imit flaw removal is acceptable. Otherwise, weld repair is nece 1/3 Limit: Flaw removal acceptable (No weld repair) Flaw depth < 1/3 Limit: Weld repair required Imit Height > 1/3 Limit: Weld repair required |

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GERIS 2000 Indication Evaluation Data Sheet

GE Nuclear Energy

Project : Nine Mile Point Unit-1 Weld ID : RV-WD-099 Patch ID : C4-11

Flaw Throughwall Dimension = 0.594 Flaw Length "I" = 1.25 Surface Separation "S" = 3.20

- Exam Data Sheet : 1-15 Ind. Data Sheet : 1-112 Indication : 112
 - *"T" nominal* = 7.13 *"T" measured* = 7.20
- Clad "T" nominal = 0.22

ASME Section XI, 1983 Edition, Summer 83 Addenda TABLE IWB-3510-1 for 4" and Greater

| a/l | Surface % | Subsurface % | Surface % | Subsurface % |
|------|-----------|--------------|-----------|--------------|
| 0.00 | 1.8 | 2.3 | ~ | ~ |
| 0.05 | 2.0 | 2.4 | ج , | ~ |
| 0.10 | 2.2 | 2.6 | - | ~ |
| 0.15 | 2.4 | 2.9 | ~ | ~ |
| 0.20 | 2.7 | 3.2 | 3.00 | 3.50 Y |
| 0.25 | 3.1 | 3.6 | ~ | ~ |
| 0.30 | 3.5 | 4.1 | ~ | ~ |
| 0.35 | 3.5 | 4.6 | ~ | - |
| 0.40 | 3.5 | 5.2 | ~ | - |
| 0.45 | 3.5 | 5.8 | - | ~ |
| 0.50 | 3.5 | 6.5 | ~ | ~ |
| | | - | Allowed | Allowed |
| | | | 3.00 | 3.50 |

| a = | 0.297 |
|-------------|-------|
| a/l value = | 0.238 |
| Y = | 1.000 |

Flaw is Subsurface

Allowed a/t = 3.50% a/t = 4.13%

Flaw is unacceptable by Table IWB-3510-1.

| Comments : | Flaw is circumferential. | |
|------------|-------------------------------|----------|
| | Separation "S" measured to ID | surface. |

| Analyst: CAM | Reviewed By: the C. Light |
|--|------------------------------|
| Level: <u>III</u> Date: <u>5/16/99</u> | Level: Date: <u>S-19-9</u> 9 |

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| | NUCLEAR ENGINEERING | CALC | ULATION CONTIN | UATION SHEET | Page _E1_ (Next <u>£</u> 2_) |
|---|--|---|--|---|---|
| | Nine Mile Point Nuclear | Station | Unit: 1 | D | isposition: |
| | Originator/Date | whigh Checker/D | oate gotis # 5.25.99 | SOVESSELM030 | 00 |
| | Ref. GE Nuclear Ene | irgy | , , , , , , , , , , , , , , , , , , , | GENE-B13-0180 DRF # |)5-124, Rev. 0 B13-02025-00 |
| : | | | ATTACHMENT E | | |
| | NIN | E MILE POINT | UNIT 1 FLAW EVALU | IATION WORKSHEET | |
| | | | Flaw ID: <u>1-113</u> | | |
| | <u>Determine</u> nearest we junction be be conserv | Region and Ori ald. The orienta tween two welc atively used. | <u>ientation of Flaw.</u> The tion is either [A]xial or Is, the region with the | weld region should be ider [C]ircumferential. If the fla more limiting acceptance c | ntified by the w is at a riteria should |
| | F | Region: <u>R\</u> Orientation: <u>cir</u> | /-WD-099 cumferential | • | |
| | 2. <u>Sketch Fla</u> | w Geometry. U | Ise the attached flaw s | ketch to draw the flaw. N// | 4 |
| | 3. <u>Classify Fla</u> proximity r | <u>aw.</u> Combine fl ule of IWA-330(| aws in close proximity), Section XI of the AS | to other flaws and to the so ME Code. Classify flaw as | urface per the either: |
| | | nside Surface Outside Surface Subsurface | Flaw is subsruface y=s/a=3.20/.297=1 | <u>because per table IWB-351</u> 0.77>0.4, use y=1 | <u>0-1, Note (4)</u> |
| | 4. <u>Determine</u> surface, in listed in Ta | <u>Vessel Wall Ge</u> put 0 for clad th able A-1 of Appe | cometry. If the flaw is ickness, else enter the endix A for the specifie | classified as subsurface or analysis value for clad thic d weld region. | outside ckness as |
| | | Cladding Thickn _ow Alloy Steel Total thickness, | tess, $t_{clad} = 0.0$ Thickness, $t_{LAS} = 7.2$ $t = t_{clad} + t_{LAS} = 7.2$ | <u>10</u> (in) <u>20</u> (in) 20(in) | |
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CALCULATION CONTINUATION SHEET

| Nine | e Mile P | oint Nuclear Station | ι | Jnit: 1 | l | | | | Disposi | tion: |
|---------------|------------------------|--|---|--|--|--|---|--|--|--------------------------------|
| Origi B. (| inator/Date Corieri | R. 5124155 | Checker/Date A. Tsirigotis | A. | 5.25. | 99 | Calculation SOVES | No. SELM030 | | Revision 00 |
| Ref. | GI | E Nuclear Energy | | <u>, ,</u> | | | | GENE- | B13-01805-124 DRF # B13-02 | , Rev. 0 2025-00 |
| | | (Nine Mi | le Point Unit | 1 Fla | w Evalu | ation ^v | Worksho | eet cont'd) | | |
| | | | | Flaw | / ID: <u>1-1</u> | <u>13</u> | | | | |
| | 5. | Size Flaw. Calcul cladding. | ate flaw dept | h, inc | luding a | ny po | rtion of t | the flaw e> | dending into | the |
| | | Surface Flaws: Flaw Depth, a = Flaw Length, L = | <u>N/A</u> (in) <u>N/A</u> (in) | | Subsu Flaw De Half Dep Flaw Lep Distance in IWA-3 | rface pth, 2 oth, a ngth, l e to Si 3300, | Flaws: 2a = <u>0</u> = <u>0</u> L = <u>3</u> urface a S = <u>3</u> | <u>.594</u> (in) <u>.297</u> (in) <u>.25</u> (in) s defined . <u>20</u> (in) | | . • |
| | 6. | Calculate Aspect I | Ratio of Flaw | <u>.</u> | | | | | | |
| | | Flaw Aspect Ratio, | a/L = <u>0.091</u> | | | | | | | |
| | 7. | IWB-3500 Flaw Ev depth, a (surface) record the value b check the box "Ac "Unacceptable per | <u>valuation.</u> Fo and 2a (subs elow. If the f ceptable per r IWB-3500" a | or the surfac law c IWB- and c | given a/ ce), in ac lepth rec -3500" b continue | L asp corda ordec elow. to ste | bect ratic ance with d in step Otherw ep 8. | o, determir h IWB-351 5 is belov vise, check | ne the allowa 10 of the Cod v the allowab c the box | ble flaw e and le value, |
| | | Inside Surface F IWB-3500 A | l aw: Illowable Dep | oth = | a = <u>N/</u> | ′ <u>A(</u> in) | | | | |
| | | Outside Surface IWB-3500 A | Flaw (top he | ead, I oth = | h ead fla a = <u>N/</u> | nge, v ′ <u>A</u> (in) | vessel f | lange reg | ions only): | |
| | | Subsurface Flaw IWB-3500 A a | : Ilowable Dep /t=2.57% for | oth = y=1.0 | 2a = <u>0.</u> 0 tmeas: | <u>370</u> (ir =7.20 | ר)<0.594 therefc" | 1 per IWB- pre a=7.20 | 3510-1, allov *2.57%=0.18 | ved 85" |
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| NUCLEAR ENGINEERING | |

CALCULATION CONTINUATION SHEET

| | | Vuclear Station | | | |
|----------|---|---|--|--|---|
| Originat | lor/Date | RL 5124/99 | Checker/Date | Calculation No. | |
| R. CO | GE Nu | lear Energy | A. TSINYOUS 7/1 5-65-7 | GE | NE-B13-01805-124, Rev. 0 |
| | | (Nine Mi | le Point Unit 1 Flaw Evalua | ation Worksheet cor | DRF # B13-02025-00 |
| | | | Flaw ID: <u>1-11</u> | <u>3</u> | |
| | AC | CEPTABILITY Acceptal Unaccep Program DER# 1- | 7: ble per IWB-3500 btable per IWB-3500 (Site Activity required) -1999-1640 Initiated | Corrective Action | |
| | 8. <u>IWI</u> nur cur allo box NC lim | <u>B-3600 Flaw Ev</u> nber from Sect ve for the spec wable value, c "Unacceptable DTE: Outside su iting. Flaw spe | valuation. Record the apprison 3.0. Record the allowal ified orientation. If the flaw heck the box "Acceptable p e per IWB-3600", and proc urface flaws for vessel and ecific analysis would be req | opriate flaw accept ole flaw depth, a or depth recorded in per IWB-3600" below eed to step 9. bottom head regior uired if outside surf | ance diagram Figure 2a, from the appropriat step 5 is below the w. Otherwise, check th ns are not considered ace flaws were found ir |
| | an <u>y</u> Fig | y region below ure # <u>D-3</u> | the vessel flange. | | |
| | Ins | ide Surface F IWB-36 | law: 00 Allowable Depth = a = | <u>N/A(</u> in) | |
| , | Ou | tside Surface IWB-36 | Flaw (top head, head flam 00 Allowable Depth = a = | nge, vessel flange <u>N/A(</u> in) | regions only): |
| | Su | bsurface Flaw IWB-360 | : 00 Allowable Depth = 2a = | <u>1.26(</u> in) <i>>0.594</i> | |
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CALCULATION CONTINUATION SHEET

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| Origina | ator/Date | | Checker/Date | Calculation No. | Revision |
|---------|-------------|--|--|--|-----------------------------------|
| R. C | orieri | RL 5724144 | A. Tsirigotis A 5.25.99 | SOVESSELM030 | 00 |
| Ref. | GE Nu | iclear Energy | • | GENE-B13-01 DRF | 805-124, Hev. 0 # B13-02025-00 |
| | | (Nine M | ile Point Unit 1 Flaw Evaluati | on Worksheet cont'd) | |
| | | | Flaw ID: <u>1-113</u> | | |
| | A | CCEPTABILITY | f: eptable per IWB-3600 cceptable per IWB-3600 | (for <u>28</u> EFPY) | |
| | 9. Fr be | om figure identi Iow 1/3 limit, fla | fied above, record the 1/3 wa w removal is acceptable. Ot | II thickness limit below. If f herwise, weld repair is nece | law depth is essary. |
| | 1/3 | 3 Limit = <u>N/A</u> (in |) | | |
| | Fr | om step 5 abov Flaw de 2a +s - | re: pth = a = <u>N/A</u> (surface) (clad thickness, if applicable) | = <u>N/A</u> (subsurface) | , |
| | FI FI | aw depth < 1/3 aw depth > 1/3 | Limit: Flaw removal accepta Limit: Weld repair required | able (No weld repair) | |
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GERIS 2000 Indication Evaluation Data Sheet

GE Nuclear Energy

Project : Nine Mile Point Unit-1 Weld ID : RV-WD-099 Patch ID : C4-11

Flaw Throughwall Dimension = 0.594 Flaw Length "I" = 3.25 Surface Separation "S" = 3.20

Exam Data Sheet: 1-15 Ind. Data Sheet: 1-113 Indication : 113

> "T" nominal = 7.13 "T" measured = 7.20

Clad "T" nominal = 0.22

ASME Section XI, 1983 Edition, Summer 83 Addenda TABLE IWB-3510-1 for 4" and Greater

| - | | Outputers 0/ | Surface % | Subcurface % |
|------|-----------|--------------|-----------|---------------------|
| a/I | Surface % | Subsurface % | Sunace % | Subsuliate 70 |
| 0.00 | 1.8 | 2.3 | ~ | ~ |
| 0.05 | 2.0 | 2.4 | 2.17 | 2.57 [°] Y |
| 0.10 | 2.2 | 2.6 | ~ | ~ |
| 0.15 | 2.4 | 2.9 | ~ | - |
| 0.20 | 2.7 | 3.2 | - | - |
| 0.25 | 3.1 | 3.6 | · | - |
| 0.30 | 3.5 | 4.1 | ~ | - |
| 0.35 | 3.5 | 4.6 | ~ | - |
| 0.40 | 3.5 | · 5.2 | ~ | - |
| 0.45 | 3.5 | 5.8 | - | ~ |
| 0.50 | 3.5 | 6.5 | ~ | ~ |
| | | - | Allowed | Allowed |
| | | | 2.17 | 2.57 |

| a = | 0.297 |
|-------------|-------|
| a/l value = | 0.091 |
| Y = | 1.000 |

Flaw is Subsurface

Allowed a/t = 2.57% 4.13% a/t =

Flaw is unacceptable by Table IWB-3510-1.

Comments : Flaw is circumferential. Separation "S" measured to ID surface.

| Analyst: | 7 |
|----------|----------------|
| | Date: 5/11/195 |

Level: Date: 5-19-99









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Figure D-3. Non-Beltline, Vessel Flange Horizontal Weld Subsurface Flaw @ 28 EFPY

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| | | | | 1 | CALCU | JLATION | | NUAT | | HEET | | Page _ (Next _ | F1_ F2_) |
|---|--------|-----------------------|--|--|--|--|--|--|----------------------------------|-----------------------------------|--------------------------------|-------------------------------------|---------------------|
| G | Nine | Mile P | oint Nuclea | r Station | | Unit: 1 | | | | | Di | spositio | n: |
| | Origii | nator/Date Corieri | B Rcst | 24(૧૧ | Checker/Da | otis A | 5.25.99 | | VESSE | _M030 | * | 0 | |
| | Ref. | G | E Nuclear En | ergy | <u></u> | | | | | GENE-B | 13-0180 DRF # E | 5-124, R 313-0202 | ev. 0 25-00 |
| | | | | I. | | | | | | | | | |
| | | | | | | ATTAC | HMENIF | | | | | | |
| | | | NI | NE MILE | POINT L | JNIT 1 FL | AW EVALI | JATIC | ON WO | RKSHEE | ΞT | | |
| | | | , | | | Flaw | ID: <u>1-114</u> | | | | | | |
| | | 1. | Determine nearest w junction b be conse | e Regior reld. The etween rvatively | <u>and Orie</u> e orientati two welds used. | entation of ion is eithe s, the regio | Flaw. The er [A]xial or on with the | e weld r [C]irc more | l region cumfere `limiting | should I ential. If accepta | be iden the flav ance cr | tified by v is at a iteria sl | y the a hould |
| | | × | | Region: Orienta | tion: <u>circ</u> | -WD-099 umferenti | al | | | • | | | |
| P | | 2. | Sketch Fl | <u>aw Geor</u> | <u>netry.</u> Us | se the atta | iched flaw | sketch | n to drav | w the fla | .w. N/A | L | |
| | | 3. | <u>Classify F</u> proximity | <u>law.</u> Co rule of I | mbine fla NA-3300, | ws in clos , Section > | se proximity XI of the AS | y to ot SME C | her flaw Code. C | vs and to Classify f | o the su flaw as | irface p either: | er the |
| | | | | Inside S Outside Subsur | Surface Surface face | <u>Flaw is s</u> <u>y=s/a=3</u> | subsurfase 3.2/0.297=1 | <u>per ta</u> 10.77> | <u>ible IWI</u> >0.4, us | <u>3-3510-</u> e y=1.0 | <u>1, Note</u> | <u>(4)</u> | |
| | | 4. | <u>Determin</u> surface, in listed in T | e Vessel nput 0 fc able A-1 | Wall Geo or clad thic of Apper | <u>ometry.</u> If ckness, el ndix A for | the flaw is se enter th the specific | class e ana ed we | ified as lysis va ld regio | subsurf lue for c n. | ace or lad thic | outside kness a | as |
| | | | | Claddin Low Alle Total th | g Thickne oy Steel 7 ickness, t | ess, t _{clad} = Thickness : = t _{clad} + t | $t_{LAS} = \frac{0.1}{7.1}$ $t_{LAS} = \frac{7.1}{7.1}$ | <u>00(</u> in) <u>20(</u> in) 20(in) | | | | ı | |
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| | Data | | Chaeker/Data | | | Calculation No. | | Revision | | |
|-------------|---|---|---|---|--|---|---|--------------------------------|--|--|
| Driginator/ | Date Pri | Rc 5/24/99 | A. Tsirigotis | 7-5-2 | 5.99 | SOVESSELM03 | 0 , • | 00 | | |
| ef. | GE Nuc | lear Energy | . <u>1</u> | <u></u> | <u> </u> | GEN | E-B13-01805-124 DRF # B13-0 | l, Rev. 0 2025-00 | | |
| | | (Nine M | lile Point Unit 1 F | -law Ev | aluation | Worksheet cont | 'd) | | | |
| | | , | Fi | aw ID: <u>-</u> | <u>1-114</u> | | | | | |
| | 5. <u>Size Flaw.</u> Calculate flaw depth, including any portion of the flaw extending into the cladding. | | | | | | | | | |
| х | Su Fla Fla | rface Flaws: w Depth, a = w Length, L = | <u>N/A</u> (in) <u>N/A</u> (in) | Sut Flaw Half Flaw Dista in IW | Depth, 2 Depth, 2 Depth, a Length, ince to S /A-3300, | Flaws: 2a = 0.594(in) = 0.297(in) L = 3.50(in) surface as define S = 3.20(in) | d | | | |
| | 6. Cal | culate Aspect | Ratio of Flaw. | | | | | | | |
| | Fla | w Aspect Ratio | , $a/L = 0.085$ | | | | | | | |
| | 7. <u>IWI</u> dep rec che "Ur | <u>B-3500 Flaw E</u> oth, a (surface) ord the value l ock the box "A nacceptable pe | <u>valuation.</u> For t and 2a (subsur below. If the flav cceptable per IW or IWB-3500" and | he giver face), ir v depth /B-3500 d contir | n a/L asp n accorde recorde)" below. nue to ste | Dect ratio, deterr ance with IWB-3 d in step 5 is be Otherwise, che ap 8. | nine the allowa 510 of the Coc low the allowat eck the box | ble flav le and ble valu | | |
| | Ins | ide Surface F IWB-3500 | law: Allowable Depth | = a = | <u>N/A(</u> in) | | | | | |
| | Ou | tside Surface IWB-3500 | Flaw (top head Allowable Depth | d, head = a = | flange, <u>N.A</u> (in) | vessel flange r | egions only): | | | |
| | Su | bsurface Flav IWB-3500 | v: Allowable Depth a/t=2.54% for y= | = 2a = 1.0 tme | <u>0.366(</u> ii eas =7.20 | n)<0.594 per IW 0" therefore a=7 | /B-3510-1, allo 20*2.54%=0.1 | ved 83" | | |
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| line Mile | Point Nuclear Station | L | Jnit: 1 | | Disposition: |
|--|--|--|---|---|---|
| Originator/E | pate ri Rc 5124199 | Checker/Date A. Tsirigotis | A-5.75.99 | Calculation No. SOVESSELM030 | Revisior 00 |
| lef. | GE Nuclear Energy | | | GENE-B13 DI | -01805-124, Rev. 0 RF # B13-02025-00 |
| | (Nine M | 1ile Point Unit | 1 Flaw Evaluation | Worksheet cont'd) | |
| | | | Flaw ID: <u>1-114</u> | | |
| | ACCEPTABILIT Accepta Unacce Program DER# 1 | Y: able per IWB-3 ptable per IWI n Activity requ 1-1999-1640 Ir | 8500 B-3500 (Site Corr ired) <i>hitiated</i> | ective Action | |
| 8. <u>IWB-3600 Flaw Evaluation</u> . Record the appropriate flaw acceptance diagram Figure number from Section 3.0. Record the allowable flaw depth, a or 2a, from the appropriate curve for the specified orientation. If the flaw depth recorded in step 5 is below the allowable value, check the box "Acceptable per IWB-3600" below. Otherwise, check box "Unacceptable per IWB-3600", and proceed to step 9. | | | | | |
| | NOTE: Outside s limiting. Flaw sp any region below | surface flaws for ecific analysis I the vessel fla | or vessel and botto would be required inge. | om head regions are r d if outside surface fla | not considered ws were found i |
| | Figure # <u>D-3</u> | | | | |
| | Inside Surface I IWB-36 | Flaw: 600 Allowable | $Depth = a = \underline{N/A}$ | (in) | |
| | Outside Surface IWB-36 | e Flaw (top h e 600 Allowable | ead, head flange, Depth = a = <u>N/A</u> | vessel flange regior (in) | ns only): |
| | Subsurface Flav IWB-36 | w: 500 Allowable | Depth = 2a = <u>1.2</u> 4 | <u>4(</u> in) <i>>0.594</i> | |
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GERIS 2000 Indication Evaluation Data Sheet

Project : Nine Mile Point Unit-1 Weld ID : RV-WD-099 Patch ID : C4-11

Flaw Throughwall Dimension = 0.594 Flaw Length "I" = 3.50 Surface Separation "S" = 3.20

GE Nuclear Energy

Exam Data Sheet : 1-15 Ind. Data Sheet : 1-114 Indication : 114

"T" nominal = 7.13 "T" measured = 7.20 Clad "T" nominal = 0.22



ASME Section XI, 1983 Edition, Summer 83 Addenda TABLE IWB-3510-1 for 4" and Greater

| | | - · · · | 0 (0) | Outrainfactor (/ |
|------|--------------|--------------|-----------|------------------|
| a/l | Surface % | Subsurface % | Surface % | Subsurface % |
| 0.00 | 1.8 | 2.3 | ~ | ~ |
| 0.05 | 2.0 | 2.4 | 2.14 | 2.54 Y |
| 0.10 | 2.2 | 2.6 | ~ | - |
| 0.15 | 2.4 | 2.9 | ~ | ~ |
| 0.20 | 2.7 | 3.2 | ~ | ~ |
| 0.25 | 3.1 | 3.6 | | ~ |
| 0.30 | 3.5 | 4.1 | ~ | ~ |
| 0.35 | × 3.5 | 4.6 | ~ | ~ |
| 0.40 | 3.5 | 5.2 | ~ | ~ |
| 0.45 | 3.5 | 5.8 | ~ | - |
| 0.50 | 3.5 | 6.5 | ~ | ~ |
| | | - | Allowed | Allowed |
| | | | 2.14 | 2.54 |

| a = | 0.297 |
|-------------|-------|
| a/I value = | 0.085 |
| Y = | 1.000 |

Flaw is Subsurface

| Allowed a/t = | 2.54% |
|---------------|-------|
| a/t = | 4.13% |

Flaw is unacceptable by Table IWB-3510-1.

Comments : Flaw is circumferential. Separation "S" measured to ID surface.

| | Reviewed By: 2 L C. D. J |
|--------------------------|--------------------------|
| Level: TTT Date: 5/12/99 | Level: Date: 5-19-99 |

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Figure D-3. Non-Beltline, Vessel Flange Horizontal Weld Subsurface Flaw @ 28 EFPY



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CALCULATION CONTINUATION SHEET

| | Nine | a Mile P | oint Nuclear Station | | Unit: 1 | | | Disposi | tion: |
|---|-----------|-------------|--|---|---|---|---|--|-------------------------|
| | Orig R | inator/Date | PL 5/24/17 | Checker/Dat | entis A5.25. | 99 | Calculation No. SOVESSELM030 | | Revision 00 |
| | Ref. | GI | E Nuclear Energy | 7.0.19- | | | GENE-B1 | 3-01805-124 | Rev. 0 |
| | | | | | | | - | | .020 00 |
| | | | | | ATTACHME | NT G | | | |
| | | | NINE MILE | POINT U | NIT 1 FLAW E | VALUA | TION WORKSHEET | Г | |
| | | | • | | Flaw ID: <u>1</u> - | 115 | | | |
| | | 1. | Determine Region nearest weld. The junction between t be conservatively | and Orie orientatio wo welds used. | <u>ntation of Flaw</u> on is either [A] , the region wit | <u>z.</u> The v xial or [h the m | veld region should be C]ircumferential. If the source limiting acceptant | e identified ne flaw is a nce criteria | by the t a should |
| | | | Region: Orientat | ion: <u>circu</u> | WD-099 umferential | | | | |
|) | | 2. | Sketch Flaw Geor | <u>netry.</u> Us | e the attached | flaw sk | etch to draw the flaw | /. N/A | |
| | | 3. | Classify Flaw. Co proximity rule of IV | mbine flav VA-3300, | ws in close pro Section XI of t | ximity t he ASN | o other flaws and to IE Code. Classify fla | the surface aw as eithe | e per the er: |
| | | | Inside S Outside Subsurl | ourface Surface face | <u>Flaw is subsu</u> y=s/a=3.2/0.3 | <u>rface p</u> 276=11 | <u>er table IWB-35-10-1</u> .59>0.4, y=1.0 | <u>, Note (4)</u> | |
| | | 4. | Determine Vessel surface, input 0 fo listed in Table A-1 | Wall Geo r clad thic of Appen | <u>metry.</u> If the fl kness, else en dix A for the s | aw is cl ter the pecified | lassified as subsurfa analysis value for cla weld region. | ce or outsic ad thicknes | de s as |
| | | | Claddin Low Allo Total thi | g Thickne by Steel T ickness, t | ss, t _{clad} = hickness, t _{LAS} = t _{clad} + t _{LAS} = | = <u>7.20</u> <u>7.20</u> | <u>)(</u> in))(in))(in) | | |
|) | | - | | , | | | | | |

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| NX | NIAGARA MOHAWK |
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| NUCLEA | R ENGINEERING |

| Nine | e Mile P | oint Nuclear Station | Unit | :1 . | | Disposition: |
|------------|-------------------------|---|---|---|--|---|
| Orig R. | ginator/Date Corieri | Rc Stallag | Checker/Date A. Tsirigotis | 5.25,99 | Calculation No. SOVESSELM030 | Revision |
| Ref. | GE | E Nuclear Energy | <u> </u> | | GENE-B | 13-01805-124, Rev. 0 DRF # B13-02025-00 |
| | | (Nine Mi | le Point Unit 1 F | law Evaluation | Worksheet cont'd) | ۲ |
| | | • | Fla | w ID: <u>1-115</u> | | |
| | 5. | <u>Size Flaw.</u> Calcul cladding. | ate flaw depth, i | ncluding any po | ortion of the flaw ext | ending into the |
| | | Surface Flaws: Flaw Depth, a = Flaw Length, L = | <u>N/A</u> (in) <u>N/A(</u> in) | Subsurface Flaw Depth, a Half Depth, a Flaw Length, Distance to S in IWA-3300, | Flaws: 2a = 0.552(in) a = 0.276(in) L = 3.50(in) Surface as defined S = 3.20(in) | |
| | 6. | Calculate Aspect | Ratio of Flaw. | | | |
| | | Flaw Aspect Ratio, | a/L = <u>0.079</u> | | | `` |
| | 7. | IWB-3500 Flaw Ev depth, a (surface) record the value b check the box "Ac "Unacceptable pe | valuation. For th and 2a (subsurf elow. If the flaw ceptable per IW r IWB-3500" and | ne given a/L as ace), in accord depth recorde B-3500" below I continue to sta | pect ratio, determine ance with IWB-3510 d in step 5 is below Otherwise, check ap 8. | e the allowable flaw 0 of the Code and the allowable value the box |
| - | | Inside Surface F IWB-3500 A | law: Nowable Depth | = a = <u>N/A(</u> in) | | |
| | | Outside Surface IWB-3500 A | Flaw (top head | , head flange, = a = <u>N/A(</u> in) | vessel flange regi | ons only): |
| | | Subsurface Flaw IWB-3500 A | n: Allowable Depth <i>a/t=2.52%</i> | = 2a = <u>.363(</u> in <i>for y=1.0 tmea</i> |)<0.552" per IWB-3 s=7.20" therefore a | 510-1, allowed =7.20*2.52%=.181 |
| | | | | | | |

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| NUC | EAR ENGINEERING |

| line Mile Po | int Nuclear Station | (| Disposi | | |
|-------------------------------|---|---|--|---|--|
| Originator/Date B. Corieri | Rc 51241991 | A. Tsirigotis | A.5.7.5.99 | SOVESSELM030 | 00 |
| ef. GE | Nuclear Energy | <u>, , , , , , , , , , , , , , , , , , , </u> | | GENE-B13- DF | 01805-124, Rev. 0 RF # B13-02025-00 |
| | (Nine M | ile Point Unit | 1 Flaw Evaluation | Worksheet cont'd) | |
| | | * | Flaw ID: <u>1-115</u> | | |
| | ACCEPTABILITY Accepta Unacce Program DER# 1 | /: ble per IWB-(ptable per IW n Activity requ - <i>1999-1640 li</i> | 3500 B-3500 (Site Corr iired) nitiated | ective Action | · . |
| 8. | WB-3600 Flaw E number from Sec curve for the spec allowable value, o box "Unacceptabl | valuation. Reco tion 3.0. Reco bified orientation theck the box le per IWB-36 | ecord the appropria ord the allowable fl ion. If the flaw dep "Acceptable per IV 500", and proceed | ate flaw acceptance di aw depth, a or 2a, fror oth recorded in step 5 i NB-3600" below. Othe to step 9. | agram Figure n the appropria s below the erwise, check tl |
| | NOTE: Outside s limiting. Flaw spe any region below | urface flaws f ecific analysis the vessel fla | for vessel and botto would be required ange. | om head regions are n I if outside surface flav | ot considered vs were found i |
| | Figure # <u>D-3</u> | | | | |
| | Inside Surface F IWB-36 | ilaw: 600 Allowable | Depth = $a = \underline{N.A}$ | <u>(</u> in) | |
| | Outside Surface IWB-36 | e Flaw (top h 600 Allowable | ead, head flange, Depth = a = <u>N.A</u> | vessel flange region <u>(</u> in) | s only): |
| | Subsurface Flav IWB-36 | v: 600 Allowable | . Depth = $2a = 1.23$ | <u>3(</u> in) <i>>0.552</i> | |
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| Nine | Mile Pol | int Nuclear Station | , <u> </u> | Unit: 1 | | Disposition: |
|-------|------------|--|---|--|--|--|
| Origi | nator/Date | 2 6 5124/94 | Checker/Date | AE.26.99 | Calculation No. | , Revisio |
| Ref. | GE | Nuclear Energy | <u>, , , , , , , , , , , , , , , , , , , </u> | | GENE-B | 13-01805-124, Rev. 0 DRF # B13-02025-00 |
| | | (Nine M | ile Point Unit | 1 Flaw Evaluation | Worksheet cont'd) | |
| | | | | Flaw ID: <u>1-115</u> | | |
| | | ACCEPTABILIT Acce Una | /: eptable per IV cceptable pe | VB-3600 r IWB-3600 | (for <u>28</u> EFPY) | |
| | 9. I | From figure identi below 1/3 limit, fla | fied above, re w removal is | ecord the 1/3 wall acceptable. Othe | thicknėss limit below rwise, weld repair is | . If flaw depth is necessary. |
| | | 1/3 Limit = <u>N/A(</u> in |) | | | |
| | | From step 5 abov Flaw de 2a +s - | /e: epth = a = <u>N//</u> (clad thickne | <u>A</u> (surface) ss, if applicable) = | <u>N/A(</u> subsurface) | |
| | | Flaw depth < 1/3 Flaw depth > 1/3 | Limit: Flaw ro Limit: Weld r | emoval acceptab epair required | le (No weld repair) | |
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GERIS 2000 Indication Evaluation Data Sheet

Project: Nine Mile Point Unit-1. Weld ID: RV-WD-099 Patch ID: C4-11

Flaw Throughwall Dimension = 0.552 Flaw Length "I" = 3.50 Surface Separation "S" = 3.20

GE Nuclear Energy

Exam Data Sheet: 1-15 Ind. Data Sheet: 1-115 Indication: 115

"T" nominal = 7.13 "T" measured = 7.20 Clad "T" nominal = 0.22



ASME Section XI, 1983 Edition, Summer 83 Addenda TABLE IWB-3510-1 for 4" and Greater

| a/I | Surface % | Subsurface % | Surface % | Subsurface % |
|------|-----------|--------------|-----------|--------------|
| 0.00 | 1.8 | 2.3 | ~ | - |
| 0.05 | 2.0 | 2.4 | 2.12 | 2.52 Y |
| 0.10 | 2.2 | 2.6 | ~ | ~ |
| 0.15 | 2.4 | 2.9 | ~ | ~ |
| 0.20 | 2.7 | 3.2 | ~ | - |
| 0.25 | 3.1 | 3.6 | ~ | - |
| 0.30 | 3.5 | 4.1 | ~ | ~ |
| 0.35 | 3.5 | 4.6 | - | ~ |
| 0.40 | 3.5 | 5.2 | - | ~ |
| 0.45 | 3.5 | 5.8 | ~ | ~ |
| 0.50 | 3.5 | 6.5 | ~ | ~ |
| | | - | Allowed | Allowed |
| | | | 2.12 | 2.52 |

| a = | 0.276 |
|-------------|-------|
| a/l value = | 0.079 |
| Y = | 1.000 |

Flaw is Subsurface

Allowed a/t = 2.52% a/t = 3.83%

Flaw is unacceptable by Table IWB-3510-1.

Comments : Flaw is circumferential. Separation "S" measured to ID surface.

| | Reviewed By: JL C. D: 9 |
|-------------------------|-------------------------|
| Level: 14 Date: 5/12/95 | Level: Date: 5-19-99 |













Figure D-3. Non-Beltline, Vessel Flange Horizontal Weld Subsurface Flaw @ 28 EFPY





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| NUCLEAR ENGINEERING |

| Nine | Mile Point | Nuclear Station | | Unit: | 1 | | | Disposit | ion: |
|-------|---------------------------------|--|--|---|--|-----------------------------|--|---|-------------------------|
| Origi | nator/Date | P. Elsuign | Checker/Date | in P | | 00 | Calculation No. | | Revision 00 |
| Ref. | GE N | Iclear Energy | A. Isingu | 15 #7/ | 51651 | 79 | GENE-B13- | 01805-124, | Rev. 0 |
| | | | | | | | DR | IF # B13-02 | 025-00 |
| | | | | A | | | | | |
| | | | | ATTA | CHMEN | н | | | |
| | | NINE MILE | E POINT UI | NIT 1 F | LAW EV | ALUA | TION WORKSHEET | | |
| | | · | | Flav | v ID: <u>1-1</u> | <u>16</u> | | | |
| | 1. <u>De</u> ne jui be | etermine Region earest weld. Th action between e conservatively | n and Orier e orientatio two welds, v used. | n is eit the reg | <u>of Flaw.</u> her [A]xia gion with | The v al or [the m | weld region should be C]ircumferential. If the nore limiting acceptanc | identified e flaw is at ce criteria | by the t a should |
| | | Region Orienta | : <u>RV-V</u> ition: <u>circu</u> | VD-099 mferer | <u>9</u> , Itial | | | | |
| | 2. <u>S</u> I | etch Flaw Geo | <u>metry.</u> Use | e the at | tached fl | aw sk | etch to draw the flaw. | N/A | |
| | 3. <u>Cl</u> pr | <u>assify Flaw.</u> Co oximity rule of I | ombine flav WA-3300, S | vs in clo Section | ose proxi XI of the | mity t ASN | o other flaws and to th /E Code. Classify flav | e surface v as eithe | per the r: |
| | | Inside S Outside Subsu | Surface e Surface rface | <u>Flaw is</u> <u>y=s/a</u> : | <u>subsurfa</u> =2.5/0.27 | ace p 6=9.(| <u>er table IWB-3510-1, N</u> 06>0.4, y=1.0 | <u>Vote (4)</u> | |
| | 4. <u>De</u> su lis | etermine Vesse Irface, input 0 fo ted in Table A- | I Wall Geor or clad thick 1 of Append | <u>metry.</u> (ness, d dix A fo | If the flav else ente er the spe | v is c r the cified | lassified as subsurface analysis value for clad I weld region. | e or outsic I thickness | le s as |
| | | Claddir Low All Total th | ng Thicknes loy Steel Th nickness, t = | ss, t _{clad} nicknes = t _{clad} + | = s,t _{LAS} = ·t _{LAS} = | <u>0.00</u> 7.20 7.20 | 2(in) 2(in) 2(in) | | |
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| | N V NIAGARA MOHAWK |
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| L | IUCLEAR ENGINEERING |

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CALCULATION CONTINUATION SHEET

| Nine | Mile Point Nuclear Station Unit: 1 | | | | r | | <u></u> | Dispos | ition: |
|---------------|------------------------------------|---|--|--|--|---|--|--|-------------------------------|
| Origi R. (| inator/Dat Corieri | * RC 5/24/99 | A. Tsirigotis | A 5.25. | 99 | Calculation No. | 1030 | | 00 |
| Ref. | G | E Nuclear Energy | | <i></i> | | G | ENE-B13 D | -01805-124 RF # B13-0 | , Rev. 0 2025-00 |
| | | (Nine Mi | le Point Unit | 1 Flaw Evalu | ation ' | Worksheet c | ont'd) | 3 | |
| | | | | Flaw ID: <u>1-1</u> | <u>16</u> | | | | |
| | 5. | <u>Size Flaw.</u> Calcul cladding. | ate flaw dept | h, including a | any po | rtion of the fl | aw exter | nding into | the |
| | | Surface Flaws: Flaw Depth, a = Flaw Length, L = | <u>N/A(</u> in) <u>N/A(</u> in) | Subsu Flaw De Half De Flaw Le Distanc in IWA- | urface epth, 2 pth, a ngth, e to Si 3300, | Flaws: a = <u>0.552(</u> = <u>0.276</u> (il L = <u>2.50(il</u> urface as def S = <u>2.50(</u> il | (in) (in) າ) ined າ) | | • |
| | 6. | Calculate Aspect | Ratio of Flaw | <u>.</u> | | | | | |
| | | Flaw Aspect Ratio, | a/L = 0.110 | | | | | | |
| | 7. | IWB-3500 Flaw Ev depth, a (surface) record the value b check the box "Ac "Unacceptable pe | valuation. Fo and 2a (subs elow. If the f ceptable per r IWB-3500" a | r the given a surface), in a law depth re IWB-3500" b and continue | /L asp ccorda cordec elow. to ste | ect ratio, det ance with IWI I in step 5 is Otherwise, o p 8. | ermine t 3-3510 c below th check th | he allowa of the Cod ae allowab e box | ble flav le and le valu |
| | | Inside Surface F IWB-3500 A | law: Mowable Dep | $oth = a = \underline{N}$ | <u>/A(</u> in) | - | | | |
| | | Outside Surface , IWB-3500 A | Flaw (top he | ead, head flat $h = a = \frac{N}{2}$ | n ge, v / <u>A(</u> in) | vessel flang | e regior | ns only): | |
| | | Subsurface Flaw IWB-3500 A a | : Ilowable Dep /t=2.66% for | oth = 2a = <u>0</u> <i>y=1.0 tmeas</i> | <u>383</u> (ir <i>=7.20</i> | i)<0.552" pei therefore a= | - IWB-35 7.20*2.6 | 510-1, allo 66%=.192 | wed |
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| Ine Mile Poli | nt Nuclear Station | l | | Disposition: | |
|----------------------------------|---|---|--|---|--|
| Originator/Date B. Corieri | RC 514/91 | Checker/Date | A 5.7.5.99 | SOVESSELM030 | |
| lef. GE N | luclear Energy | | ······································ | GENE-B13 D | 3-01805-124, Rev. 0 RF # B13-02025-00 |
| | (Nine M | 1ile Point Unit | 1 Flaw Evaluation | Worksheet cont'd) | |
| | | | Flaw ID: <u>1-116</u> | | |
| A | ACCEPTABILIT Accepta VInacce Program DER# 1 | Y: able per IWB-3 ptable per IW n Activity requ 7-1999-1640 | 3500 B-3500 (Site Corr iired) | ective Action | |
| 8. <u> </u> n c a b | <u>WB-3600 Flaw E</u> umber from Sec urve for the spec llowable value, o ox "Unacceptab | Evaluation. Rection 3.0. Reco cified orientati check the box le per IWB-36 | ecord the appropri ord the allowable f on. If the flaw dep "Acceptable per l 600", and proceed | ate flaw acceptance d law depth, a or 2a, fro oth recorded in step 5 WB-3600" below. Oth to step 9. | liagram Figure om the appropriat is below the nerwise, check th |
| N li a | IOTE: Outside s miting. Flaw sp ny region below | surface flaws f ecific analysis v the vessel fla | or vessel and bott would be require ange. | om head regions are d if outside surface fla | not considered ws were found in |
| F | igure # <u>D-3</u> | | | , | |
| 1 | nside Surface F IWB-36 | Flaw: 600 Allowable | Depth = a = N/A | <u>.(in)</u> | i. |
| c | outside Surface IWB-36 | e Flaw (top h e 500 Allowable | ead, head flange, Depth = a = <u>N/A</u> | vessel flange regioi <u>(</u> (in) | ns only): |
| s | ubsurface Flav IWB-36 | w: 600 Allowable | Depth = 2a = <u>1.3</u> | <u>1(</u> in) <i>>0.552</i> | , |
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| Nine | e Mile Pol | int Nuclear Station | 1 | Unit: 1 | | Disposition: |
|------|------------------------|--|---|--|--|--------------------------------------|
| Orig | inator/Date Corieri | RC Stuiler | Checker/Date A. Tsirigotis | A5.25.99 | Calculation No. SOVESSELM030 | Revision 00 |
| Ref. | GE | Nuclear Energy | <u>, , , , , , , , , , , , , , , , , , , </u> | | GENE-B13-0 DRF | 1805-124, Rev. 0 - # B13-02025-00 |
| | | (Nine M | ile Point Unit | 1 Flaw Evaluation | Worksheet cont'd) | |
| | | | | Flaw ID: <u>1-116</u> | | |
| | | ACCEPTABILITY Acce Una | f: eptable per IV cceptable pe | VB-3600 r IWB-3600 | (for <u>28</u> EFPY) | |
| | 9. | From figure identi below 1/3 limit, fla | fied above, re aw removal is | ecord the 1/3 wall t acceptable. Othe | hickness limit below. If rwise, weld repair is ne | flaw depth is cessary. |
| | | 1/3 Limit = <u>N/A</u> (in |) | | | |
| | | From step 5 abov Flaw de 2a +s - | ve: epth = a = <u>N//</u> (clad thickne | <u>A</u> (surface) ss, if applicable) = | <u>N/A(</u> subsurface) | ĸ |
| | | Flaw depth < 1/3 Flaw depth > 1/3 | Limit: Flaw ro Limit: Weld r | emoval acceptabl repair required | le (No weld repair) | |
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GERIS 2000 Indication Evaluation Data Sheet

Project : Nine Mile Point Unit-1 Weld ID : RV-WD-099 Patch ID : C4-11

Flaw Throughwall Dimension = 0.552 Flaw Length "I" = 2.50 Surface Separation "S" = 2.50

GE Nuclear Energy

Exam Data Sheet : 1-15 Ind. Data Sheet : 1-116 Indication : 116

"T" nominal = 7.13 "T" measured = 7.20 Clad "T" nominal = 0.22



ASME Section XI, 1983 Edition, Summer 83 Addenda TABLE IWB-3510-1 for 4" and Greater

| a/l | Surface % | Subsurface % | Surface % | Subsurface % |
|------|-----------|--------------|-----------|--------------|
| 0.00 | 1.8 | 2.3 | ~ | ~ |
| 0.05 | 2.0 | 2.4 | ~ | ~ |
| 0.10 | 2.2 | 2.6 | 2.24 | 2.66 Y |
| 0.15 | 2.4 | 2.9 | ~ | ~ |
| 0.20 | 2.7 | 3.2 | ~ | ~ |
| 0.25 | 3.1 | 3.6 | ~ | ~ |
| 0.30 | 3.5 | 4.1 | ~ | ~ |
| 0.35 | 3.5 | 4.6 | ~ | ~ |
| 0.40 | 3.5 | 5.2 | - | ~ |
| 0.45 | 3.5 | 5.8 | ~ | ~ |
| 0.50 | 3.5 | 6.5 | ~ | ~ |
| | | • | Allowed | Allowed |
| | | | 2.24 | 2.66 |

| a = | 0.276 |
|-------------|-------|
| a/l value = | 0.110 |
| Y = | 1.000 |

Flaw is Subsurface

Allowed a/t = 2.66% a/t = 3.83%

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Flaw is unacceptable by Table IWB-3510-1.

| Separation "S" measured to ID surface. | |
|--|--------------------------|
| | |
| Analyst | Reviewed By: C. / |
| Level: Date: 5/1//55 | Level: 111 Date: 5.19.99 |



EXAM DS4 V2 7498



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Figure D-3. Non-Beltline, Vessel Flange Horizontal Weld Subsurface Flaw @ 28 EFPY



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CALCULATION CONTINUATION SHEET

| Nine Mile Point Nuclear Station | 1 | Unit: 1 | | l | Disposition: |
|--|---|--|--|--|---|
| Originator/Date | Checker/Date | A | <u> </u> | Calculation No. | Revisio |
| R. Corieri C SIP((4) | A. Isirigotis | TT. | 5.25.94 | GENE-B13-018 | 305-124, Rev. (|
| | | | | DRF # | # B13-02025-00 |
| | | ΑΤΤΑ | CHMENT I | | |
| NINE MILE | | T 1 FL | AW EVALU | ATION WORKSHEET | |
| | F | law ID | : <u>1-122/149</u> | | |
| 1. <u>Determine Region</u> nearest weld. The junction between be conservatively | <u>and Orienta</u> orientation two welds, th used. | ition of is eithe ie regio | <u>Flaw.</u> The par [A]xial or [on with the n | weld region should be ide [C]ircumferential. If the fla nore limiting acceptance | entified by the aw is at a criteria shoul |
| Region: Orienta | tion: <u>circum</u> | <u>D-099</u> ferenti | <u>al</u> | | |
| 2. <u>Sketch Flaw Geor</u> | <u>metry.</u> Use tl | he atta | ched flaw sł | ketch to draw the flaw. N | /Α |
| 3. <u>Classify Flaw.</u> Co proximity rule of I\ | ombine flaws WA-3300, Se | in clos | e proximity f (I of the ASN | to other flaws and to the s ME Code. Classify flaw a | surface per l s either: |
| Inside S Outside Subsur | Surface Surface face <u>Fla</u> | <u>aw is s</u> =s/a=2 | ubsurface p .10/0.227=9 | <u>er table IWB-3510-1, Not</u>).25>0.4, use y=1.0 | t <u>e (4)</u> |
| 4. <u>Determine Vessel</u> surface, input 0 fo listed in Table A-1 | Wall Geome or clad thickne of Appendix | etry. If ess, els A for | the flaw is c se enter the the specified | lassified as subsurface o analysis value for clad th d weld region. | r outside iickness as |
| Claddin Low Alle Total th | g Thickness, oy Steel Thic ickness, t = t | t _{clad} = kness, _{clad} + t | $t_{LAS} = \frac{0.00}{7.20}$ LAS = $\frac{7.20}{7.20}$ | <u>D</u> (in) D(in) D(in) | |
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| NUCLEAR ENGINEERING |
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CALCULATION CONTINUATION SHEET

| ninin 1 | - 1 | | Chaelies/Data | ····· | <u> </u> | Calculation No. | Bavision |
|---------|-----------|--|--|---|---|---|--|
| | ator/Date | RC 5124/ag | A Tsirigotis | A 5.75 | .99 | SOVESSELM030 | . 00 |
| ef. | GE | Nuclear Energy | | | <u> </u> | GENE-B13 D | 3-01805-124, Rev. 0 RF # B13-02025-00 |
| | | (Nine M | ile Point Unit | 1 Flaw Eva | luation \ | Worksheet cont'd) | |
| | | | Fla | aw ID: <u>1-12</u> | <u>2 /149</u> | | |
| | 5. | <u>Size Flaw.</u> Calcul cladding. | ate flaw dept | h, including | any poi | tion of the flaw exte | nding into the |
| | | Surface Flaws: Flaw Depth, a = Flaw Length, L = | <u>N/A</u> (in) <u>N/A(</u> in) | Subs Flaw [Half D Flaw L Distan in IWA | epth, 2 epth, 2 epth, a ength, l ce to Su -3300, s | Flaws: a = 0.453 (in) = 0.227 (in) = 7.75 (in) urface as defined S = 2.10 (in) | - |
| | 6. | Calculate Aspect | Ratio of Flaw | . ' | | | |
| | | Flaw Aspect Ratio, | a/L = <u>0.029</u> | | * | | |
| | 7. | IWB-3500 Flaw E depth, a (surface) record the value b check the box "Ac "Unacceptable pe | valuation. Fo and 2a (subs below. If the f cceptable per r IWB-3500" a | or the given surface), in law depth r IWB-3500" and continu | a/L asp accorda ecorded below. e to ste | ect ratio, determine t nce with IWB-3510 (in step 5 is below th Otherwise, check th p 8. | the allowable flav of the Code and ne allowable valu le box |
| | | Inside Surface F IWB-3500 A | law: Allowable Dep | a = 1 | <u>N/A(in)</u> | | |
| | | Outside Surface IWB-3500 A | Flaw (top he Allowable Dep | ead, head f oth = a = | lange, v <u>N/A</u> (in) | vessel flange region | ns only): |
| | | Subsurface Flaw IWB-3500 A | /: \llowable Dep <i>a/t=2.3</i> | oth = 2a = 1 6% for y=1. | <u>0.340(</u> in <i>0 tmeas</i> |)< 0.453" per IWB-3 =7.2: therefore a=7. | 510-1, allowed 2*2.36%=0.1670 |
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CALCULATION CONTINUATION SHEET

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| Jainator/Data | ····· | Chacker/Date | | Calculation No | · · · · · | Revision |
|--|--|---|---|--|---|--|
| R. Corieri | RL 5124191 | A. Tsiriqotis | A-5.75. | 99 SOVESSE | LM030 | 00 |
| ef. GE Nuc | lear Energy | <u> </u> | | | GENE-B13-01805 DRF # B | -124, Rev. 0 13-02025-00 |
| | (Nine Mi | le Point Unit | 1 Flaw Evalua | tion Worksheet | cont'd) | |
| | | , , | aw ID: <u>1-122 /</u> | 149 | | |
| AC | CEPTABILITY | 7: ble per IWB-3 btable per IWI Activity requ | 3500 B-3500 (Site (ired) | Corrective Actio | n . | |
| | DER1-1 | 999-1640 Init. | iated | | | |
| 8. <u>IWF</u> nur cur alic boy | <u>3-3600 Flaw Events</u> nber from Sector ve for the specor wable value, constants "Unacceptables | valuation. Re ion 3.0. Reco ified orientati heck the box e per IWB-36 | ecord the appropriation of the allowab on. If the flaw "Acceptable p 600", and proce | opriate flaw acc le flaw depth, a depth recorded er IWB-3600" b eed to step 9. | eptance diagrar a or 2a, from the d in step 5 is belo below. Otherwise | n Figure appropria ow the e, check th |
| NC lim any | TE: Outside si iting. Flaw spe / region below | urface flaws f ecific analysis the vessel fla | or vessel and would be requ ange. | oottom head re uired if outside a | gions are not co surface flaws we | nsidered ere found i |
| Fig | ure # <u>D-3</u> | | | | | |
| ins | ide Surface F IWB-36 | law: 00 Allowable | Depth = a = | <u>N/A</u> (in) | | |
| Ou | tside Surface IWB-36 | Flaw (top h e 00 Allowable | ead, head flan Depth = a = | ge, vessel flar <u>N/A(</u> in) | nge regions onl | y): |
| Su | bsurface Flaw IWB-36 | 7: 00 Allowable | Depth = 2a = | <u>1.20(</u> in) <i>>0.453</i> | 3 | |
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CALCULATION CONTINUATION SHEET

| Vine Mile P | oint Nuclear Station | | Unit: 1 | | Disposition: |
|-----------------|--|---|--|---|-----------------------------|
| Originator/Date | R. slavila | Checker/Date | A121.20 | Calculation No. | Revision |
| R. Corieri | KC 5129(49 | | MI 5º65'19 | GENE-B13. | 1805-124 Bev 0 |
| | (Nine N | file Point Unit | 1 Flaw Evaluation | DR Worksheet cont'd) | F # B13-02025-00 |
| | | F | aw ID: <u>1-122 /149</u> | | |
| | ACCEPTABILIT | Y: eptable per IV acceptable pe | VB-3600 r IWB-3600 | (for <u>28</u> EFPY) | |
| 9. | From figure ident below 1/3 limit, fl | tified above, re aw removal is | ecord the 1/3 wall t acceptable. Othe | hicknèss limit below. I rwise, weld repair is ne | f flaw depth is cessary. |
| | 1/3 Limit = <u>N/A(</u> ir | ר) | | | |
| | From step 5 abo Flaw d 2a +s - | ve: epth = a = <u>N//</u> · (clad thickne | <u>\(</u> surface) ss, if applicable) = | <u>N/A(</u> subsurface) | |
| | Flaw depth < 1/3 Flaw depth > 1/3 | Limit: Flaw r Limit: Weld r | emoval acceptabl repair required | le (No weld repair) | |
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GE Nuclear Energy

GERIS 2000 Indication Evaluation Data Sheet

Project: Nine Mile Point Unit-1 Weld ID: RV-WD-099 Patch ID: C4-11 / C4-12

Flaw Throughwall Dimension = 0.453 Flaw Length "I" = 7.75 Surface Separation "S" = 2.10 Exam Data Sheet: 1-15 / 1-16 Ind. Data Sheet: 1-122 / 1-149 Indication: 122 / 149

"T" nominal = 7.13 "T" measured = 7.20 Clad "T" nominal = 0.22



ASME Section XI, 1983 Edition, Summer 83 Addenda TABLE IWB-3510-1 for 4" and Greater

| Surface % | Subsurface % | Surface % | Subsurface % |
|-----------|---|---|--|
| 1.8 | 2.3 | 1.92 | 2.36 Y |
| 2.0 | 2.4 | - | ~ |
| 2.2 | 2.6 | » ~ | ~ |
| 2.4 | 2.9 | ~ | ~ |
| 2.7 | 3.2 | - | ~ |
| 3.1 | 3.6 | - | ~ |
| 3.5 | 4.1 | | ~ |
| 3.5 | 4.6 | ~ | ~ |
| 3.5 | ` 5.2 | ~ | |
| 3.5 | 5.8 | ~ | ~ |
| 3.5 | 6.5 | ~ | - |
| | - | Allowed | Allowed |
| | | 1.92 | 2.36 |
| | Surface % 1.8 2.0 2.2 2.4 2.7 3.1 3.5 3.5 3.5 3.5 3.5 3.5 | Surface %Subsurface %1.82.32.02.42.22.62.42.92.73.23.13.63.54.13.54.63.55.23.55.83.56.5 | Surface % Subsurface % Surface % 1.8 2.3 1.92 2.0 2.4 ~ 2.2 2.6 ~ 2.4 2.9 ~ 2.7 3.2 ~ 3.1 3.6 ~ 3.5 4.1 ~ 3.5 5.2 ~ 3.5 5.8 ~ 3.5 6.5 ~ 3.5 6.5 ~ 3.5 1.92 |

| a = | 0.227 |
|-------------|-------|
| a/l value = | 0.029 |
| Y = | 1.000 |

Flaw is Subsurface

Allowed a/t = 2.36% a/t = 3.15%

Flaw is unacceptable by Table IWB-3510-1.

| Comments : Flaw is circumferential. | | | | | |
|---|-----------------------------|--|--|--|--|
| Separation "S" measured to ID surface. | | | | | |
| Indication continues from patch C4-11 into C4-12. | | | | | |
| Throughwall dimension from data sheet 1-12 | 22. | | | | |
| Analyst | Reviewed By: Jh. C. Dip | | | | |
| Level: Date: S/ic/sg | Level: Date: <u>5-19-99</u> | | | | |

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1611 Channel Avenue, Memphis, TN 38113

September 9, 1999 NMP1-99007

Mr. Roy Corieri Niagara Mohawk Nine Mile Point Nuclear Station

SUBJECT: Evaluation of Flaw Proximity After Projected Flaw Growth

Mr. Corieri:

I have reviewed the eight (8) flaws requiring analytical evaluation recorded during the GERIS 2000 examinations of the Nine Mile Point Unit-1 Reactor Pressure Vessel welds RV-WD-099 and RV-WD-140 using the projected flaw growths for 28 EFPY as documented in Reference 1.

| WELD ID | Allowable Flaw Depth Criterion | Fatigue Crack Growth | Fatigue Crack Growth (inches) |
|------------------------|-----------------------------------|-------------------------|----------------------------------|
| RV-WD-099 @ 28 EFPY | IWB-3600 Axial Evaluation | 1.98e –2 | 0.0198 inches |
| Figure D-3 | IWB-3600 Circ. Evaluation | 8.64e –3 | 0.00864 inches |
| RV-WD-140 @ 28 EFPY | IWB-3600 Axial Evaluation | 4.21e-3 | 0.00421 inches |
| Figure D-12 | IWB-3600 | 7.61e -4 | 0.000761 inches |

The projected flaw growths for the 28 EFPY period is as follows: (Reference 1)

Circ. Evaluation

The flaws recorded were characterized as being fabrication related with the most likely cause of the flaw being thin film slag deposits or lack of fusion. All references to "fatigue crack growth" are due to the use of fatigue crack growth rates in the flaw analytic evaluation.

The projected circumferential flaw growth for weld RV-WD-099 is 8.64e-3 or 0.00864 inches. This flaw growth is the total predicted circumferential flaw growth. The total should be divided by 2 for the predicted growth at each end of a flaw. As shown in Figures 1 and 2 the separation distances for any two adjacent flaws recorded in the region of the analyzed flaws is greater than the combined projected flaw growth of any two adjacent flaws ($2 \times (0.00864^{\circ} / 2)$). Therefore no linkage of any flaws in the RV-WD-099 weld is projected.



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The projected axial flaw growth for weld RV-WD-140 is 4.21e-3 or 0.00421 inches This flaw growth is the total predicted axial flaw growth. The total should be divided by 2 for the predicted growth at each end of a flaw. As shown in Figure 3 the separation distances for any two adjacent flaws recorded in the region of the analyzed flaws is greater than the combined projected flaw growth of any two adjacent flaws ($2 \times (0.00421'' / 2)$). Therefore no linkage of any flaws in the RV-WD-140 weld is projected.

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Note: Indications 15 and 16 are combined in accordance with IWA-3330.

The original evaluations used the requirements of IWA-3330 to determine flaw interactions. IWA-3330 Multiple Planar Flaws states: "(a) Discontinuous indications shall be considered single planar flaws if the distance between adjacent flaws is equal to or less than the dimension S, where S is determined as shown in Fig. IWA-3330-1." The dimension S as shown in Fig. IWA-3330-1 is the greater throughwall dimension of any two adjacent flaws.

The throughwall dimension of each of the eight flaws requiring analytic evaluation is greater than the total projected flaw growth dimension. IWA-3330's use of the dimension "S" as the criteria for combining flaws is therefore more conservative than the use of the projected flaw growth dimensions to determine flaw interactions. No additional flaw combinations resulted from the use of the projected flaw growth dimensions.

References:

- 1. Fax from Betty Branlund to Chris Minor, dated August 30, 1999, "RE: Fatigue Crack Growth for Welds RVWD-099 and RVWD-140," GE-NE, San Jose, CA. DRF B13-02025-00.
- 2. GENE Report, "Niagara Mohawk, Nine Mile Point Unit-1, RFO-15, Flaw Indications in the Nine Mile Point Unit-1 Reactor Pressure Vessel", August 1999, Revision 1.
- 3. Herlekar, Aroon, "Nine Mile Point Unit 1 RPV Flaw Evaluation Handbook," GE-NE, San Jose, CA, April 1999, (GENE-B13-01805-124, Rev. 0).

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Prepared By:

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Wade F.

Reviewed By:

Wade F. Miller ISI Specialist, GENE 610-718-9117



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Analytical Evaluation of Rejectable Weld Indications in Recirculation System Piping (System 32)

In accordance with the requirements of ASME Code Section XI, Subsection IWB-3610 (1983 Edition with Summer 1983 Addenda), Niagara Mohawk Power Corporation (NMPC) is submitting to the NRC staff for review and approval a structural flaw evaluation of indications found in four (4) reactor recirculation system (System 32) Safe-end to elbow welds during RFO15. These structural flaw indication evaluations were performed using ASME Code Section XI, Subsection IWB-3610, 1986 edition without Addenda.

The NMP1 ISI Program invokes the 1983 edition with Summer 1983 Addenda. Both NUREG-0313 Revision 2 and Generic Letter 88-01 refer to the 1986 Edition of ASME Code Section XI, IWB-3600, for evaluation of flaws caused by intergranular stress corrosion cracking (IGSCC). The 1986 Code edition provides detailed requirements for evaluation of IGSCC indications. Therefore, the 1986 edition (without Addenda) of Section XI was used to evaluate the acceptability of the indications.

During RFO15, ultrasonic inspections were performed on reactor recirculation system welds (System 32) in accordance with Generic Letter 88-01 and ASME Code Section XI requirements (1983 edition with Summer 1983 Addenda). Initially, two (2) welds were identified with circumferential indications near the weld root that exceeded the acceptance criteria in the ASME Code, Section XI, paragraph IWB-3514.3. Per the requirements of Section XI, Article IWB-2430(a), expanded scope inspections were performed. The first expanded scope included five welds, during which, a third weld with a rejectable indication was identified. A second scope expansion was required to include 100 percent of the Category "B-J," B9.11 circumferential piping welds in System 32. During the second scope expansion, one (1) additional weld with a rejectable indication was identified. The affected welds are the following:



32-WD-046 Loop 12 - Safe-end to elbow weld (original scope)

- 32-WD-086 Loop 13 Safe-end to elbow weld (original scope)
- 32-WD-126 Loop 14 Safe-end to elbow weld (first expanded scope)
- 32-WD-168 Loop 15 Safe-end to elbow weld (second expanded scope)

The subject Reactor Recirculation System piping was replaced in 1982-1983 with installation (fit-up) and quality assurance in accordance with ASME Code Section III, 1977 Edition (through Summer 1978 Addenda). Acceptance criteria for these welds are contained in ASME Code Section III, Subsection NB-4424. This subsection allows for weld conditions involving undercut, concavity and internal root weld condition ("root geometry"), while still meeting code acceptance criteria. The indications are from prior repairs during the 1982-1983 replacement and are a root condition that does not indicate the presence of IGSCC.

Comparison of the rejectable indication sizes verses acceptance criteria documented in calculation S12.9-32WDNOZZLE (see Attachment 3A) are tabulated below:

| | Measured | | Maximu | m Allowed | |
|-----------|------------------|-----------------|--------|-----------|----------------------------------|
| Weld | Maximum Depth | Total Length | Depth | Length | Comments |
| 32-WD-046 | 0.08″ 0.32″ | 67.5″ 0.5″ | 0.43″ | 81.0″ | Subsurface Indication (see Note) |
| 32-WD-086 | 0.20" | 17.4″ | 0.43″ | 81.0″ | , |
| 32-WD-126 | 0.19″ | 17.3″ | 0.42″ | 81.0″ | |
| 32-WD-168 | 0.18″ | 19.7″ | 0.42" | 81.0″ | |

Note: The apparent subsurface indication exhibits a maximum depth of 0.32" depth 0.5" long at the 30" location. Concluded as not associated with the inside surface or the 67" flaw reported.



The above evaluation demonstrates that the indication sizes are less than those found acceptable in calculation S12.9-32WDNOZZLE. Therefore, the indications are acceptable in accordance with IWB-3600, and are acceptable for continued service through the present operating cycle. The welds have been changed to IGSCC Category "F" welds and future examinations of the four (4) welds will be performed in accordance with ASME Code Section XI, Subsection IWB-2420(b).

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