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A. Edward Scherer
Manager of
Nuclear Regulatory Affairs

February 6, 2007

Document Control Desk
U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C., 20555-0001

Subject: **Docket No. 50-362**
60-day Post Refueling Outage Reactor Pressure Vessel Head Inspection Report for San Onofre Nuclear Generating Station, Unit 3

Reference: EA-03-009, Subject: "Issuance of First Revised NRC Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads At Pressurized Water Reactors", dated February 20, 2004

Dear Sir or Madam:

This letter provides the Southern California Edison Company (SCE) 60-day post refueling outage response to First Revised NRC Order EA-03-009, "Issuance of First Revised NRC Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads At Pressurized Water Reactors" for San Onofre Nuclear Generating Station (SONGS) Unit 3.

As required by First Revised NRC Order EA-03-009, SCE completed inspections of the Reactor Pressure Vessel Head (RPVH) penetrations during the Unit 3 Cycle 14 refueling outage, which ended on December 12, 2006.

In summary, SCE performed a bare metal visual inspection of the RPVH surface including 360 degrees around all 102 RPVH penetrations, Non Destructive Examination (NDE) Ultrasonic Test (UT) and leak path assessment of all 91 Control Element Drive Mechanism (CEDM) nozzles and all 10 In-Core Instrument (ICI) nozzles, and NDE eddy current testing of the wetted surface of the vent line penetration. Visual inspections were also performed to identify potential boric acid leaks from pressure-retaining components above the RPVH. In addition to the requirements of the First Revised Order, supplementary surface examinations were performed on the inside diameter (ID) surfaces of all 91 CEDM and ten ICI penetrations.

P.O. Box 128
San Clemente, CA 92672
949-368-7501
Fax 949-368-7575

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No through-wall leakage was identified at any reactor vessel head penetration, no boric acid leaks were identified from pressure-retaining components above the RPVH, no deposits were found on RPVH surfaces, and no degradation of reactor vessel head base material was identified during the performance of these inspections at SONGS Unit 3. Ultrasonic testing confirmed that indications in four CEDM nozzles found and repaired in Cycle 13 had not grown. Additionally the four weld overlays applied during Cycle 13 as repairs had NDE Dye Penetrant (PT) performed per footnote 3 of NRC Order (EA-03-009) paragraph IV.C.(1). No recordable indications were found during the PT.

If you have any questions or would like additional information concerning this subject, please call Mr. Thomas Raidy at (949) 368-7582.

Sincerely,

Enclosure

cc: B. S. Mallett, Regional Administrator, NRC Region IV
N. Kalyanam, NRC Project Manager, San Onofre Units 2 and 3
C. C. Osterholtz, NRC Senior Resident Inspector, San Onofre Units 2 and 3

Enclosure

60-day Post Refueling Outage
Reactor Pressure Vessel Head Inspection Report for
San Onofre Nuclear Generating Station, Unit 3 Cycle 13

References:

1. EA-03-009, Subject: "Issuance of First Revised NRC Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads At Pressurized Water Reactors", dated February 20, 2004

2. Letter from Herbert N. Berkow (NRC) to Harold B. Ray (SCE); Subject: "Relaxation of the Requirements of Order EA-03-009 Regarding Reactor Pressure Vessel Head Inspections, San Onofre Nuclear Generating Station (SONGS), Units 2 and 3 (TAC Nos. MC5552 AND MC5523), dated June 27, 2005

3. Letter from Jack Donohew (NRC) to Harold B. Ray (SCE); Subject: "San Onofre Nuclear Generating Station (SONGS), Units 2 and 3 Re: Correction to Relaxation of the Requirements of Order EA-03-009 Regarding Reactor Pressure Vessel Head Inspections (TAC Nos. MC5552 AND MC5523), dated September 26, 2005

4. NRC letter, S. Dembeck to A. Scherer, "San Onofre Nuclear Generating Station, Units 2 and 3, Inservice Inspection Program Relief Request ISI-3-8, Embedded Flaw Repair Process (TAC Nos. MC1470 and MC1471)", dated May 5, 2004

5. SCE letter, A. E. Scherer (SCE) to the U.S. Nuclear Regulatory Commission dated May 11, 2006; Subject Docket No. 50-362, Third Ten-Year Inservice Inspection (ISI) Interval Relief Request ISI-3-21 Request for Alternative to ASME Code Rules for the Embedded Flaw Repair Process for Control Element Drive Mechanism (CEDM) # 56, San Onofre Nuclear Generating Station, Unit 3

6. Letter from A. E. Scherer (SCE) to the U. S. Nuclear Regulatory Commission dated November 20, 2006; Subject: Docket No. 50-362 Additional Information Supporting Third Ten-Year Inservice Inspection (ISI) Interval Relief Request ISI-3-21 Request for Alternative to ASME Code Rules for the Embedded Flaw Repair Process for Control Element Drive Mechanism (CEDM) #56, San Onofre Nuclear Generating Station, Unit 3

The following activities were completed for the San Onofre Nuclear Generating Station (SONGS) Unit 3 reactor head during the Cycle 13 refueling outage:

Using the specified equation in accordance with NRC Order EA-03-009 (Reference 1) part IV.A, Southern California Edison (SCE) calculated the susceptibility category of the

SONGS Unit 3 Reactor Pressure Vessel Head (RPVH) to Primary Water Stress Corrosion Cracking (PWSCC) related degradation. This susceptibility category is represented by a value of effective degradation years (EDY) for the end of each operating cycle. As of the end of the Cycle 13 fuel cycle the calculated value for SONGS Unit 3 was 17.3 EDY.

In accordance with EA-03-009 part IV.B, SCE assigned SONGS Unit 3 to the High PWSCC susceptibility category.

In accordance with EA-03-009 part IV.C (1), SCE performed RPVH and head penetration nozzle inspections using the techniques of paragraph IV.C.(5)(a) and paragraph IV.C.(5)(b).

In accordance with EA-03-009 paragraph IV.C.(5)(a), a bare metal visual examination of no less than 95 percent of the RPVH surface (including 360° around each head penetration nozzle) was performed. The RPVH surface was found in good condition and there were no indications of any degradation or measurable boric acid deposits. SCE confirmed that the surface obscured by support structure interferences which are located at RPVH elevations downslope from the outermost RPVH penetration constitute less than 5 percent of the RPVH surface. SCE inspected those areas of the RPVH upslope and downslope from the support structure interferences. There was no evidence of boric acid or degradation of the RPVH material in any of these areas.

In accordance with EA-03-009 paragraph IV.C.(5)(b), non-visual NDE was performed on each of the 102 penetrations as described below:

Head Vent Line

The vent line was examined in accordance with method (ii), using Eddy Current Testing (ET). The ET examination included the entire wetted surface of the J-groove weld and the wetted penetration inside diameter (ID) surface to at least 2 inches above the highest point of the root of the J-groove weld. The inspection probes for both the weld surface and the vent line penetration surfaces were delivered manually. No indications of PWSCC were identified as a result of this head vent line inspection.

CEDM penetrations

All 91 Control Element Drive Mechanism (CEDM) penetrations were examined in accordance with method (i), Ultrasonic Testing (UT). The effective inspection coverage above the root and below the toe of the weld for each nozzle is provided in Attachment 1. There were no exceptions to the minimum inspection distances approved for SONGS Unit 3 in Relaxation Request # 3 (References 2 and 3). Using UT, an assessment

of the annulus between each CEDM penetration and the RPVH determined that no leakage path had developed.

Penetrations 32, 56, 57, and 64 were found to have no growth on the non-through wall, axially oriented UT indications found and repaired in cycle 13. During the cycle 13 outage SCE conservatively decided to perform embedded flaw repairs. The four weld overlays had NDE performed (PT) per the order paragraph IV.C.(1) note 3. No recordable indications were found during the PT.

Attachment 2 originally submitted on November 20, 2006 (Reference 6) provides specific details related to the CEDM 56 inspection. The NRC granted verbal approval of ISI-3-21 on December 1, 2006.

In addition to the examinations required by EA-03-009, supplemental ET surface examinations of the inside diameters of all 91 CEDM penetrations were performed. No PWSCC was identified by these supplemental examinations.

Incore Instrument (ICI) penetrations

All ten ICI penetrations were examined in accordance with method (i), UT examinations. These inspections included UT from the ID surface and from the ICI bottom face such that the entire ICI penetration nozzle volume was examined, from at least 2 inches above the highest point of the root of the J-groove weld to the bottom of the nozzle. In addition to the examinations required by EA-03-009, supplemental ET surface examinations of the inside diameters of all ten ICI penetrations were performed and supplemental ET surface examinations of all ten ICI bottom face surfaces were performed. No indications of PWSCC were identified as a result of these inspections. Using UT, an assessment of the annulus between each ICI penetration and RPVH determined that no leakage path had developed.

In accordance with EA-03-009 part IV.D, visual inspections were performed to identify potential boric acid leaks from pressure-retaining components above the RPV head. There were no indications of any boric acid leakage identified.

In accordance with EA-03-009 part IV.E, SCE submits this report within 60 days after returning the plant to operation.

Attachment 1:

Measured Coverage
Above and Below CEDM Welds

60-day Post Refueling Outage
Reactor Pressure Vessel Head Inspection Report for
San Onofre Nuclear Generating Station, Unit 3 Cycle 14

Attachment 1:

Measured Coverage Above and Below CEDM Weld

	Inspection Coverage	
Penetration #	**Inches Above Weld**	**Inches Below Weld**
Pen 01	3.48	1.44
Pen 02	2.56	1.32
Pen 03	3.64	1.16
Pen 04	3.76	1.40
Pen 05	2.56	1.36
Pen 06	3.12	1.00
Pen 07	3.28	1.24
Pen 08	4.00	1.28
Pen 09	3.56	1.20
Pen 10	2.84	1.08
Pen 11	3.88	1.20
Pen 12	2.96	1.32
Pen 13	3.76	1.36
Pen 14	3.32	1.08
Pen 15	3.80	1.36
Pen 16	3.60	1.28
Pen 17	3.92	1.16
Pen 18	3.96	1.36
Pen 19	2.92	1.28
Pen 20	3.28	1.20
Pen 21	2.36	1.16
Pen 22	4.28	1.04
Pen 23	3.28	1.28
Pen 24	5.16	1.16
Pen 25	3.72	1.12
Pen 26	3.28	1.12
Pen 27	3.32	1.12
Pen 28	4.04	1.08
Pen 29	3.96	1.24
Pen 30	3.64	1.12
Pen 31	3.52	1.12
Pen 32	3.68	1.16
Pen 33	3.08	0.92
Pen 34	4.20	1.16
Pen 35	4.24	0.96
Pen 36	3.68	0.76
Pen 37	3.80	0.68
Pen 38	3.72	1.08
Pen 39	3.56	0.88
Pen 40	3.76	0.80
Pen 41	3.88	1.12
Pen 42	4.24	1.08
Pen 43	3.64	0.96
Pen 44	4.24	0.92
Pen 45	4.20	0.88

	Inspection Coverage	
Penetration #	**Inches Above Weld**	**Inches Below Weld**
Pen 46	4.44	0.84
Pen 47	3.28	0.60
Pen 48	3.76	0.92
Pen 49	4.16	0.60
Pen 50	4.04	1.04
Pen 51	4.00	0.84
Pen 52	4.32	0.72
Pen 53	4.24	0.96
Pen 54	4.04	0.84
Pen 55	4.20	0.96
Pen 56	4.08	1.16
Pen 57	4.16	1.30
Pen 58	3.16	0.80
Pen 59	4.00	0.80
Pen 60	4.68	0.84
Pen 61	3.56	0.88
Pen 62	3.88	0.84
Pen 63	3.56	0.68
Pen 64	3.92	0.80
Pen 65	3.72	0.80
Pen 66	3.48	0.88
Pen 67	3.48	0.92
Pen 68	3.80	0.84
Pen 69	4.04	0.64
Pen 70	4.00	0.60
Pen 71	4.16	0.64
Pen 72	2.76	0.72
Pen 73	2.96	0.64
Pen 74	4.04	0.68
Pen 75	4.28	0.68
Pen 76	3.32	0.72
Pen 77	3.80	0.68
Pen 78	2.84	1.04
Pen 79	3.68	0.84
Pen 80	3.52	0.52
Pen 81	3.96	0.76
Pen 82	3.68	0.80
Pen 83	3.52	0.60
Pen 84	4.36	0.60
Pen 85	4.00	0.60
Pen 86	3.56	0.60
Pen 87	3.72	0.56
Pen 88	3.60	0.52
Pen 89	3.68	0.36
Pen 90	3.68	0.40
Pen 91	3.40	0.36

Attachment 2

SAN ONOFRE Unit 3
Control Element Drive Mechanism (CEDM) #56
November 2006 Ultrasonic Exam Re-evaluation

60-day Post Refueling Outage
Reactor Pressure Vessel Head Inspection Report for
San Onofre Nuclear Generating Station, Unit 3 Cycle 14

SAN ONOFRE Unit 3
Control Element Drive Mechanism (CEDM) #56
November 2006 Ultrasonic Exam Re-evaluation

Scope:

This report contains the November 2006 reanalysis of Reactor Vessel Head Penetration (RVHP) penetration CEDM #56 Time of Flight Differential (TOFD) ultrasonic data collected for the inspection periods of 2003, 2004 Pre and Post repair, and 2006.

Examination Results:

2003 Inspection (PCS-24)

During the inspection of CEDM #56 a Parent Tube Indication (PTI) was reported at a circumferential location of 356° near the lower extent of the weld. This indication was reported to have a remaining ligament of 0.293"(ID) and was dispositioned as grain noise after supplemental eddy current examination confirmed that there was no OD or ID surface connection.

Data from the 2003 inspection were re-evaluated in November 2006. Evaluation of the same indication has determined that the indication had a remaining wall of 0.169". This evaluation considered both the B and "B" prime scan (Figures 1A and 1B) for evaluation.

2004 Inspection Results. (PCS-24)

During the inspection of CEDM #56 a PTI was reported. This Indication was reported at a circumferential location of 356° near the lower extent of the weld. This indication was reported to have a through wall depth of 0.513" with a remaining ligament of 0.148". The reported growth since the previous inspection led to a weld repair of the penetration.

Sizing results of this indication in November 2006 were similar to the 2004 inspection record. The indication through wall depth was 0.491" with a remaining ligament of 0.170". (See Figures 2A and 2B).

The November 2006 analysis of post repair inspection data found no change from the pre-repair inspection data. (See Figure 3)

SAN ONOFRE Unit 3
Control Element Drive Mechanism (CEDM) #56
November 2006 Ultrasonic Exam Re-evaluation

2006 Inspection Results. (PCS-24)

During the inspection of CEDM #56 a PTI was reported. This was the same indication reported during the 2003 and 2004 pre and post repair inspections. This indication was reported at a circumferential location of 350° near the lower extent of the weld. This indication was reported to have a through wall depth of 0.464" with a remaining ligament of 0.197". The analyst noted there were no diffraction signals typical of PWSCC observed.

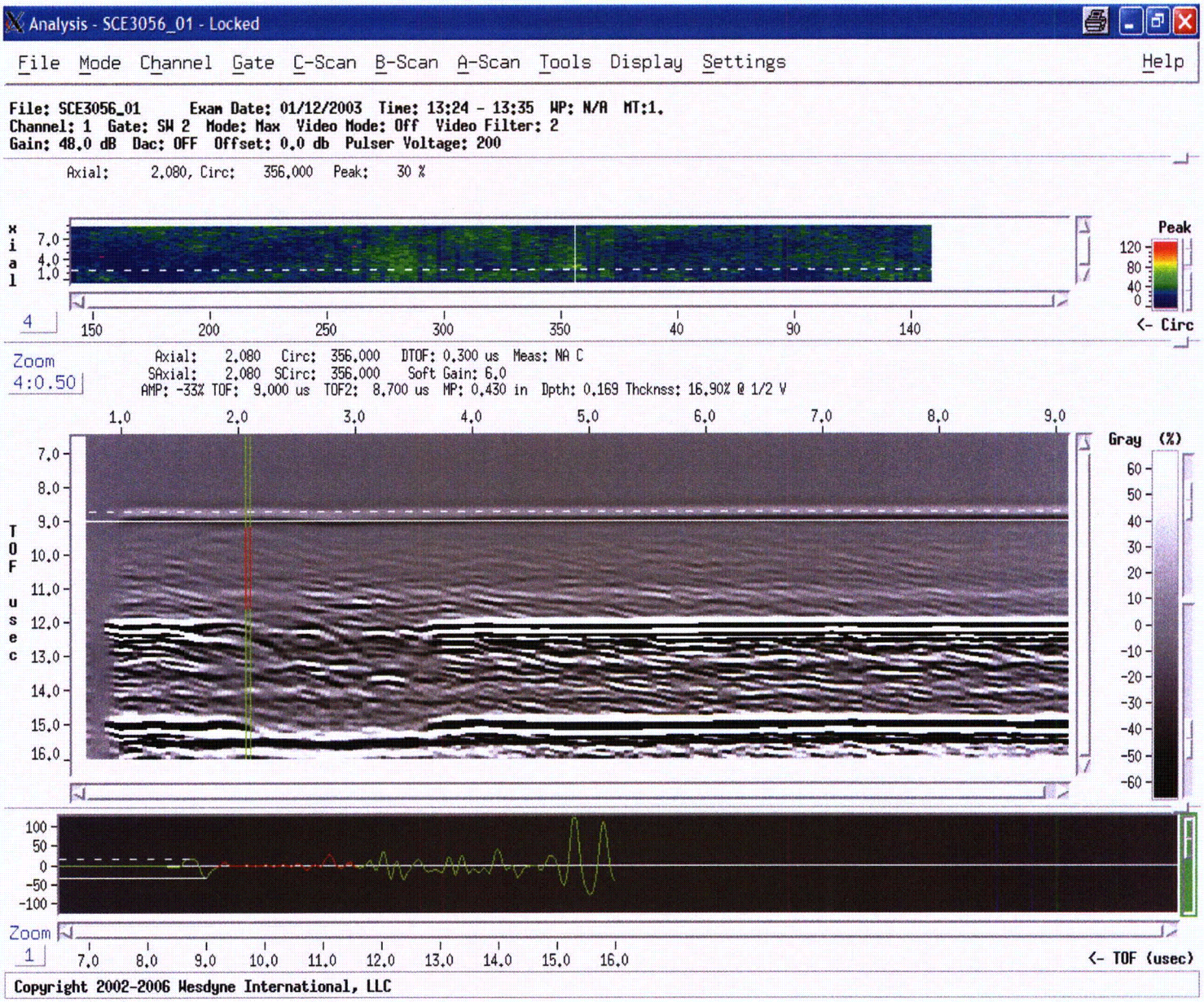
The November 2006 re-evaluation concluded that the Indication has a through wall depth of 0.492" and a remaining ligament of 0.169". (See Figures 4A and 4B).

Summary:

Comparing Figures 1A from the Cycle-12 inspection and Figure 4A from the Cycle-14 inspection shows that the depth of this indication in CEDM 56 has remained essentially the same from 2003 thru 2006. It is SCE's conclusion that this indication shows no growth from discovery in 2003.

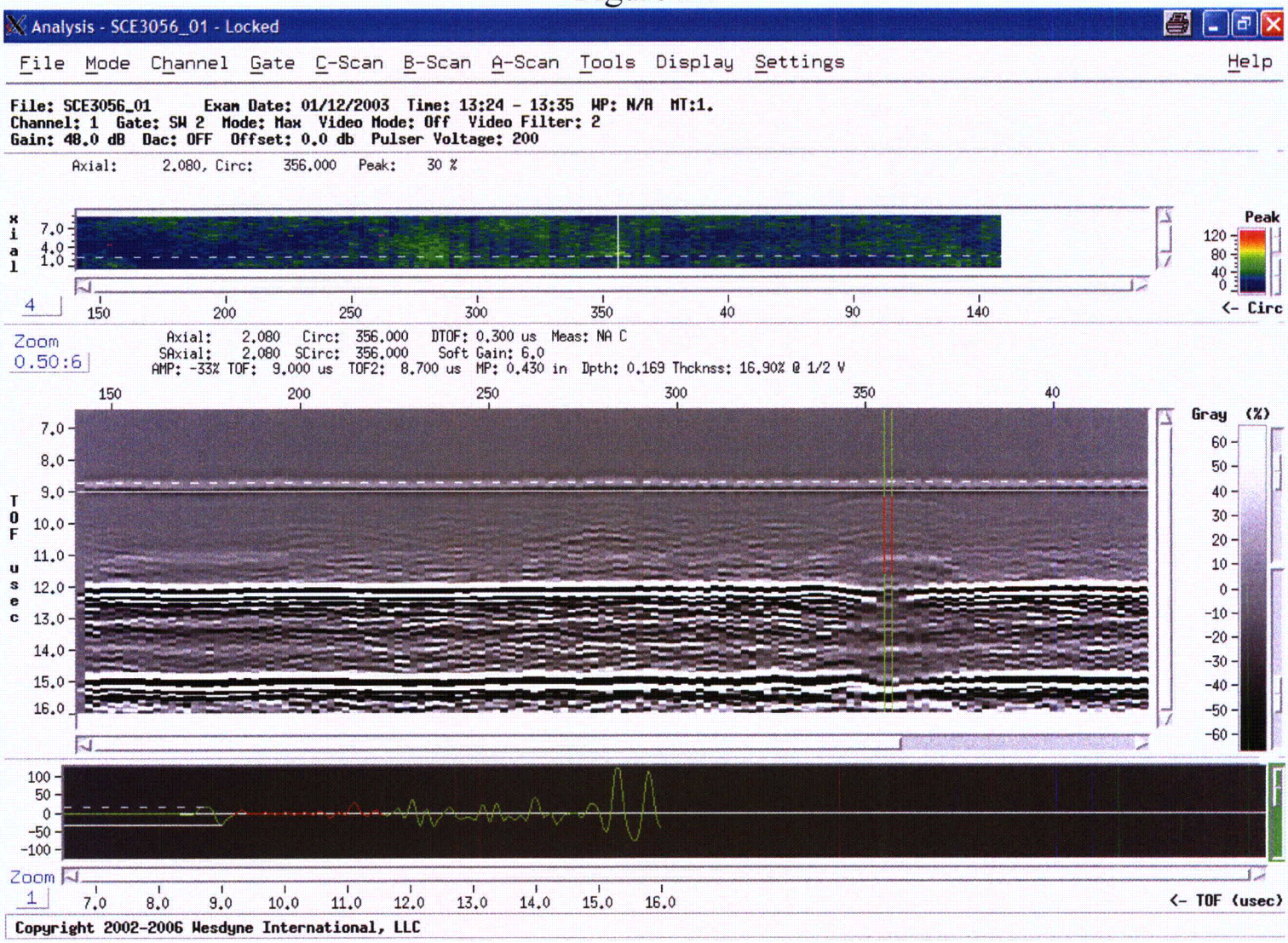
Within this comparison there are slight changes in the grain noise due to refinement in calibration settings, better transducer contact and an increase in pulse voltage. It appears that the original sizing of this indication during the 2003 inspection did not accurately identify the indication's maximum depth. This is in part due to having determined in 2003 that the indication was not a PWSCC flaw. Under sizing of this indication in 2003 led to reported growth and repairs during the 2004 inspection.

Figure 1A



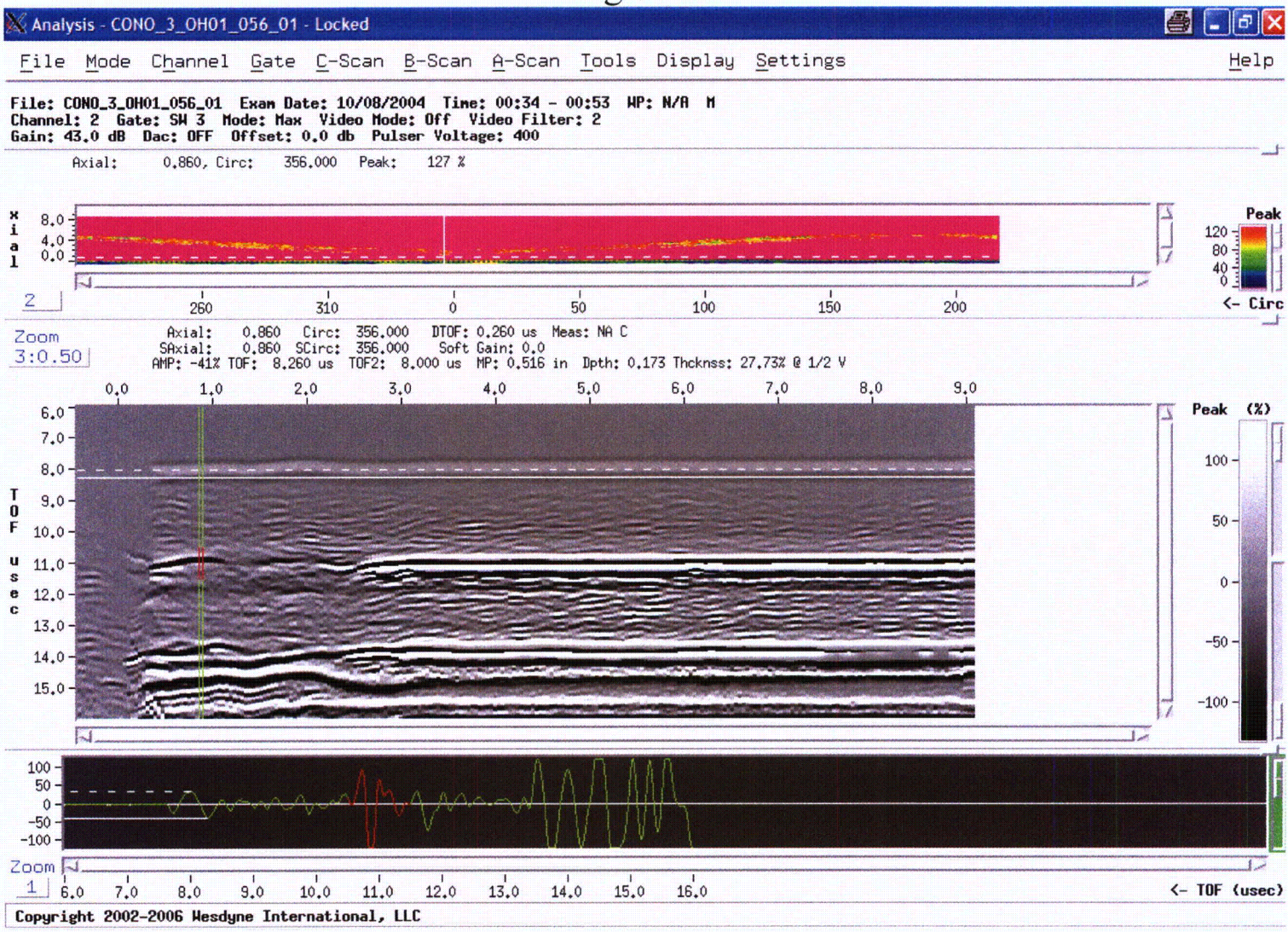
Indication (Anomaly) #1
B Scan Channel 1

Figure 1B



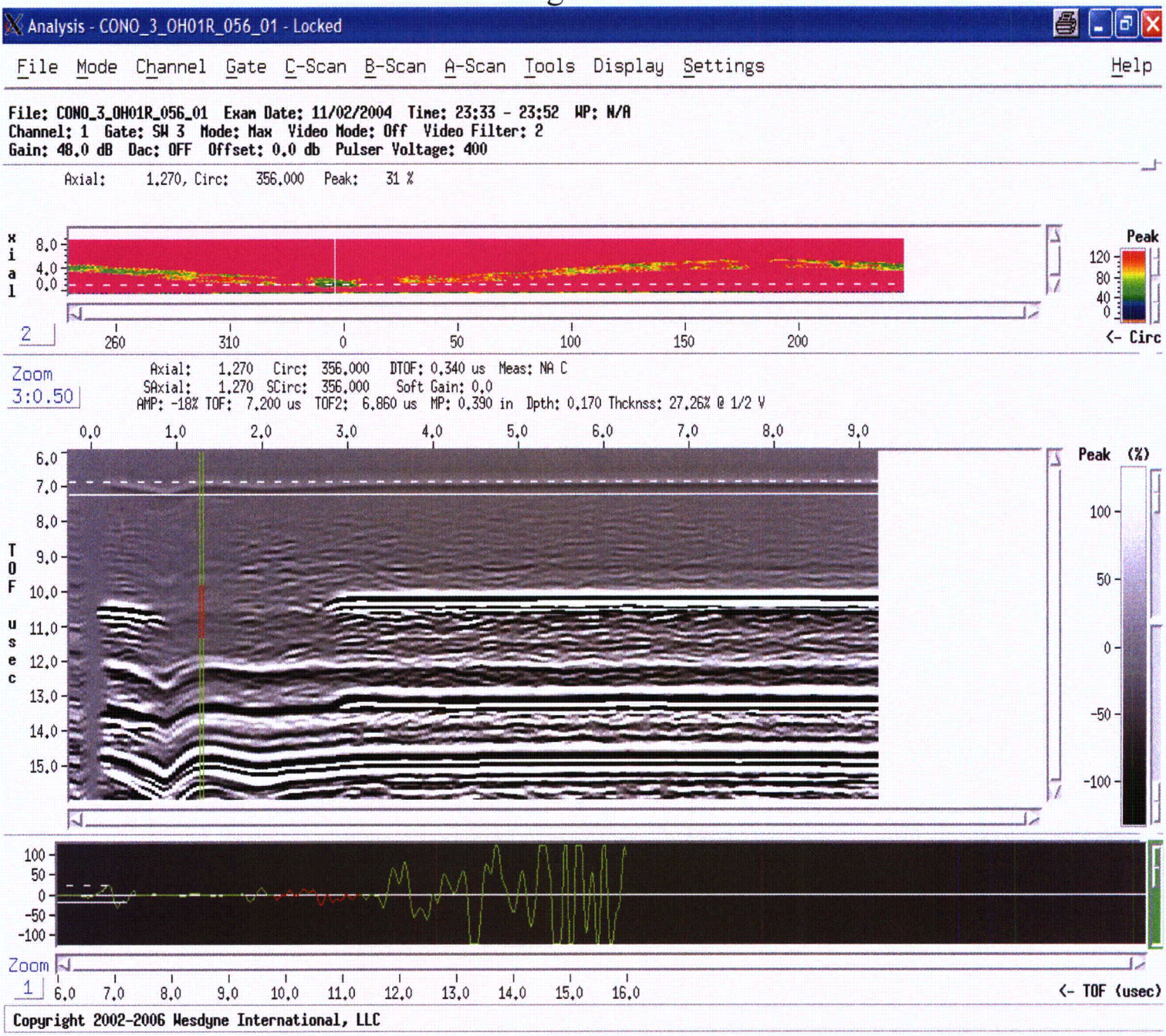
Indication (Anomaly) #1
"B" Prime Scan Channel 1

Figure 2A



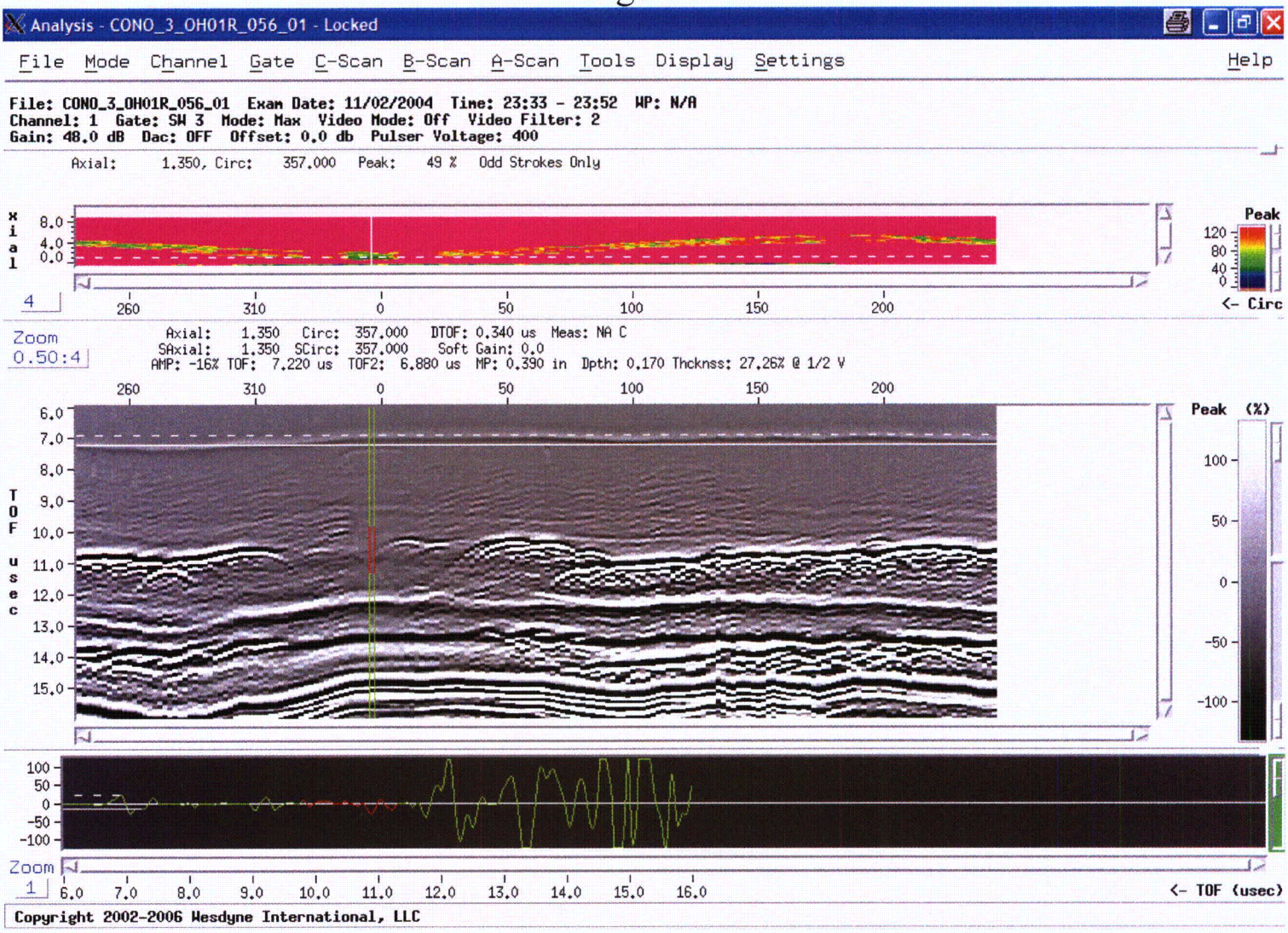
Indication (Anomaly) #1
B Scan Channel 2

Figure 2B



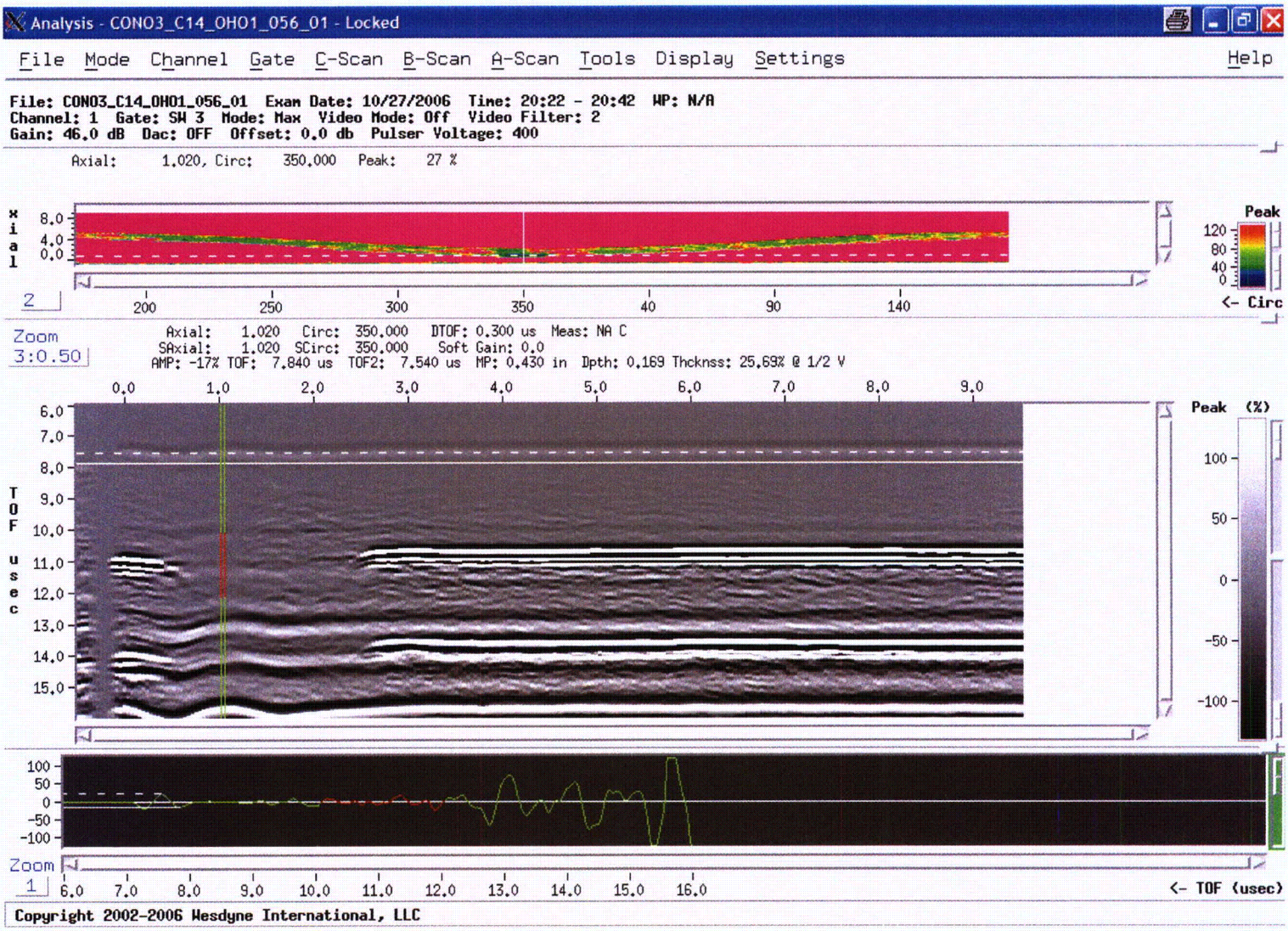
Indication (Anomaly) #1
B Scan Channel 1

Figure 3



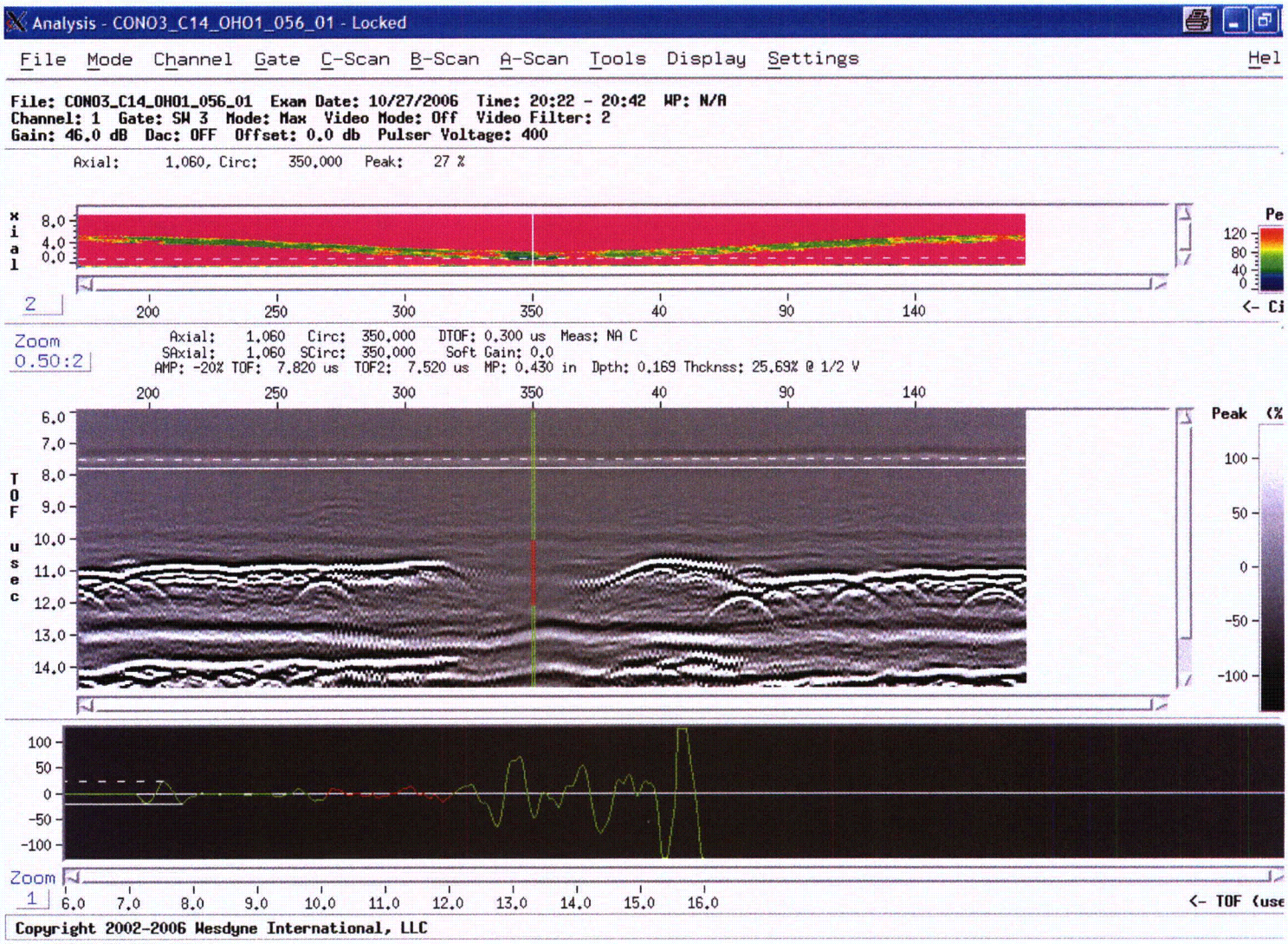
Post Repair Examination
"B" Prime Channel 1

Figure 4A



Indication (Anomaly) #1
B Scan Channel 1

Figure 4B



Indication (Anomaly) #1
"B" Prime Scan Channel 1