ATTACHMENT (3)

EVALUATION OF DISSIMILAR METAL WELD EXAMINATIONS PERFORMED AT NINE MILE POINT UNIT 1 DURING REFUELING OUTAGE 19 (N1R19)

Performed for NMPNS
By
The Electric Power Research Institute (EPRI)

Nine Mile Point Nuclear Station, LLC
May 10, 2007

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Evaluation of Dissimilar Metal Weld Examinations Performed at Nine Mile Unit 1 during Refueling Outage 19 (N1R19)

IR-2007-271

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Evaluation of Dissimilar Metal Weld Examinations Performed at Nine Mile Unit 1 during Refueling Outage 19 (N1R19)

IR-2007-271

Internal Report, April 2007

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ABSTRACT

The inservice examination scope for Nine Mile Unit 1 during the 19th refueling outage (N1R19) included the examination of selected recirculation system welds. During these examinations, one planar indication was found in the 32-WD-164(N2D) safe-end-to-inlet nozzle weld and a second indication was reported in a similar weld 32-WD-122. EPRI NDE Program personnel were requested to provide a technical review of the indications reported in the aforementioned welds. The initial technical support provided included:

- Review and analysis of available automated ultrasonic data including ultrasonic examinations intended to further characterize and evaluate the recorded indications.
- Review of previous ultrasonic examination data.
- Review of available fabrication data including construction radiographs.
- Communicate with utility and vendor personnel regarding the repair and examination history of this weld.

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1
INTRODUCTION

1.1 Background

During refuel outage 19, inservice inspections (ISI) at Nine Mile Unit 1 included automated ultrasonic examination (UT) of the N2D and the N2C safe-end-to-nozzle welds. The welds were examined as part of the population scheduled in Unit One's third ten-year interval ISI program. Both the N2D and the N2C safe-end-to-nozzle weld configurations (see Figure 1-1) contain a dissimilar metal weld joining the carbon steel nozzle to a stainless steel safe-end. Both welds are denoted in Nine Mile's BWRVIP-75 program as Category "A" welds and the specific weld identification numbers are 32-WD-164 (N2D) and 32-WD-122 (N2C) [1]. This category refers to welds made entirely of resistant materials. Nine Mile also relies on Hydrogen Water Chemistry (HWC) and Noble Metal Chemical Addition (NMCA) for mitigation of stress corrosion cracking (SCC) in these welds.

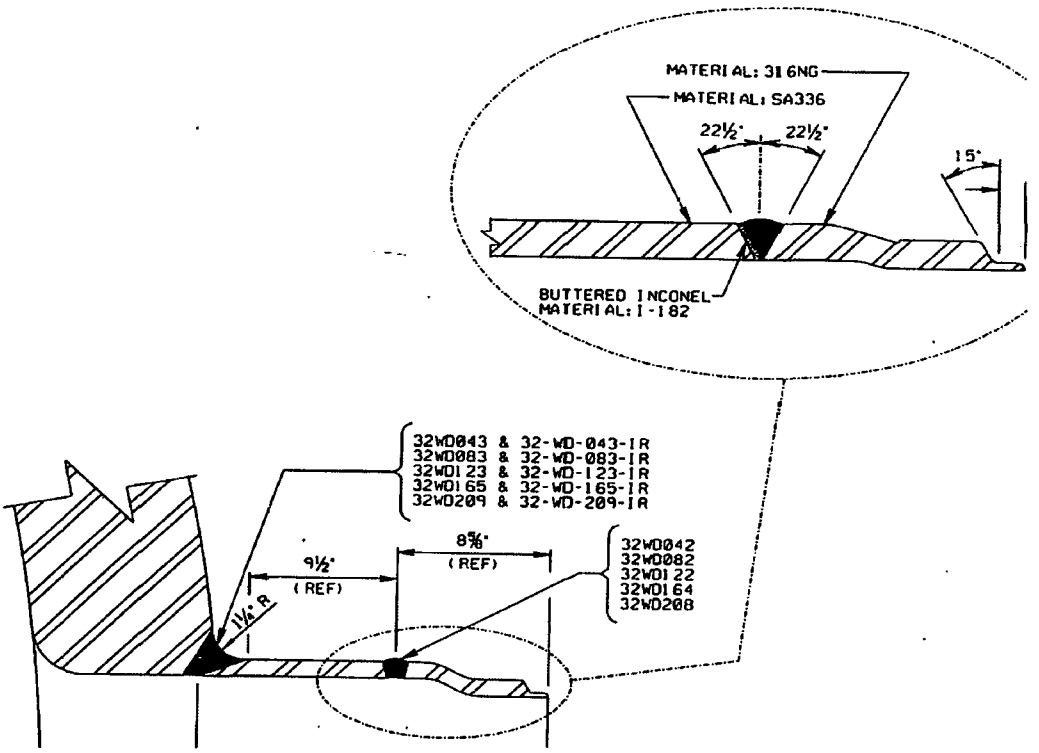


Figure 1-1
N2 Configuration

The examinations of the N2C and N2D safe-end-to-nozzle welds were performed during RF019 by Nine Mile's inspection vendor, WESDYNE International, using a automated technique defined in procedure WDI-SSP-1105 Revision 0, titled *"Generic Procedure for the Automated (IntraSpect) Ultrasonic Examination of Dissimilar Metal Welds using WDI-STD-119A."* As documented on the applicable Performance Demonstration Qualification Statement (PDQS No. 523) dated February 16, 2006, the procedure meets the requirements of the Performance Demonstration Initiative's implementation of The American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section XI, Appendix VIII, Supplement 10.

WESDYNE's initial evaluation of the N2D weld 32-WD-164 UT data revealed a planar-type, circumferential indication located at the approximate three o'clock position. The planar indication was reported to be contained in the weld material and connected to the inside surface. Length and depth measurements were performed and the indication was reported to be 1.59" long (measured at the inside surface) with a through-wall dimension of 0.27" (15.43%). A second indication was also reported in the N2C nozzle weld 32-WD-122. This indication did not have the same character as the indication reported in the N2D nozzle weld and it appeared to be solely contained in the nozzle cladding. Joe Cilento of Constellation Energy requested assistance from the NDE Program to support a technical evaluation of the reported data, and EPRI's Carl Latiolais was selected to support this request. This summary report documents the NDE Program's results of the technical review of past examination history for N2D weld 32-WD-164.

2
SERVICE RELATED EXPERIENCE

2.1 Background

Documentation from dissimilar metal weld degradation in boiling water reactors (BWRs) was collected and reviewed for relevance and also guided the direction of this evaluation. Information relevant to this review is included below.

Hope Creek (1997)

In October of 1997, Hope Creek Nuclear Power Station detected a through-wall circumferential crack in their N6 Core Spray nozzle-to-safe-end-weld. Root cause analysis determined that this crack was due to SCC in the alloy 182 weld material located in a weld repair area. The presence of this weld repair was confirmed by a review of the fabrication data indicating that the weld had been repaired nine times, and in some cases was excavated down to the root [2]. This type of repair process may have caused a crevice condition on the inside surface of the component, which is a known initiation point for SCC. Due to problems in the ultrasonic characterization of the defect, GE issued a revision to SIL-455 [3] to incorporate lessons learned from this experience. Additionally, EPRI issued an NDE Alert [2] that included additional inspection processes aimed at increasing the reliability of the examinations. The following recommendations were made:

- Expand the examination volume to cover the entire inconel weld and adjacent heat affected zone.
- Interrogate the upper regions of the weld, outside the code examination volume, to search for reflections from midwall to deep flaws orientated both axially and circumferentially.
- The use of enhanced automated imaging systems that allow multiple views of the ultrasonic data that aid in evaluation.
- Review of previous examination data using the improved ultrasonic data analysis software.
- Thorough reviews of the fabrication records in an effort to locate fabrication defects or known repair areas, especially on inside surfaces that are potential sites of SCC initiation.

Riverbend Unit 1 (1989, RF-2)

During a 1989 scheduled inservice inspection, a circumferential indication was found by ultrasonic examination in the N4A-2 inlet feedwater nozzle-to-safe-end weld during the second refueling outage. The indication, approximately 6" long with a reported maximum depth of 0.20", was located in the Alloy 182 weld butter on the safe-end side of the weld. This indication was reexamined four times in a period of three years, and crack growth was reported each time. The safe-end was replaced during the 1992 RF-4 refueling outage.

The NRC contracted Brookhaven National Laboratory to conduct a metallurgical examination and failure analysis, including destructive examination of the safe-end weld [4]. The results of this evaluation indicated that the cracking was SCC of Inconel 182 weld metal that initiated at a weld defect (lack of root penetration or lack of fusion) located at the original base metal/alloy 182 interface, approximately 84% through-wall and 7.0" long.

The cracking mechanism determination in this report was based on tests performed on alloys 82 and 182 in simulated reactor environments. Testing was conducted on creviced and non-creviced slow strain specimens. These experiments showed that in the uncreviced condition, all alloys were immune to SCC, but in the creviced conditions, both Alloys 600 and 182 were susceptible to SCC. It also demonstrated that the fractography of the specimens was quite similar to the River Bend crack and that the fabrication flaw noted acted as the crevice condition needed for initiation.

Duane Arnold (RF-16, 1999)

While performing scheduled ultrasonic examinations on the recirculation system, two circumferential indications were found in the N2B safe-end-to-nozzle inlet weld. As a result, expanded scope examinations were performed on welds of a similar configuration. During these examinations, similar indications were found in the N2D. The examinations were performed using automated ultrasonic examination procedures approved for application to dissimilar metal weld configurations that were enhanced based on the Hope Creek's experiences in 1997. Depth sizing data was collected, but this data was limited due to the presence of weld crowns. The flaws, however, could be measured to a depth of at least 65% of the thickness.

Weld overlay repairs were performed on both nozzles. In preparation for overlay, one of the flaw locations began to leak, confirming that the indication was associated with a deep crack found with the enhanced automated techniques. Review of previous automated data with the advanced data analysis software indicated that the indications were present in the 1996 data. A complete review of the fabrication records and digitized radiographs show that there were extensive weld repairs performed in the root area of the welds during fabrication. The final root, while acceptable, contained areas of suck-back and root concavity in the area of the flaws, which appear to have sharp edges creating an inner surface creviced condition. These conditions are believed to act as stress risers that are initiation points for SCC.

Nine Mile - Unit 2 (RF07, 1999)

During RF07 (1999), as a result of industry events and implementation of lessons learned from Hope Creek, Nine Mile staff reviewed the data on 17 dissimilar metal welds that were previously examined with automated techniques. This review was performed with RD-TECH TomoView data analysis software. While reviewing the feedwater nozzle-to-safe-end weld 2RPV-KB20 (N4D), it was noted that there were several circumferential indications present that were not addressed in previous examination reports. The newly identified indications appeared to be located in the same radial plane above a surface connected fabrication flaw originally reported in 1995. A detailed flaw analysis was performed in 1998, and it was considered acceptable for continued operation. Although this analysis was performed conservatively, assuming active IGSCC, it was considered to be most likely a fabrication flaw that exhibited no growth based on three UT examinations (1990, 1995 and 1998).

Based on this evaluation, it was determined that the flaw identified in the Inconel 182 buttering of this weld was representative of an active stress corrosion crack initiated from a previously documented area containing a fabrication defect believed to be lack of fusion connected to the inside surface. This condition may have provided a crevice condition that acted as the initiation point for the SCC.

Pilgrim Unit 1 (2003)

While online, Entergy personnel noted an increasing trend of unidentified drywell leakage. The plant was shutdown in a planned outage to install a Unit Aux Transformer (UAT). At this time, it was noted that the Control Rod Drive nozzle (N10) was leaking in the nozzle-to-cap weld area. Subsequent investigations by NDE ultrasonic personnel determined that source of the leak appeared to be a 1.75" long circumferential crack located in the butt weld adjacent to what seemed to be a previously repaired area. A manual examination was performed on this weld to better characterize the flaw and provide information to support the overlay repair. This examination was performed in accordance with ASME Section XI, Appendix VIII, Supplement 10, as modified by the Performance Demonstration Initiative (PDI) program. The following was observed during the examination:

- A circumferential flaw was detected within the area adjacent to the through-wall leak.
- This flaw could only be evaluated with the higher angle (60 and 80-ODCR) degree refracted longitudinal search units due the unusually large weld width caused by the repair.
- The length of the flaw was measured to be 1.75", with a semi-elliptical depth profile that started out shallow on the ends and propagated radially toward the center of the flaw where it actually leaked through.
- This flaw exhibited typical ultrasonic signal characteristics indicative of SCC.
- It was visually and physically apparent that a weld repair was performed in the same location as the flaw.

Fabrication records for this weld were reviewed and confirmed that a weld repair was made in the area of this flaw. Radiographic reader sheets state that the inside surface in the area of the flaw was also ground in an effort to remove unacceptable conditions noted on the fabrication radiograph. Additionally, the radiographs were digitally enhanced to increase resolution and also confirmed the presence of the weld repair in the area of the leaking crack.

Susquehanna Unit 1 (RF-13, 2004)

During the U1-13RIO inservice inspections (ISI) at Susquehanna Steam Electric Station (SSES), the N1B nozzle-to-safe-end weld was examined as part of the population scheduled in Unit One's second ten-year interval ISI program. During this examination, a planar-type, circumferentially oriented flaw was reported to be located at the approximate top dead center. This flaw appeared to be contained in the weld material and connected to the inside surface. Evaluation of the qualified UT sizing data showed the flaw to be approximately 2" long, with a through-wall dimension of 1.14". The N1B nozzle-to-safe-end configuration contained a dissimilar metal weld joining the carbon steel nozzle to a stainless safe-end (28" OD and nominal thickness of 2.15").

While in the process of performing a required scope expansion, a second flaw was reported in the N2J safe-end-to-nozzle weld. Initial examination of this weld indicated a suspect indication in an area where it appeared that the search unit was being compromised by weld crown. The vendor requested that the surface condition of this weld be improved to eliminate the limitation. After removal of the weld crown restriction, the examination was repeated and the vendor reported a planar-type, circumferentially oriented indication located at approximately 45 degrees. The flaw appeared to be contained in the weld material and connected to the inside surface. Evaluation of the qualified UT sizing data showed the flaw to be 12.14" long, with a through-wall dimension of 0.94". Similar to N1B, the N2J configuration contains a dissimilar metal weld joining the carbon steel nozzle to a stainless safe-end (14" OD and nominal thickness of 1.32").

Both of these welds were classified as Category "C" welds. This category refers to welds not made of resistant materials that have undergone a stress improvement (SI) process. Mechanical stress improvement (MSIP) was applied to the N2J in 1993 and to the N1B in 1995. SSES also started Hydrogen Water Chemistry in 2000.

A complete review of all available ultrasonic data was performed using advanced data analysis software. This software provided the examiners with enhanced data analysis capabilities (A, B, C and D Scans) above and beyond what was available to the data analyst during the original analysis. As a result of this review, there was strong evidence that these flaws were actually present prior to MSIP in thesame location and relative depth. Weld overlay repairs were performed on both nozzles.

Duane Arnold (RF-20, 2007)

During refuel outage 20, inservice inspections (ISI) at Duane Arnold Unit 1 included manually-driven, encoded automated UT of the N2F safe-end-to-nozzle weld. The weld was examined as part of the population scheduled in Unit One's fourth ten-year interval ISI program. The N2F safe-end-to-nozzle weld configuration contains a dissimilar metal weld joining the carbon steel nozzle to a SB-166 Inconel safe-end (13" OD and nominal thickness of 1.1"). N2F safe-end-to-nozzle weld is denoted in Duane Arnold's BWRVIP-75 program as a Category "D" weld and the specific weld identification number is RRF-F002. This category refers to welds not made of resistant materials that have not undergone a stress improvement (SI) process. Duane Arnold relies on Hydrogen Water Chemistry (HWC) and Noble Chemical Addition (NMCA) for mitigation of SCC in this weld.

Evaluation of the N2F weld RRF-F002 UT data revealed a planar-type, circumferential indication located at the approximate six o'clock position. The planar indication appeared to be contained in the weld material and connected to the inside surface. Length and depth measurements were performed and the indication was reported to be 5.9" long (measured at the inside surface) with a through-wall dimension of 0.59" (55.6%). As a result of this finding, Duane Arnold expanded the examination scope to include three additional welds with similar configurations. During the examination of these additional welds, a flaw was reported in the N2C inlet safe end-to-nozzle weld RRC-F002. This flaw also was also reported to be contained wholly in the weld and butter with a length of 6.30" (ID) and a maximum depth of 0.79" (71.8%). Review of the radiographs on N2F in the area of the flaw showed evidence that some inside surface repairs may have been performed, but these were not documented in the fabrication records. Repair records for N2C showed that the weld had been repaired in the area of the reported flaw and root condition could have acted as a stress riser. Both welds were subsequently overlaid.

3
EXAMINATION HISTORY

3.1 Previous Ultrasonic Examination History (N2D)

Available documentation was reviewed to determine the examination history of N2D and N2C (see Table 3-1 and 3-2, respectively).

Table 3-1 N2D Safe-end-to-nozzle Weld 32-WD-164 Ultrasonic Examination History

Examination Date	Type of Examination (Automated/Manual)	Results
1982	Manual (Initial Pre-Service Examination)	Geometric reflectors (Root and ID geometry)
1995 Note 1	Manual	Inside surface geometry (Root)
2007 Note 2	Automated (Manual Performed for Information WESDYNE)	Reported a planar-type, circumferential indication located at the approximate three o'clock position. The planar indication appeared to be connected to the inside surface. Length and depth measurements were performed and the indication was reported to be 1.59" long on the inside surface, with a through dimension of 0.27" (10.58%).

Note 1 First examination using a refracted longitudinal search unit
Note 2 First PDI qualified examination

Table 3-2 N2C Safe end-to-nozzle Weld 32-WD-122 Ultrasonic Examination History

Examination Date	Type of Examination (Automated/Manual)	Results
1982	Manual (Initial Pre-Service Examination)	Root Geometry
1988 Note 1	Manual	Root Geometry
1995	Manual	No Recordable Indications
1999	Automated General Electric	Acoustic Interface and Non-Relevant Indications
2007 Note 2	Automated WESDYNE	Reported a planar-type, circumferential indication located at the approximate twelve o'clock position. The planar indication appeared to be wholly contained in the nozzle cladding.

Note 1 First examination using a refracted longitudinal search unit
Note 2 First PDI qualified examination

4
REVIEW OF FABRICATION DATA (INCLUDING RADIOGRAPHS)

4.1 General

A complete review of the fabrication data for the N2 safe-end-to-nozzle weld (N2D) 32-WD-164 was performed. Table 4-2 contains the repair history for weld (N2D) 32-WD-164. The radiographs and repair records for (N2C) 32-WD-122 were not reviewed during this evaluation because the indication was confirmed to be a cladding flaw and not in the structural portion of the weld volume. The weld identification numbers for these welds were different during fabrication. Table 4-1 below shows the weld identification used during fabrication for tracking the in-process inspections.

Table 4-1 Fabrication Weld Identifications

Fabrication Weld Identification	In-service Weld Identification
FW-14D-SEN	32-WD-164

4.2 (N2D) – 32-WD-164 Evaluation

The review of the radiographs and repair records for this weld revealed that this weld was repaired up to nine times during installation and the majority of the repairs were due to unacceptable ID root conditions, which would have required significant working of the inside surface. These numerous repairs altered the normal shape of the root in this area, which is evident on the ultrasonic data shown in Figure 4-1 and the radiographs in Figures 4-2 and 4-3. Additionally, there was evidence on some of the intermediate radiographs that a crevice condition due to root concavity could have been formed on the inside surface of the weld. Figure 4-3 identifies this possible crevice area. While the reported flaw could be associated with welding flaws left in the weld during fabrication, the correlation between stress corrosion cracking can be closely associated with 82/182 materials, weld repairs, and/or ID creviced conditions as noted in References 2-4.

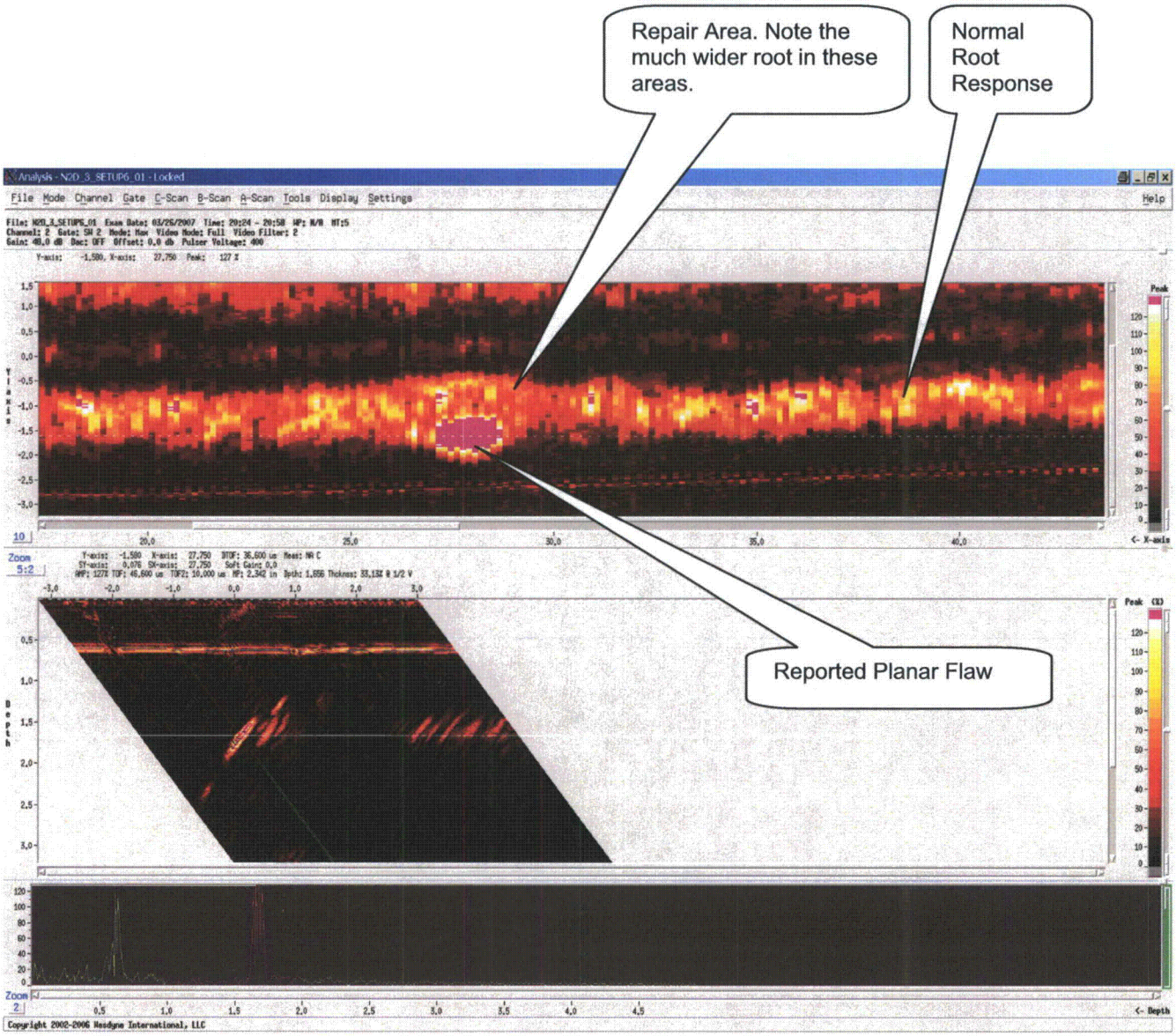


Figure 4-1
Repair Area on (N2D) 32-WD-164

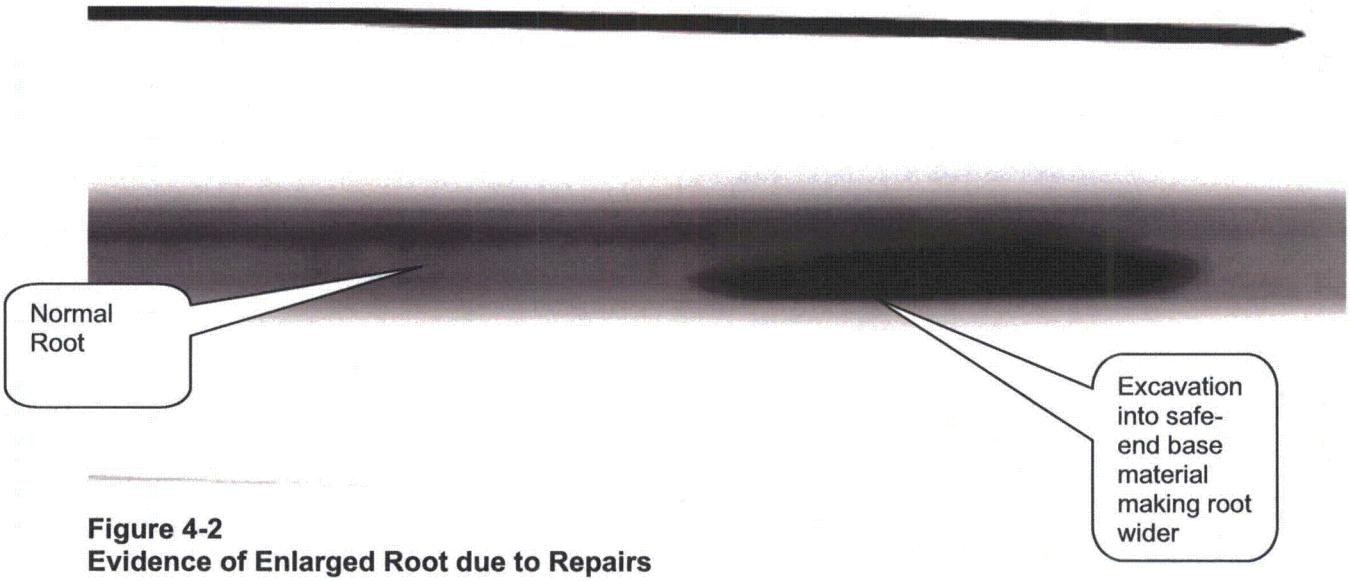


Figure 4-2
Evidence of Enlarged Root due to Repairs

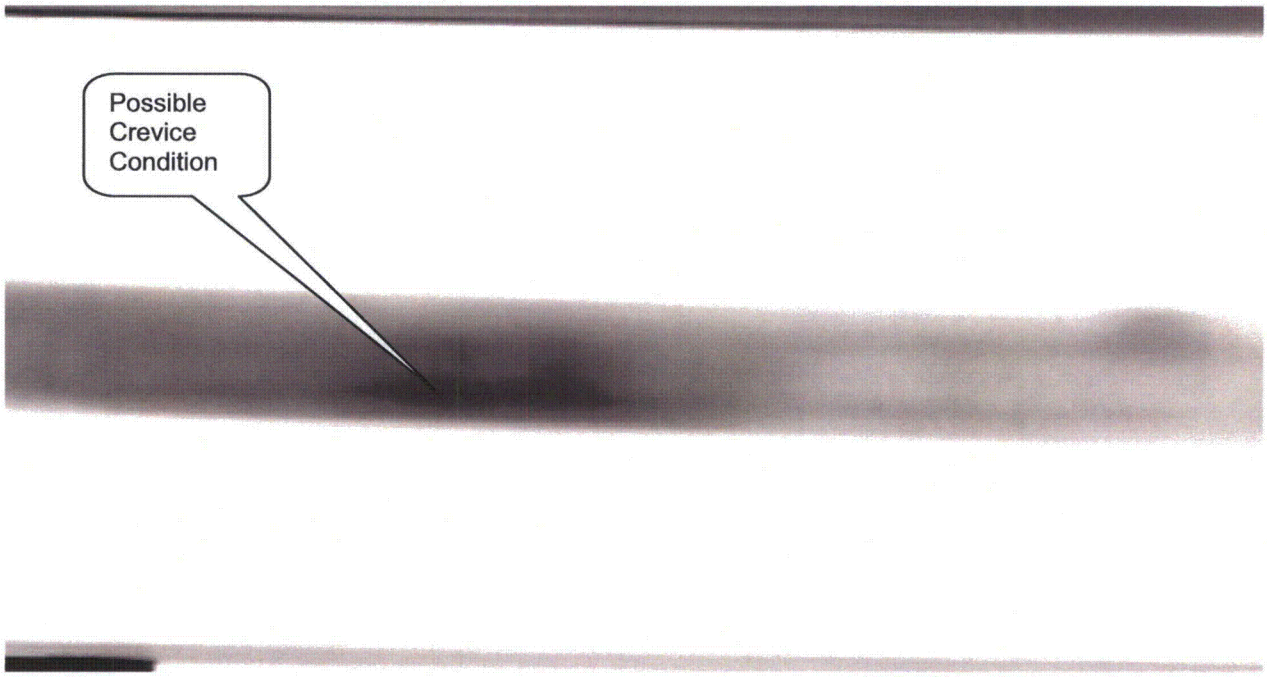


Figure 4-3
Possible Crevice on Radiograph

Table 4-2
Repair History for Weld (N2D) 32-WD-164

Date	Film Marker Locations	Type of Defect	Comments
10/30/1982	14"-28" and 28"-42" (Info Only)	Incomplete fusion, Tungsten Inclusions, Porosity and a burn through	Root Shot prior to filling cavity.
10/31/1982	14"-28" and 28"-42" (Info Only)	Incomplete fusion	Root Shot prior to filling cavity Repair 1 of Root
11/2/1982	14"-28" and 28"-42" (Info Only)	Incomplete fusion, porosity, Tungsten inclusions	Root Shot prior to filling cavity Repair 2 of Root
11/3/1982	14"-28" and 28"-42" (Info Only)	Incomplete fusion, porosity, Tungsten inclusions	Root Shot prior to filling cavity Repair 3 of Root
11/4/1982	14" – 30"(Info Only)	Acceptable	Other areas on weld still had incomplete fusion that required repair
11/6/1982	14" – 28" (Info Only)	Incomplete fusion	Root Shot Prior to filling cavity Repair 4
11/8/1982	14" – 28" (Info Only)	Incomplete fusion	Root Shot prior to filling cavity Repair 5
11/8/1982	14"- 28" (Info Only)	Porosity and Tungsten inclusions (Acceptable)	Excavation Shot
11/10/1982	14" – 28" (Info Only)	Incomplete fusion, porosity, Tungsten inclusions	Intermediate shot during filling of cavity Repair 6
11/11/1982	20" – 32" (Info Only)	Incomplete fusion	Intermediate shot during filling of cavity Repair 7
11/11/1982	14" – 28" (Info Only)	Incomplete fusion	Intermediate shot during filling of cavity Repair 8
11/12/1982	18" – 30"(Info Only)	Incomplete fusion	Intermediate shot during filling of cavity Repair 9
11/12/1982	14"-28""(Info Only)	Acceptable (Tungsten inclusions)	Excavation Shot
11/13/1982	22"- 32" (Info Only)	Acceptable	Informational shot after filling of cavity
11/13/1982	14" 30" (Info Only)	Acceptable	Informational shot a little over half way filled
12/5/1982	14"-28" and 28"-42"	(Tungsten inclusions, artifacts) Acceptable	Final

5
REVIEW OF PREVIOUS EXAMINATION DATA

5.1 (N2D) 32-WD-164

A thorough review of the manual examination data from the 1992 and 1995 outages was performed. With the exception of the 1995 examination, the previous examinations were performed with shear wave search units only, which are known to be ineffective in the examination of dissimilar metal welds. (The use of shear waves in the current qualified procedures is limited to examination of the base material on both sides of the weld and is not relied upon for examination of the weld material.) The 45 and 60 degree refracted longitudinal search units used in 1995 were not optimally focused for the depth of the reported indications. Based on the aforementioned information, it is possible that the reported flaw could have been present since fabrication and therefore not detected due to limitations in the examination techniques used.

5.2 (N2C) 32-WD-122

The 1999 automated report was reviewed; it was clear that the flaw was present in the data and appeared to not have changed in dimension since the last examination. Previous manual examinations did not have the benefit of the advanced ultrasonic imagery, and it is likely that without it, the examiners would have classified this flaw as clad noise and thus not reported it.

6
EVALUATION OF INDICATION IN INLET SAFE-END-TO-NOZZLE (N2D) 32-WD-164

6.1 (N2D) 32-WD-164 Flaw Characterization

EPRI staff, along with the qualified examiner that originally reported the flaws, performed a detailed review of the automated data collected and the results of the inspection vendor's analysis of this weld using the Intraspect data analysis software. The ultrasonic analysis approach used by WESDYNE makes use of advanced imaging software that is capable of displaying A, B, B-Prime, and C scan images. The results of EPRI's review are detailed below.

This flaw exhibits characteristics typical of a planar flaw that could be related to the original fabrication of the weld. This conclusion is based on the following key attributes:

- The indication plots to the fusion zone of the inconel weld and safe-end in an area where several documented repairs were performed.
- The echo dynamic pattern observed from this flaw is smooth and no evidence of branching or multifaceted tip signals was detected.
- The B and B-Prime (D-Scan) views indicate that the flaw does not vary in depth for the entire length of the scan. This uniform response pattern is not indicative of SCC.
- The C-Scan image shows that the flaw is extremely straight and its axial position does not vary along the entire length of the scan. This consistent response is also not indicative of SCC.

The flaw appears to be connected or in very close proximity to the inside surface, but due to the inherent limitations of the ultrasonic techniques being used, it is impossible to determine if it is actually open to the inside surface. However, it has been evaluated conservatively by the vendor and the utility to be a surface connected flaw.

While there is evidence that the reported flaw may be related to fabrication welding processes, the large number of ID weld repairs, and the possible presence of an ID creviced condition on the inside surface make it impossible to completely rule out that the reported flaw may actually be shallow SCC.

7
EVALUATION OF INDICATION IN INLET SAFE-END TO NOZZLE (N2C) 32-WD-122

7.1 (N2C) 32-WD-122 Flaw Characterization

A thorough review of both the 1999 and the 2007 automated data confirm that the reported indication is clearly a fabrication flaw located near the transition between the stainless steel cladding and the nozzle butter (see Figure 7-1). The flaw is 1.3" long on the ID and is wholly contained in the cladding. It does not propagate into either the carbon steel base material or the inconel butter material. See Figures 7-2 and 7-3 below for images of the flaw collected from the 1999 and the 2007 data.

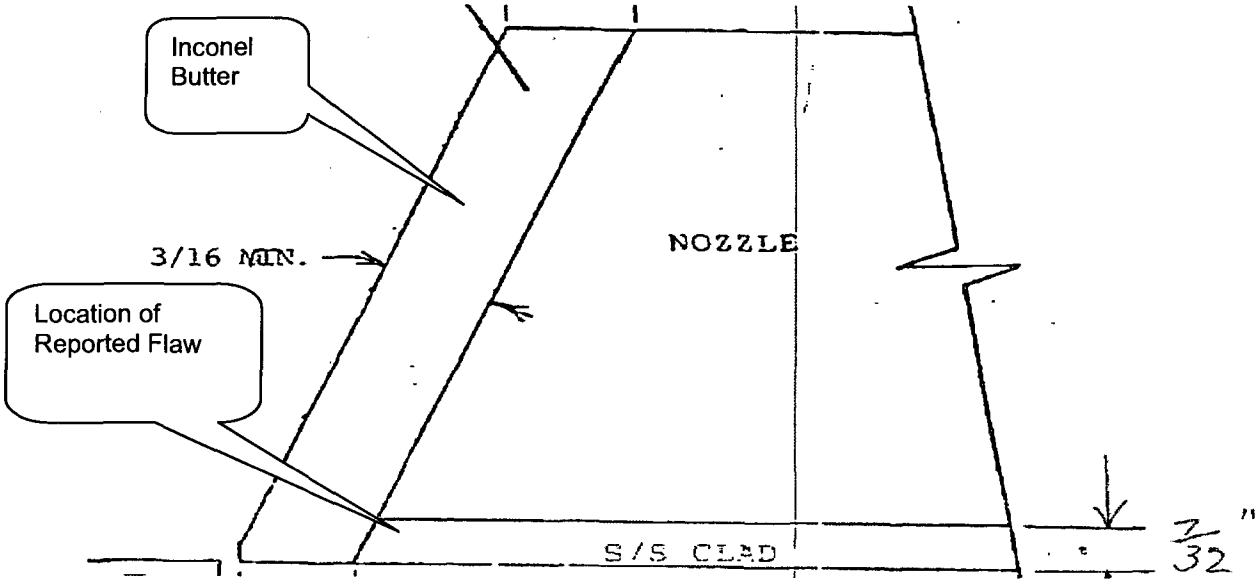


Figure 7-1
Location of Flaw

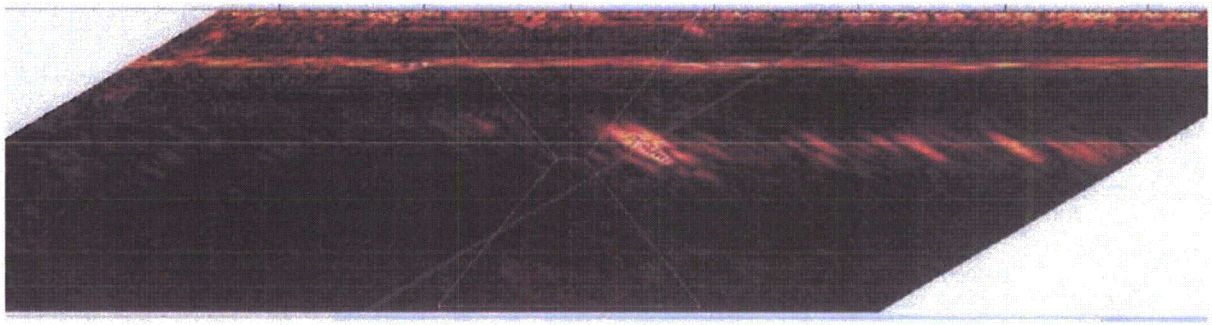


Figure 7-2
Cladding Fabrication Flaw Reported during 2007 Examination

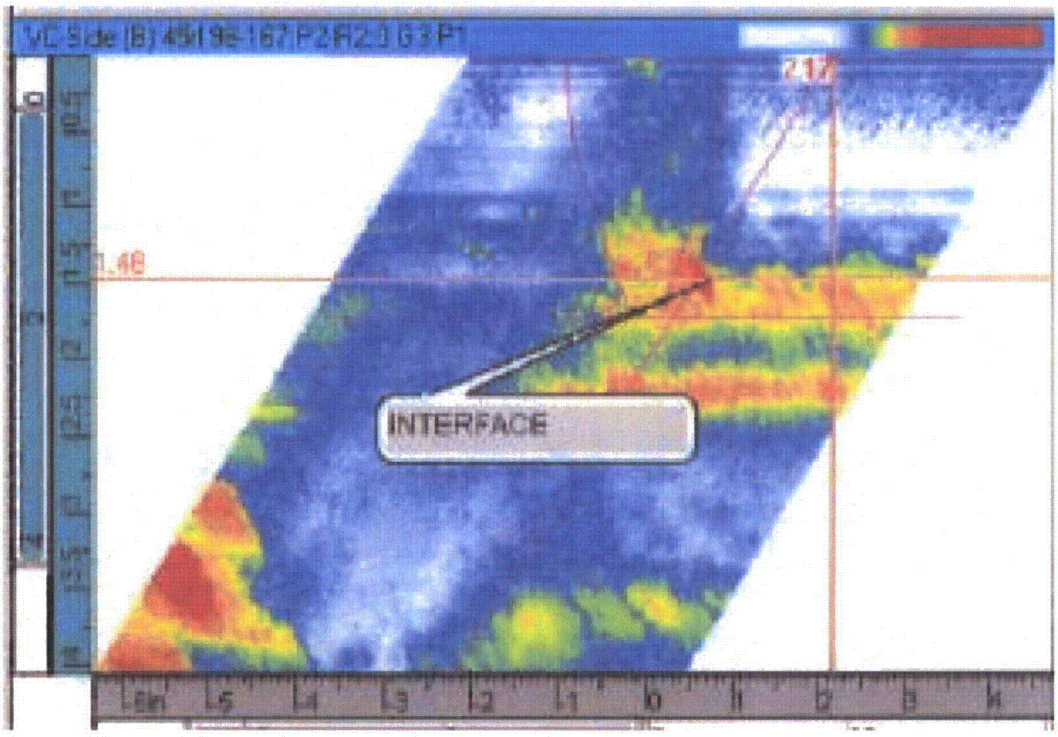


Figure 7-3
Image from 1999 Data Showing Cladding Fabrication Flaw Reported during 2007 Examination

8
CONCLUSION

EPRI personnel were requested to provide assistance during the Nine Mile Unit 1 RF-19 outage by performing a technical evaluation of examination results reported by WESDYNE International for the N2D and N2C safe-end-to-nozzle dissimilar metal welds. The data provided for this review support their conclusion that N2D safe-end-to-nozzle weld contains a 1.59" long planar-type, circumferential flaw. The flaw reported in the N2D weld appeared to be ID connected and contained within the Alloy 82/182 weld material. The characteristics of this indication are not typical of SCC located in Alloy 82/182 weld material. EPRI's technical evaluation results confirm WESDYNE's conclusions; however, due to the numerous ID weld repairs and possible crevice condition noted, stress corrosion cracking (SCC) in this area cannot be completely ruled out.

Data provided by WESDYNE from the examination of N2C supports their conclusion that the flaw reported in the N2C weld is consistent with a fabrication flaw. This flaw is 1.3" long on the ID located near the transition between the stainless steel cladding and the nozzle butter and is wholly contained in the cladding. The flaw does not appear to propagate into either the carbon steel base material or the inconel butter material and is typical of a cladding defect.

9
REFERENCES

1. Boiling Water Vessel Integrity Program (BWRVIP) document BWRIP-75 Titled "*BWR Vessel and Internals Project, Technical Basis for Revisions to Generic Letter 88-01 Inspection Schedules*
2. NDE Alert Bulletin P-98-009 Titled *"Lessons Learned Regarding Effective Detection and Discrimination of Flaws in Dissimilar Metal Welds."* Issued early 1998.
3. GE Nuclear Energy Services Information Letter (SIL) SIL No. 455 Revision 2 Titled *"ISI of additional Alloy 182 Welds"* Dated January 29, 2001.
4. Brookhaven National Laboratory Report Titled *"Metallurgical Evaluation of a Feedwater Nozzle to Safe-End Weld from River Bend Station Unit 1"*. This report was prepared by request of the NRC. (Task Order No; 2, Fin E2089, Subtask No. 5a.) Dated August 1995.

ATTACHMENT (4)

AUTOMATED ULTRASONIC WELD EXAMINATION SUMMARY REPORT FOR RECIRCULATION INLET NOZZLE-TO-SAFE END WELD NO. 32-WD-164

(Page 94 of 186 thru page 140 of 186)

Performed for NMPNS
By
WesDyne International

WESDYNE INTERNATIONAL

Automated Ultrasonic
WELD EXAMINATION SUMMARY

Report # *W-1-1105-07-007*

Site: *Nine Mile* Unit: *1* Outage #: *N1R19* Procedure # *WDI-SSP-1105* Revision: *0*

System: *Recirc* Component ID: ***32-WD-164*** Component Config: *Safe End to Nozzle*

Examiner: *Thomas Walsh* Level: *II* Examiner: *Larry Musgrave* Level: *II*

Examination Type: PSI: ___ ISI: √ Operating System: *IntraSpect*

Calibration Data Pkg.(s): *W-1-1105-07-02*

EXAMINATION SUMMARY

One relavent indication was seen in the automated ultrasonic examination data taken on the weld listed above. The examination meets the requirements of ASME B&PV Code, Section XI, Appendix VIII, 1995 edition with addenda through 2000. The PDI qualified procedure required detection scanning with a 45 degree refracted longitudinal 1 MHz, 60 degree refracted longitudinal 1 MHz, 60 degree refracted longitudinal 2 MHz, and 45 degree shear 2.25 MHz transducers. An additional 45 degree refracted longitudinal 2 MHz transducer was used to depth size the indication.
The indication found is on the safe end side of the weld in an area of previous weld repair. The repair was for incomplete root fusion. Although the repair was performed the UT indication characteristics are more indicative of a lack of fusion reflector than a service induced flaw. A manual exam of the indication was also performed to look for additional flaw characteristics such as faceting . No faceting was found. The indication has been evaluated as a flaw using the ASME Code IWB tables.

The 45 shear recorded one relevant, non-relevant indications,and acoustic interface.
The 1 MHz 45 degree refracted longitudinal recorded non-relevant indications.
The 1 MHz 60 degree refracted longitudinal recorded non-relevant indications.
The 2 MHz 60 degree refracted longitudinal recorded non-relevant indications (the shear component reflected off indication #1.)
The 2 MHz 45 degree refracted longitudinal recorded the indication.

The examination coverage was limited by the OD geometry (taper) of the safe end.

Previous Data Reviewed: *Yes* Type: *UT & RT*

Examination Coverage Achieved: *Risk Informed - 100%, Lower 1/3 -100% (Based on Single Sided Demonstration)*

Acceptable: * ___ Rejectable: √

N.D. Lamitt III 4/2/07

Summary by: CLAYTON SHAW	Utility Reviewer:	ANII Reviewer:
Level II Date: 3-29-07	Level III Date: 4-2-07	Date: 4/5/07

* USE-AS-IS DISPOSITION - REF: CR 2007-1859 & F.A.# NMP-29Q-301. 4-10-07

WESDYNE INTERNATIONAL

Ultrasonic

INDICATION DATA

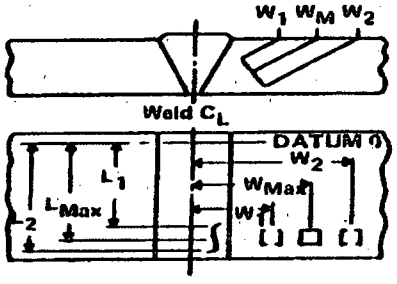
Sheet

Report # *W-1-1105-07-007*

Site: *Nine Mile* Unit: *1* Outage #: *N1R19* Procedure # *WDI-SSP-1105* Revision: *0* FCN: *N/A*

System: *Recirc.* Weld #: ***32-WD-164*** Thickness: *1.69* *inches*

Datum 0 Location: *Top Dead Center* & *Weld Center Line*



The layout at the left shows a perpendicular propagating scan. For parallel scans the L and W dimensions would be reversed in relation to the weld centerline.

Abbreviations

L- Distance from Datum 0 (typically measuring flaw's major dimension, ie. length)
MP- Metal Path
Prop.- Propagation
RL- Remaining Ligament above flaw
SU Loc- Search Unit Location
W- Distance from Datum 0 (typically locating flaw's minor dimension, ie. width)
US- Upstream
DS- Downstream
CW- Clockwise
CCW- CounterClockwise

IND. #	Angle &Mode	Prop. Direction	W SU Loc	MP	W Ind. Loc.	L1	L2	Length	RL	Depth	Comments
1	*45S*	*DS*				*26.85*	*28.8*				*Track Dimensions*
1	*45S*	*DS*	*-1.9*	*2.39*	*-0.17*	*24.7*	*26.5*	*1.8*	*1.51*	*0.18*	*Pipe OD Dimensions*
						Reflector RL measured at top of echo dynamic pattern, no tip signal seen					
						Consistant W measurement across indication					
1	*45L2*	*DS*				*27.75*	*29.05*				*Track Dimensions*
1	*45L2*	*DS*	*-1.9*	*2.4*	*-0.19*	*25.5*	*26.7*	*1.2*	*1.42*	***0.27***	*Pipe OD Dimensions*
						Reflector RL measured at top of echo dynamic pattern (possible tip signal)					
						Consistant W measurement across indication					
		Track Offset Ratio = 93.25/101.25 = 0.92									
		ID/OD Ratio = 25.7/29.0 = 0.886* *Most conservative length x ID/OD Ratio = 1.8 x 0.886 =* ***1.59 (Length at ID)***									
		**Inside and outside diameters taken from Safe End drawing #00788-3667*									

C Shaw [signature] Analyst	II Level	3-28-07 Date	[signature] UT-III Utility Review by	3-30-07 Date	[signature] ANII Review by	4/15/07 Date
[signature] Review by	III Level	3/30/07 Date				

WESDYNE INTERNATIONAL

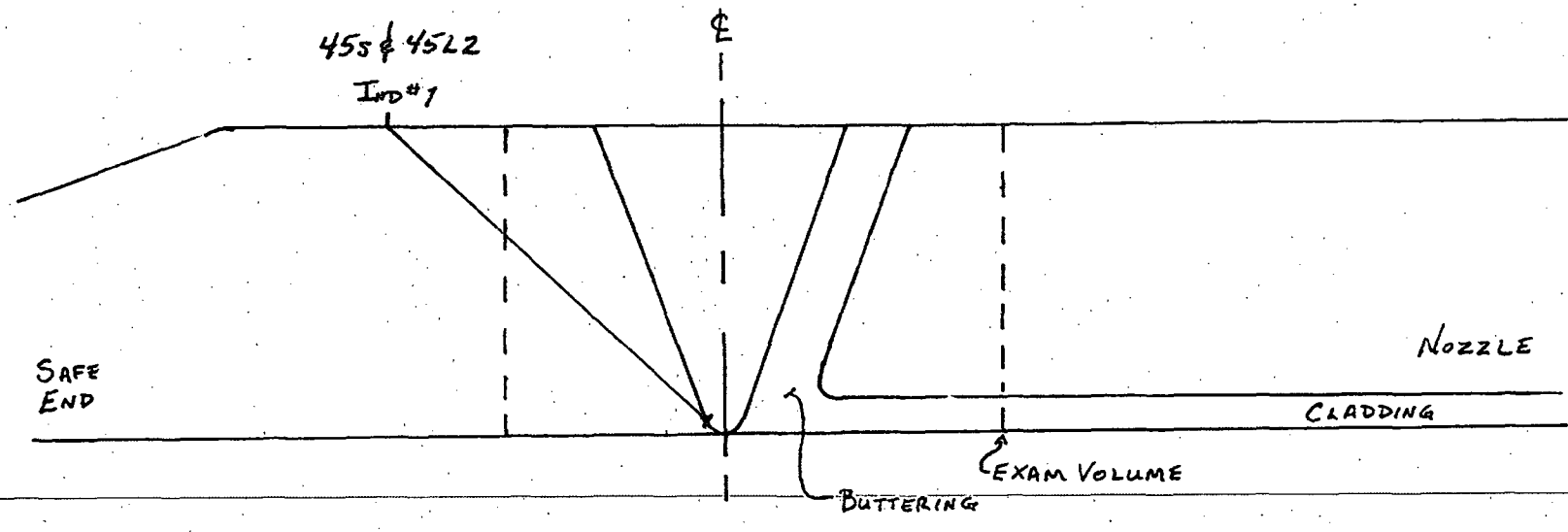
SKETCH
Sheet

Report # W-1-1105-07-007

Site: Nine Mile | Unit: 1 | Outage #: N1R19 | Procedure # WDI-SSP-1105 | Revision: 0 | FCN: N/A

System: Recirc. | Weld #: 32-WD-164

INDICATION #1



FLOW →

SKETCH CONSTRUCTED USING DRAWING # 00788-3667

C. SHAW	II	3-28-07					
Drawn By	Level	Date					
Review by	III	3/30/07	J J Clento UT-III	3-30-07	R A Johnson	4/5/07	Pg 96 of 186
	Level	Date	Utility Review by	Date	ANII Review by	Date	

WESDYNE

IWB 3514-2 Calculation

Project :	Nine Mile Point N1R19	*Exam Report # :*	W-1-1105-07-007
System:	Recirc (32)		
Weld No.:	32-WD-164	*Indication :*	1

Flaw Thruwall Dimension "a" =	0.27	*"T" nominal =*	1.69
Flaw Length "l" =	1.59	*"T" measured =*	1.75
Surface Separation "S" =	0.00	*Clad "T" nominal =*	0.00

ASME SECTION XI, 1989 W/A FOR ISI AUSTENITIC STEEL WELDS
ALLOWABLE PLANNER FLAWS FOR CATEGORY B-F AND B-J
TABLE IWB 3514-2 FOR 2.0" THICKNESS

Aspect Ratio a/l	Surface a/t %	Subsurface a/t %	Truth	Surface a/t %	Subsurface a/t %
0.00	10.0	10.0	FALSE	-	-
0.05	10.2	10.2	FALSE	-	-
0.10	10.4	10.4	FALSE	-	-
0.15	10.5	10.5	TRUE	10.58	10.43 V
0.20	10.7	10.7	FALSE	-	-
0.25	10.9	10.9	FALSE	-	-
0.30	11.1	11.1	FALSE	-	-
0.35	11.2	11.2	FALSE	-	-
0.40	11.4	11.4	FALSE	-	-
0.45	11.6	11.6	FALSE	-	-
0.50	11.7	11.7	FALSE	-	-
				Allowed 10.58	Allowed 0.60

a = **0.270**
a/l value = **0.170** If a/l > .5, then a/l = .5
Y = **0.000** Y = S/a, If Y > 1, then Y = 1

Flaw is Surface

Allowed a/t = **10.58%**
a/t = **15.43%**

Flaw is unacceptable by Table IWB-3514-2.

Comments :

Analyst: C. Shaw Level: II Date: 3-28-07

Reviewer: Level: III Date: 3/30/07

Utility Reviewer: Level: III Date: 3-30-07

WESDYNE INTERNATIONAL

Ultrasonic Examination
SCAN LIMITATION
Sheet

Report # W-1-1105-07-007

Weld Number: 32-WD-164

Interfering Condition: OD TAPER

Size of Interfering Condition: FULL 360°

Distance from Weld Centerline: 2.95"

Distance from Datum Point 0.0: FULL 360°

Reference Drawing Number: 0078 3667 FIG1

Comments and Sketches:

Some coverage missed on nozzle only due to drop out on circumferential scans.
This does not affect reported coverage by single side demonstration.

See Attached Sketch Sheet

EXAMINER Clayton Shaw LEVEL II DATE 3/28/07

REVIEWER [illegible] LEVEL III DATE 4/2/07

REVIEWER [illegible] LEVEL III DATE 4-2-07

Authorized Inspection Agency [illegible] DATE 4/5/07

WESDYNE INTERNATIONAL

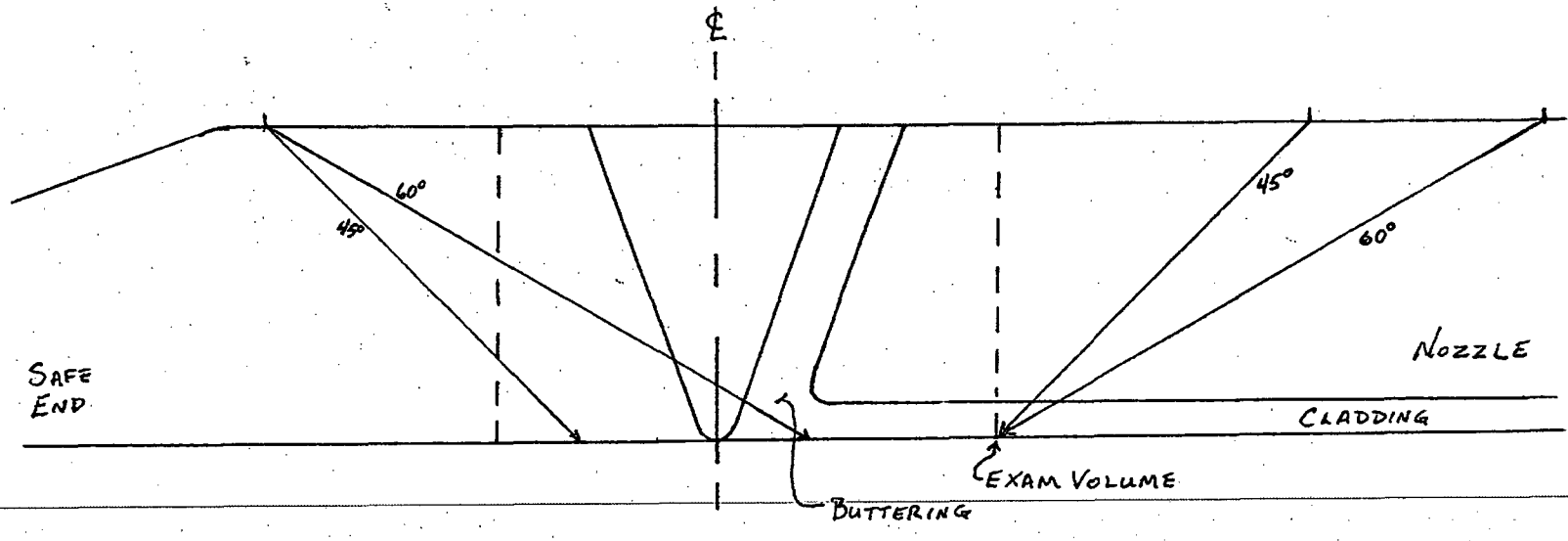
SKETCH
Sheet

Report # W-1-1105-07-007

Site: Nine Mile Unit: 1 Outage #: N1R19 Procedure # WDI-SSP-1105 Revision: 0 FCN: N/A

System: Recirc. Weld #: 32-WD-164

Coverage Plot



FLOW →

SKETCH CONSTRUCTED USING DRAWING # 00788.3667

C. SHAW	II	3-28-07	J J Colantuitte	3-30-07	N D Johnson	4/5/07	Pg 99 of 186
Drawn By	Level	Date	Utility Review by	Date	ANII Review by	Date	
Review by	III Level	3/30/07 Date					

WESDYNE INTERNATIONAL

IntraSpect Automated UT System

EXAMINATION DATA

for OD examination of Dissimilar Metal Welds

Report # *W-1-1105-07-007*

Site: *Nine Mile* Unit: *1* Outage #: *N1R19* Drawing ID: *F-45183-C Sht. 7*
System: *Recirc.* Weld #: ***32-WD-164*** Procedure # *WDI-SSP-1105*
Configuration: *Safe End to Nozzle* Revision: *0* FCN: *N/A*
Component Temp.: *77 °F* Thermometer #: *105227*
Calibration Data Pkg. #: *W-1-1105-07-02* Disk #: *N/A*
Operator(s) / Level(s): *Walsh / II, Hopkins / II, Musgrave / II, Overly / II*
Exam Date & Time: *3/26/07 0205 Thru 3/27/07 1225*

ANALYSIS RESULTS

Angle &Mode	Skew	CH #	File Name	Indications & Comments
45L1	3 (DS)	1	N2D_3_SETUP1_01	NRI - X = 0 to 59
60L1	"	2	"	NRI - X = 4 to 63
45L1	"	1	N2D_3_SETUP1_02	NRI - X = 57 to 103
60L1	"	2	"	NRI - X = 61 to 107
60L2	"	1	N2D_3_SETUP6_01	Indication #1 seen with shear component only
45S	"	2	"	Indication #1 - see Indication sheet and images
45L2	"	1	N2D_3_SIZING1_01	Indication #1 - Best Image, see Indication sheet and images, 58dB
45L2	"	1	N2D_3_SIZING1_02	Indication #1 - 63dB, prefer N2D_3_SIZING1_01
45L2	4 (US)	1	N2D_4_SIZING1_01	Ind. #1 - from nozzle side, see images, prefer N2D_3_SIZING1_01
60L2	3 (DS)	1	N2D_3_SETUP6_02	NRI - Added Coverage on nozzle side, X= 40 to 65
45S	"	2	"	NRI - Added Coverage on nozzle side, X= 43 to 68
45L1	4 (US)	1	N2D_4_SETUP4_01	NRI
60L1	"	2	"	NRI
60L2	"	1	N2D_4_SETUP5_01	NRI
45S	"	1	"	NRI
60L2	"	1	N2D_4_SETUP5_02	NRI
45S	"	2	"	NRI
60L2	"	1	N2D_4_SETUP5_03	NRI
45S	"	2	"	NRI
45L1	5 (CW)	1	N2D_5_SETUP2_01	NRI - Drop out X= 12 to 40 on nozzle side
60L1	"	2	"	NRI
45L1	"	1	N2D_5_SETUP2_02	NRI - X= 0 to 50, Drop out X= 12 to 40 on nozzle side
60L1	"	2	"	NRI
45L1	"	1	N2D_5_SETUP2_03	Incomplete - Not Used
60L1	"	2	"	Incomplete - Not Used
				(Continued)

Remarks:

RT film was reviewed in the area of indication number 1. The UT indication correlated to the repair area documented on the construction radiographic reports. The ultrasonic characteristics such as consistent W measurements and lack of defined tip signals are not indicative of a service induced flaw, however, this indication will be conservatively evaluated as a surface plalnar flaw against the ASME Code Table IWB-3514-2.

[signature] 3/30/07

Analyst Clayton Shaw [signature] Level II Date 3-28-07
Reviewer [signature] Level III Date 3-30-07
Auth. Inspect. Agency [signature] Date 4/5/07

WESDYNE INTERNATIONAL

IntraSpect Automated UT System

EXAMINATION DATA

for OD examination of Dissimilar Metal Welds

Report # W-1-1105-07-007

Site: Nine Mile Unit: 1 Outage #: N1R19 Drawing ID: F-45183-C Sht. 7
System: Recirc. Weld #: 32-WD-164 Procedure # WDI-SSP-1105
Configuration: Safe End to Nozzle Revision: 0 FCN: N/A
Component Temp.: 77 °F Thermometer #: 105227
Calibration Data Pkg. #: W-1-1105-07-02 Disk #: N/A
Operator(s) / Level(s): Walsh / II, Hopkins / II, Musgrave / II, Overly / II
Exam Date & Time: 3/26/07 0205 Thru 3/27/07 1225

ANALYSIS RESULTS

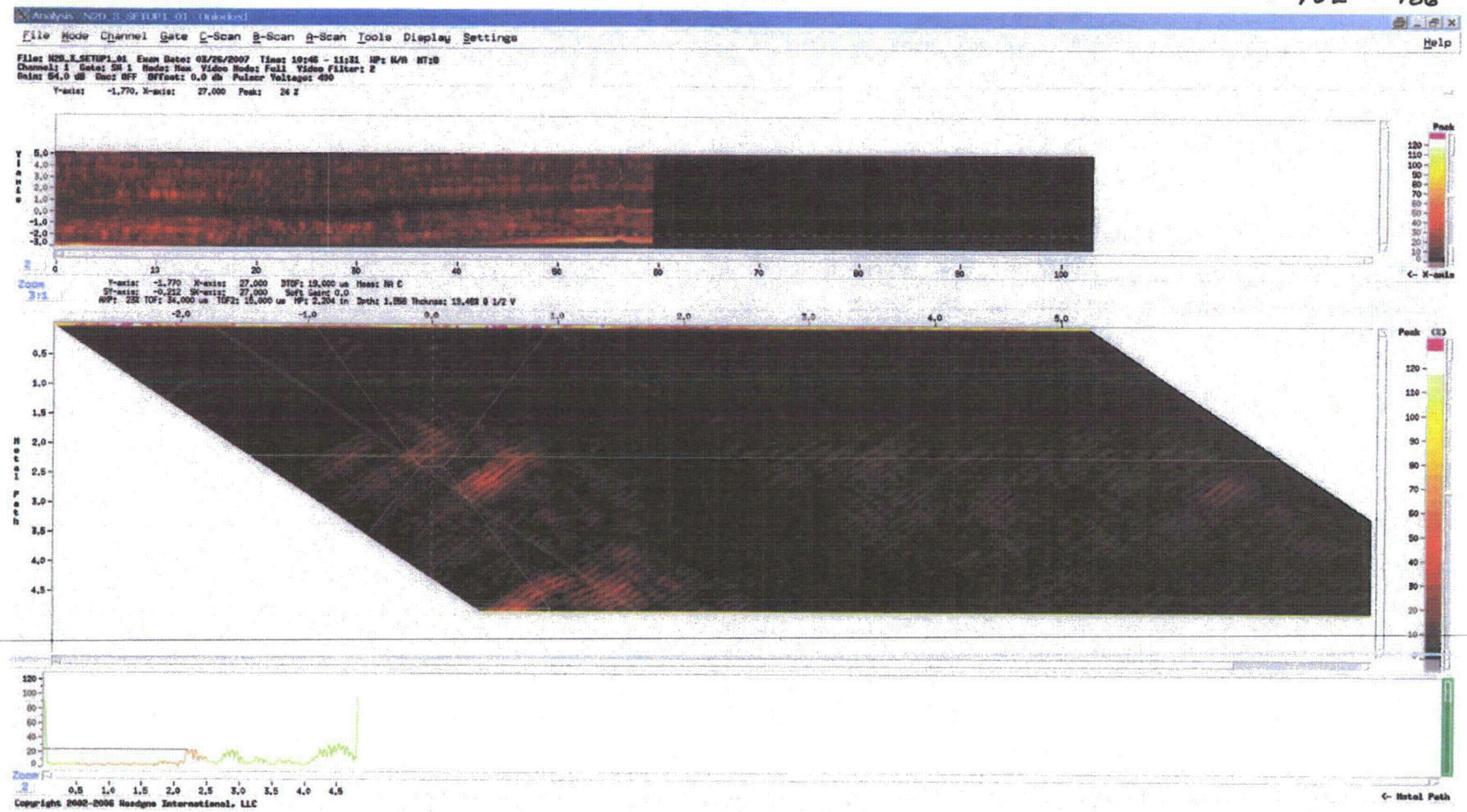
Angle &Mode	Skew	CH #	File Name	Indications & Comments
45L1	"	1	N2D_5_SETUP2_04	NRI - Drop out X= 83 thru 0 to 41 on nozzle side
60L1	"	2	"	NRI
45L1	"	1	N2D_5_SETUP2_05	NRI - Drop out X= 10 to 41 on nozzle side
60L1	"	2	"	NRI
45L1	5 (CW)	1	N2D_5_SETUP2_06	NRI - X= 0 to 40, Drop out X= 10 to 40 on nozzle side
60L1	"	2	"	NRI
45L1	6 (CCW)	1	N2D_6_SETUP3_02	NRI - Drop out X= 12 to 36 on nozzle side
60L1	"	2	"	NRI
45L1	"	1	N2D_6_SETUP3_03	NRI - Drop out X= 23to 32 on nozzle side
60L1	"	2	"	NRI
45S	6A (CCW)	1	N2D_5A_SETUP7_01	NRI
45S	5A (CW)	2	"	NRI
45S	5B (CW)	1	N2D_5B_SETUP8_01	NRI
45S	6B (CCW)	2	"	NRI

Remarks:

Track circumference is 101 1/4" and weld circumference is 93 1/4".
NRI = No Relevant Indications

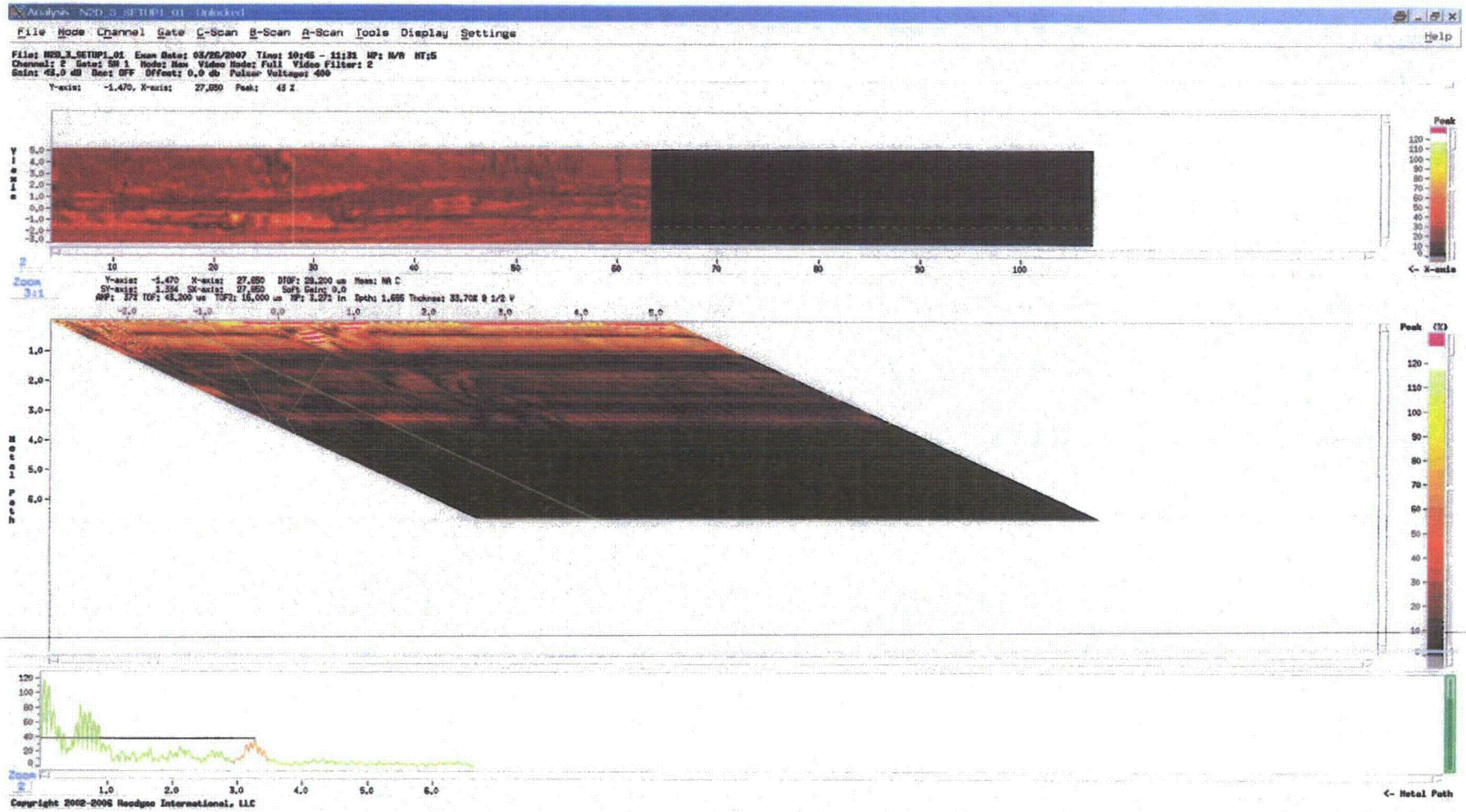
P.E. Lawrence III 3/31/07

Analyst Clayton Shaw Level II Date 3-28-07
Reviewer Level III Date 3-30-07
Auth. Inspect. Agency Date 4/5/07



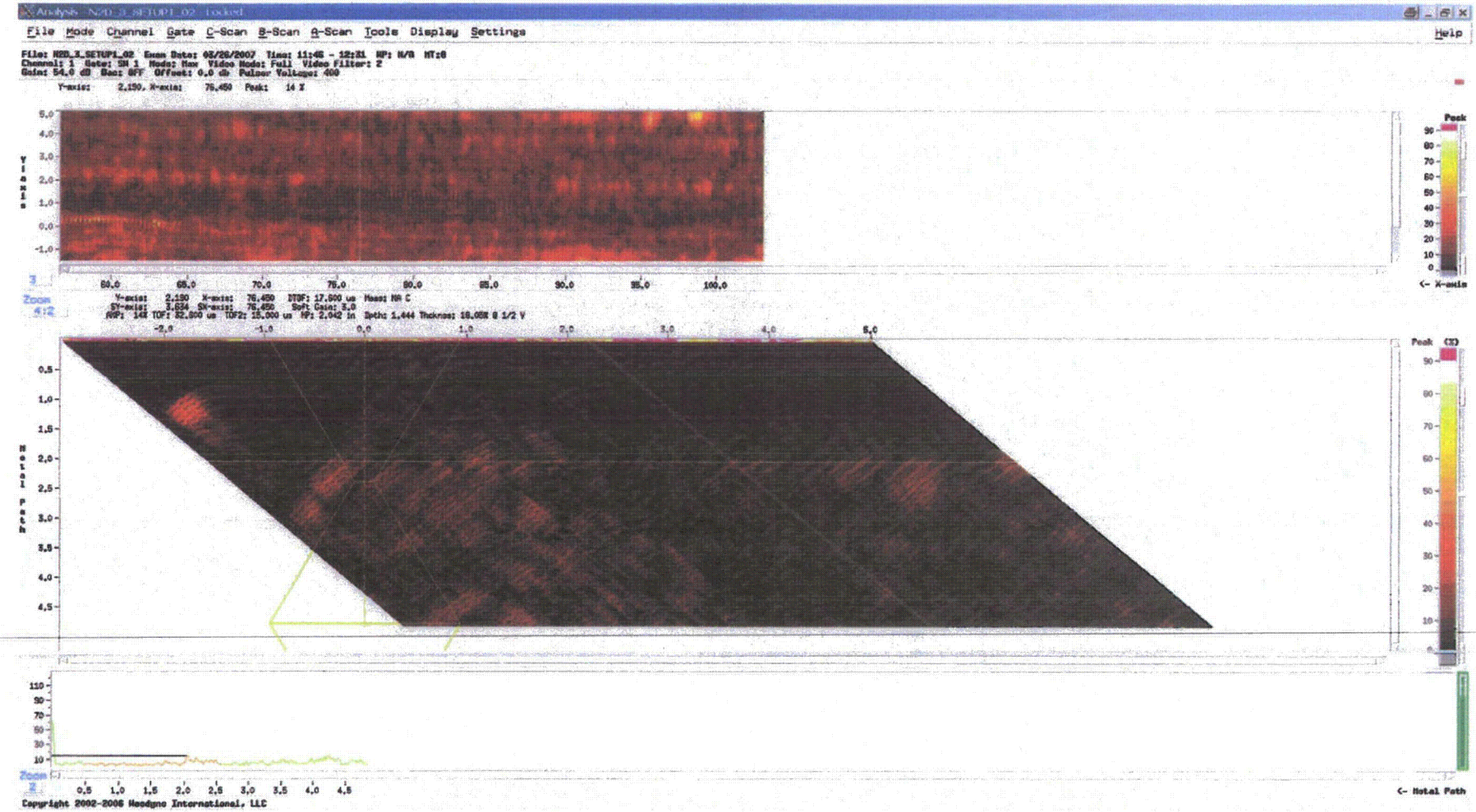
NRI

ANALYST Clayton E. Sutton LEVEL: II DATE: 3-28-07



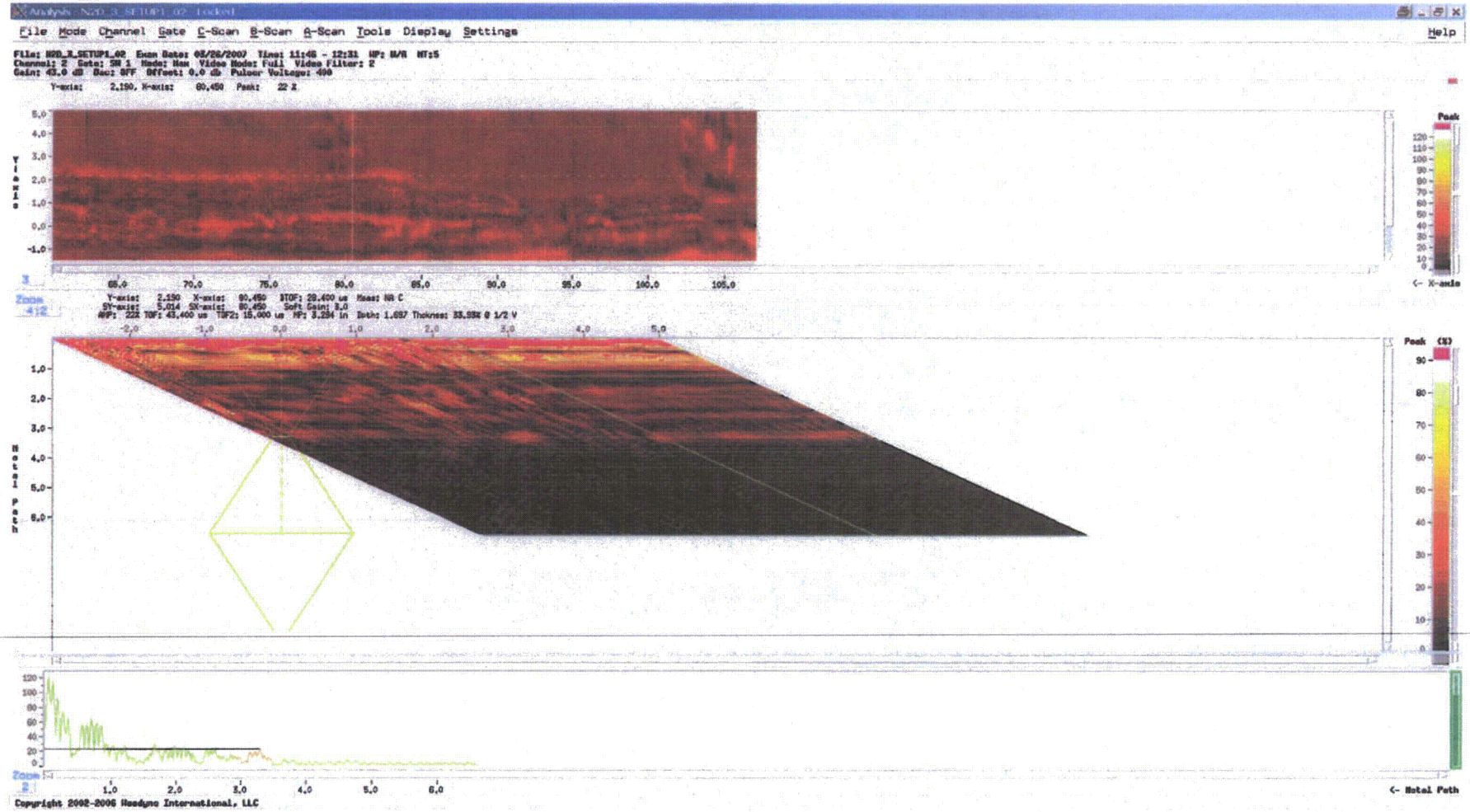
NRI

ANALYST Clayton E Stone LEVEL: II DATE: 3-28-07



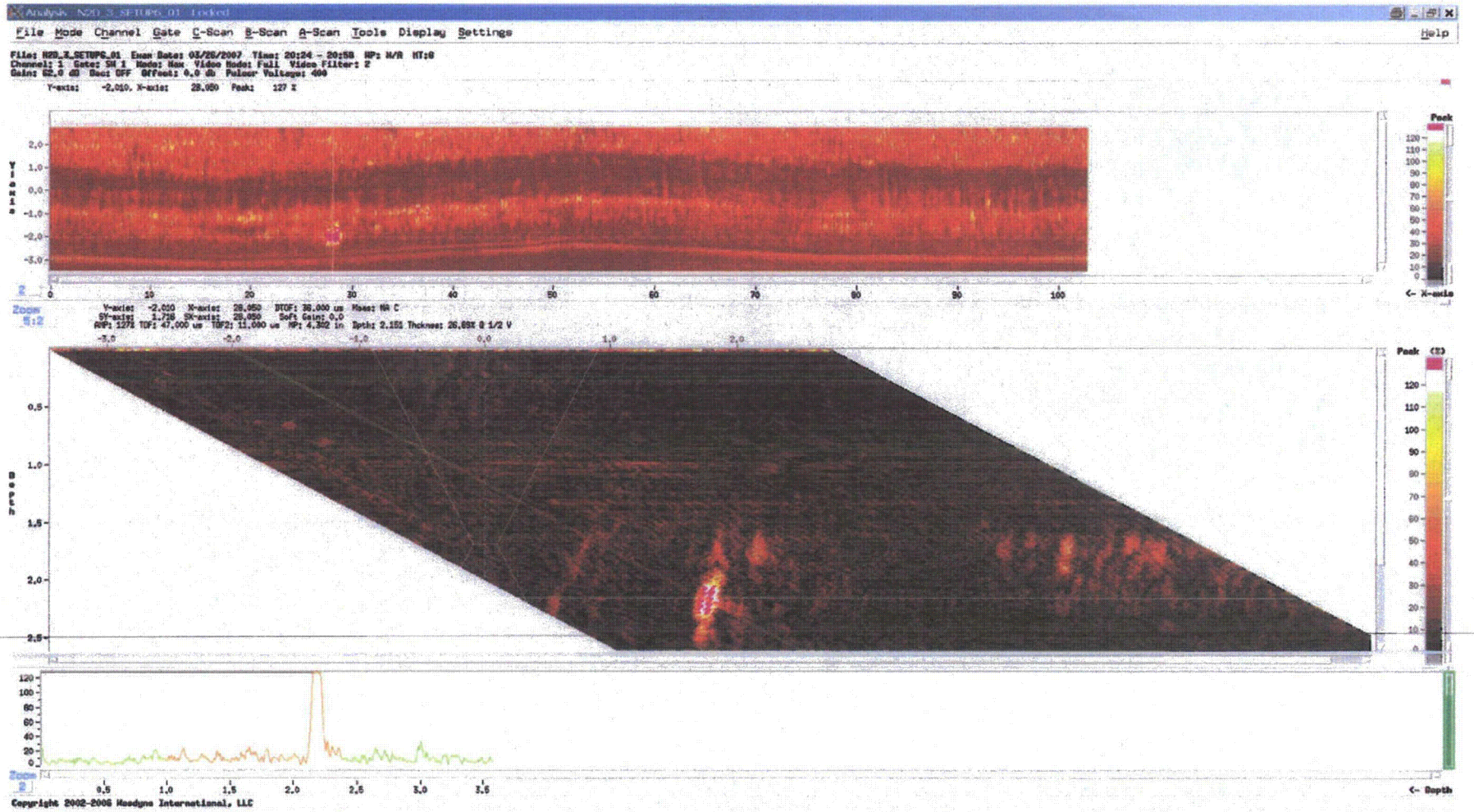
NRI

ANALYST _____ LEVEL: II DATE: 3-28-07



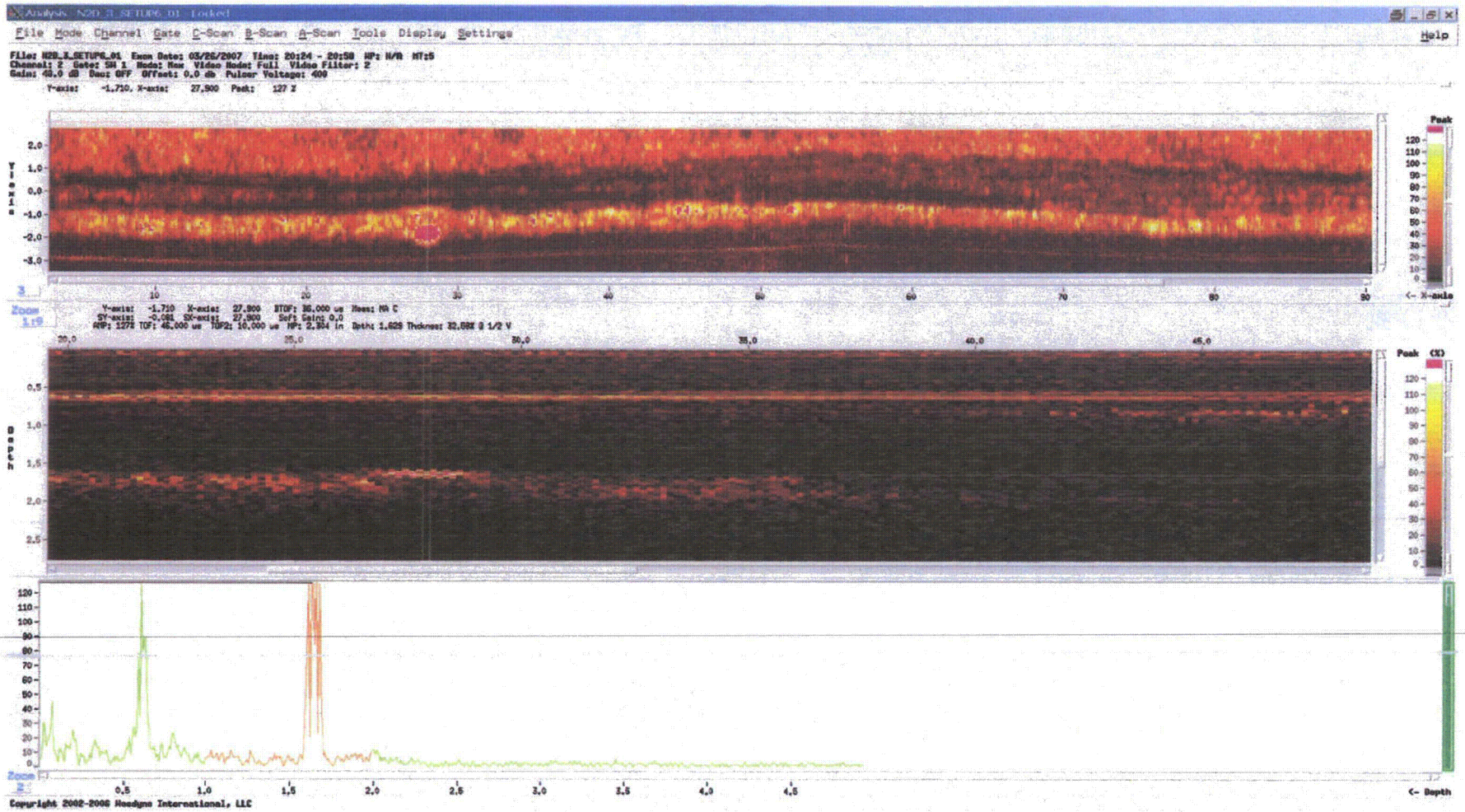
NRI

ANALYST Clyde E. Shaw LEVEL: II DATE: 3-28-07



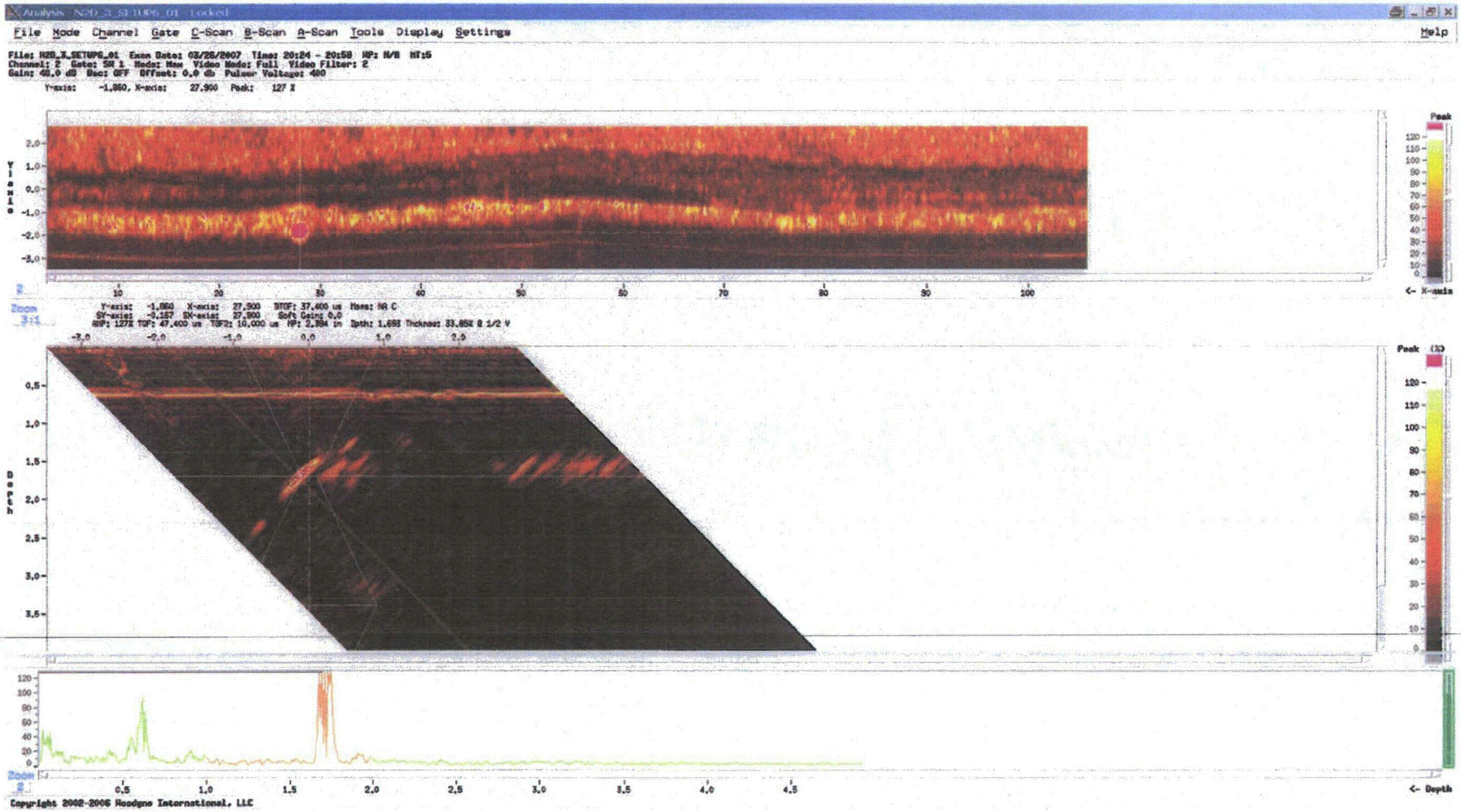
NRI - Shear component of 60RL reflecting off Indication # 1 shown

ANALYST _____ LEVEL: II DATE: 3-28-07



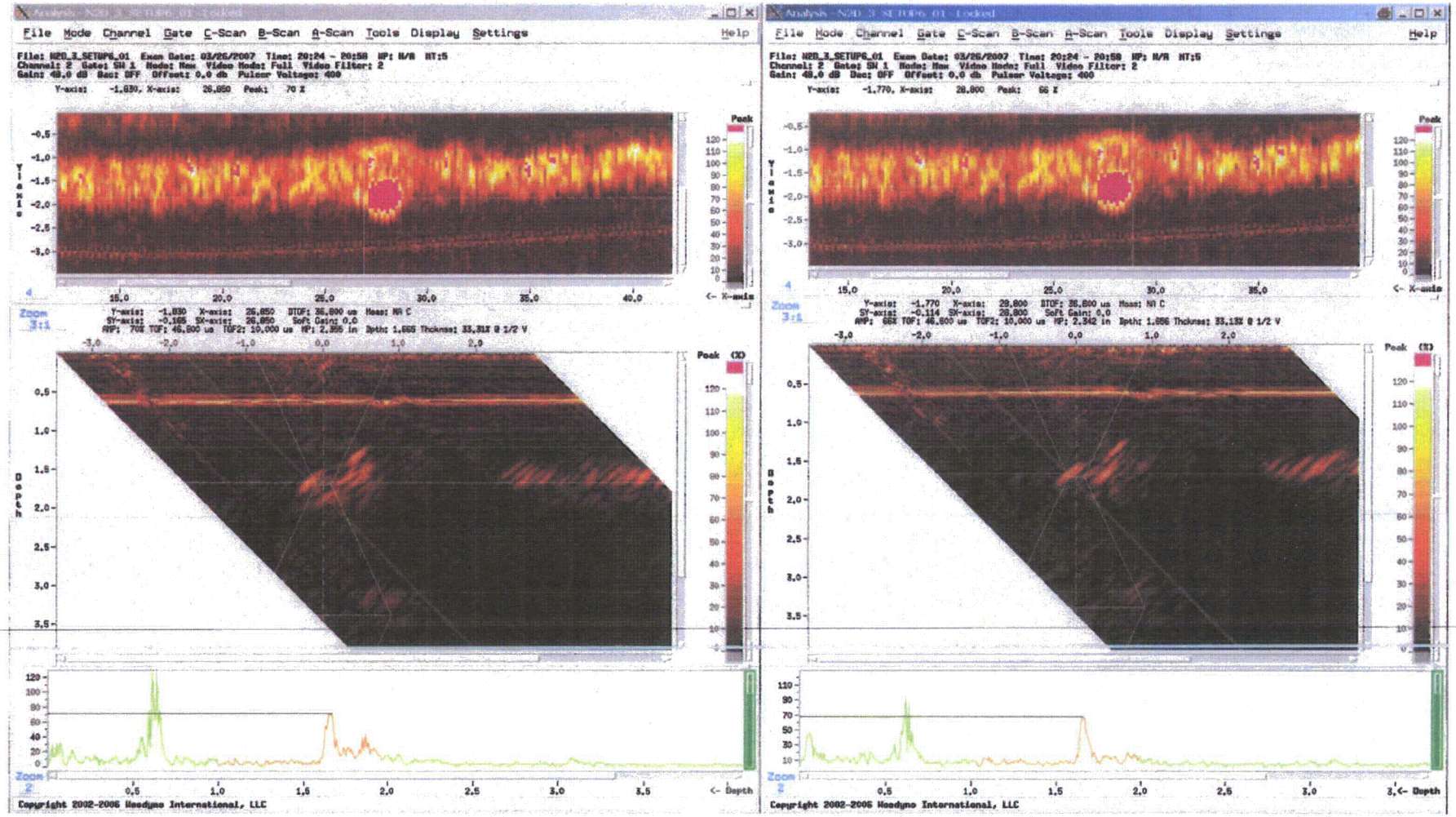
Indication #1 - W measurement does not vary

ANALYST _____ LEVEL: II DATE: 3-28-07



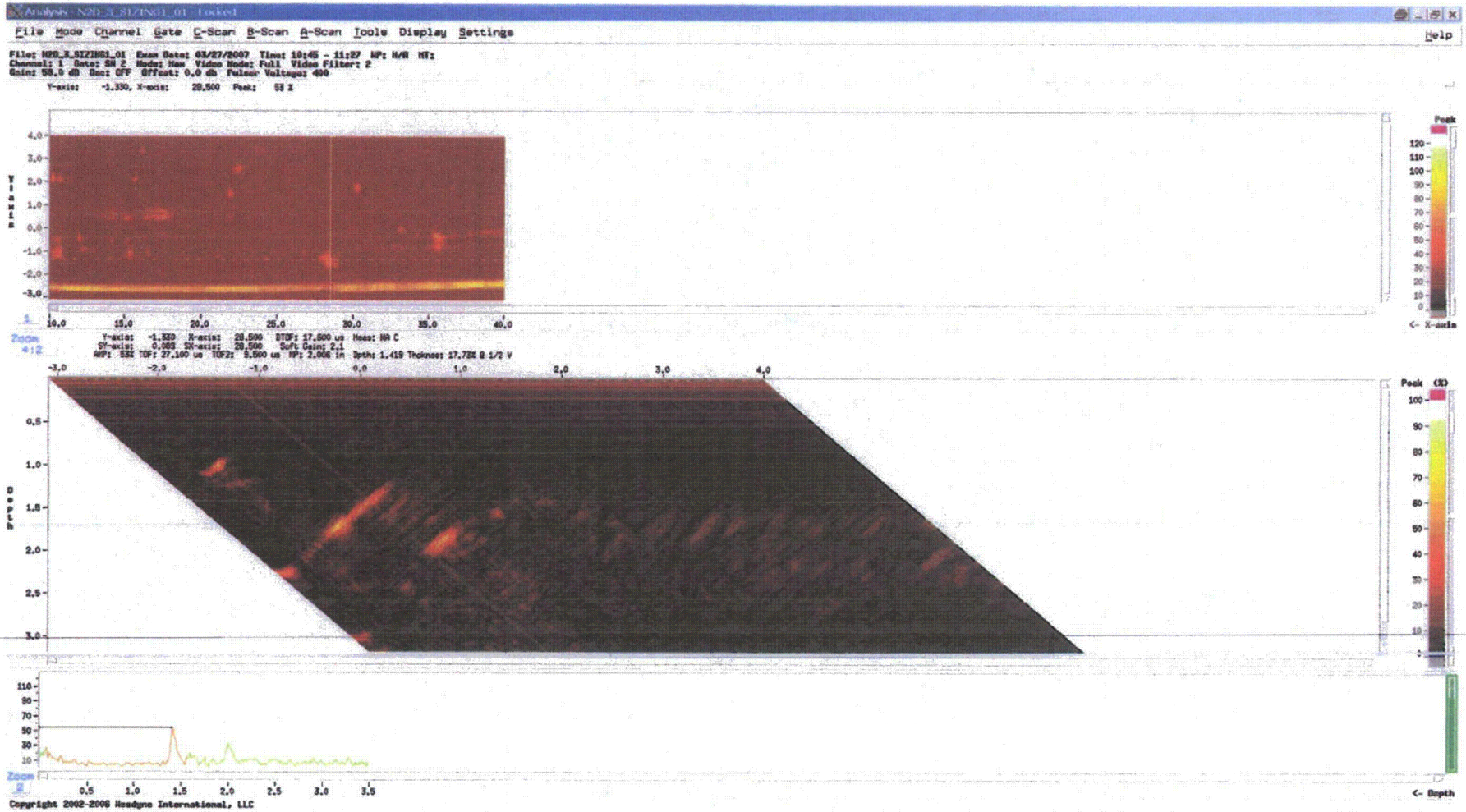
Indication #1

ANALYST [illegible] LEVEL: II DATE: 3-28-07



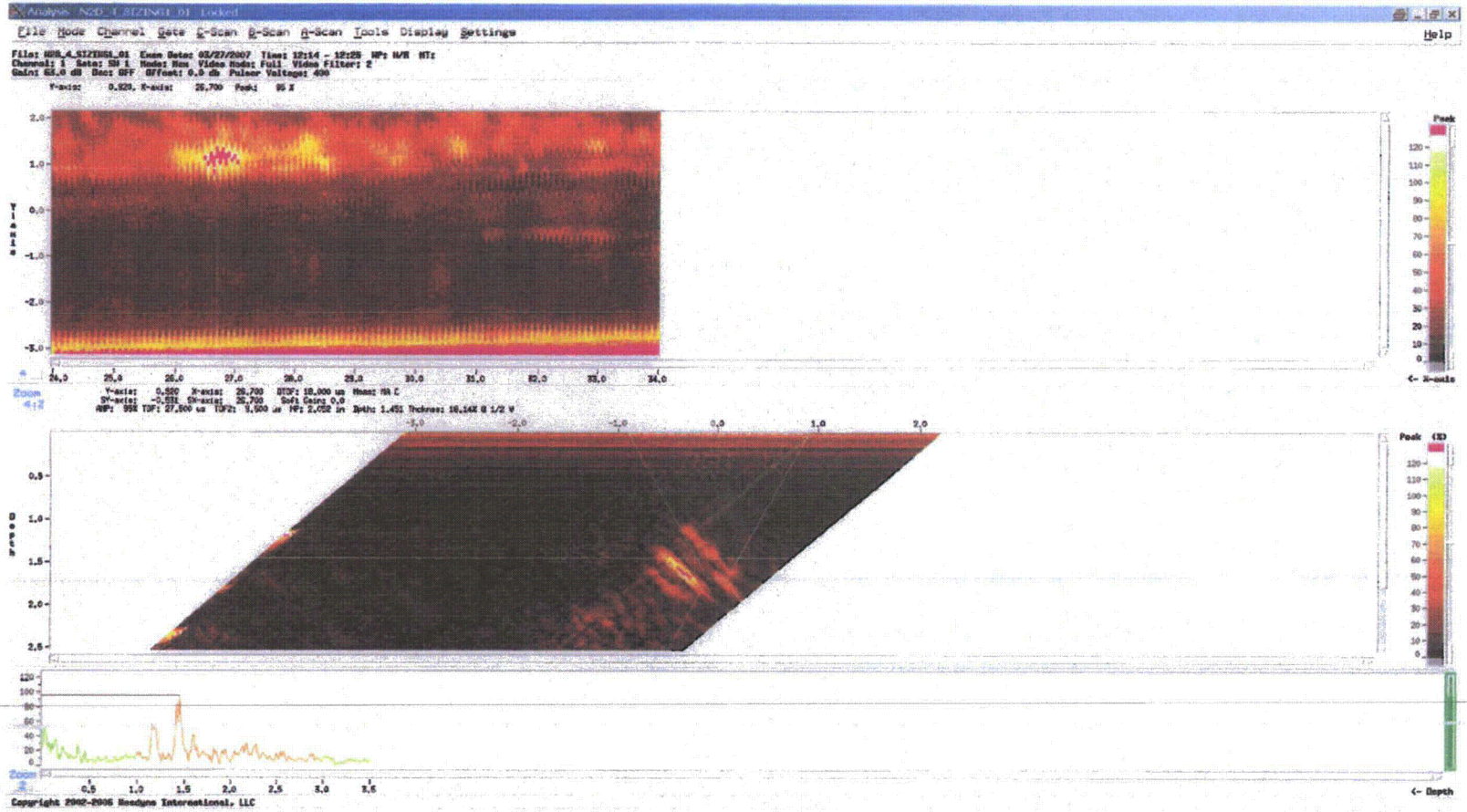
Indication #1 - End points (Length)

ANALYST Clayton E Ellis LEVEL: II DATE: 3-28-07



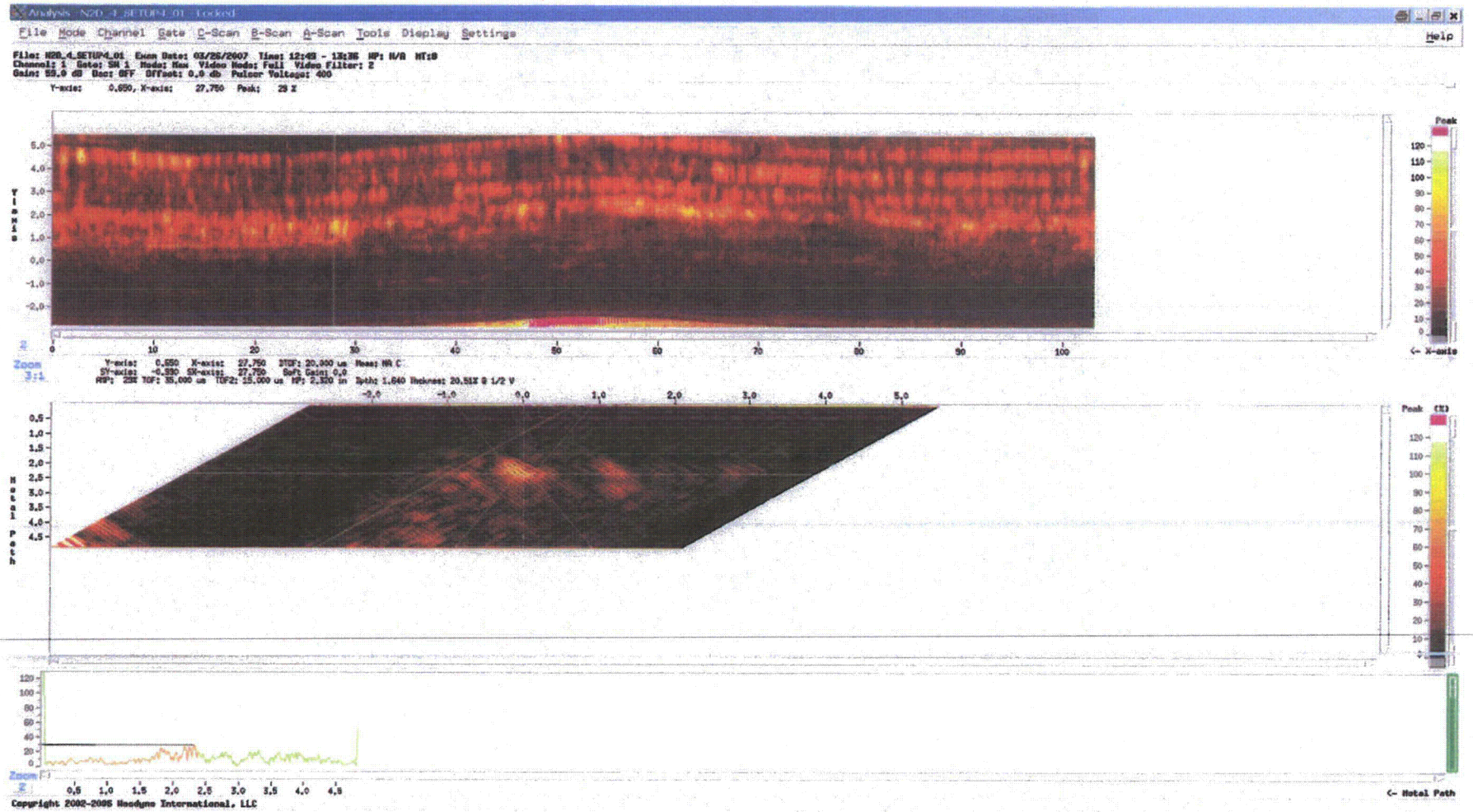
Indication #1 - Remaining Ligament shown under 'Depth'

ANALYST Clayton E Cotton LEVEL: II DATE: 3-28-07



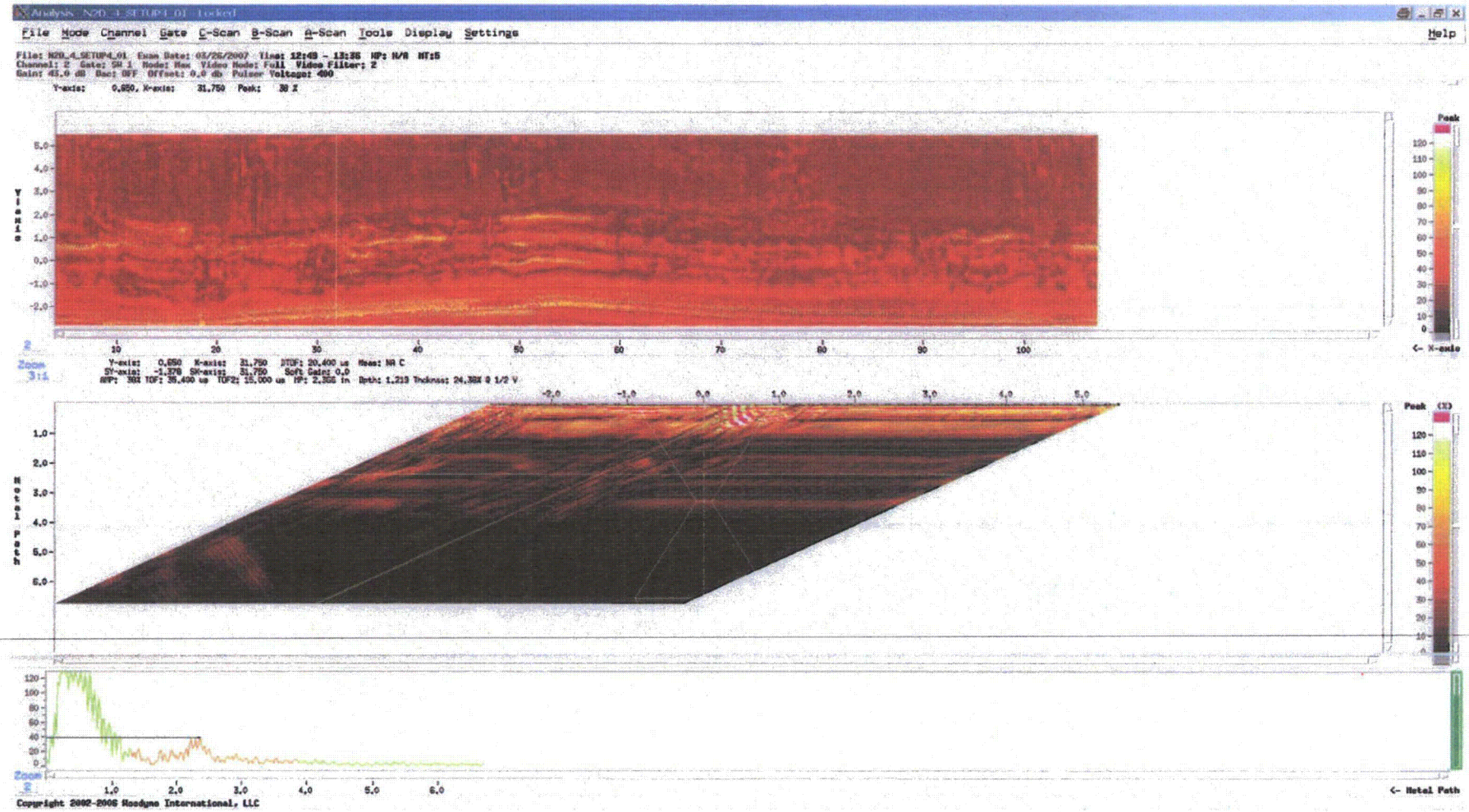
Indication #1 - from nozzle side

ANALYST Clayton E. Cotton LEVEL: II DATE: 3-28-07



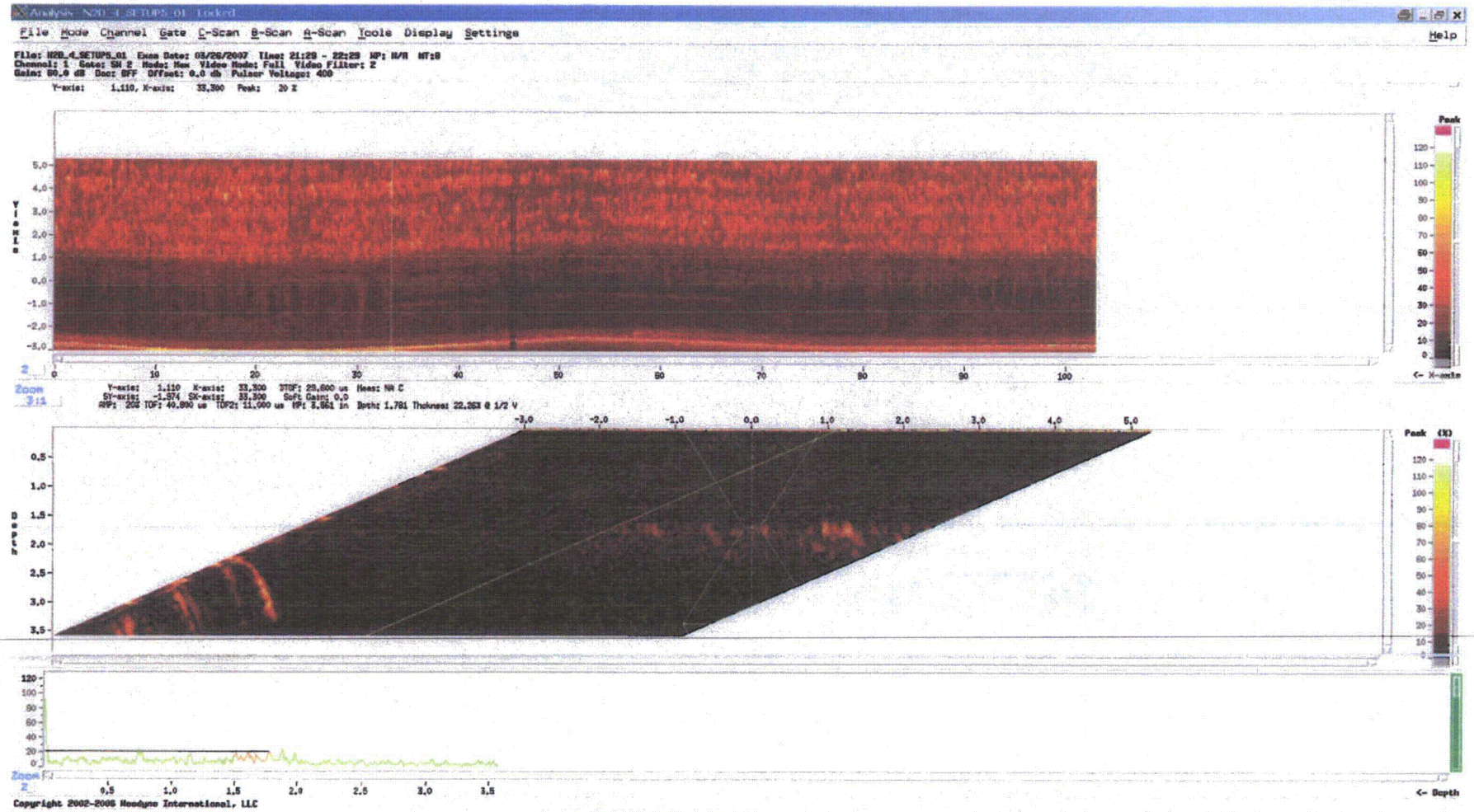
NRI

ANALYST Clyde E. Ellis LEVEL: II DATE: 3-28-07



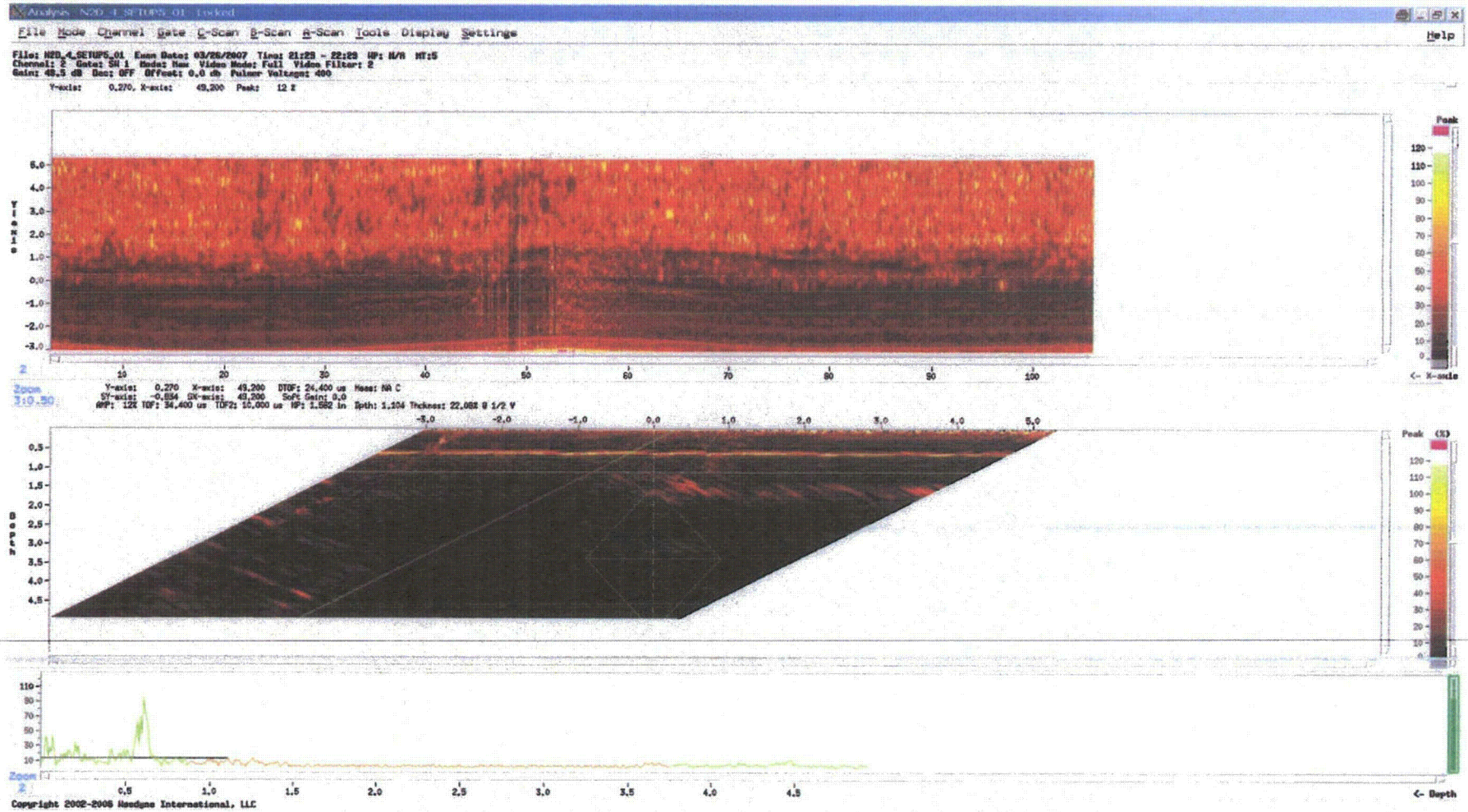
NRI

ANALYST Clayton E Otter LEVEL: II DATE: 3-28-07



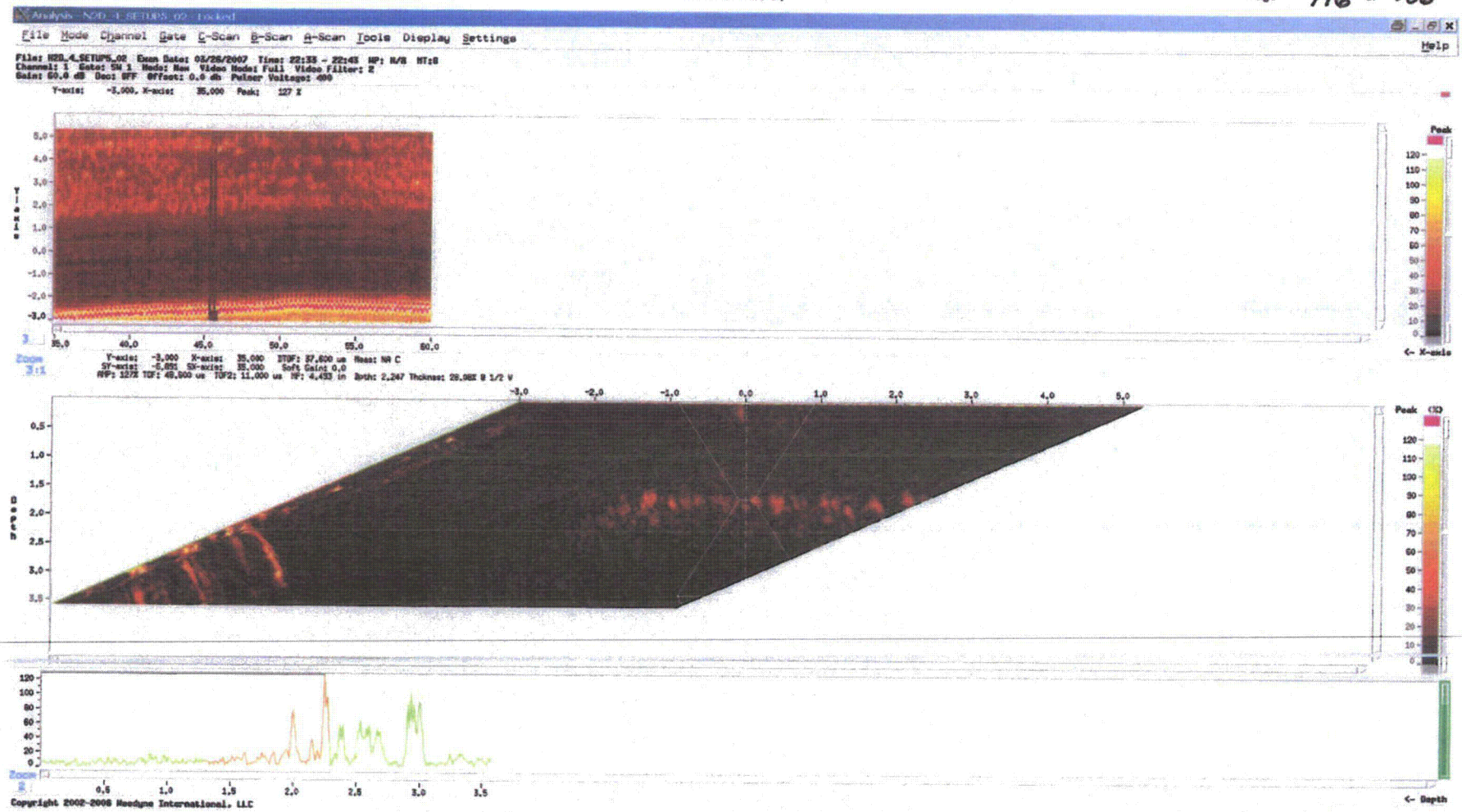
NRI

ANALYST _____ LEVEL: II DATE: 3-28-07



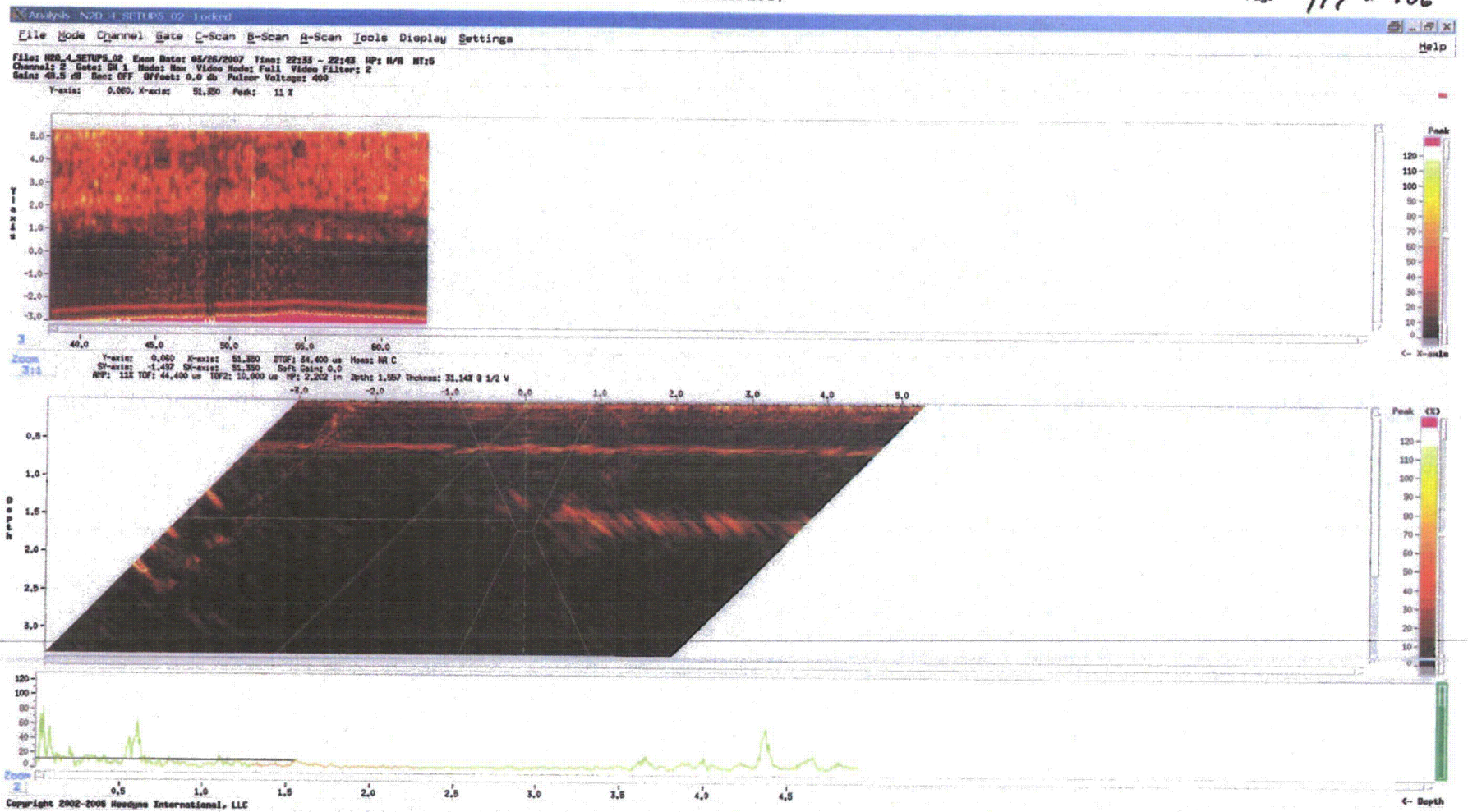
NRI

ANALYST Clayton E Otter LEVEL: II DATE: 3-28-07



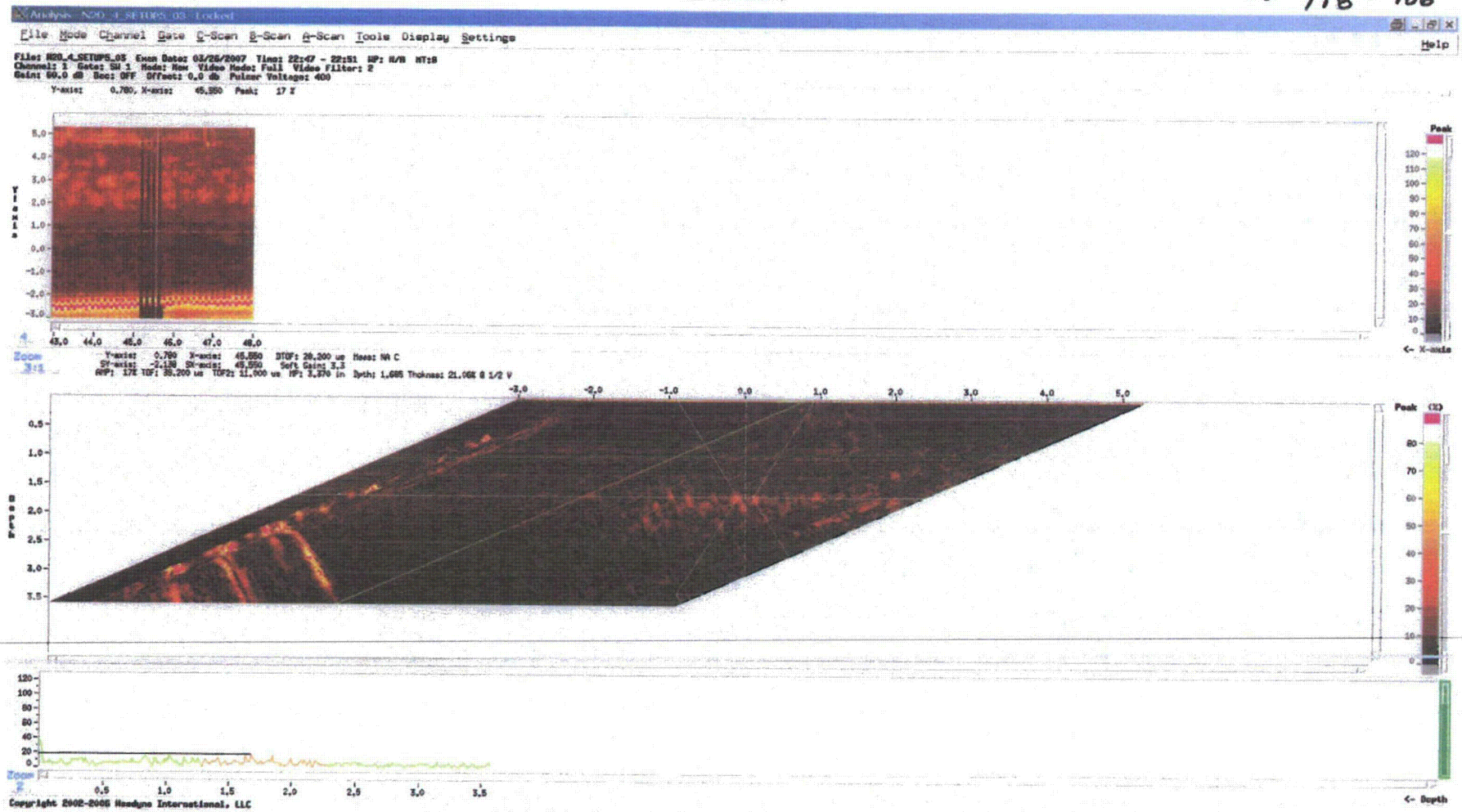
NRI - Attempt to improve data quality X= 45 to 46

ANALYST _____ LEVEL: II DATE: 3-28-07



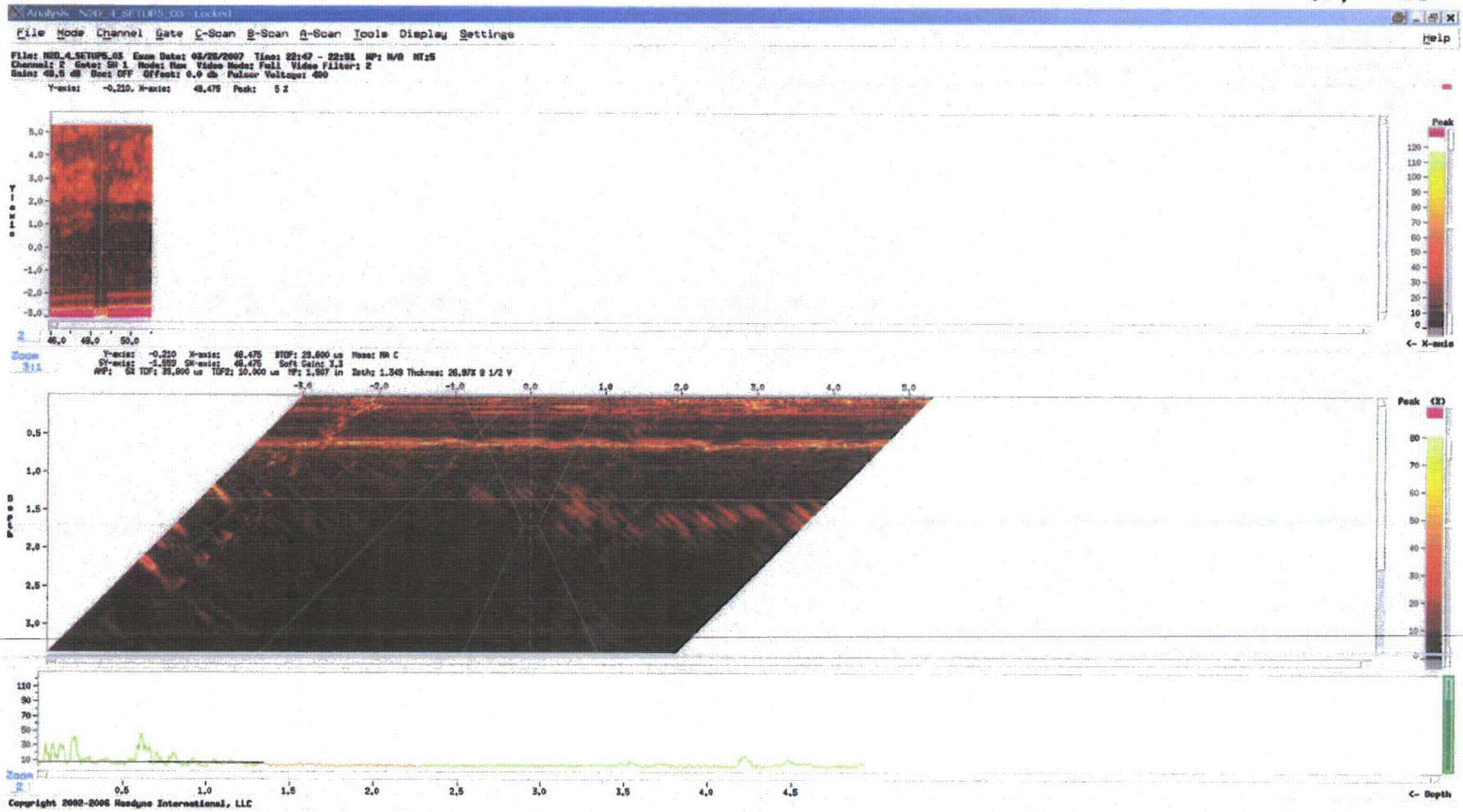
NRI - Attempt to improve data quality X= 48 to 49

ANALYST _____ LEVEL: II DATE: 3-28-07



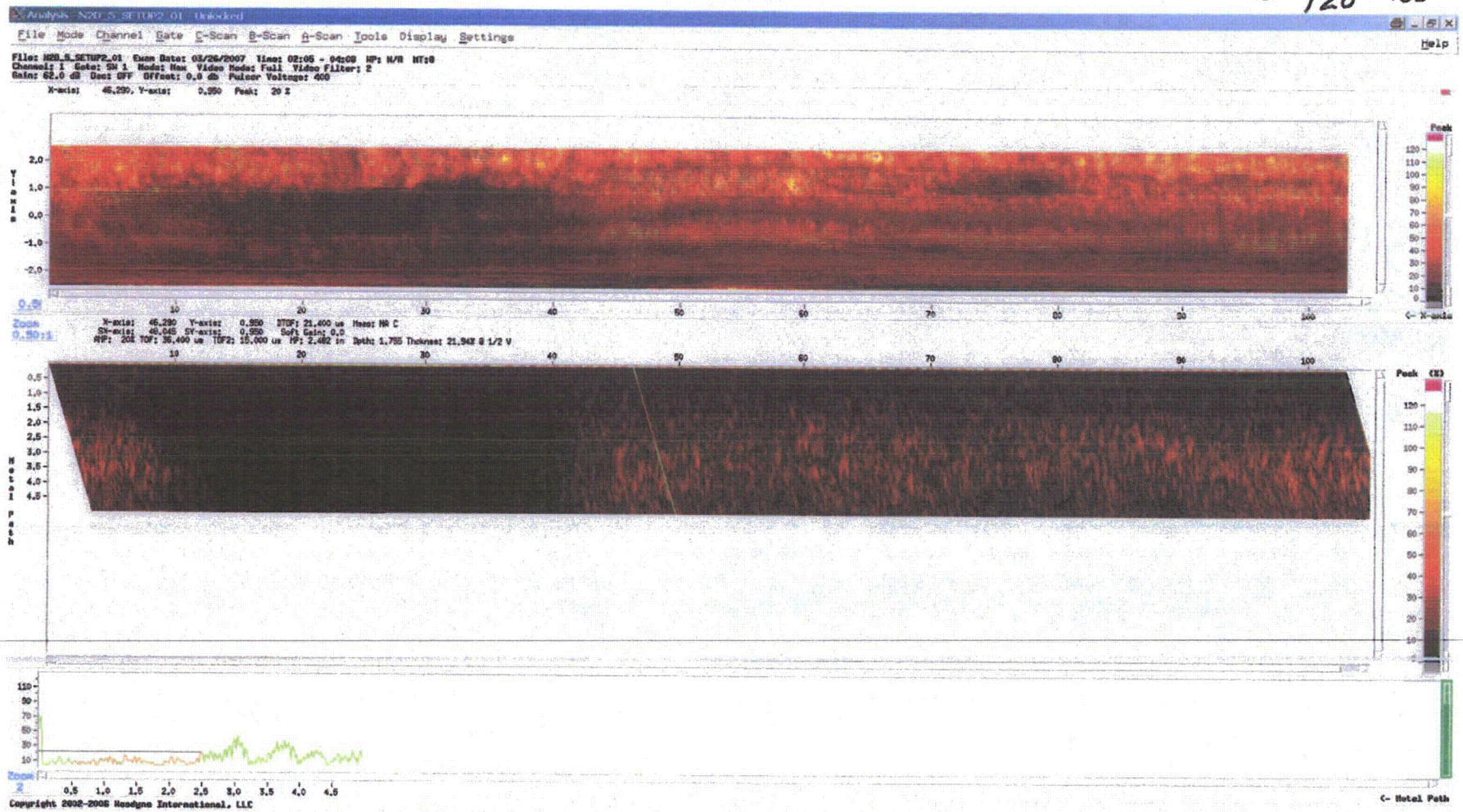
NRI - Attempt to improve data quality X= 45 to 46

ANALYST _____ LEVEL: II DATE: 3-28-07



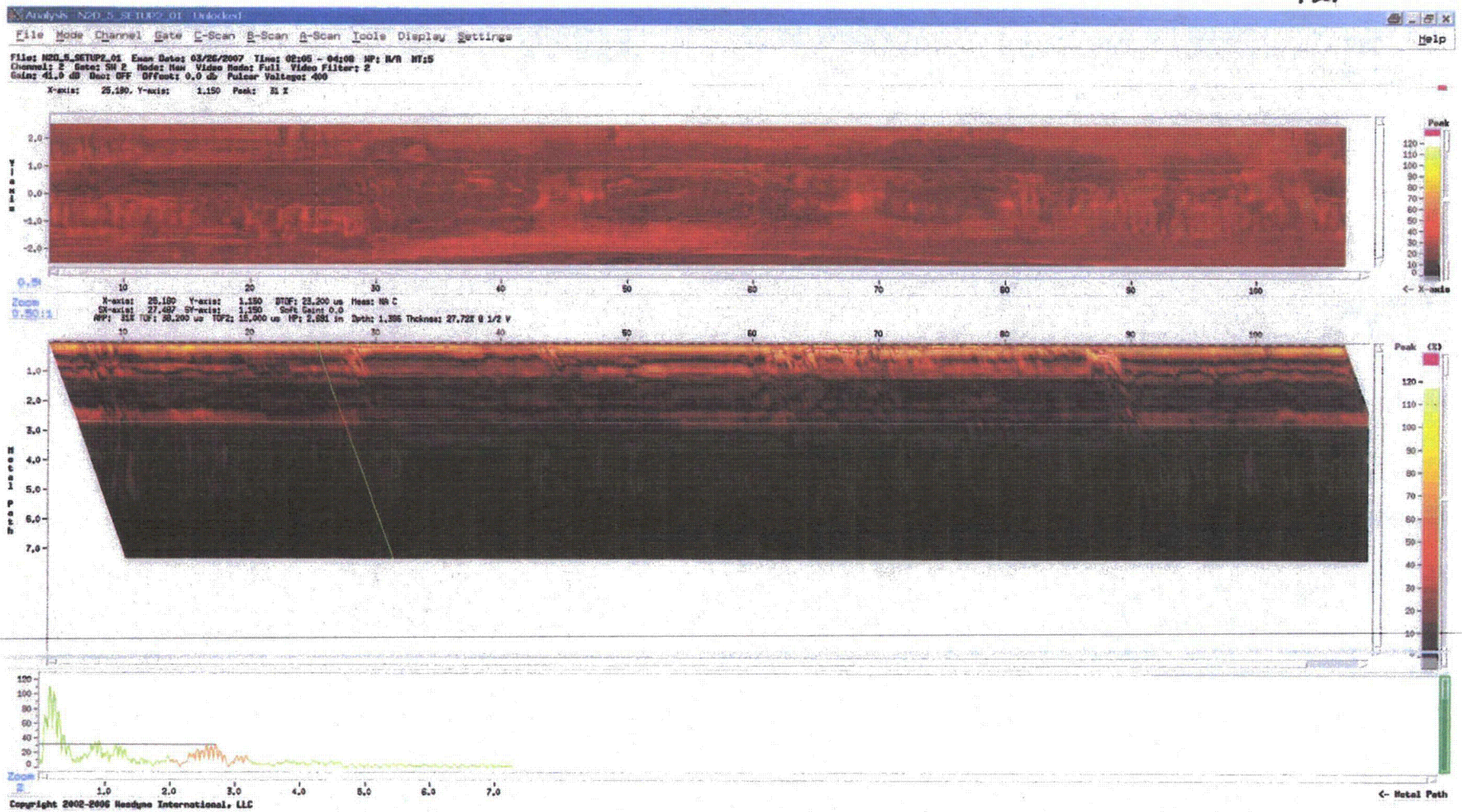
NRI - Attempt to improve data quality X= 48 to 49

ANALYST Clayton Cotka LEVEL: II DATE: 3-28-07



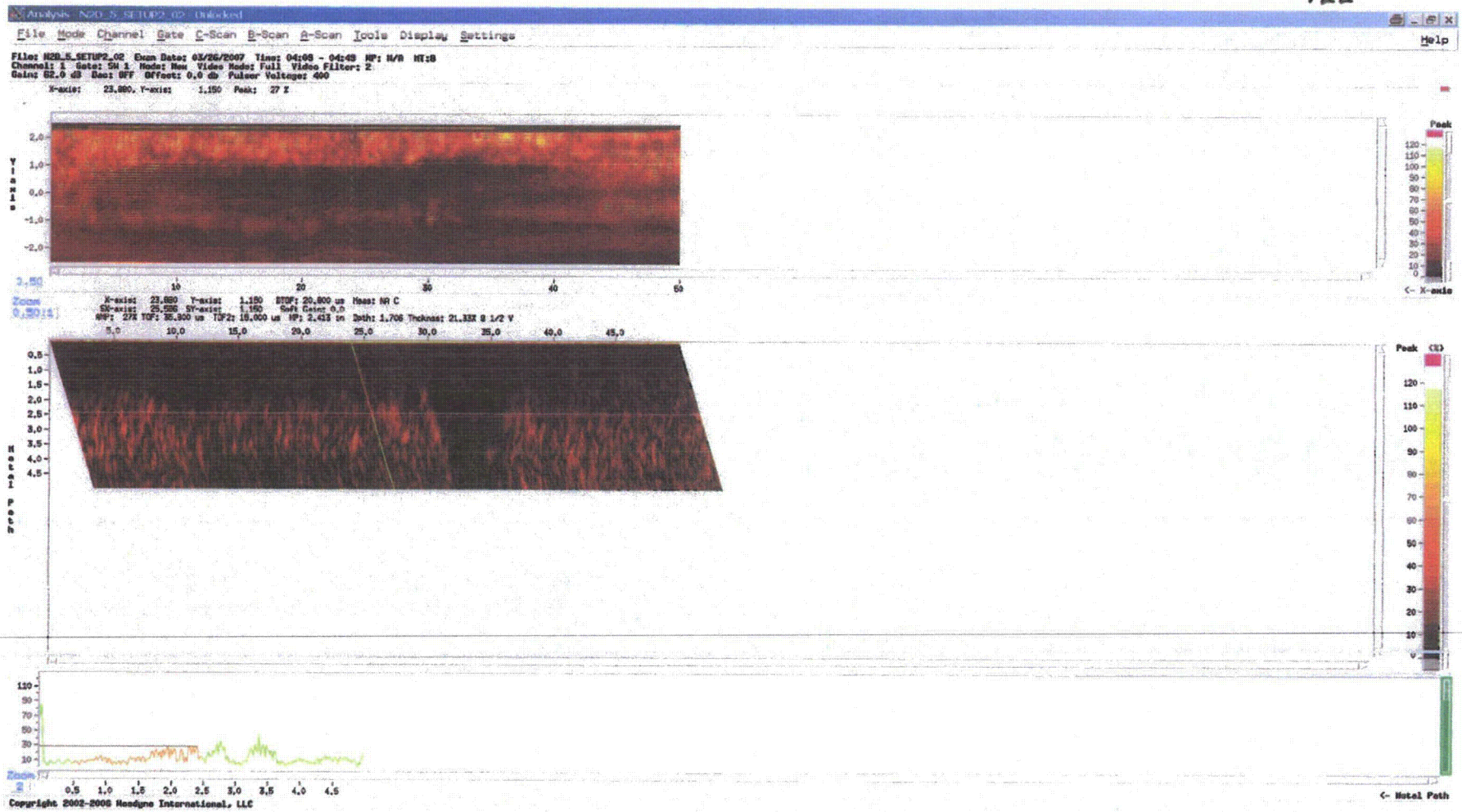
NRI - Drop out X= 12 to 40 on nozzle side

ANALYST Clayton E Stone LEVEL: II DATE: 3-28-07



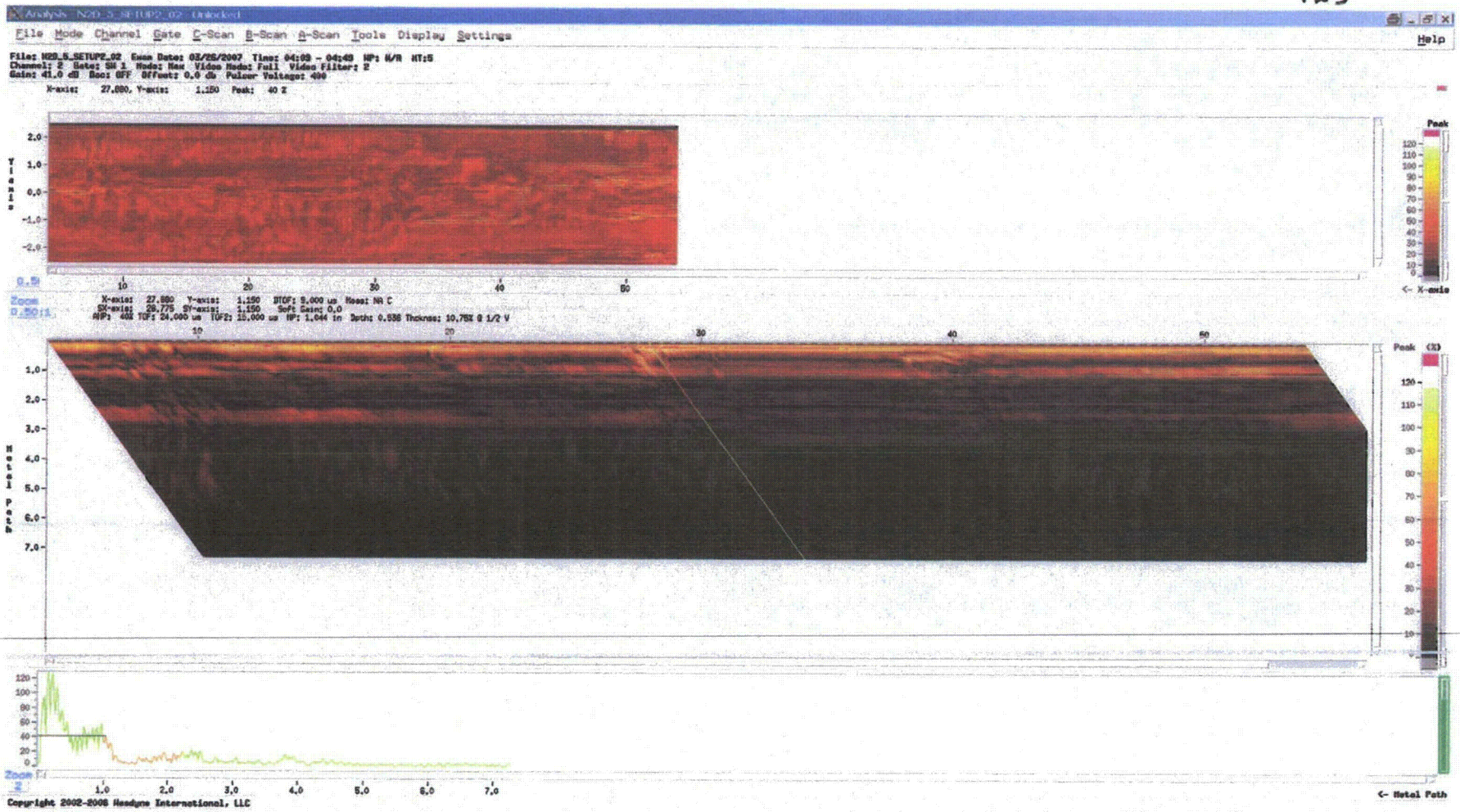
NRI

ANALYST [signature] LEVEL: II DATE: 3-28-07



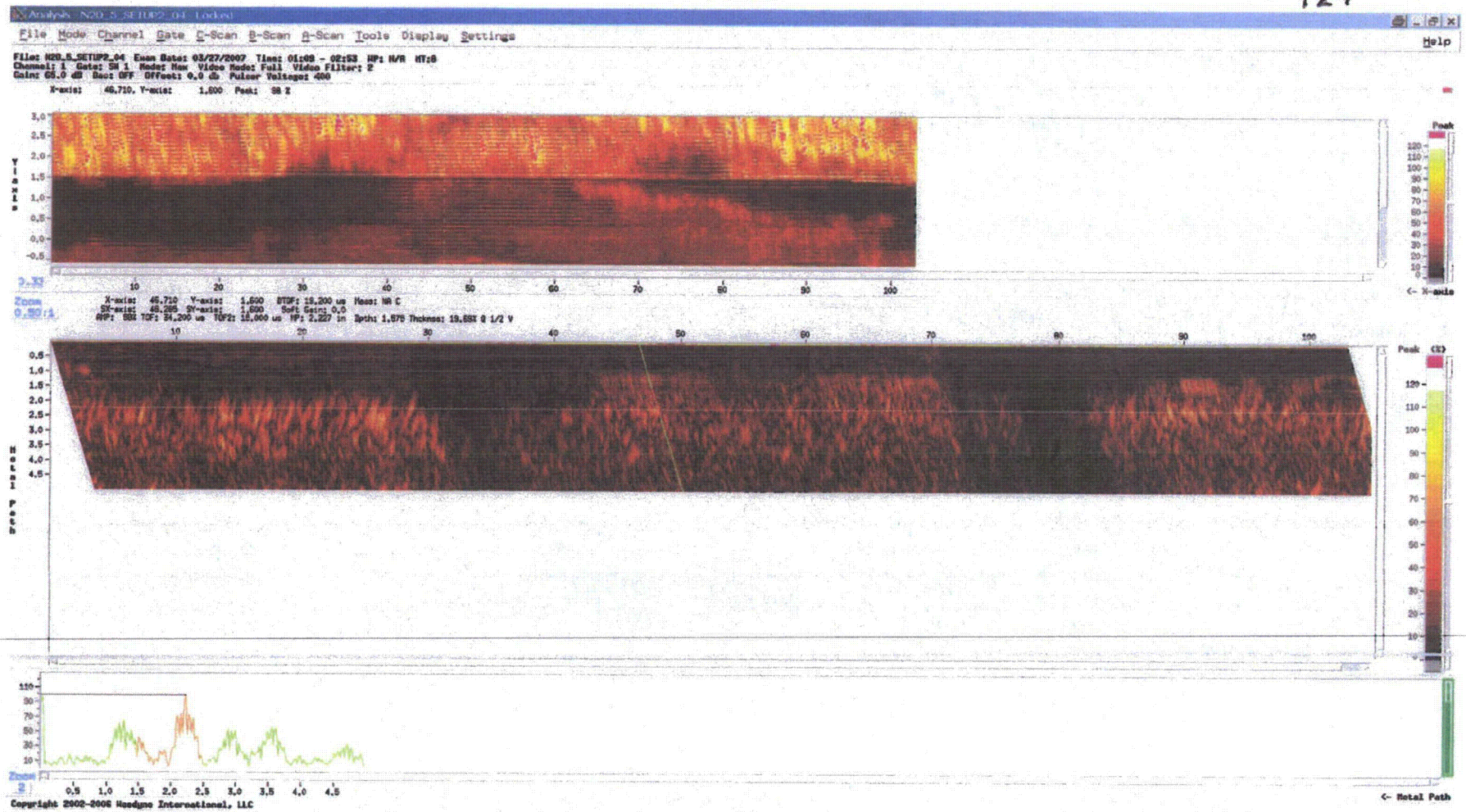
NRI - Drop out X= 12 to 40 on nozzle side

ANALYST _____ LEVEL: II DATE: 3-28-07



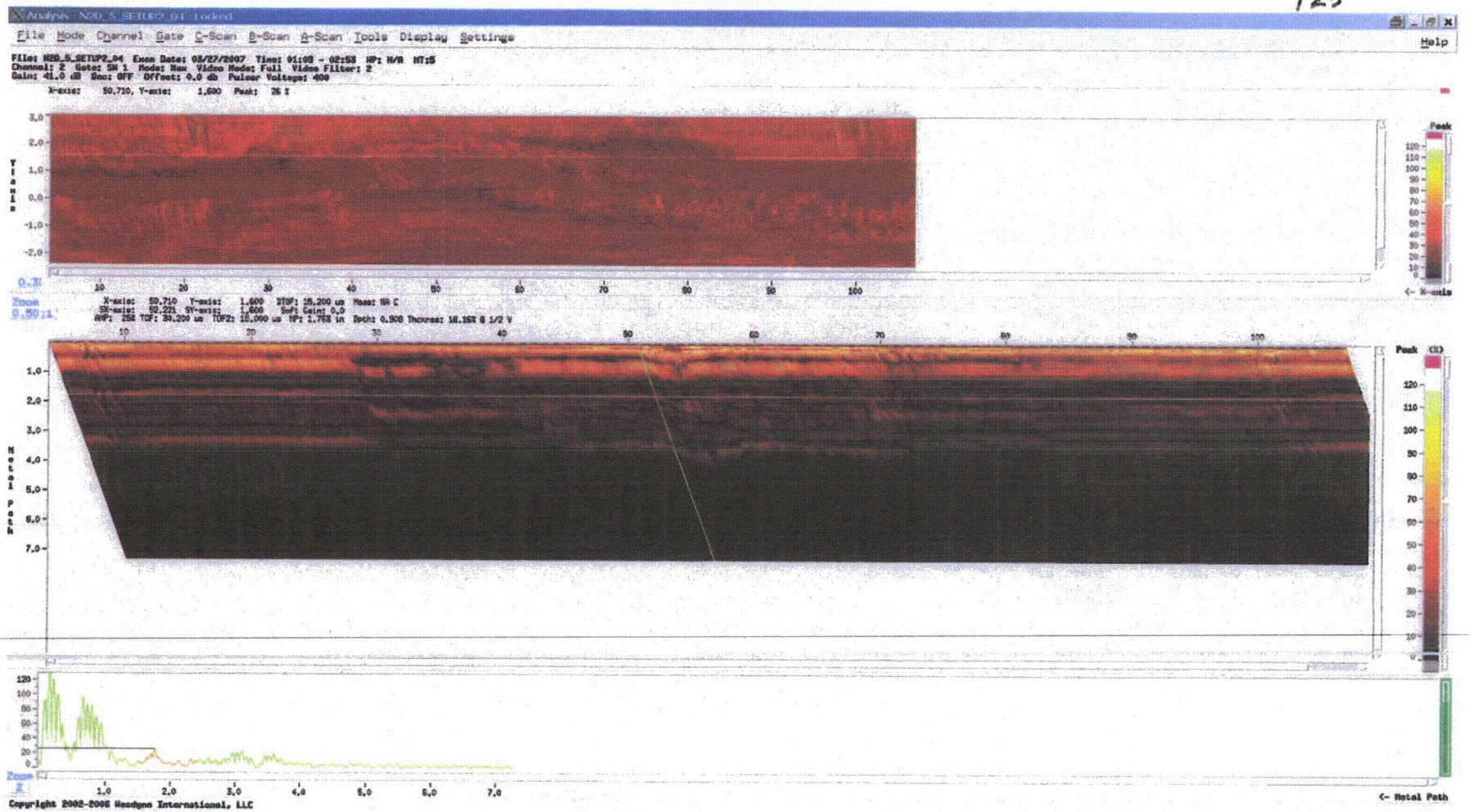
NRI

ANALYST _____ LEVEL: II DATE: 3-28-07



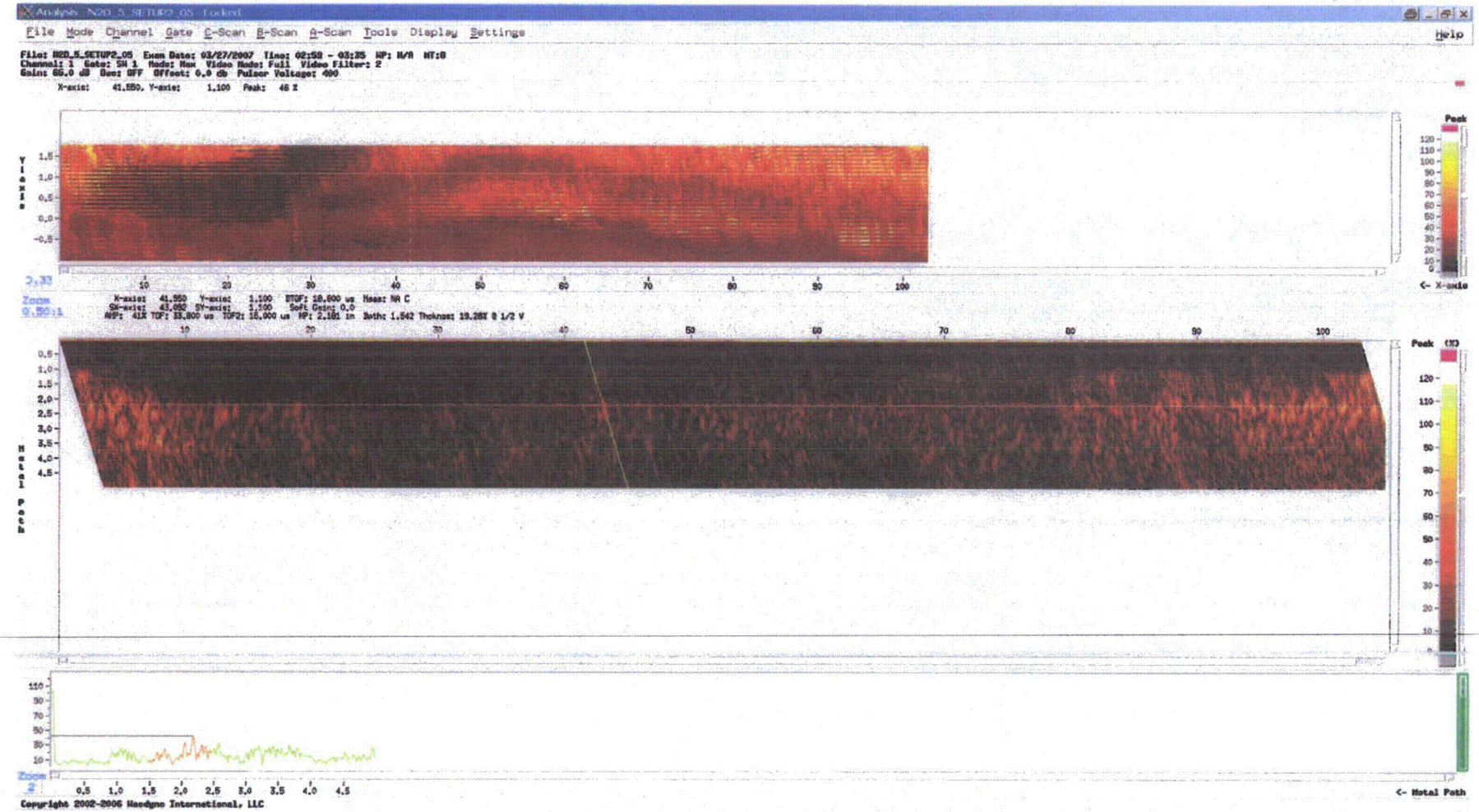
NRI - Drop out X= 83 Thru 0 to 41 on nozzle side

ANALYST Clayton E Stiles LEVEL: II DATE: 3-28-07



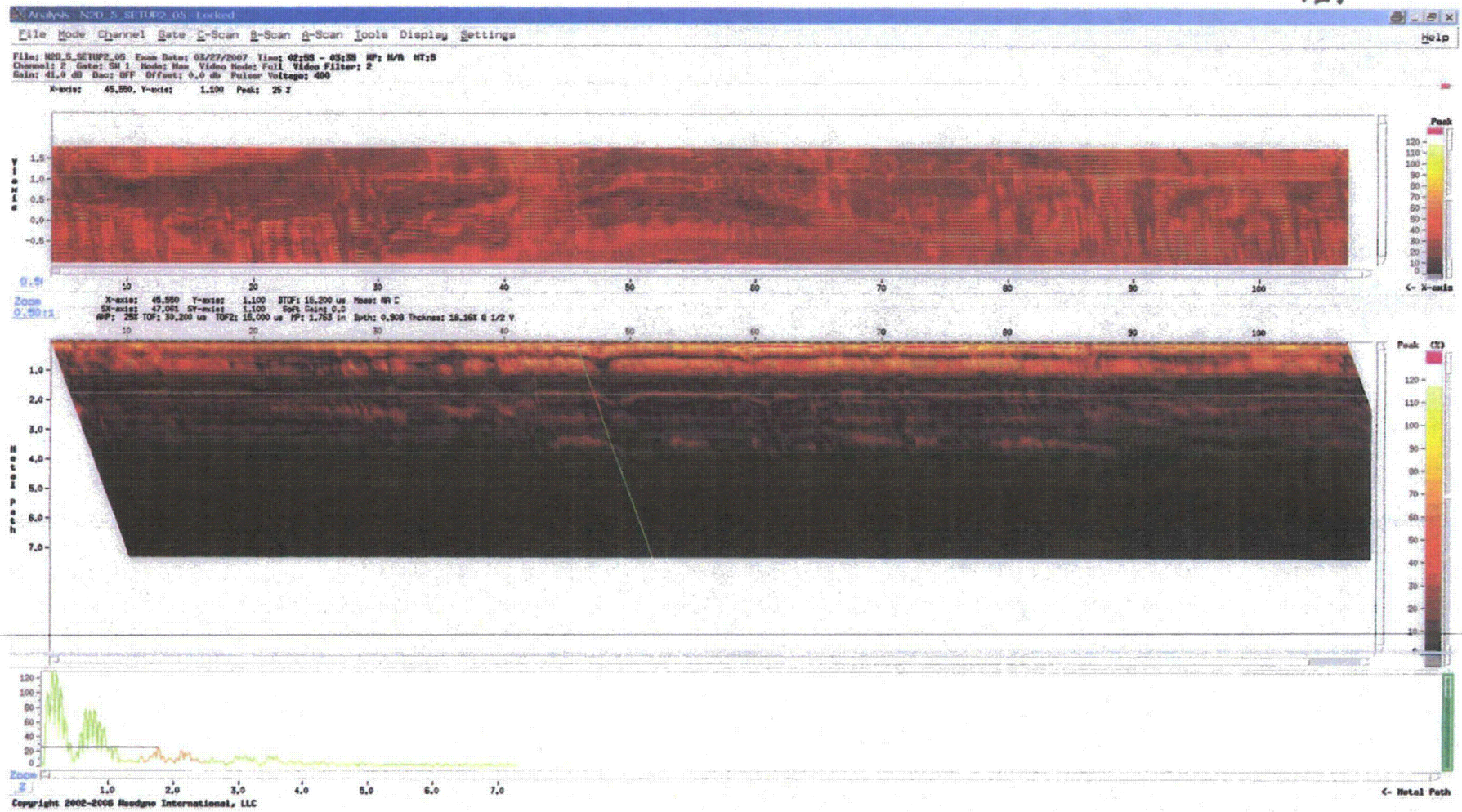
NRI

ANALYST _____ LEVEL: II DATE: 3-28-07



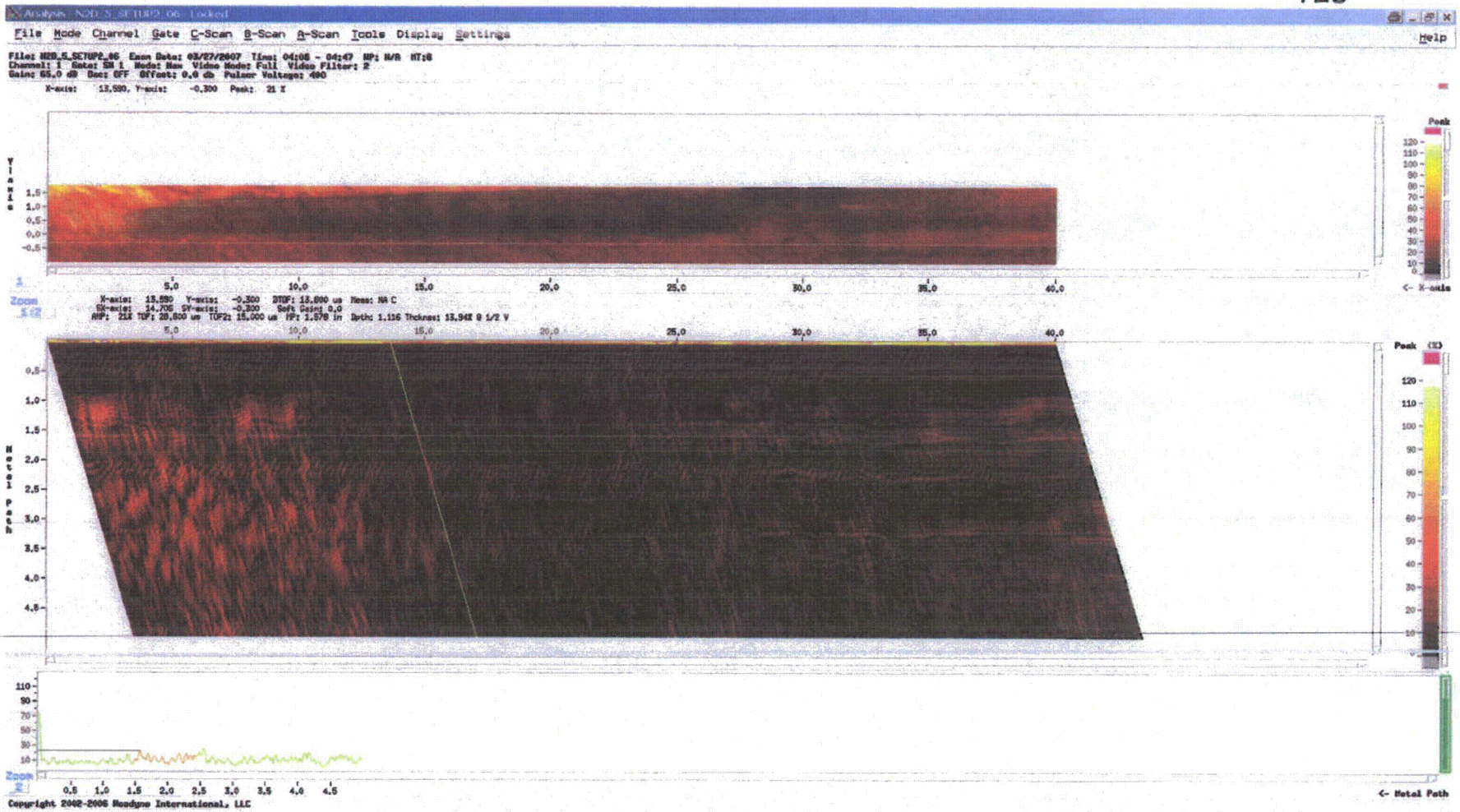
NRI - Drop out X= 10 to 41 on nozzle side

ANALYST Clyde E Shaw LEVEL: II DATE: 3-28-07



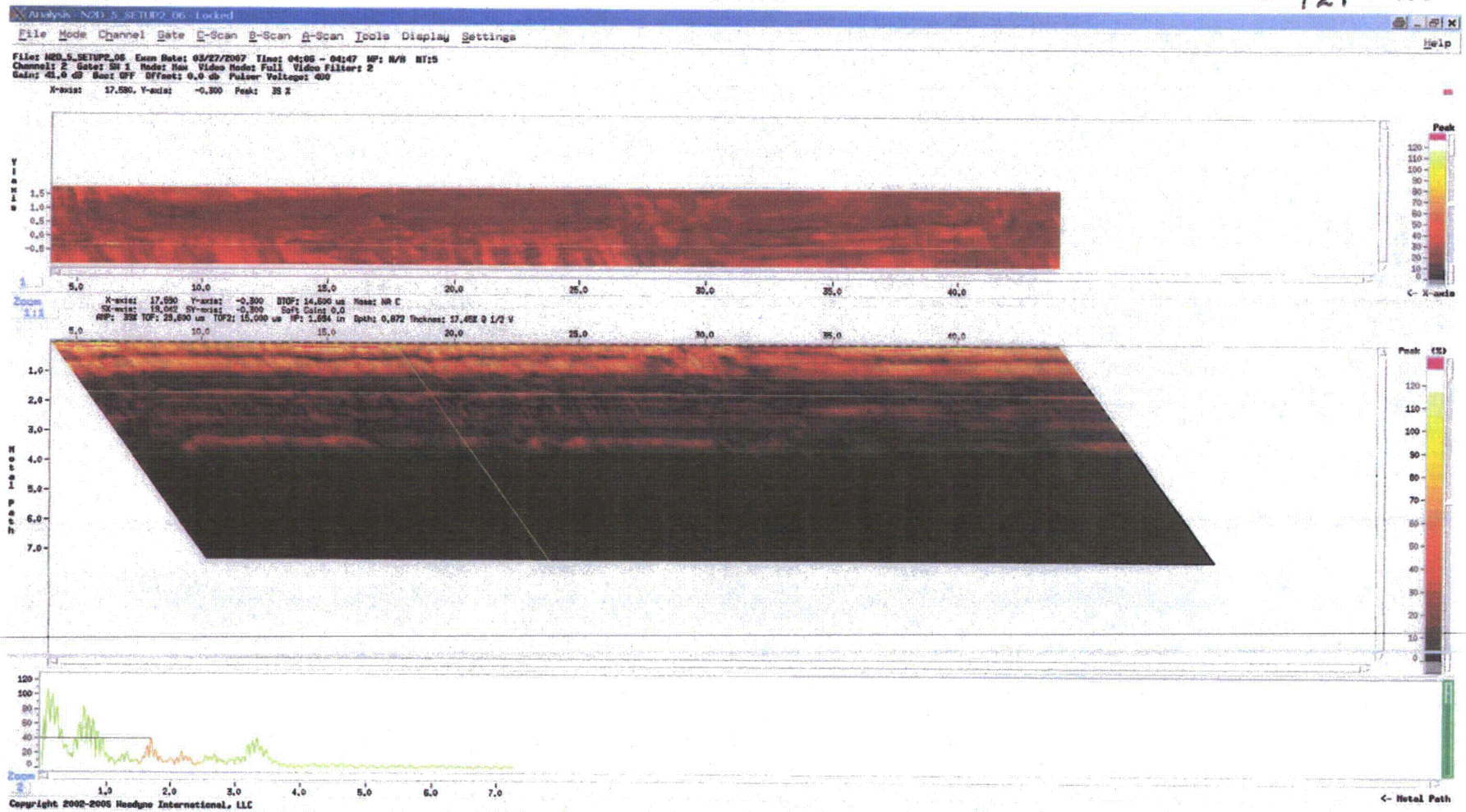
NRI

ANALYST Clayton E Adkins LEVEL: II DATE: 3-28-07



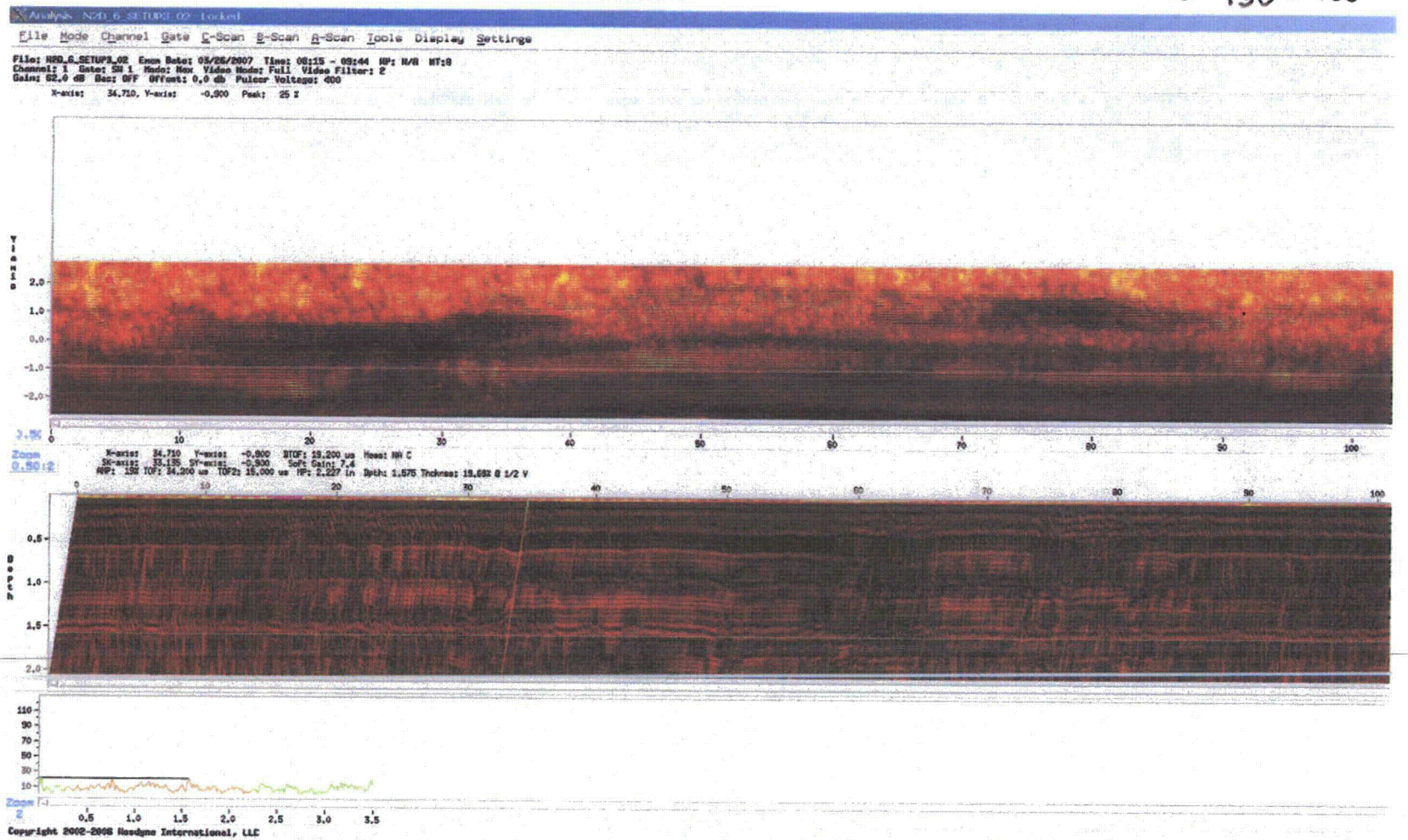
NRI - Drop out X= 10 to 40 on nozzle side

ANALYST Clayton E. Hart LEVEL: II DATE: 3-28-07



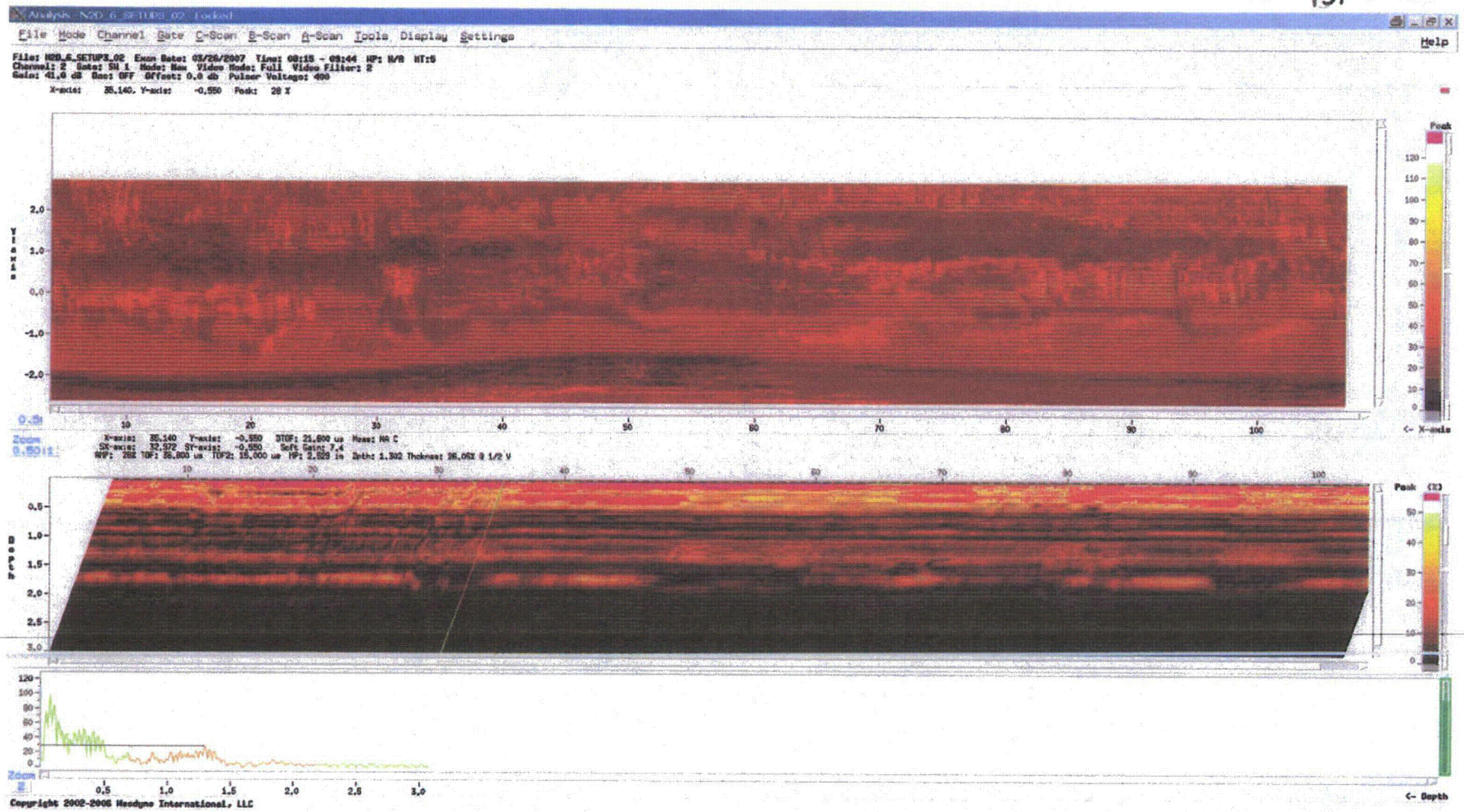
NRI

ANALYST Clayton E. Johnson LEVEL: II DATE: 3-28-07



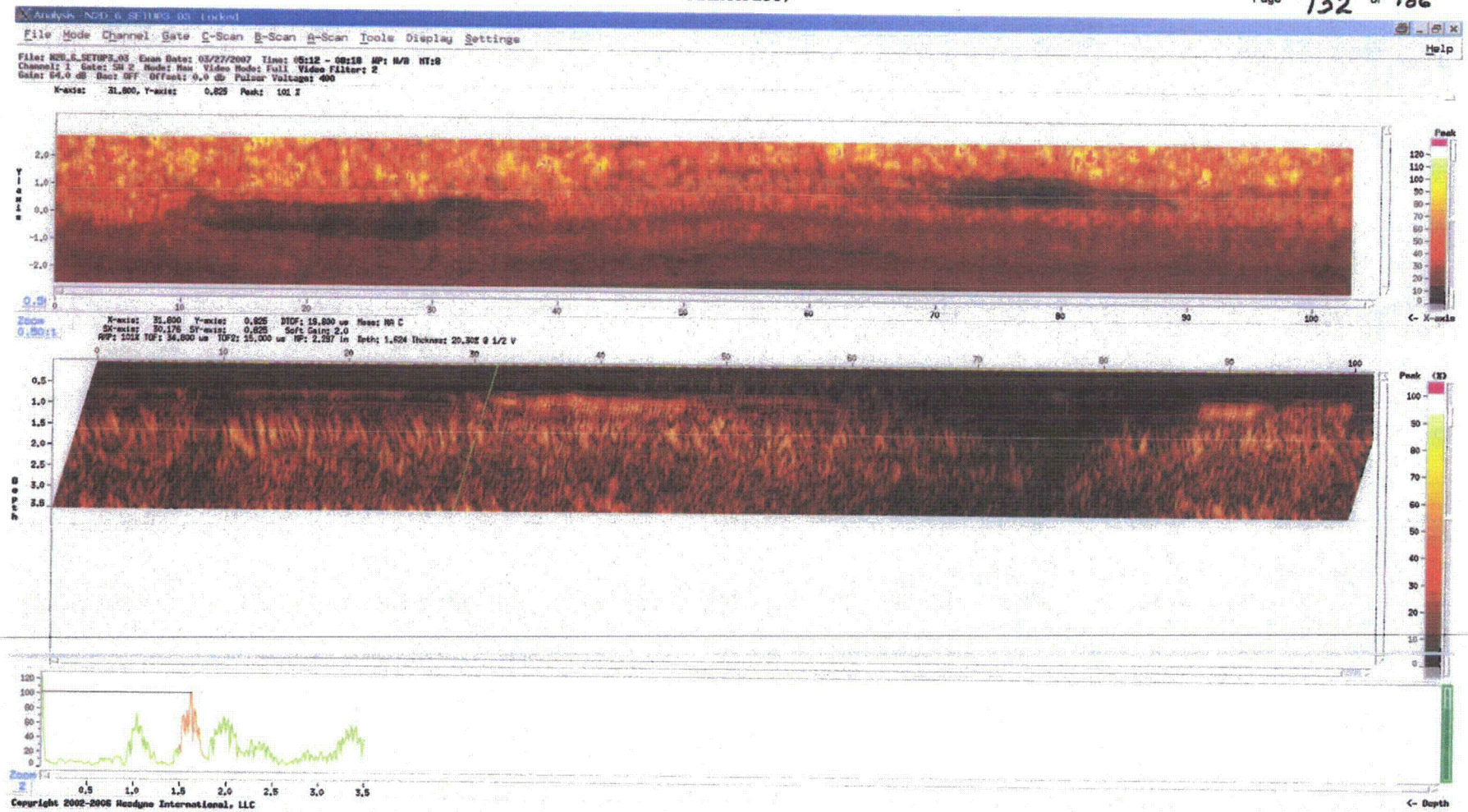
NRI - Drop out X= 12 to 36 on nozzle side

ANALYST _____ LEVEL: II DATE: 3-28-07



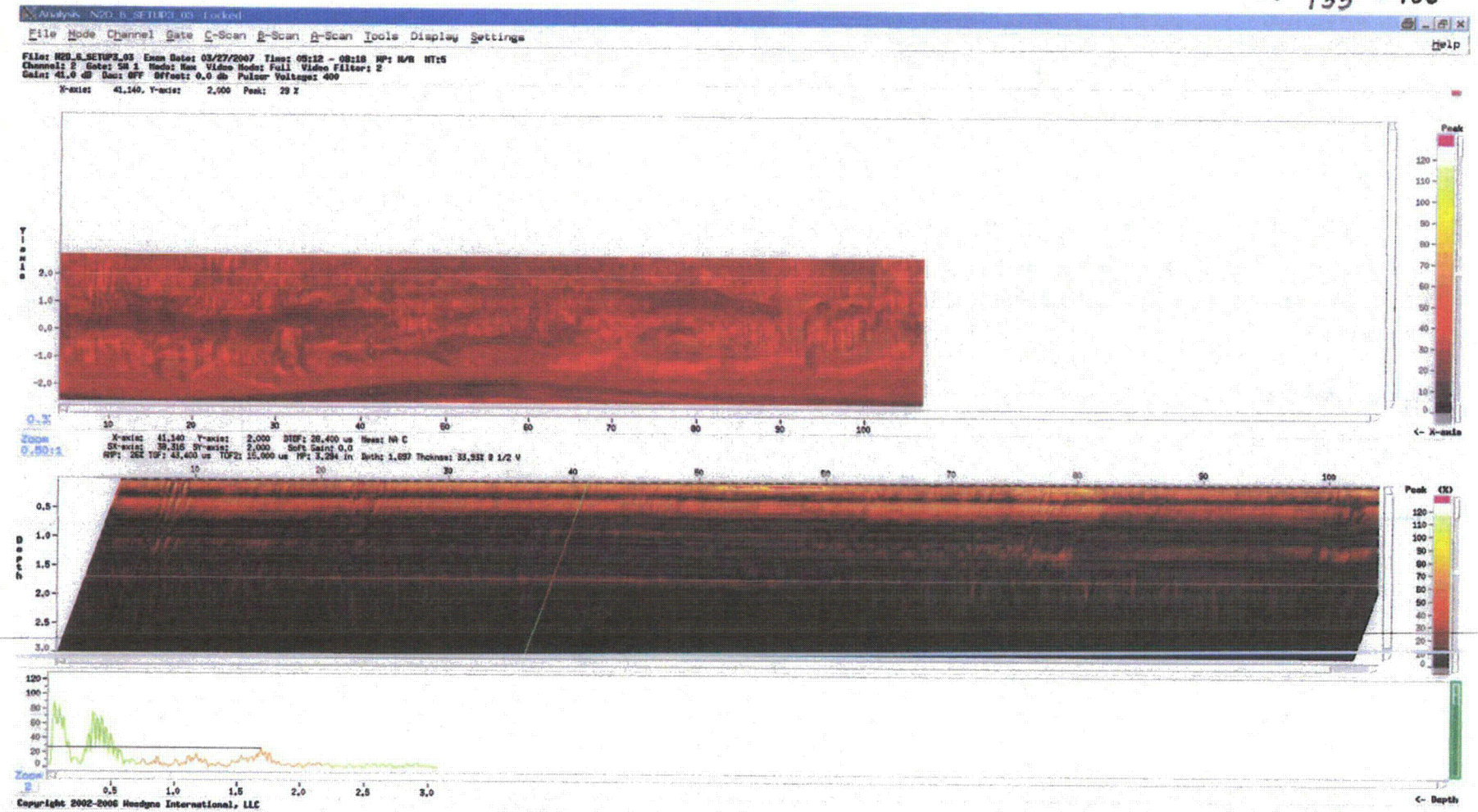
NRI

ANALYST Clayton E Adkins LEVEL: II DATE: 3-28-07



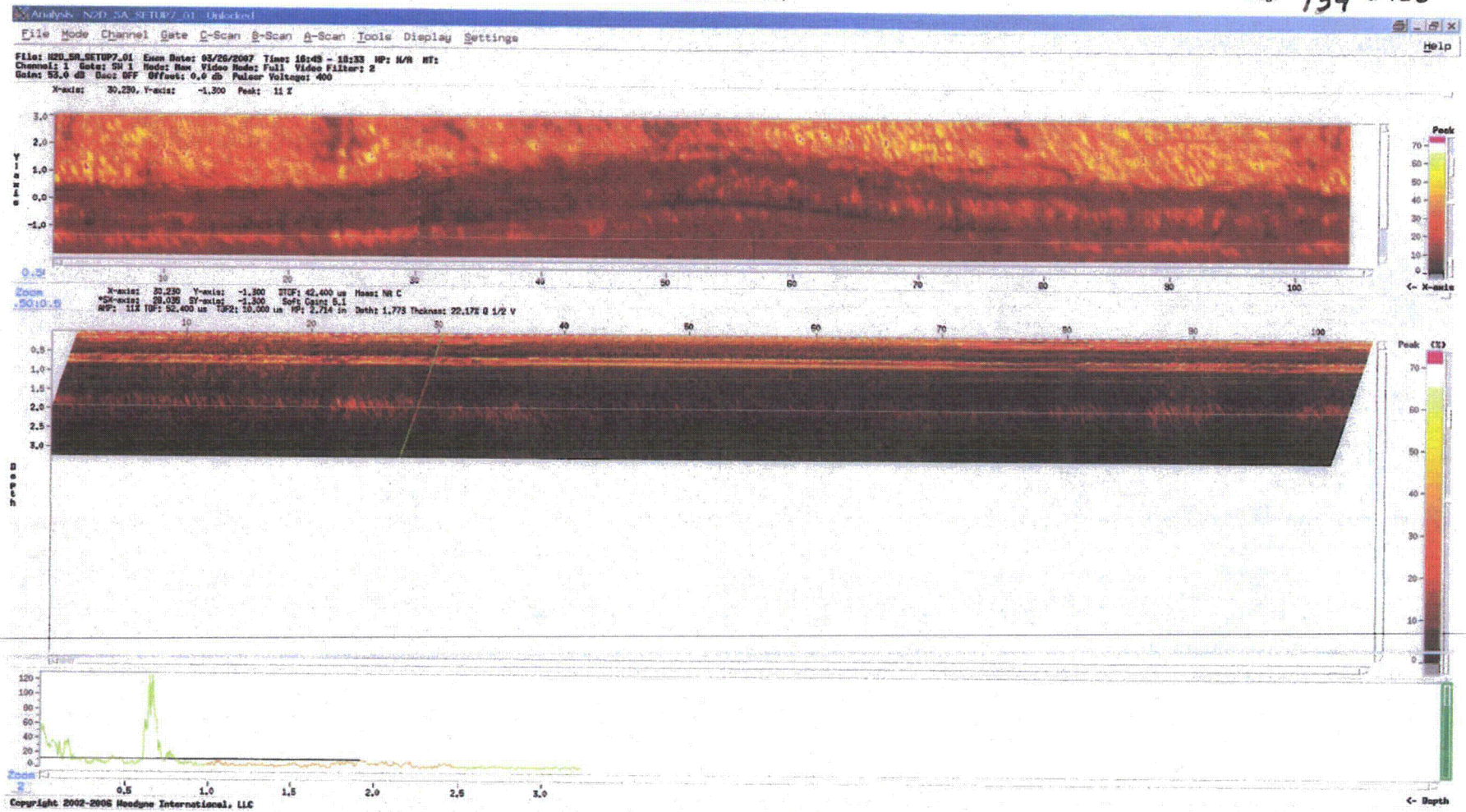
NRI - Drop out x= 23 to 32 on nozzle side

ANALYST Clayton Eaton LEVEL: II DATE: 3-28-07



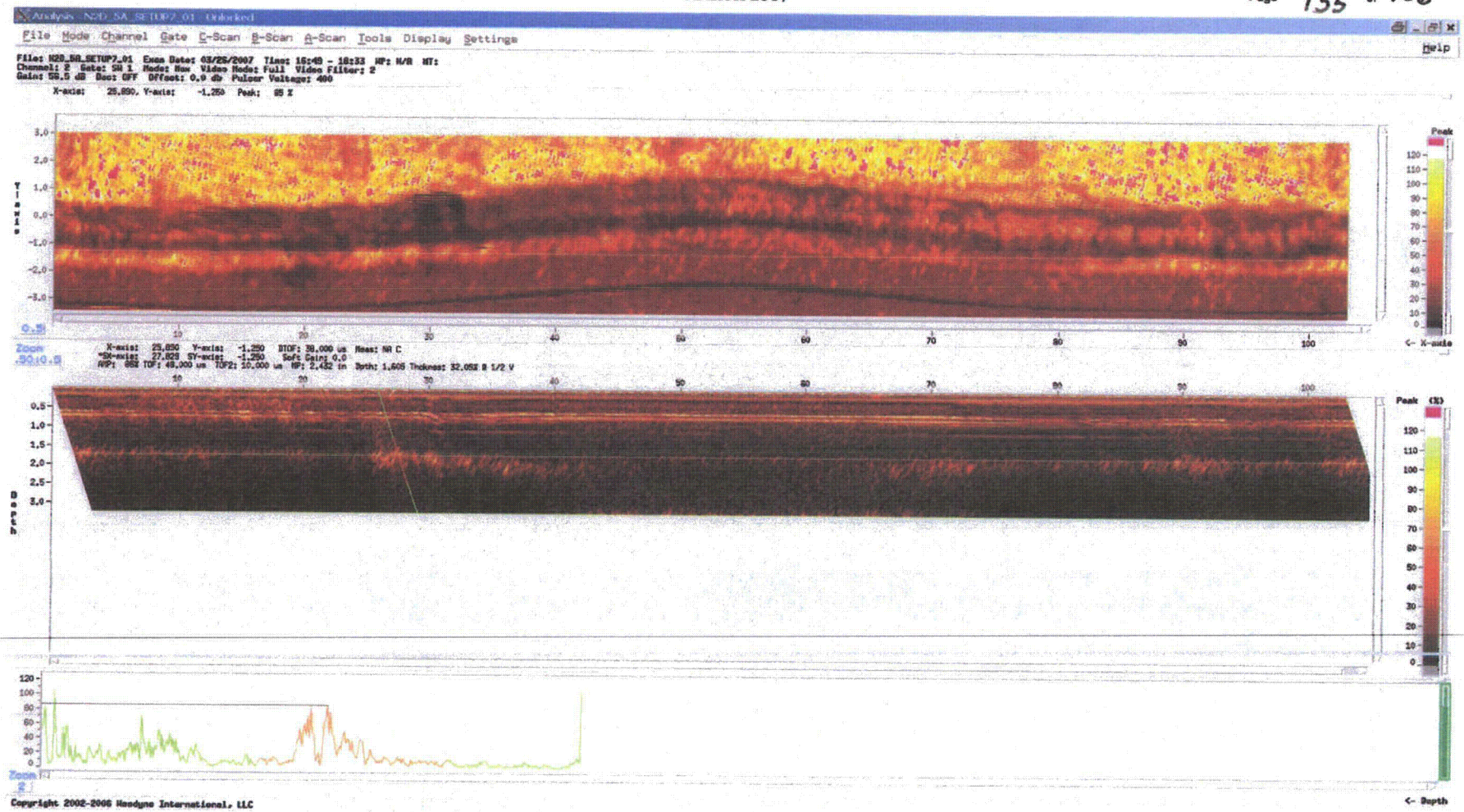
NRI

ANALYST _____ LEVEL: II DATE: 3-28-07



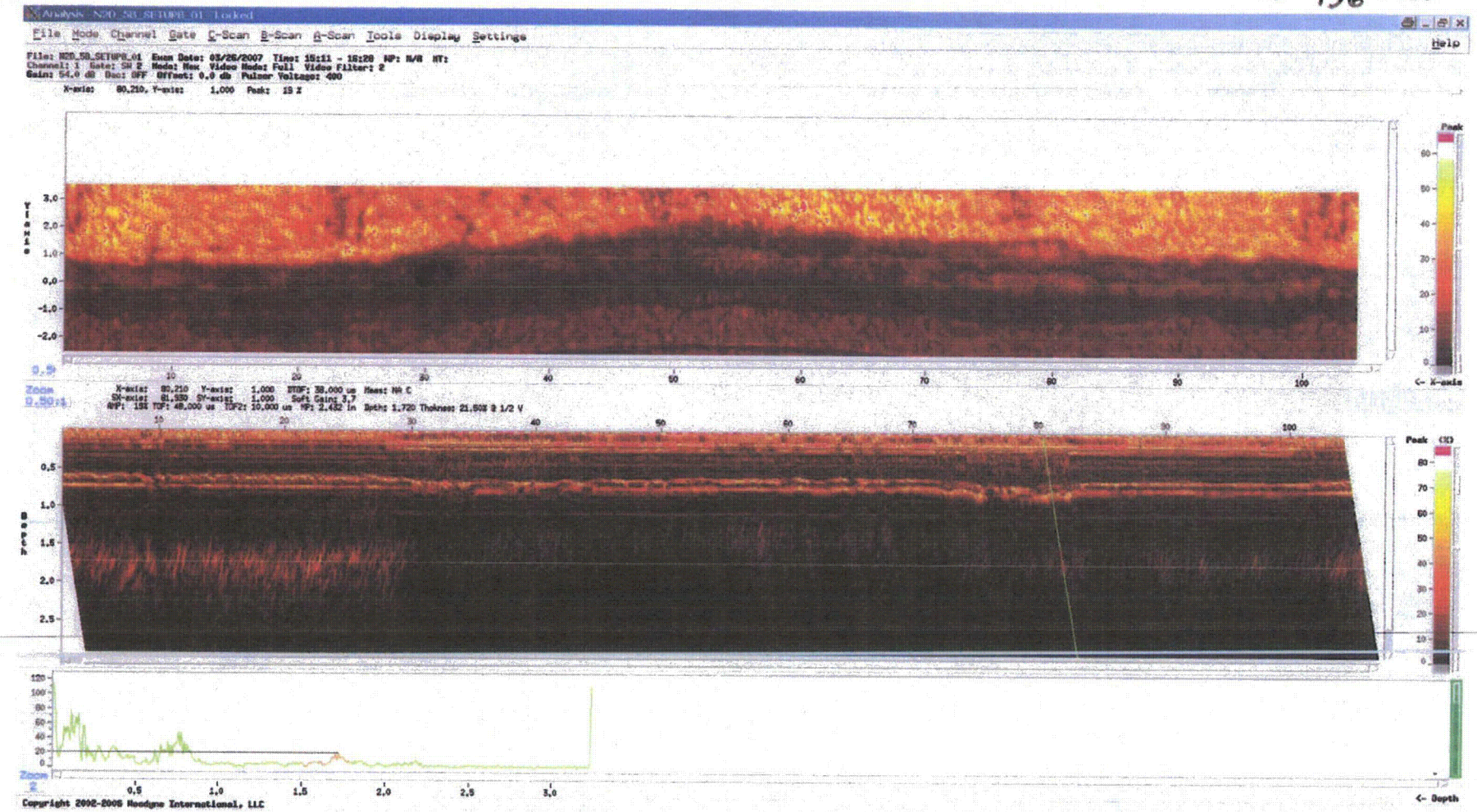
NRI - B-Scan shows area of Indication #1

ANALYST _____ LEVEL: II DATE: 3-28-07



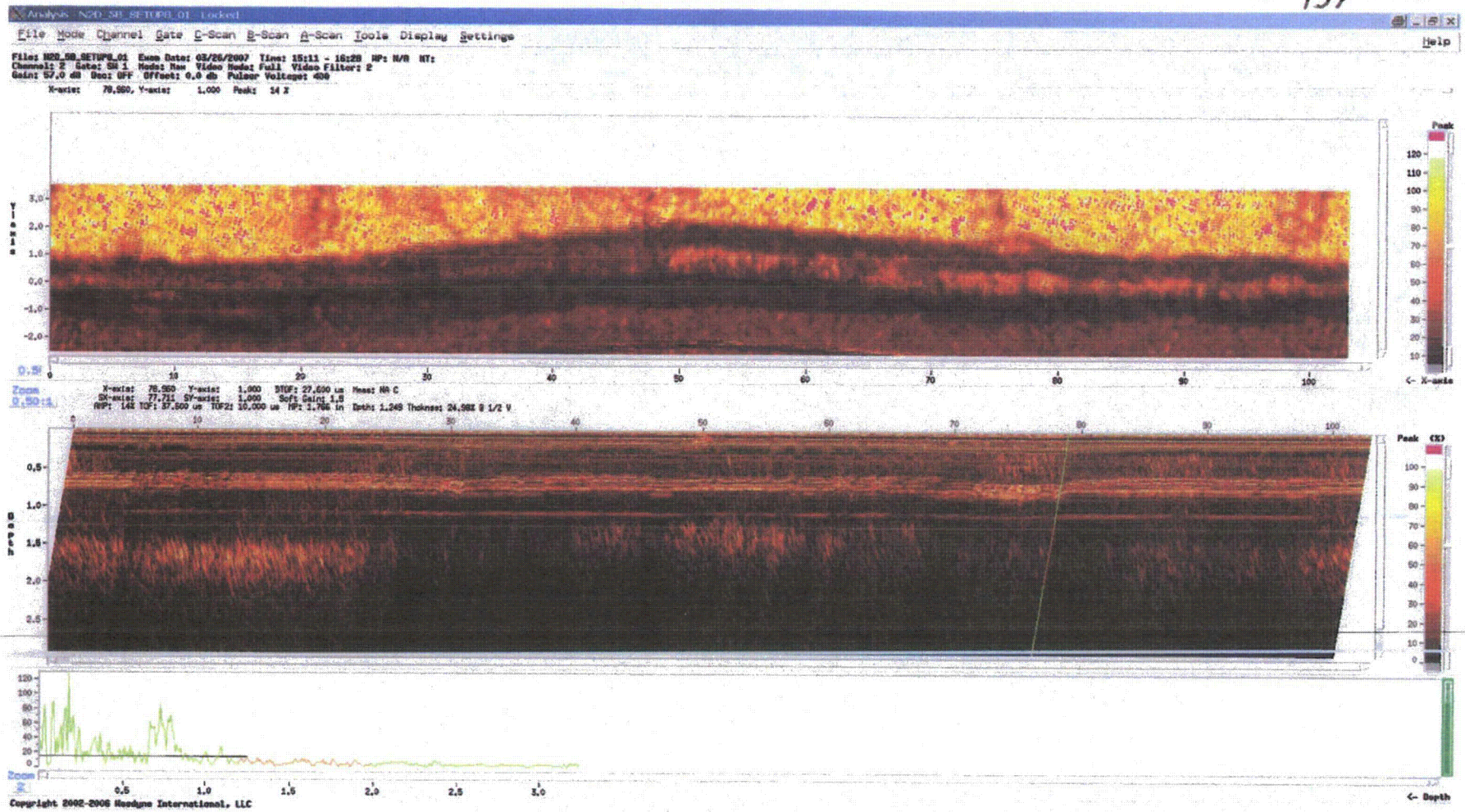
NRI - B-Scan shows area of Indication #1

ANALYST Clayton Ethen LEVEL: II DATE: 3-28-07



NRI

ANALYST [signature] LEVEL: II DATE: 3-28-07



NRI

ANALYST _____ LEVEL: II DATE: 3-28-07

WESDYNE INTERNATIONAL
A Westinghouse NDE Company

ULTRASONIC CALIBRATION DATA SHEET

Plant: Nine Mile Point Unit: 1 UT No. W-1-1111-07-002

Comp/System: 32 ISO #: F-45183-C, Sht. 7 Rev. 7 Procedure No. WDI-SSP-1111 Rev. 0

Reference Blk. # SAP 103435 Cal Block No. SAP 102915 Examination Surface ☑ OD ☐ ID

Thermometer s/n: SAP 105230 Block/Comp Temp 68 °F / 76 °F

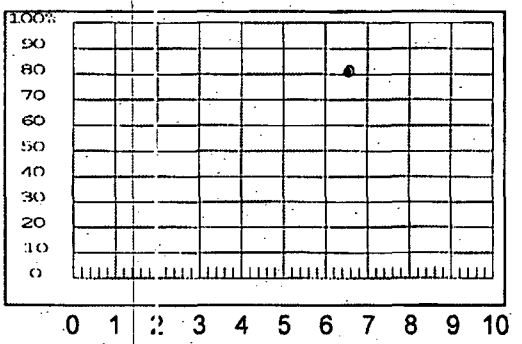
SEARCH UNIT

Scan Angle: 45° Mode: Shear
Serial No.: 0095VM Mfg. KBA
Fixturing: Non Integral Model: Comp G
Size: 0.50" Shape: Round
Frequency: 1.5 MHz # Elem: 1
Measured Angle: 45°
Cable Type: RG-174 Length: 6'
Couplant Brand: Ultragel II
Couplant Batch: 06225

SCAN AREA	
0° WRV	☐
0° BM	☐
⊥ To Weld	☑
∥ To Weld	☐

Connectors: 0
Exit Pnt Dim: = 0.35"
Contoured ☑ N/A ☐ Ax ☐ Circ

IDENT	0° or ⊥ TO WELD Sweep Pos	AMPL. %	ATTEN dB	∥ TO WELD Sweep Pos	AMPL %	ATTEN dB
2.0" Notch	6.6	80%	13.2			
					N/A	
		N				



Screen Divisions, 10 = 4.42

INSTRUMENT SETTINGS

Mfg/Model No.: Krautkramer USN 58L SW
Serial No.: SAP 104390
Damping: 500 Puls Wth: 330
Pulsr: Square - Single Reject: Off
Freq.: 2.0 MHz Rectify Full
PRF: Auto High Volt: 450 Jack: T
Range 4.42 Vel. 0.1245
Swp Delay 0.000 Zero 7.3834

CAL. CHECKS	TIME
Initial Cal.	13:04
Intermediate	17:10
Intermediate	N/A
Intermediate	N/A
Final Cal.	18:43

Gain 0° or ⊥ dB 13.2
Gain ∥ dB N/A

Scan Sensitivity Ax = 23.2 dB
Circ = N/A

Screen Height Linearity

	High	Low		High	Low
1	100	50	6	50	25
2	90	45	7	40	20
3	80	40	8	30	15
4	70	35	9	20	10
5	60	30	10	10	5

Low must be ½ High ±5% FSH

Amplitude Control Linearity

Initial	Δ dB	Result
80	-6dB	40
80	-12dB	20
40	+6dB	80
20	+12dB	80

EXAMINATION WELD/AREA	Recordable Indications Yes	Recordable Indications No	Scan Limitation Yes	Scan Limitation No	COMMENTS
32-WD-164	X			X	See indication data sheet.
	Code Coverage Achieved:			N/A	

EXAMINER Stephen T. Williams LV II DATE 3/27/2007
Print Stephen T. Williams

EXAMINER David M. Griebel LV II DATE 3/27/2007
Print David M. Griebel

REVIEWER [signature] LV III DATE 3/29/07

REVIEWER [signature] LV III DATE 4-2-07

Authorized Inspection Agency [signature] DATE 4/5/07

Acceptance Criteria: 1989 ASME Sec. XI, No Add.
Risk Informed ☐ Yes ☑ No
Weld Is ☐ Acceptable ☐ Rejectable

ADDITIONAL SHEETS? (Check Box)
☑ Supplement ☑ Plot ☐ Other ☐ N/A

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WESDYNE INTERNATIONAL, LLC

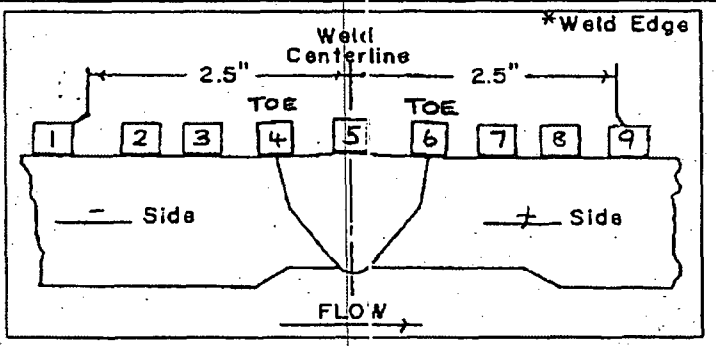
A Westinghouse NDE Company

WALL THICKNESS PROFILE SHEET

WELD NO. 32-WD-164

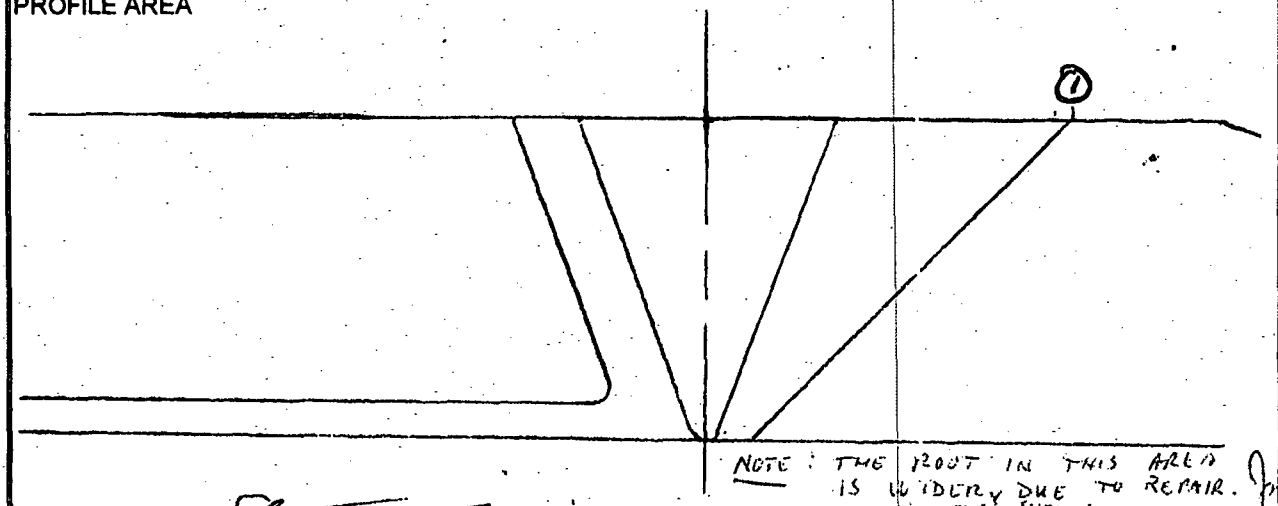
UT DATA SHEET NO. W-1-111-07-002

Position	0°	90°	180°	270°
1				
2				
3				
TOE* 4		N A		
C_L 5				
TOE* 6				
7				
8				
9				



CROWN HEIGHT:	Flush	DIAMETER:	29.68"
CROWN WIDTH:	1.40"	WELD LENGTH:	93.25"
LONG SEAM @:	N/A	ISO. DRWG. #	F-45183-C Sht. 7, Rev. 7

PROFILE AREA



NOTE: THE ROOT IN THIS AREA IS UNDERCUT DUE TO REPAIR. THAN SHOWN

Examiner:	Stephen T. Williams	Level	II	Date:	3/27/2007
Examiner:	David M. Griebel	Level	II	Date:	3/27/2007
Reviewer:		Level	III	Date:	3/29/07
Utility Review:	JJ Cilento	Level	III	Date:	4-2-07
Authorized Inspection Agency				Date:	4/5/07

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WESDYNE INTERNATIONAL

A Westinghouse NDE Company

ULTRASONIC EXAMINATION INDICATION REPORT

SITE: Nine Mile Point, Unit 1

UT Sheet No.: W-1-1111-07-002

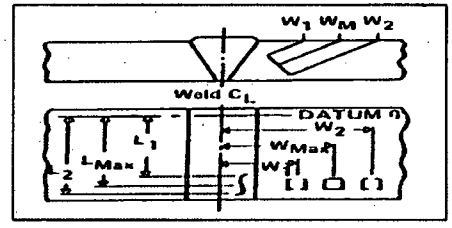
Page 3 of 3

Weld No.: 32-WD-164 Datum 0 Location : TDC

Procedure No. WDI-SSP-1111 Rev. 0

Exam Surface OD ☑ ID ☐ Thickness : 1.68"

Exam Volume :Lower 1/3 ☐ Full ☑



W Max - Distance from CL to SU at Maximum Response
MP - Metal Path
L - Distance from Datum 0
RBR - Remaining Back Reflection
SU Loc - Search Unit Location

Layout shown for perpendicular scan. For parallel scan, L's & W's would be reversed.

Ind. No.	Max Amp % of DAC	W Max		Forward % of DAC		Backward % of DAC		L Max	L1 % DAC	L2 % DAC	RBR Amp 0 degree	SU Loc US, DS CW, CCW	REMARKS
		W	MP	W1	MP	W2	MP						
1	45%	1.95"	2.44"	N/A	N/A	N/A	N/A	25"	24.7	26.5	N/A	DS	Supplemental manual exam for an automated detected indication. Indication does not exhibit IGSCC crack-like characteristics (ex. faceting, varying W-dim., etc.)

Comments: 45° Shear 1.5 MHz

EXAMINER: Stephen T. Williams LEVEL II DATE 3/27/2007

Signature: Stephen T. Williams

EXAMINER: David M. Griebel LEVEL II DATE 3/27/2007

Signature: David M. Griebel

Andrew S. Bullock III 3/29/07

REVIEWER: JJ Cilento UT-III DATE 4-2-07

Authorized Inspection Agency RP Kolenz DATE 4/5/07

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