

Frequently Asked Questions
Guidelines for Integrity Assessment of Cased Pipe Using ECDA
Revision Date: June 16, 2010

These Frequently Asked Questions (FAQs) are intended to clarify, explain, and promote better understanding of issues concerning integrity assessment of cased pipe using ECDA. These FAQs are not substantive rules and do not create rights, assign duties, or impose new obligations not outlined in the existing regulations and standards. Requests for informal interpretations regarding specific situations may be submitted to PHMSA in accordance with 49 C.F.R. §190.11.

248. What are the basic regulatory requirements for cased pipe monitoring and inspection and what code sections apply?

Cased pipe that is located in a covered segment, as defined in 49 CFR § 192.7, must have an integrity baseline assessment and periodic reassessments using one of the assessment methods. Under the Integrity Management Rule, operators cannot leave shorted, contacted or coupled casings (either metallic or electrolytic) in their pipelines or segments without mitigating the situation. Such a condition (shorts, contacts or couples) is considered detrimental to the long-term integrity of the covered segment.

Original: 3/01/2010

249. Incorrect Pre-Assessment Data: If an operator creates regions based on pre-assessment data and during the direct examination determines that construction documentation was incorrect and the cased pipe should have been in a different region, does the operator have to perform additional direct examinations on cased pipe in that region? For example, an uncoated carrier pipe was documented as being coated, or an unfilled casing was documented filled.

Implicit in 49 CFR § 192.925, which invokes by reference NACE RP 0502-2002, is the expectation that the External Corrosion Direct Assessment (ECDA) process will be performed correctly. Mistakes or errors can invalidate the assessment results. In such cases, the operator must take steps to correct the mistakes/errors, or re-perform the assessment. NACE addresses this need in §6.5 *"Feedback and Continuous Improvement."* In this example, because the initial pre-assessment was flawed and the operator did not find what was expected and the cased crossing was in the wrong region and possibly the wrong indirect inspection tools were used, PHMSA would expect the operator to either re-perform the assessment, or, as a minimum, do the following:

- a) Update the pre-assessment to reflect the as-found condition;
- b) Update the determination of ECDA regions, and assure the affected cased pipe is in the correct region;
- c) Correct the selection of indirect inspection tools for each region, if required;
- d) Perform new indirect inspections where appropriate;
- e) Perform additional direct examinations if needed; and

- f) Assure that the post assessment notes the lessons learned from the flawed pre-assessment and implement continual improvements in the program to minimize recurrence of the error.

Original: 3/01/2010

- 250. No Previous Monitoring Data:** If an operator has cased pipe that has not been monitored on an annual basis (no annual C/S readings) because casing wires and vents were not installed, but the operator has documentation on the construction, including the original pressure test, of the cased pipe and the indirect inspection results show that the casing is not shorted to the carrier pipe, what must the operator do to assess and monitor the pipeline during future assessments.

If the segment of pipe was properly tested on an annual basis, and the operator can demonstrate that the annual testing would identify a short, those annual tests can be used as monitoring data for the cased crossing. If the operator can not demonstrate that no shorts exist (or existed in the past), the priority of this cased crossing should be raised. Such an increase in priority should indicate that the cased crossing be directly examined under step 3 of the ECDA process.

Original: 3/01/2010

- 251. Filled, Shorted, and an Incomplete Inspection:** If an operator performs Guided Wave Ultrasonic Testing (GWUT) on a shorted and filled cased pipe, but is unable to clear the short and does not get 100% coverage with the GWUT inspection, has the operator satisfied the assessment requirements?

No. Because the entire carrier pipe has not been assessed, the assessment requirements have not been fulfilled in accordance with DOT regulations. If the short is not cleared, this is a high risk cased crossing and would need to be excavated and directly examined.

Original: 3/01/2010

- 252. Filled, Isolated, and Not Following Go-No Go Target Items:** If an operator does not have a prior assessment on a filled, cased pipe and completes a GWUT inspection, but is unable to follow all of the GWUT Go-No Go Target Items, has the operator satisfied the assessment requirements? For example, the operator does not remove the end seals because they do not want to lose the filler material.

No. Since the operator has not been able to complete all of the GWUT Go-No Go Target Items in the PHMSA GWUT procedure, the use of the GWUT device cannot be considered successful and thus the assessment would not be considered acceptable without additional technical analysis and justification. In such cases, the operator must document an engineering justification for not removing an end seal, and submit a notification to PHMSA in accordance with 49 CFR §§ 192.921(a)(4) or 192.937(c)(4), as applicable. PHMSA would review such notifications on a case-by-case basis.

Original: 3/01/2010

253. Fifty Casings in One Region: If an operator places all of their cased crossings in one region regardless of specific differences in casings based on the pre-assessment data, is this always wrong?

Under certain circumstances, placing all of the cased crossings in one region may not be inherently wrong, but there would need to be engineering justification for doing so in order to demonstrate that all cased crossings meet all criteria associated with the region definition in accordance with NACE RP 0502-2002 § 3.5. The operator should evaluate the 17 guidance points for selecting regions, and document a technical justification for not establishing regions as described in the guidance (especially with respect to the specific factors that require different regions). If an engineering justification is not documented, additional regionalization must be performed in order for the assessments to be considered valid under the standard. The documented engineering justification must be available for inspection.

Original: 3/01/2010

254. Each Casing in Their Own Region: Is it permissible for an operator to place each of its cased crossings in separate region regardless of similarities with other cased crossings?

Yes, this is allowed. However, placing each of the cased crossings in their own region could require that each cased crossing be assessed and directly examined each assessment interval in order to comply with the provisions of NACE RP 0502-2002 § 5.10 (depending on the results of the indirect inspection). Any region (with only one casing) that had an immediate or a scheduled indication would have to be directly examined (NACE RP 0502-2002, §5.10.2.1 and §5.10.2.2). If multiple regions (each composed of only one cased crossing) have no immediate or scheduled indications, then those regions can be grouped together and one region (or two regions on first application) most likely to have corrosion could be selected for direct examination (NACE RP 0502-2002, §5.10.1 and §5.10.2.3.2). Also from this group, one region (or two regions on first application) could be randomly selected for the additional validation direct examination.

Revised: 4/20/2010

255. Reassessment on Filled Casings that have not Experienced a Major Change in Status: The guidelines state that “[a]ny indication of a change in casing integrity, or (for a filled casing) fill level or fill quality based on an evaluation of the casing monitoring program data using the guidelines in Exhibit D” is an indication with “immediate” priority. Would minor changes that are expected or for which there is a valid explanation meet this criteria for an “immediate” priority? For example, the fill level may have dropped a few inches because it was a hot summer and the vents warmed up. They would need to: 1) verify that no shorts exist, 2) if significant fill loss they would need to investigate why, and 3) repair and refill. If no shorts exist I do not see the need to reassess.

By rule, all casings in line segments subject to IMP requirements have to be assessed every 7 years (or less) by an allowable assessment method in accordance with 49 CFR § 192.939(a) and (b). The priority for a direct examination of the carrier pipe may not be “immediate” provided that operators verify that no short exists, the fill material remains intact and in contact with the carrier pipe, and any repairs or refilling necessary are accomplished promptly so that the

effect on the integrity of the carrier pipe is minimal. An engineering evaluation of the as-found condition must be documented to justify that the as-found condition does not represent a change that is indicative of a condition deleterious to pipeline integrity.

Original: 3/01/2010

256. All Casing Low Risk: Do small operators with very few cased crossings still have to do a direct examination even if all of their cased crossings are low risk and filled?

Yes. The code, 49 CFR Part 192, requires that an assessment be performed every 7 years. If ECDA is the assessment method, it must be performed in accordance with NACE RP 0502-2002. As required by the ECDA process, the location most likely to have corrosion (either an immediate, scheduled or monitored indication) must be directly examined, plus at least one additional direct examination at a randomly selected location shall be conducted to provide additional confirmation that the ECDA process has been successful.

Original: 3/01/2010

257. Direct Examinations to Demonstrate ECDA Effectiveness: Do small operators with very few cased crossings still have to do effectiveness digs on cased crossings? The concept of combining regions is good, but at some point all operators, small and large, will not see any risk benefit in effectiveness examinations.

The code, 49 CFR Part 192, requires that an assessment be performed every 7 years for all covered segments. If ECDA is the assessment method, it must be performed in accordance with NACE RP 0502-2002. As required by the ECDA process, the location most likely to have corrosion (either an immediate, scheduled or monitored indication) must be directly examined, plus at least one additional direct examination at a randomly selected location shall be conducted to provide additional confirmation that the ECDA process has been successful.

Original: 3/01/2010

258. Corrosion Growth Rate: What is the proper method for determining corrosion growth rate that should be used on cased crossings when calculating reassessment intervals?

When conducting ECDA, operators must comply with NACE RP 0502-2002 §6.2.3 as referenced by 49 CFR § 192.925 to determine the corrosion growth rate used to calculate the reassessment interval.

Original: 3/01/2010

259. Protection of Casing: Do I have to cathodically protect a casing?

It is not the intent of the casing guidance material to require operators to provide cathodic protection (CP) to casings. In fact, providing CP to a casing may make it more difficult to determine if there are metallic shorts or electrolytic shorts or contacts.

Original: 3/01/2010

260. Monitoring Casing Integrity: How are operators expected to monitor structural integrity of the casing and end seals?

PHMSA has not established prescriptive requirements for how an operator should monitor the structural integrity of the casing. PHMSA expects operators to develop their own technically sound processes. PHMSA has provided some guidance on monitoring of casings and some of the information contained in these materials section could be utilized. Each operator must determine which method(s) are applicable to their situations.

Original: 3/01/2010

261. Leak Surveys: Are leak surveys conducted in accordance with 49 CFR § 192.706 sufficient to assess carrier pipe integrity in a shorted casing?

No. Leakage surveys are not capable of identifying anomalies or defects in pipe that must be repaired as required by the Integrity Management Rule, 49 CFR Part 192, Subpart O. Under the Integrity Management Rule, operators cannot leave shorted, contacted or coupled casings (either metallic or electrolytic) in their pipelines or segments without mitigating the situation. Such a condition (shorts, contacts or couples) is considered detrimental to the long-term integrity of the covered segment.

Original: 3/01/2010

262. Minimum Number of Direct Examinations: An operator has multiple casing regions in a pipeline segment and each region has multiple casings. A variety of immediate, scheduled, and monitored indications were identified. How many direct examinations must be made in the ECDA process?

The number of direct examinations needed in each casing region is determined by the number of immediate, scheduled and monitored indications in accordance with NACE RP 0502-2002, § 5.10 and 49 CFR § 192.925.

For initial ECDA assessments:

- a) Within each region, the following indications must be directly examined:
 - i) ALL immediate indications, and
 - At least two (2) scheduled indications or if there are no scheduled indications in the region, at least two (2) monitored indications deemed most likely to have external corrosion or if there are no scheduled or monitored indications, at least two (2) locations deemed most likely to have external corrosion; and
- b) In addition, at least two (2) randomly selected locations must be directly examined (for process validation) one of which should be a scheduled indication or if there are no scheduled indications then at a monitored indication, in accordance with NACE RP 0502-2002, § 6.4.2.

For periodic reassessments:

- a) Within each region, the following indications must be directly examined:
 - i) ALL immediate indications, and
 - At least one (1) scheduled indication; OR if there are no scheduled indications in the region, at least one (1) monitored indication deemed most likely to have external corrosion; or if there are no scheduled or monitored indications, at least one (1) location deemed most likely to have external corrosion.
- b) In addition, at least one (1) randomly selected location must be directly examined for process validation in accordance with NACE RP 0502-2002, § 6.4.2.

Original: 3/01/2010

263. Direct Examination Example #1: An operator has two casing regions in a pipeline segment which are being assessed by ECDA. Region A has multiple casings, some of which are filled and some of which are unfilled. Region B has multiple casings, all of which are filled. There are no “immediate” or “scheduled” indications at any of the casings. All indications in both regions are “monitored.” How many direct examinations need to be performed?

If the assessment is an initial ECDA assessment:

- a) Two (2) monitored indications in the one region deemed most likely to have external corrosion in accordance with NACE 0502, § 5.10.2.3.2. Region A, since it has unfilled casings, would typically be considered the region most likely to have external corrosion unless there are unique external corrosion risk factors associated with the filled casings in Region B; and
- b) At two (2) randomly selected locations (for process validation) one of which should be a scheduled indication or, if there are no scheduled indications, then at a monitored indication in accordance with NACE RP 0502-2002, § 6.4.2.

If the assessment is a periodic reassessment:

- a) One (1) monitored indication in the one region deemed most likely to have external corrosion in accordance with NACE 0502, § 5.10.2.3.2. Region A, since it has unfilled casings, would typically be considered the region most likely to have external corrosion unless there are unique external corrosion risk factors associated with the filled casings in Region B; and
- b) At one (1) randomly selected location (for process validation) in accordance with NACE RP 0502-2002, § 6.4.2.

Original: 3/01/2010

264. Direct Examination Example #2: An operator has a pipeline segment with one region containing 5 filled casings. During indirect examination performed for a 7-year reassessment, the operator identifies that one of the casings is metallurgically shorted to the carrier pipe. None of the other four casings had any indications. How many direct examinations need to be performed?

A minimum of 2 casings must be directly examined.

- a) The metallurgically shorted casing (immediate indication) (NACE RP 0502-2002, § 5.10.2.1); and
- b) One randomly selected casing location (for process validation in accordance with NACE RP 0502-2002, § 6.4.2).

Original: 3/01/2010

- 265. Direct Examination Example #3:** An operator has a pipeline segment with one Region containing 3 filled and 2 unfilled casings. During indirect examination performed for an initial assessment, the operator identifies that one of the filled casings is metallicity shorted to the carrier pipe and that both unfilled casings have electrolytic shorts. None of the other casings had any indications. How many direct examinations need to be performed?

All 5 casings must be directly examined.

- a) The metallicity shorted casing (immediate indication in accordance with NACE RP 0502-2002 §5.10.2.1); and
- b) The 2 electrolytically shorted casings (scheduled indications in accordance with NACE RP 0502-2002 §5.10.2.2.2); and
- c) Two (2) additional casings at randomly selected locations (for process validation) one of which should be a scheduled indication, or if there are no scheduled indications, then at a monitored indication in accordance with NACE RP 0502-2002, § 6.4.2. In this case, since there are only two other locations from which to choose, the two remaining casings without indications must be directly examined.

Original: 3/01/2010

- 266. Direct Examination Example #4:** An operator has a pipeline segment with two regions: Region A has 5 casings (3 unfilled and 2 filled) and Region B has 5 unfilled casings. During indirect examination performed for a 7-year reassessment, the operator identifies that one of the unfilled casings in Region A is electrolytically shorted to the carrier pipe. None of the other casings in either region had any indications. How many direct examinations need to be performed?

A minimum of 3 casings in the pipeline segment must be directly examined.

- a) For Region A, one casing must be directly examined:
 - The electrolytically shorted casing (scheduled indication in accordance with NACE RP 0502-2002 §5.10.2.2.1).
- b) For Region B, one casing must be directly examined:
 - One casing location deemed most likely to have external corrosion (NACE RP 0502-2002, § 5.10.1); and
- c) For the segment:
 - One randomly selected casing location in either Region A or Region B (for process validation in accordance with NACE RP 0502-2002, § 6.4.2).

Original: 3/01/2010

- 267. If a casing has been filled with wax per the PHMSA guidelines and a monitoring program has been implemented and followed in accordance with the PHMSA guidelines, does the casing have to be reassessed every 7 years if testing indicates there are no immediate indications?**

Yes. All casings in line segments subject to IMP requirements have to be assessed every 7 years (or less) by an allowable assessment method in accordance with 49 CFR § 192.939(a) and (b). However, if the operator uses ECDA for the assessment method, every casing may not necessarily require a direct examination. A properly filled casing that has been effectively monitored and has no metallic shorts or electrolytic contacts might be a lower priority for a

direct examination than an unfilled casing in the same casing ECDA region. Each situation must be evaluated and will depend, in part, on the number of filled and/or unfilled casings in the ECDA region.

Original: 3/01/2010

268. Once an operator has wax filled a casing, does this allow the operator to reprioritize the filled casing within the next integrity re-assessment cycle?

Yes. Operators are allowed to reprioritize a casing in an ECDA region based on the new risk assessment conducted in accordance with 49 CFR § 192.917(c). If a wax filled casing is deemed to present less of a threat than an unfilled casing, then it might be deemed a lower priority in the next integrity re-assessment cycle. However, all pipe must be re-assessed every 7 (or fewer) years by an allowable assessment method in accordance with 49 CFR § 192.939(a) and (b).

Original: 3/01/2010

269. What are the definitions of DA, Direct Assessment and DE, Direct Examination?

DA – Direct Assessment

DA is a method of assessing the integrity of pipelines with regard to the corrosion threat. It is a four step process (pre-assessment, indirect inspection, direct examination, and post assessment) that must be followed in its entirety and was approved as a method in the 2002 Pipeline Safety Improvement Act (PSIA) which was signed into law on 12/17/2002. Currently PHMSA recognizes four DA processes: External Corrosion Direct Assessment (ECDA); Dry Gas Internal Corrosion Direct Assessment (DG-ICDA); Stress Corrosion Cracking Direct Assessment (SCCDA); and Confirmatory Direct Assessment (CDA). NACE has approved or is working on standards for the following DA processes: ECDA; DG- ICDA; SCCDA; CDA; Wet Gas Internal Corrosion Direct Assessment (WG- ICDA); and Internal Corrosion Direct Assessment for Liquid Petroleum Pipelines. NACE defines DA as *‘A structured process that combines pre-assessment, indirect inspections, direct examination, and post assessment to evaluate the impact of predictable pipeline integrity threats such as corrosion.’* Subpart O of 49 CFR 192.903 defines DA as *‘Direct assessment is an integrity assessment method that utilizes a process to evaluate certain threats (i.e., external corrosion, internal corrosion and stress corrosion cracking) to a covered pipeline segment’s integrity. The process includes the gathering and integration of risk factor data, indirect examination or analysis to identify areas of suspected corrosion, direct examination of the pipeline in these areas, and post assessment evaluation.’*

DE – Direct Examination

NACE defines DE in the ECDA standards as *‘Inspections and measurements made on the pipe surface at excavations as part of ECDA’* or in the SCCDA standard as *‘Inspections and measurements made on the pipe surface at excavations as part of direct assessment’*. The DG-ICDA standard has a similar definition (*Examination of the pipe wall at a specific location to determine whether metal loss from internal corrosion has occurred. This may be performed using visual, ultrasonic, radiographic, or other means*).

Original: 6/16/2010

- 270. If no casings with a region (hazardous liquids) test as electrically shorted to the carrier pipe but there is one DCVG indication near one of the casing ends - what direct exams are required? Of course, the end of the casing that might contain the DCVG indication should be one direct exam and the other end of that same casing should be another direct exam. But, for the rest of the casings that have no indications nearby, does examining both ends of one casing constitute one direct exam or is excavation of each end of a casing considered as two direct exams?**

PHMSA does not agree that only the end(s) of the casing need be directly examined. Rather the entire casing would need to be evaluated under current requirements. An indication at the end could mask indications inside the casing or that past shorts or couples/contacts could have existed which may have affected the integrity of the carrier pipe further inside the casings. PHMSA would expect operators to use all of the indirect inspection tools available including GWUT (including the "GWUT 18 Point Checklist") to determine the integrity of carrier pipe and then select the casing(s) with the highest priority to be directly examined in their entirety.

Original: 6/16/2010

- 271. How will PHMSA handle casing assessments made before the guidance material was made public (when operators used ECDA but may not have followed the guidelines entirely)?**

PHMSA cannot make a blanket statement regarding how it views ECDA integrity assessments made prior to the publication of the casing guidance. It can affirm that if the guidance was adhered to, then the assessment is considered acceptable. Where there are differences, a situation by situation analysis will need to be performed and technical justifications for variances to the guidance provided.

Original: 6/16/2010

- 272. How would one handle a cased segment that has the attributes of Item 1 and Item 4 (from Exhibit B)? For example, a casing that has an attribute of Item 1, no attributes of Items 2-6, and perhaps some attributes from Items 7-17, could be placed in, say, Region A. Another casing that has an attribute of Item 4, no attributes of Items 2-6, and perhaps some attributes from Items 7-17, would be required per the guidance to be placed into a different region, say, Region B. How then would one regionalize a cased segment that has the attributes of Items 1 and 4, no attributes of Items 2, 3, 5, or 6, and then perhaps some attributes from Items 7-17? Should this segment be considered as Region A, Region B, or a whole new region, say, Region C? If each different combination of Items 1-6 required a new region to be established, this could then entail a million different regions before one even begins considering the "C" attributes from Items 7-17.**

In Exhibit B, PHMSA requires that if casings have different attributes in items 1 through 6 that they should be in separate regions. When casings have various combinations of these 6, they may have to be in separate regions but there may be situations that they could be combined, such as when one attribute is the determinate for how a casing is going to be assessed and the other attributes are minor. Thus in the example above, when multiple casings have the same attributes 1 and 4 plus others of minor consequence of 7 to 17, they could be combined into

one region. Also when one casing has different attributes 1 and 2 and another has different 1 and 4, these may have to be in separate regions regardless of whether attributes 7 to 17 are identical. Operators are expected to have a technical justification for how they place casings into different or the same ECDA regions. Such justification should be the same for each segment and pipeline and not change based on non technical issues.

Original: 6/16/2010

- 273. If an operator has a pipeline system that operates at pressures less than 30% SMYS, and conducts a baseline assessment for external corrosion on all cased pipe using ECDA, can subsequent re-assessments be conducted using the low stress reassessment method (49 CFR 192.941), even though all of the casings were not directly examined during the baseline assessment?**

Yes. As long as the baseline assessment complies with NACE RP0502-2002 (as required by 49 CFR Section 192.925) and the direct examinations required by NACE RP0502-2002 were successfully completed, then all of the casings have had a successful baseline assessment. Subsequent re-assessments may be performed using the low stress reassessment method in 49 CFR Section 192.941 for all of the casings, as long as the operating pressure remains below 30% SMYS during the assessment and reassessment intervals.

Original: 6/16/2010

- 274. Must an operator always perform a 100% direct examination inspection of the carrier pipe within the casing under Step 3, Direct Examination, when doing an ECDA assessment?**

Yes. In the ECDA assessment process in Step 3, Direct Examination, in accordance with NACE RP0502-2002, Section 5, and 49 CFR Section 192.925, pipeline operators must do a full, 100% direct examination of the carrier pipe within the casing to ensure that no indications have been missed by any of the indirect inspection tools. Many of these indirect inspection tools cannot 'see' inside the casings but do infer by their readings that an indication may be located somewhere inside the casing. Because many of the indirect inspection tools can not accurately locate nor categorize the specific indication, a 100% direct examination of the carrier pipe is necessary.

Original: 6/16/2010