PRODUCT FAILURE EVALUATION PROCEDURE

1. If you need the mill material certification and/or heat treatment tensile test results, call Quality Assurance (QA) at 918/445-7668. Furnish the product size, type, heat code and manufacturing date and the requested information will be faxed to you within 24 hours of your inquiry.

2. If a problem should arise, complete this form (QA0005) as accurately and completely as possible. This information and the accompanying samples will serve as the basis for determining the failure root cause.

3. **Do not clean samples submitted for analysis.** The samples may contain important evidence that help determine well conditions present at the time of the failure.

4. **All failure samples must include the stamped upset end with the heat code and date of manufacture.**
   - *For Body Failures:* - Include approximately 12" on both sides of the break. If the break is within 24" of an upset, include the upset and 12" on the other side of the break. If a tensile pull test is required, include a 24" section of rod body to be used for physical testing.
   - *For Pin and Upset Failures:* - Include the upset end with the broken pin and the mating coupling or the pin end with the galled threads and the mating coupling. If a tensile pull test is required, include a 24" section of rod body to be used for physical testing.
   - *For Coupling Failures:* - Depending upon the type of failure, include either both halves or the entire coupling.

5. Tag each sample piece with the following information: (1) company name, (2) lease name & number, (3) number of rods from surface to failure and (4) your name & telephone number.

6. **Carefully pack the failed sample halves to avoid mechanical damage to the mating fracture surfaces during shipment.**

7. Immediately ship the samples and the completed QA0005 Form to Norris Sucker Rods. In Midland, Texas send the samples to the attention of Technical Services or in Tulsa, Oklahoma send the samples to the attention of the Quality Assurance Lab. In case tracing the shipment becomes necessary, you should retain the shipping receipts or notes until you have been informed by phone that we have received the samples and the completed QA0005 Form.
   - If you ship the samples by motor freight, Federal Express or UPS, use the following physical address: 7900 West I-20, Midland, Texas 79706 (915/561-8101) or 4801 West 49th Street, Tulsa, Oklahoma 74107 (918/ 445-7600 or 800/767-7637).
   - If you mail the samples using the USPS, use the following address: PO Box 60575, Midland, Texas 79711-0575 (915/561-8101) or PO Box 1496, Tulsa, Oklahoma 74101-1496 (918/445-7600 or 800/767-7637).
   - In certain cases, shipment by air freight may be necessary. Airfreight shipments should be addressed to 7900 West I-20, Midland, Texas 79706; Attention – Technical Services (915/561-8101). The air waybill must be marked – "Notify Upon Arrival". Please call and inform Technical Services as to when and where to expect the arrival of your shipment.

8. After the samples have been evaluated, a Product Failure Evaluation (PFE) Report will be mailed stating the failure root cause. Typically the PFE Reports will be one of two types and will be presented to the individual responsible for the solution or problem.
   - *Non-Warranty Related*: Most failures will be the direct result of certain pumping and/or well conditions. For these situations, Norris will make an effort to recommend possible corrective actions.
   - *Warranty Related*: Should a question of defectiveness for any Norris Sucker Rod or Coupling arise while covered by warranty, the issue shall be submitted to a qualified and accredited independent laboratory for opinion. When warranty adjustments for steel sucker rods are considered, Norris will request that the customer submit one (1) copy of the well servicing invoice, with the subject fishing cost properly identified, to: Norris Rods, PO Box 1496, Tulsa, Oklahoma 74101-1496, Attention – Quality Assurance Manager. Upon arrival of the warranty reimbursement claim, a check – for the amount of the fishing cost only – will be forwarded to the person filing the warranty claim. The well servicing company will not be reimbursed directly.

Mark (√) all appropriate check boxes (☐).

SECTION I
Failure Information

Date:_____/_____/_____

Norris Sales Representative: _____Location:_____

Phone Number:_____Fax Number:_____

DO NOT CLEAN SAMPLES SUBMITTED FOR ANALYSIS!

Customer:_____Representative:_____

Phone Number:_____Fax Number:_____

Lease & Well Number: _____Location:_____

Failure Date:____/_____/_____Pull Date:_____/_____/_____Number of Rods "FS" to Failure: _____

Product Size:_____Product Type:_____Heat Code:_____Date Of Manufacture: _____

Number of Pieces: _____Description of Pieces: _____

_____

_____

Failure samples must include the stamped upset end with the heat code & manufacturing date.

Please Note: ***For failure samples that require the assistance or opinion of an independent metallurgical laboratory, the response time for a PFE Report on that sample is at the leniency of the lab.***

Report Type:

☐Acid Spot Test [1]
☐Chemical Analysis [2]
☐Heat Treatment Tensile Test Result [3]
☐Independent Metallurgical Analysis [4]
☐Mill Material Certification [5]
☐Pumping System Review [6]
☐Scale X-ray Diffraction Analysis [7]
☐Tensile Pull Test (must include 24" of rod body) [8]
☐Visual (verbal report) [9]
☐Visual (written report) [10]

Additional Comments:_____

_____

_____

_____

Response time requested for a verbal analysis: ☐48 Hours, ☐1 Week or ☐2 Weeks.

Response time requested for a written analysis: ☐2, ☐4, ☐6 or ☐8 Weeks.

[1] Please allow up to 48 hours for acid spot test results.
[2] Requires the assistance of an outside independent metallurgical laboratory. Please allow up to 4-6 weeks for a chemical analysis.
[3] Please allow up to 24 hours for the heat treatment tensile test results.
[4] Requires the opinion of an outside independent metallurgical laboratory. Please allow up to 8 weeks for a written analysis.
[5] Please allow up to 24 hours for the mill material certification.
[6] May require the assistance and/or opinion of an outside metallurgical laboratory. Please allow up to 8 weeks for a written analysis.
[7] Requires the opinion of an outside independent metallurgical laboratory. Please allow up to 8 weeks for a scale x-ray diffraction analysis.
[8] Please allow up to 1 week for the tensile pull test results.
[9] May require the assistance and/or opinion of an outside independent metallurgical laboratory. Please allow up to 2-4 weeks for a verbal report.
[10] May require the assistance and/or opinion of an outside independent metallurgical laboratory. Please allow up to 6-8 weeks for a written report.

Mark (√) all check boxes (☐) that apply.

SECTION II
Design Data

Pumping Unit:

Pumping Unit Manufacturer: _____ Type: _____

Size: _____ - _____ - _____ Stroke Length: _____ SPM: _____ Unit Rotation: ☐CW or ☐CCW

☐Electric or ☐Gas Motor

Manufacturer: _____ Type _____ Frame _____ Size _____ HP

☐Clock / ☐POC / ☐Vibration Switch

Brand: _____ 24 hour % runtime: _____ Minutes: on _____ off _____ downtime _____

Completion:

Casing Size: _____", Weight: _____#, TD: _____', PBTD: _____', Pressure: _____#

☐Cased: (perforations: _____ to _____) or ☐Open Hole: (from: _____ to _____)

Tubing: Size: _____", Grade: _____, Weight: _____#, SN Depth: _____', Pressure: _____#

☐Anchor or ☐Packer: setting depth: _____', description: _____

☐Gas Separator or ☐Mud Anchor: description: _____

Rod String (at the time of failure):

*Number	Footage	Size	Grade	Coupling	Manufacturer	New / Used

Total Footage:

*Scraper Manufacturer: _____, Type: _____, # Per Rod: _____

Pump: Size: _____, Plunger (type): _____, Bore: _____, Fit: _____, Length: _____

Production: BOPD: _____, BWPD: _____, BFPD: _____, @ SL: _____ & SPM: _____

Fluid Properties: Oil Gravity: _____ API, Water SG: _____, Fluid SG: _____, Tubing Gradient: _____

Gas: _____ mcf/d, H_2S: _____ ppm, CO_2: _____ ppm, Water: _____ pH, BH Temperature: _____ °F.

Static FL: _____' FS, Dynamic FL: _____' FS, Pump Intake Pressure: _____#

Mark (√) all check boxes (☐) that apply.

SECTION III
Service Record

1. Does this well flow? ☐No (skip 1a) ☐Yes.
1a. How does the well flow? ☐Heads ☐Steady.
2. Does this well pump off? ☐No ☐Yes.
3. Does this well pound fluid? ☐No ☐Yes.
4. Is this well in a water flood? ☐No ☐Yes.
5. Is this well in a CO_2 flood? ☐No ☐Yes.
6. Is the well bore deviated? ☐No (skip 6a) ☐Yes.
6a. Is a deviation survey included? ☐No ☐Yes.
7. Have you used faster SPM? ☐No (skip 7a) ☐Yes.
7a. What SPM have been used? _____
8. Did you use a larger bore? ☐No (skip 8a) ☐Yes.
8a. What bores did you use? _____
9. Are pump teardown reports included? ☐No ☐Yes.
10. Are well servicing reports included? ☐No ☐Yes.
11. Is a water analysis included? ☐No ☐Yes.
12. Is a gas analysis included? ☐No ☐Yes.
13. Severity of corrosion? ☐None (skip 13a), ☐Light, ☐Moderate, ☐Severe.
13a. Corrosion type: ☐Brine_____, ☐CO_2 (ppm)____, ☐H_2S (ppm)____, Other: _____
14. Do you have a chemical inhibition program? ☐No (skip 14a), ☐Yes, how often: _____
14a. Inhibition program for? ☐Corrosion_____☐Emulsion_____☐Paraffin_____
☐Scale_____☐Other_____
15. Has this well been weighed? ☐No (skip 15a) ☐Yes, by: _____, Date: _____
15a. Weighed Conditions: SPM:_____SL:_____Pump Bore:_____
Rod Detail: _____
Weight: maximum:_____lb. minimum:_____lb.
16. Other important information: _____

Failure History

Furnish data on all rod parts, including other manufacturers!

Failure Date	Failure Depth	Fracture Location	Rod / Coupling Size & Type	Manufacturer	Heat Code	Date Of Manufacture

Purchase Record

Date Purchased:_____, PO (AFE) Number: _____, Issued To: _____
Information Furnished By:_____, Prepared By: _____Date:_____

- Norris Use Only -

Norris DT Number: _____
Date Fracture Received: _____/_____/_____ PFE File Number: _____