

REVISED (August 2000) DRAFT DOCUMENT ASSESSMENT FORM

Thanks to those of you who have sent comments on the JUN 00 version of this form, which was sent electronically to all.

** I have put changes and additions *in italics*.

About the form

1. Why do we want this form ?

As a key part of the MIC Risk Assessment Task we shall need to evaluate a variety of documents and data, both in the public domain, and (to some extent) confidential ones. This is a draft form for use in evaluations of documents, on which I would like comments.

2. Please send your comments by return.

It's not too late for further comments. I will try to use the form to carry out some evaluations before the joint Task 1/2/3 meeting in London after the EUROCORR meeting on 10-14 September.

3. Input from Task 1 on definitions of MIC.

I still do not have any input.

4. Provision for inadequate information.

One feature that I have tried to take account of is that in almost all cases there will be less than the total amount of information that would ideally like to have. For each main section I have included an opportunity for the assessor to indicate his or her view of whether the data supports MIC.

5. Working definition of MIC.

Following an interesting presentation by Brenda Little at the recent COST 520 meeting in Budapest, in which she demonstrated that in some stainless steel weld corrosion the involvement of bacteria followed the initiation of corrosion, rather than being the initiator of corrosion, I am proposing that we take MIC to be Microbially Influenced Corrosion. Brenda's cases would therefore be considered as MIC. This seems to me to be reasonable, since complete protection against corrosion is rarely achieved in practice, and the acceleration of corrosion by microbial action at sites where corrosion rates would otherwise be low or negligible is MIC.

Anna Iverson says that she is not convinced from the evidence presented that the corrosion could not be due to poor weld quality, which was not evaluated (e.g. by a non-biological corrosion test). This is an excellent example of the care that has to be taken in evaluating the presence or absence of MIC in data.

6. Basis for the assessment.

At the Venice meeting I suggested that the assessment of MIC could be taken as a sort of mathematical product of three main factors, based on the list of Aspects that we have already generated. Thus:

$$\text{MIC} = f(\text{general aspects}) \times f(\text{microbial aspects}) \times f(\text{metal/material aspects})$$

Clearly, if any one of the functions = 0, then we are not dealing with MIC. Putting quantitative or semi-quantitative values to the factors is the next step, once we have the data.

***I would like us to try at the September meeting to assess which of the aspects (or possibly a combination of some of them) of MIC in each of the three factors are essential to establish the presence of MIC. I had hoped for some input from Task 1, but in any case we will need to deal with cases where the amount of data is inadequate.*

If you are unable to be present at the meeting on 15 September, please send an e:Mail to me, andrew@ampritchard.freeseve.co.uk

7. The form

* Items that are starred thus in the margin require an input.

Items in bold separated by forward slashes, e.g. **Yes/No/not stated** require the assessor to circle or delete the appropriate items to give the desired answer.

IT'S TOO LONG !!!

In most cases, a lot of the questions will either get a quick answer, or there will not be enough detail to provide any answer. So I don't think it will take very long to fill it in. And if the data are there, it is important for the value of the assessment that they are included.

DRAFT BIOCORROSION NETWORK MIC EVALUATION FORM

1. DATA SOURCE

- * Open literature **Yes/No**
if **Yes**, give full reference:
- * Document title:
- * Authors:
- * Journal (Vol/pages/date):
- Report (Designation/pages/source):
- *Type of facility (e.g. inside of heat exchanger tube)*
- *Media (e.g. Baltic seawater)*

if **No**, either give reference (if permitted) or devise one to maintain confidentiality (your name and a number, e.g. Pritchard 3), and devise a title, based on technical content, and date, if allowed, e.g. Oil pipeline 1980

- * Reference:
- * Title & (date):

2. GENERAL MIC CONDITIONS

2.1 Temperature

- * In range 5-65°C (40-150°F) **Yes/No/not stated**
- * Stated value °C/°F
- * Implied (e.g.lab.temp., North Sea bed = c.4°C)

2.2 Water

- * Presence stated **Yes/No**
- * Type and any analysis (e.g.seawater, ppm sulphate, pH)
- * If presence not stated, can it be implied? **Yes/No**
- * Wet/dry cycle **Yes/No**
- * Presence doubtful (assessor's view) **Yes/No**

- * Stagnant **Yes/No stated/assumed**
- * Flow **Yes/No stated/assumed laminar/turbulent/intermittent**
- * *Flow rate (if specified):*

2.3 Nutrients

- * Specified **Yes(give details)/No** **Details:**
- * Implied **Yes(give reasons)/No** **Reasons:**
- * Presence of pollution **Yes(details)/No/not specified** **Details:**
- * Electron acceptor available **Yes(oxygen,sulphate,nitrate,other)/No**

2.4 Assessor's opinion

** Do General Conditions make MIC impossible ? **Yes/No**

3. MICROBIAL ASSESSMENT

3.1 Biofilm

- * Present **Yes/No**
- * If **Yes**, give evidence
- * EPS details (if any)

3.2 Microorganisms

- * Presence identified **Yes(how?)/No** **How identified:**
- * Species identified **Yes(how?)/No** **How ?:**
- * Numbers and method of assessment for each species:

3.3 Metabolites identified

- * Inorganic acids or salts (e.g.sulphides) **Yes/No**
- * If **Yes**, give Type, Concentrations
- * Organic acids or salts **Yes/No**
- * If **Yes**, give Type, Concentrations

3.4 Details of any MIC control measures

- * Are any control measures stated to be applied ? **Yes/No**
- * If **Yes**, **Biocide** **Mechanical cleaning** **Chemical cleaning** **Other**
Give details:
- * *Type of biocide (chemical name and/or commercial name):*
- * *Dosing regime (concentration, period, interval):*
- *Observed effect of biocide on corrosion:*
- *Details of non-biocidal treatment:*

3.5 Assessor's opinion

** Does the microbial assessment in the document suggest that MIC is Impossible **Yes/No**

4. METAL/ALLOY DETAILS

4.1 Composition

- * Give details of all metals or alloys involved in MIC (give commercial name and chemical analyses if provided):
- * Are welds involved ? **Yes/No**
- * If **Yes**, give any details of welding (process, filler used):

4.2 Geometry

- * Coupons **Yes/No**
- * Plant items (specify):
- * Crevices **Yes/No**

4.3 Surface

- *Mechanical (e.g. sandblasted, surface finish by grit sandpaper, mechanical treatment such as shot peening): Yes/No if Yes, details:*
- *Chemical (e.g. phosphating, electropolishing, nitriding): Yes/No if Yes, details:*
- *Coatings: Yes/No if Yes, details (e.g. paint, polymer):*
- *Corrosion product data: Yes/No if Yes, details (e.g. amount, colour, porosity, analysis):*

4.4 Corrosion type

- * Are details of corrosion given ? **Yes/No**
- * Are illustrations provided ? **Yes/No**
- * If illustrations provided, are these **Photographs/micrographs ?**
- * Is the type of corrosion specified ? **Yes/No**
- * If **Yes**, is it **pitting/cracking/stress-related/sulphide**

4.5 Corrosion rates

- * Are specific corrosion rates given **Yes/No**
- * If **No**, can limits be calculated (e.g. penetration rate as material thickness/time) **Yes/No**
- * Give rates and ranges (if provided) for each material and units
(units are typically mpy = thousandths of an inch/year, mm/yr, or a corrosion current/area)
- * *Type of corrosion General/local Do rates refer to mean rate or pitting:*
- *How were corrosion rates estimated (e.g. weight loss, metallography, LPR, ER):*
- *Were non-microbial tests carried out in parallel Yes/No if Yes, are there significant differences in the rates between biological and non-biological tests:*

4.6 Assessor's opinion

- ** Is it likely that the observed corrosion was not influenced by MIC ? **Yes/No**

5. Assessor's name: