Safari Nuclear Reactor Visit

A very successful and well attended visit took place to the Safari Nuclear Reactor plant and related departments, on the 6th of May 2009. This was probably the biggest gathering of SAINT members in a very long time. Special thanks to Corporate Members Necsa namely Frikkie de Beer and his team for their time in putting together this visit for SAINT.

Suggestions were made for more visits of this type to take place in future.

SAINT member Francois van Zyl from SA Technical is looking into arranging a visit for SAINT when next they are busy with a Boeing revamp.

More ideas from members are welcome!

Rainer Rohloff (right) presenting the H Rohloff Trophy for progress in NDT 2008 to Lew Wells on the occasion of SAINT's visit to NECSA

TRAINING OF THE NDT TECHNICIANS

It is said that confusion and misunderstanding reigns when employers and individuals wish to enrol students for NDT training.

There should be absolutely no confusion on the part of the employers enrolling their employees for training at the various training institutions.

I say this because you the employer employing NDT for quality control purposes or are about to perform NDT services for your client, shall have a Written Practice in place in which it states how the employee of the company is going to be trained qualified and certified / authorised by that company. This document shall have been checked and verified by a Level 3. This very same document shall state the pre-requisites for attending an NDT theoretical course at a training institution that has been audited and approved by you the employer.

If the employer is not sure or venturing into NDT for the first time he should ASK!! It is always too easy to throw the arms into the air saying; ñI did not knowò. ASK, who? The Training Institutions, Level 3s in the NDT field, and or SAINT.

BE HONEST AND OPEN!
The same applies to the private individual, however, should such a person, on approaching the training institution with the intent of enrolling, he / she should be advised and counselled properly by said institution as to the pre-requisites for enrolment and further to be properly advised as to the required practical experience that is required for certification / authorisation and that this required experience can and will only be gained under the guidance and supervision of a Level 2 or 3.That just having the theoretical course behind his name does not necessarily entitle him to walk into a position of employment.

Training institutions should demand of the enrollee that they sign a declaration (ISO 9712) of having the required education and practical experience and as in line with the SAQA NQF standards.

Do not allow the enrollee to creep through the net, through the loophole of ñtraining assumed to be in placeò. It will come back to haunt at a later date when registration is enforced and these escapees ñrun aroundò trying to get all the pre-learning in place.
They will blame your poor advice.

There should be no problem with the theoretical training of an NDT technician old or new.

Lew Wells

Assisting in the assessment and inspection of NDT applied on process - plants/equipment

Introduction

1. If done well, NDT can provide useful information to assist in the management of plant safety. If inappropriate NDT is applied or not applied correctly, then the results are likely to give a false impression of the integrity and safety of the plant.

2. NDT is a measurement of a physical property or effect from which the presence of damage or irregularity can be inferred. It is not a measurement of an absolute parameter such as temperature or pressure.

3. The distinction between what would be considered changes in material properties and what would be considered a defect is not distinct. This can lead to NDT missing defects and also producing false calls i.e. a defect is reported when in fact the signal is not produced by a defect. Also, NDT is applied to a greater or lesser extent by human operators who introduce human error and subjectivity into the process.

4. NDT is rarely 100% effective at detecting defects of concern. Like all measurements, defect positioning and sizing measurements with NDT techniques are subject to errors. As these techniques are often a combination of separate measurements, these errors can be significant.
5. There are some common misconceptions regarding NDT which are still prevalent in industry:

   a. No defects found and reported means that there are no defects in the component. All NDT techniques have strengths and weaknesses and no one technique is capable of detecting all types of defect nor is there one which is 100% reliable.

   b. A defect measured at 5 mm means that the defect actually is 5 mm. All measurements are subject to errors particularly if obtained under site conditions.

   c. If NDT reports defect growth or non-growth then this is actually the case. Identification of growth/no growth requires comparison of two measurements each with their own errors. The growth measurement is then subject to the combined errors.

   d. 100% Inspection Coverage. This does not necessarily mean that 100% of the component has been inspected.

   e. Hard copy results can't lie. Hard copy results are only as good as the techniques and data used to produce them.
   f. NDT to a National Standard is always appropriate. National standards are only relevant to specific circumstances and only include knowledge available at the time of development. The NDT requirements need to be checked against the standard to see if it is relevant to the particular situation.

NDT PROCESS

6. Damage mechanisms which could be expected to occur in the plant item and hence should be detected, if present, by the NDT technique should be identified. As with any other contract/order, NDT should start with a specification of requirements. For NDT this is a defect specification or description, which includes:

Å A description of the damage mechanism - location, type, morphology, orientation;
Å Whether the volume or surface requires NDT;
Å The size of defect which needs to be detected and the sizing errors that can be tolerated.

7. NDT can be applied without stating a particular defect to look for. The defect description is then defined by the capabilities of the technique applied and the plant item can only be passed clean of defects detected by this technique.

8. Once the specification has been produced then the appropriate method and technique can be selected. The NDT method should be specified in the Written Scheme of Examination/Scope of Work, if relevant, or documented elsewhere.

9. All NDT should be applied under the control of a procedure which is produced and approved by competent personnel. This is likely to be undertaken by the NDT company on behalf of the plant owner. The procedure, which may be supplemented by a specific technique sheet, should be sufficiently detailed to define the technique to be applied. The NDT technique can then be applied by a competent person and the results reported. The report should highlight any restrictions in the application of the technique and should list any changes to the technique which were required by the particular application.

10. The results from large area NDT techniques such as corrosion mapping, floor scanners are often presented as colourful computerised plots. Although these visual outputs look impressive, they do not show the limitations in the technique and are not proof in themselves that the NDT was performed correctly. If the result is no defects found, there may still be the need for action taking into account the capability of the NDT technique and the nature of defects which may not have been found.

11. Standards governing Manufacturing NDT often specify acceptance criteria in terms of the NDT measurement i.e. no indication longer than é or no signal with amplitude greater thané . This simplifies the assessment procedure and puts the responsibility of deciding whether a defect indication is acceptable or unacceptable on the NDT operator.

12. NDT is only able to lead to a reduction in the probability of failure if appropriate action is taken in response to the results obtained.

13. For in-service inspection, acceptance criteria are not as easy to define. If manufacturing acceptance criteria are used, it should be justified that these capture relevant degradation mechanisms which may be present in operational conditions. They should also be compatible with the both the plant item and the NDT technique used.

14. A number of codes can be followed to assess flaws and degradation. Many codes that have been prepared take into account the accuracy of the NDT test methods, however, some do not and care should be taken when interpreting the results.

NDT MANAGEMENT

15. In order to have confidence in NDT results, it is important that the NDT, as a special process, is applied correctly and the capability of that process is known and understood.

16. This requires proper management and control. Plant owners who have a certified quality management system will have procedures to control the instigation and purchase of NDT activities. They may also have procedures to cover the application of the NDT although these will often be left to the NDT vendor.

17. Responsibility for the specification and control of the NDT is not always clearly defined between the plant owner and the NDT vendor. However, site practice can be different from the documentation and the nature of NDT activities mean that they are not always subjected to the same control as is applied to other products and services.

18. Errors are common in unplanned NDT activities: operators performing a planned job may be asked to 'inspect this item whilst you are here'. In such a case the NDT performed is dependent on the operator's experience; its appropriateness and capabilities are not stated and records to allow future assessment or repetition may not be produced.

19. Site NDT should be under the supervision and support of a Level 3 operator and NDT should be approved by Level 3 personnel. Level 2 qualifications are specific to a NDT method and, in the case of ultrasonics, to a particular geometry. Generic qualifications such as PCN may need supplementation by job specific training for particular NDT technique applications.

20. All NDT should be controlled by a procedure approved by a Level 3. Some techniques such as magnetic particle inspection or dye penetrant inspection are simple to apply in principle and there is a temptation to just apply them without a procedure. Conversely operators who have a wide experience of the technique may apply advanced techniques and equipment and they may rely on that experience to adjust the many variables instead of recording them in a complete procedure.

21. NDT is often applied in compliance with a national or international standard. It is not sufficient to state that a component was inspected in accordance with a standard. Most standards have options on various technique parameters and a procedure or technique sheet should be produced to state what values are to be used. Approval of the procedure by a Level 3 implies that the standard has been assessed in the light of the component to be inspected and found to be appropriate.

22. NDT can be applied without a written procedure. But only if all the parameters are recorded so that what has been applied can be subsequently assessed and if necessary repeated. Where NDT plays a key role in guaranteeing the safety of the component, additional steps would be expected to be taken to improve the reliability of the NDT, to ensure that all the defects of concern are detected and that the NDT technique is applied correctly.

23. The HSE's Best Practice documents (ultrasonics, surface techniques) give guidance on assessing the role of the NDT and the effectiveness required of it in reducing the risk of component failure. Such steps include:

Å auditing the NDT with independent operators performing repeat NDT on a sample of the inspected;
Å repeating all of the NDT with different personnel or with different NDT techniques;
Å witnessing the inspection by independent third party;
Å establishing capability through qualification.

Extracts from COMAH - Health and Safety Executive (Britain)

Submitted by council member Keith Cain.

TECHNICAL REPORTS

NDT personnel write technical reports for two primary purposes. Technical reports are used to communicate information to customers, colleagues and managers, and they are used to document the equipment and procedures used in testing and the results obtained so that the work can be repeated if necessary or built upon. The content and style of technical reports vary widely depending on the primary purpose and the audience. Many companies and organizations have developed their own standard format. The sections generally included in technical reports are shown as follows.

Qualities of Good Technical Reports

Regardless of the specific format used, all quality technical reports will posses the following qualities:

Accuracy - Great care should be taken to ensure that the information is presented accurately. Make sure values are transferred correctly into the report and calculations are done properly. Since many people proof read right over their own typographical errors, it is often best to have another person proofread the report. Mistakes may cause the reader to doubt other points of the report and reflect on the professionalism of the author.

Objectivity - Data must be evaluated honestly and without bias. Conclusions should be drawn solely from the facts presented. Opinions and conjecture should be clearly identified if included at all. Deficiencies in the testing or the results should be noted. Readers should be informed of all assumptions and probable sources of errors if encountered.

Clarity - The author should work to convey an exact meaning to the reader. The text must be clear and unambiguous, mathematical symbols must be fully defined, and the figures and tables must be easily understood. Clarity must be met from the readers' point of view. Donôt assume that readers are familiar with previous work or previous reports. When photographs are included in a report, a scale or some object of standard size should be included in the photograph to help your readers judge the size of the objects shown. Simply stating the magnification of a photograph can cause uncertainty since the size of photographs often change in reproduction.

Conciseness - Most people are fairly busy and will not want to spend any more time than necessary reading a report. Therefore, technical reports should be concisely written. Include all the details needed to fully document and explain the work but keep it as brief as possible. Conciseness is especially important in the abstract and conclusion sections.

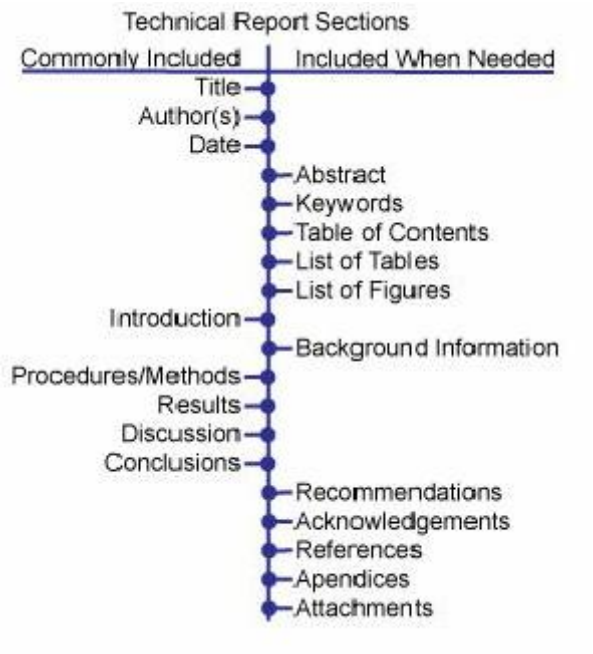
Continuity - Reports should be organized in a logical manner so that it is easy for the reader to follow. It is often helpful to start with an outline of the paper, making good use of headings. The same three-step approach for developing an effective presentation can be used to develop an effective report:

1) **Introduce the subject matter (tell readers what they will be reading about)**
2) **Provide the detailed information (tell them what you want them to know)**
3) **Summarize the results and conclusions (re-tell them the main points)**

Make sure that information is included in the appropriate section of the report. For example, donôt add new information about the procedure followed in the discussion section. Information about the procedure belongs in the procedure section. The discussion section should focus on explaining the results, highlighting significant findings, discussing problems with the data and noting possible sources of error, etc. Be sure not to introduce any new information in the conclusion sections. The conclusion section should simple state the conclusion drawn from the work.

Writing Style –

A relatively formal writing style should be used when composing technical reports. The personal style of the writer should be secondary to the clear and objective communication of information. Writers should, however, strive to make their reports interesting and enjoyable to read.



Thanks to our Council member Keith Cain for bringing the problem to attention, that, many in the NDT field have i.e. of putting together a decent technical report.
Information extracted from ndt-ed.org Resource Center
See BS EN ISO 9934-1 NDT - Magnetic Particle Testing and BS EN 571-1 NDT - Penetrant Testing for minimum requirements of info to be added.