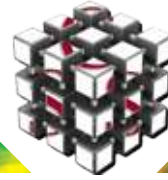




Non-Destructive Testing Newsletter



October 2011

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From the Chair.....

Each Nadcap meeting we take time to review the progress we have made as a Task Group, how the program has progressed in meeting the needs of all of the Nadcap customers, Subscribers and Suppliers. It has been frustrating to me, as the Task Group Chair and a Subscriber representative, to see that we really don't make progress concerning the number of findings we have per audit (initial and reaccreds), and the types of findings that we continue to see quarter after quarter. The number one issue, and has been for years, is in Compliance failures. Seeing as this is what we are in business to do; that is, to meet our customer requirements and expectations, continuing to see failed compliance as the number one finding category is troubling. Over the years the Task Group has looked at implementing various tools to positively impact this trend. We initiated the first Nadcap Newsletter; we present a Supplier Symposium at each meeting to try to clarify major issues and address timely topics; and we partnered with some of our Supplier Voting Members to create the Clarification Matrix, among other tools. Although we have gotten much positive feedback for all of these initiatives, we have not seen the profound improvement that we all desire.

At the past meeting in London, the NDT Task Group reached out to the Supplier Support Committee with a proposed partnership. The SSC has a mentoring program that is available upon request for Suppliers who feel they need help navigating the Nadcap accreditation program. However, most of the Suppliers who hear about the program are those who attend the meetings and hear the message at the NMC meeting, or visit the SSC Help Desk. For the most part, these are the same Suppliers who have had the most success in the program. The Suppliers who cannot attend the meetings are usually the ones having the most difficulties. Therefore, we are proposing to make the information concerning the mentoring program part of the package received by Suppliers when they sign up for an audit. We want all the new Suppliers, as well as those who are part of the program but do not have the opportunity to participate in the global meetings, to read about this mentoring program. We also are looking at making the mentoring program mandatory for Suppliers who repeatedly find themselves failing compliances. You will be hearing more on this, and other initiatives the Task Group/Supplier Support Committee alliance will look to implement.

However, providing tools to improve the program is only half of the answer. Just as important is the responsibility the Supplier base has in using the tools. We find many times that, although the checklists are made available to Suppliers to do an internal audit to prepare themselves for the Nadcap audit, there are lots of excuses why the pre-audit does not get done. Suppliers fail to review the checklist to see if they are truly ready, if they have implemented all of the required programs, and then they have difficulties when the auditor arrives. It is critical for all involved in this program to realize that there is equal responsibility for success between the Task Group and the Suppliers. We must provide the tools for success, but the Suppliers must use them. It continues to baffle me when a Supplier says they didn't have time to do a thorough internal audit, and then they have to spend two or three times the hours in answering NCR's, or answering to their customers.

It is most important that we now find a way to improve the core group of our Suppliers as we are looking at the advent of a new checklist for Eddy Current, a new checklist for Non-Film Radiography and, in the not too distant future, an expanded

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checklist for Ultrasonic Inspection. More on these programs will be available at the October meeting and written in the next issue of the NDT Newsletter.

Also, in this issue of the NDT Newsletter you will meet the new Vice-Chair of the NDT Task Group, Bobby Scott. Bobby has been a valued member of the Task Group for a number of years and now he is stepping into a new role, filling the vacancy we experienced when Andy Statham left Rolls-Royce to become our newest Nadcap Staff Engineer. Please take the time to read the article Bobby has provided and, if you have the opportunity, step up and welcome Mr. Scott to his new position.

Stay well and I hope to see you all in Pittsburgh.

Phil Keown – NDT Task Group Chair

Nadcap Meeting Schedule

2011	Location
October 17-21	Pittsburgh, Pennsylvania, USA
2012	Location
February 20-24	San Diego, California, USA
June 25-29	Berlin, Germany
October 22-26	Pittsburgh, Pennsylvania, USA

Digital Radiography

Following the direction given by the NDT Task Group, the Computed Radiography (CR) and the Real Time Radiograph (RTR) have been removed from the current checklist. The removal was due to the fact that the ASTM E 2033 is not yet released as it is still being discussed by the sub-committee during the ballot process. This specification contains most of the actual inspection requirements. These techniques, CR & RTR, will be added once the ASTMs are released for use.

During one of the ad-hoc meetings, the team decided that there were advantages of having a single checklist that covers conventional film radiography (AC7114/4) and another checklist that covers Digital Radiography (DR) using Digital Detector Arrays (DDA), which would have to be discussed and agreed to at a Task Group meeting.

The latest checklist has been written around the current ASTM's and compliance assessment guidance notes added where appropriate. At present the team is going over each question, refining

the requirement and where necessary adjusting the compliance assessment guidance. This includes the removal of questions, which the team feels are not relevant to the user, such as the requirements and tests imposed on the equipment manufacturer.

The ad-hoc team has further discussed the involvement of the Suppliers, as several Suppliers have had a good deal of input to the relevant groups such as the ASTM and Materials Affordability Initiative (MAI). And the team agreed that once the checklist was nearer completion that these Suppliers would be invited to participate with checklist completion.

During the June Nadcap meeting in London the team discussed the need for a new stand alone checklist with the NDT Task Group, and it was agreed that this was a new technique that required a separate audit from Radiography due to the checklist content and the time required to address all the questions. So the new checklist number is AC7114/6.

NDT Newsletter – Want to be on the Circulation?

The NDT newsletter is published periodically throughout the year. The newsletters are read by the subscribing Nadcap Users, Suppliers, Auditors and anybody that happens to click on the latest NDT newsletter on the PRI website (www.pri-network.org). The aim of the newsletter is to communicate information relating to NDT within the Nadcap program to improve our process and to promote the sharing of best practices at all levels.

Have you stumbled across the NDT Newsletter by chance? Want to receive it on a regular basis? Keep up-to-date of the latest Nadcap NDT information by getting added to the distribution list! To receive notification when a new edition has been published, please e-mail Rhonda Joseph at rjoseph@sae.org with your name, company and email address.

During the June meeting, Hank Sikorski presented a paper on Digital X-ray. After the presentation an NDT staff member was tasked with generating an excel spread sheet that lists all the relevant process control checks so that each member can define the frequency they expect for each check. This spread sheet was taken from the presentation given by Hank. This data will then be correlated by staff and presented to the ad-hoc group for discussion, which will allow the team to set a baseline frequency for each control check. This is currently on-going.

On a final note the ad-hoc team is looking for Suppliers who would be willing to volunteer to have a test audit of the new checklist, carried out at their facility.

Chris Stevenson (Rolls-Royce plc) & **Mike Horky** (Boeing Company)

Phil Ford – NDT Senior Staff Engineer

Pre-Penetrant Etch

This article is published to raise awareness of Subscriber requirements regarding pre-penetrant etch.

Many Subscribers require pre-penetrant etch prior to penetrant inspection if smearing operations are performed. Recent Task Group review of Nadcap NDT audits has revealed that some Suppliers are not performing pre-penetrant etch prior to penetrant inspection after smearing operations. NCR's have been raised against the Suppliers to address this issue.

The excerpts below are from DOT/FAA/AR-01/95 - Study of the Factors Affecting the Sensitivity of Liquid Penetrant Inspections January 2002.

Preparation of the Part.

One of the most critical steps in the penetrant inspection process is cleaning of the part. A good cleaning procedure will remove all contamination from the part and not leave any residue that may interfere with the inspection process. It is also important that the cleaning process not produce metal smearing that can cover or close defects at the surface of the part. In many cases, chemical cleaning alone does not adequately prepare the surface of a part for inspection and mechanical cleaning methods must be employed. These mechanical cleaning methods such as grit, or other media blasting, sanding, and even steam cleaning have been shown to cause metal smearing in some alloys.

Metal Smear From Machining or Cleaning Operation.

It is well recognized that machining and peening operations cause a small amount of the material to smear on the surface of some materials. It is perhaps less recognized that some cleaning operations, such as steam cleaning, can also cause metal smearing in the softer materials. This metal smearing can have a very detrimental effect on an LPI (Liquid Penetrant Inspection), as defects that are normally open to the surface can partially or completely be covered over. Etching of the specimens was found to return the flaw to the premechanical processing level of detectability.

There are numerous studies concerning metal smearing of aluminum alloys documented in the literature. One of

the earliest studies to publish results on the subject was published by McFaul in 1965. McFaul reports on the efforts of researchers at Douglas Aircraft Company. They produced thermal fatigue-cracked blocks of 2024 aluminum alloy. The results are presented as a series of photographs, and show that sanding, milling, hand scraping, shot peening, grit blasting, vapor blasting, and tumble deburring all reduced the sensitivity of penetrant inspection. They also found that, with the exception of shot peening, a mild etch to remove 0.0076 mm (0.0003 inch) removed the metal smear and returned the penetrant indications. In a similar study, Cook, Lord, and Roehrs investigated the effect that sanding has on the LPI detectability of quench cracks in aluminum specimens. They found that the sanding process adversely affected the LPI procedure and that a minimum of 0.0051 mm (0.0002 inch) must be chemically removed from the surface in order to restore detectability of the quench cracks.

Perhaps the most quantitative data on this subject is presented by Rummel in his article on the use of probability of detection (PoD) data to evaluate process capabilities. Two PoD curves are presented which show the effect that metal smear and etching can have on crack detectability. One curve shows the PoD of an as-machined, aluminum flat panel. A PoD of 90 percent is not attained until the crack length reaches 11 mm (0.435 inch). The second curve shows that when the sample is etched, a 90 percent PoD is possible with crack length around 2 mm (0.077 inch).

In all the articles mentioned in the previous section, the authors agreed that etching prior to penetrant inspection improved flaw detectability. That is, if the etchant is properly removed from the part before applying penetrant. Kleint warns in a 1987 article that acid entrapment from a pre-penetrant etch can have disastrous effects on the penetrant inspection. The article states that the sodium hydroxide caustic often used to etch aluminum parts does not affect penetrants, but acids used to etch parts of other materials do. Experts in the penetrant field warn that caustics can in fact reduce penetrant brightness. Careful cleaning of both acid and caustic etches before penetrant inspection is highly recommended. A reversible

developer is also recommended for verification of etchant removal.

There are several other risks to the parts being processed when an etchant is used. First, since the etching process is removing metal from the surface of the part, the minimum dimensional tolerances of the part must be considered. A second possible risk is that the etching process could have an effect on the material properties of the part. The chemical etchant used should uniformly remove material from the surface and should not etch micro-structural features (such as grain boundaries) preferentially. Ideally, a study should be conducted to evaluate the effects of the etching process (or other chemical process) on the mechanical properties and performance of the component.

As the above report points out, many Subscribers have conducted extensive studies to justify their specification engineering requirements for pre-penetrant etch prior to penetrant inspection after smearing operations. We need to assure the Subscriber's requirements are met to improve the odds of detecting noncompliant product. We ask that those who are auditing penetrant facilities to be aware of this important and necessary process. If it is discovered that the penetrant facility does not perform the etching process, then questions should be raised as to when and where it is being supported. Grant you, there may be exceptions that preclude the need for the etch process dictated by customer requirements based on material or dimensional characteristics. When this type of situation exists, verify by asking for specific evidence that this condition exists, for without this necessary preparation, the penetrant process could be in jeopardy of its full potential.

Bob Rainone – Goodrich Corporation

Andy Statham – NDT Staff Engineer

Flow-down

Following the Customer Flow-Down

During the audit, one of the most time consuming tasks is following the flow-down of the customer requirements. I am always amazed by how many blank faces I see when I ask the question, "Can I see where the NDT requirement in your Shop Order/Traveler/Work Instructions/Router came from?"

I am more surprised at how many Level 3's appear not to understand that this is a requirement of **AC7114 Paragraph 4.1.1** which states:

"4.1 Customer Requirements

4.1.1 Responsibility

Has a Level 3 been given responsibility for identifying and assuring implementation of customer NDT requirements for the following?

Review of NDT requirements"

I do realize that for some organizations this requirement was and unfortunately still is an organizational culture change. The customer flow-down review was traditionally left to engineering, planning, and/or quality organizations. The Level 3 was only involved if someone thought that there was a problem; then, the Level 3 would be consulted. Sometimes, I still see the requirement for the Level 3 review in memo form or stated within the personnel qualification procedure (Written Practice); and I wonder how many engineers, planners and/or contract review personnel in companies follow a memo or the Written Practice. If the requirement is in the form of a memo or the Written Practice is the requirement flow-down or up through the organization(s); and does anyone know that it exist – other than the Level 3?

So if you are the Level 3, where do you look for the customer's requirement and what should be defined?

Often, following the customer's flow-down is easier stated than realized. But, the customer NDT requirement should include at a minimum four parts: (1) acceptance criteria, including grade/class (if required), (2) process specification, (3) area of component to be inspected, and (4) sensitivity level (if required).

I will cover the acceptance criteria, along with the process specification first, because generally when you find the acceptance requirements the process specification becomes apparent.



If the customer flow-down is the acceptance specification, then, the process specification might be contained within the acceptance specification.

As examples: Acceptance flow-down of AMS-STD-2219 would require ASTM STD's as the process specifications. A flow down of BAC5423, BAC 5424, would require BSS process specifications. Flow-down of SIP-004, would require RPS705, etc. All of these process specifications are listed within the acceptance specifications, and may not be called-out specifically.

The NDT acceptance requirement may be on the purchase order, the customer drawing, parts listing, the Supplier's drawing (if they have design authority); or it may be a bit more obscured in a manufacturing or welding specification. It may even be in a customer NDT plan (MIL-I-6870E), etc. But, it must be somewhere in the flow-down from the customer to the Supplier. There is no such thing as default acceptance criteria, unless the default requirements are part of the customer's flow-down.

I am always delighted when I review a purchase order and it states something similar to the following:

"Penetrant inspect welds per ASTM-1417-05e1, Type, I, Level 2 sensitivity; acceptance per MIL-STD-1907 Not. 4, Grade B." Or; "Radiographic inspect GTAW welds per ASTM E 1742-11, sensitivity level 2-2T; acceptance per AMS-STD-2219 Rev A, Grade B."

I am certain that most would agree that NDT inspection requirements written in such a manner are clear and defined. It includes the process specification, the

material sensitivity requirements, the acceptance specification, the acceptance grade, and the area on the component requiring inspection. Unfortunately this is not always the norm.

The purchase order may have the acceptance requirements, but it may also only contain legal statements and/or quality clauses such as; 'All specifications and material call-outs stated on the applicable drawings must be met, as specified. The latest revision therein shall be met.' Or, 'The customer shall be notified thereto of any superseded or obsolete specifications, prior to implementation.'

In either case the next place to look for the applicable criteria would be on the customer drawing.

The customer drawing may define the requirement directly or list an acceptance specification or manufacturing/quality requirement specification. On some older customer drawings, the NDT requirements may only state to penetrate inspect per MIL-STD-6866; or Radiographic inspect per MIL-STD-453. Not only do you have obsolete specifications, there are no acceptance specifications stated. This type of drawing requirement requires customer clarification for two reasons. (1) Does the customer intend to maintain configuration control to the obsolete specification, or use the superseded/latest revision specification? (2) What is the required acceptance criteria? These two questions might be answered on the purchase order; or the Level 3 should have asked for clarification during contract review.

Sometimes, during the audit, when confronted about such drawing criteria, the Supplier will present a procedure that

states, "No defects allowed", as a default criteria. By now, you know that default criteria is not acceptable, unless part of the customer flow-down. You would probably give some stress or design engineers nightmares if they understood what the Probability of Detection was for acceptance criteria such as "no defects allowed." This might be an interesting subject for a different article.

An exception to the "no defect" rule might be fasteners. Some fastener specifications require acceptance to be made by the materials laboratory, and not the NDT Inspector (e.g. all indications by penetrant are reported, but not rejected).

The customer acceptance flow-down shall include the class or grade of acceptance (if required). The class or grade may be on the drawing, without other NDT requirements, such as, the drawing may state that it is a Grade B casting. All other casting NDT requirements may be in the casting manufacturing specification. The grade/class may also be defaulted within the acceptance specification. The specification may state that if the grade/class is not referenced on the drawing, then it shall be inspected to grade/class B.

The third part of customer flow-down requirements is the area of the component to be inspected. As part of the review of customer requirements, ensure that if parts within an assembly are inspected at different operations within the manufacturing process that all parts of the assembly are inspected at the correct sequence of operations. Ensure that zoned areas are clearly identified on the flow-down. Does the requirement state machined surfaces only? If you are responsible for the machined surfaces, is it understood what the customer wants you to do if you see an indication on a non-machined surface? Do you have a flow-down requirement for the non-machined area? These might be questions that the Level 3 will ask to be defined during contract review. These are the questions that I would ask during the audit, if the situation warranted.

Lastly, the inspection quality level or sensitivity level should be identified in the flow-down. What are the penetrant sensitivity requirements? What are the radiographic quality Level requirements? What are the ultrasonic sensitivity requirements (if not identified by the class/grade)? The quality/sensitivity requirements may be on the drawing/purchase order or may be defaulted within the process/acceptance specification. The sensitivity requirements

may be identified by a customer specific identifier (e.g. FB1, Code 3, Method E, MR4, etc). Ensure that you also have the specification that defines the unique identifier. It is all part of the flow-down.

Hopefully, I have not confused you any more than you were. Following the customer flow-down is not always easy, but it is required by AC7114 paragraph 4.1.1, and also required as part of your Nadcap audit. The customer requirements generally consist of 4 parts: (1) the acceptance criteria, including grade/class (if required), (2) the process specification, (3) area of component to be inspected, and (4) sensitivity level (if required).

As the Auditor, I am required to verify that the NDT inspection requirements in your Shop Order/Traveler/Work Instructions/Router/Techniques match your customer's flow-down, wherever the flow-down originates. If your facility creates their own drawings from the customer drawings, then I must see the customer drawings, not just

yours. If you write your own specifications/procedures from the customer specifications, then, I must see both yours and the customers. The compliance section of the method checklists (AC7114/1, AC7114/2, AC7114/3, and AC7114/4) can also be used to identify flow-down requirements. Each job will require the following to be identified, the customer's purchase order number, customer process specification, customer acceptance criteria, customer part number, drawing notes, and revisions. The good news is that the review should become easier as your customers require that their Level 3's review the purchase orders and/or drawings prior to release. Good Luck!

Linda Beene – NDT Auditor

Linda Beene is a PRI Lead Auditor (NDT, CP and AQS), and a Senior NDT/Quality Consultant with Inner Lab Consulting Group.

Clarification Database

Periodically an item will be brought to the NDT Task Group regarding the Nadcap NDT process or AC 7114 series checklists that may need further consideration. You may not be aware, but Suppliers and subscribing members collectively record these items and capture them on a 'Clarification Database'. Items are split by the five checklists and then further items that may cover all NDT commodities. These items are distributed to the relevant members of the Task Group for consideration and their conclusions are then recorded on the database.

Examples of recent clarifications include:

Question: *AC 7114/1 - Where a batch of remover is mixed for one job only does the refractometer check need to be carried out?*

Clarification: Yes - Refractometer must be used for every batch mixed.

Question: *AC 7114/2 - Where AS 5282/ketos test pieces are used do results have to be compared with a baseline to show variations in system performance?*

Clarification: No - as long as the minimum requirements are satisfied variations do not need to be taken into account.

Question: *AC 7114/3 - Is the manipulating equipment verified to ensure angular control of the search units to within one degree in two mutually perpendicular directions?*

Clarification: Only required when contour following is performed or angle beam inspection. This issue is N/A to flat plate and composites.

Question: *AC 7114/4 - Do humidity and temperature need to be recorded for radiographic storage areas?*

Clarification: No - Where the storage conditions appear to be inappropriate however, it would be expected that the Supplier can demonstrate that the correct conditions do exist.

Currently the database is currently maintained by Andy Bakewell (SVM) and Andy Statham (PRI Staff Engineer). Please feel free to submit to the Task Group any items that you consider need clarification, but don't forget that these may already have been considered and are on the database.

This is very useful resource can be accessed via the following route:

eAudit.net/Documents/Public Documents/Non-destructive Testing/Data Folder/Clarification Database.

If you need to know any more information, please feel free to contact one of us.

Andy Bakewell – EM Inspection: Andy.Bakewell@emcol.co.uk

Andy Statham – PRI Staff: andy.statham@pri-europe.org.uk

AC 7114/1 Wipe Off Technique

From AC 7114/1

6.13 Non-Aqueous Developer (Form d)

Compliance Assessment Guidance: The auditor shall verify compliance to each of these requirements by direct observation. The auditor shall include the wipe-off technique when answering section 6.13.

6.15 Evaluation

Compliance Assessment Guidance: The following evaluation process shall be determined by direct observation, and by researching the specifications, procedures and other customer documents that are applicable and required to reach an educated answer to each question.

6.15.5 Were the indications wiped with a solvent dampened swab or brush in accordance with customer requirements?

Compliance Assessment Guidance: For the purpose of this checklist, the term "swab" shall include lint-free cloth.

Staff Engineers have recently seen several (many) Suppliers who have challenged NCR's that have been written for non-compliance of the wipe-off technique. Grievances generally fall in to three categories:

1. the auditor did not expressly state that it is the expectation of the Task Group that a wipe-off technique is performed,
2. the component were rejected, or
3. the components were accepted without exhibiting indications that were considered borderline.

All these complaints so far have been, and will probably continue to be rejected by the Task Group. The expectation of the Task Group is that when there is a customer requirement to perform a wipe-off, or your procedure stipulates the necessity for the wipe-off technique, the wipe-off technique will be performed irrespective of whether components processed are exhibiting rejectable indications or not.

Please treat any request from the auditor to perform the wipe-off as 'real world' because if the technician/operator doesn't perform the wipe-off correctly, it will be an NCR.

Andy Statham – NDT Staff Engineer

Supplier Update

In an effort to keep Suppliers informed and up to date on various activities within the Nadcap world, I would like to touch on a few items of interest.

1. New initiatives started by the Supplier Support Committee (SSC) at Nadcap meetings:

- Supplier Support Center – This welcome center is located near the registration desk. It is designed to meet and greet Suppliers and provide general instructions on the various Task Group meetings.
- First time Suppliers orientation meeting. – This informative session is to welcome new Suppliers.
- Suppliers Welcome Pack – This handy packet is filled with great information. It contains general information about the Nadcap process, contact information and the Nadcap Dictionary. The dictionary contains the definition of common acronyms, words and phrases used by the Performance Review Institute (PRI).

2. Webinar dealing with AC7114 Revision E changes presented by eQualLearn:

Course Topics Include (a cost is associated with this Webinar):

- Rationale and explanation of the latest changes to AC7114
- Interpretation of the Nadcap NDT Task Group expectation for checklist compliance
- NDT Quality System Requirements (Level 3 Responsibility, Internal NDT Audits, Performance Review, etc)
- NDT Personnel Certification (Written Practice, Personnel Records, Examinations, Supplier Level 3 Personnel, etc)
- Equipment Calibration

3. Ballot Manager in eAuditNet:

- New feature allowing voting members to manage your voting status
- Record comments to checklists ballots
- Track your voting status

4. Metric for Supplier Cycle Time within the NDT Task Group:

- Target Cycle Time for the NDT Task Group is 25 days (initial and reaccreditations audits). This is one of many metrics the Task Group tracks in an effort to improve the overall Nadcap system.
- The best way to reduce or minimize cycle time is to be prepared for the audit from the start. Perform a pre-audit using the appropriate checklist prior to your actual audit. Identify any issues during the pre-audit and apply the appropriate corrective actions. This should minimize the amount of NCR's during the actual audit which, in turn, should minimize the cycle time due to less time being spent answering NCR's.
- If a response is required, do so in a timely manner. Issues need to be addressed as soon as possible. It's not a good idea to wait until "the last day" to send in your response. This only adds to the cycle time and impacts the 25 day metric.

Gary White – Orbit Industries, Inc. Supplier Voting Member

Why The Tumbling E?

UK Suppliers are becoming familiar with the now mandated near vision test using the “tumbling E” system and this article explains some of the reasons why it has been adopted and mandated as the only permitted near vision examination by the UK NANDTB. Of course its use is not limited to UK Suppliers and anyone wishing to meet the near vision requirements of NAS 410/EN 4179 can use this test. The equivalence has been determined and accepted by the UK NANDTB and therefore any Responsible Level 3 can easily justify the technical equivalency by simply referring to the work already done for this purpose.

Before settling on this format a number of issues were considered and addressed, many of these issues never having been taken into account previously so the test is not a simple equivalent test but a further step forward in standardization. For example the light level used for the test has never been addressed previously and all previous tests have related to reading ability to some extent. So after much research and many trials the final version went live during 2011 and from the beginning of January this year became the only permitted test for UK governed sites.

During the research period it became obvious that flow-down to the test administrators was, in many cases, poorly controlled and the tests administered were not regulated correctly. Bringing the test more closely in the control of the Responsible Level 3 has already had a

positive effect in this area. In addition to this the other innovations that are worthy of note include:

- Controlled light levels
- Test carried out using eyewear used for inspection
- Test using both eyes together
- Test not reliant on reading ability
- International (not language dependent)
- Locally administered and controlled
- Easily repeated (or verified) locally

The use of the test requires that the test administrator is correctly trained and delegated which is a fundamental requirement. However in most cases a thorough understanding of the supporting documentation (UK NANDTB 24) is really all that is required. The random generated test charts are prepared locally and the format is such that any type of modern printer is likely to be suitable for production of the charts. In this way the system is failsafe since poor quality charts will lead to “failure”.

Take a look at one of the following links if you would like to find out more:

http://www.bindt.org/NANDTB/NANDTB_Vision_Requirements.html

<http://www.eminspection.co.uk/visiontests/>

Andy Bakewell – EM Inspection: Andy.
Bakewell@emcol.co.uk

In Step with the CSR



Name: Melanie Petrucci

Title: Committee Service Representative for NDT, Welding, AQS & Electronics

About Me: There's not much to know about me. I began working here at PRI in August 2011. Although I worked for Sears Holdings Corporation for over five years, my position here is my very first “big girl job”. I recently graduated from Allegheny College with a BS in biology, and therefore this is my first full-time job out of college. I have a knack for languages and am moderately fluent in Spanish, can speak conversational German, and know some general American Sign Language. When I'm not working, I enjoy all kinds of boring things. I am an avid runner and go jogging at least five times a week. I am obsessed with movies, especially children's movies and cartoons, and I frequently quote them in everyday conversation. I love to eat pretty much anything that is fried in grease and/or terribly bad for you. I greatly enjoy ballroom dancing when I can find a decent partner. But my real passion is books. I not only love reading books, but I enjoy collecting them. I currently own over eight hundred books which I have nowhere near enough room to store. I read just about any type of book from any genre. Some of my favorites include the *Harry Potters*, *Ella Enchanted*, *Count of Monte Cristo*, *Memoirs of a Geisha*, *Can You Keep a Secret?*, and *Ender's Game*.

In Step with Bobby Scott

Let me introduce myself. I'm Bobby Scott, the Bombardier representative and the Vice-Chair of the Nadcap NDT Task group. Pictured with me are my wife Marion, my three sons, Ryan, Ross, and Adrian. My sons have listened to me for a number of years promoting the importance of NDT and Engineering so it is no surprise that they have all decided to embark on careers in the Medical field!

I have been involved in NDT for over 30 years. My career began in 1978 working in the famous Belfast shipyard Harland and Wolff. Contrary to popular belief I can assure you the rumor that I worked on the Titanic is totally untrue! I was given a solid foundation in NDT there and received excellent training (Welding Institute, Cambridge) in the five major methods and subsequently passed PCN Level 2 examinations allowing me on the recertification bus that I still jump on every five years!

I must admit that ten years later when I moved into the Aerospace industry at Short Brothers I did not miss carrying 200KV X-ray tubes up 30 foot ladders in Arctic conditions at all! Short Brothers as the aerospace aficionados will already be aware, was the first company in the world to manufacture production aircraft (the original contract from the Wright brothers in 1908). Bombardier bought Short Brothers in 1989, and I have been involved in NDT training, production support, new technology and process auditing ever since.

As a NDT auditor and trainer, both internally and at our supply base, I have had the pleasure of meeting some of the most dedicated and conscientious individuals in the industry. It is still a joy to meet some of these NDT technicians who exhibit great pride in their profession and enthusiastically protect their workplace.

I have always believed that the importance of good quality NDT training cannot be understated in our industry, and we are all aware that when belts get tightened training can often be the first thing to suffer. I was involved a few years ago when Bombardier Belfast had their own NDT training school for Suppliers. For many years after we closed this operation, I have kept in contact with some of the original trainees to see how their careers have progressed. As a member of the



Bobby Scott (sunglasses) with his family enjoying time off before assuming the role of Vice Chair of the NDT Task Group.

UK NANDTB, ensuring delivery of good quality NDT training continues to be a main objective.

I have to confess that when Nadcap was first introduced into the UK with the mandate by Rolls Royce, I was an avid opponent! I believed that Bombardier personnel could carry out critical process audits at our Suppliers more effectively than PRI, and that we would have the advantage of having better product knowledge than a Nadcap auditor. Several things changed around the turn of the century, such as, September 11, the spread of our Supply base across Eastern Europe, Asia and South America and the search for cost reductions across the entire business, so it became apparent that Nadcap would have to be embraced!

I attended my first Nadcap Task Group meeting in January 2005 at Tempe, Arizona and was immediately impressed by the wealth of knowledge around the table both from Subscribers and Suppliers. (There were times however, particularly during the baseline checklist discussions when I felt like reaching for my gun!) But as everyone is now aware, democracy prevailed and the Group got there!

I now have to admit I have made a complete "U turn". Nadcap is the only

show on the road and I have seen the improvements the program has brought to our Suppliers/potential Suppliers. I have met a large number of NDT auditors through oversight activity, Nadcap meetings and the NUCAP program and the professionalism and determination to carry out what at times can be a difficult job is very apparent.

I have observed tremendous progress in my short time attending Nadcap meetings, but I believe we cannot afford to stand still. I truly hope to be able to play a small part in the future as the program continues to change to the benefit of all stakeholders.

Out of work I enjoy travelling, and I can still differentiate quite easily between auditing an NDT Supplier in Downtown LA, and sitting with my wife on Santa Monica beach! (Trust me there are people who believe that auditing is just another form of industrial tourism). I also enjoy watching many different sports, but the highlight is always following the little soccer team in red from Manchester.

Please feel free to stop and say "hello" at our next meeting, and I look forward to chatting to many more of you in the upcoming months.

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