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Editors

Phil Keown
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From the Chair

For many of us, our busy day-to-day activities tend to put us in a cocoon. Looking at the happenings in our world and we ask, "How does this affect me?". Recent evidence shows that the Nadcap program is having a dynamic impact on many facets of the NDT arena around the globe. The latest is the initiation of the National Aerospace NDT Board – China (NANDTB-CN). This initiative, drawing on the expertise of the aerospace community of China, and using the infrastructure of the Defense Industry NDT Board (DiNDTB), is aimed at providing a consistent means of qualifying NDT personnel to the requirements of NAS 410/EN 4179. Since the bulk of the aerospace suppliers in China are engaged in making product for the User Primes involved in Nadcap, the Board has decided to base specific examinations on the Nadcap NDT requirements. This effort is on-going and updates will be posted in future issues of the Nadcap NDT Newsletter.

Also, the NDT industry document for overhaul and repair is in the process of being revised. Some key changes to AMS 2647 are focused on bringing many of the current Nadcap best practices to the document. Although the requirements in the overhaul and repair world differ from those of the new manufacture requirements, it is recognized there are many "best practices" identified by the Nadcap process that would be beneficial to begin to address the differences between new-make and after market. Again, new developments in this revision process will appear in the NDT newsletter to help the aerospace NDT community stay on top of these issues.

The Supplier Workshop held at the April meeting, in Paris, was attended by 53 supplier representatives from 12 different countries with material was presented in English and in French. This session focused on the new NDT Baseline Checklist, the User Prime specific requirements listed in the supplements and the clarification materials listed in the Hand Books. This is the 4th time, in the 4th regional venue, that this material was presented. The Task Group now feels that it is time to make this material available on the PRI website and look to reassess the need for continued workshops. For now, the Task Group plan is to suspend any further session for this year and focus on determining what material might be effectively addressed at future meetings. The supplier base is hereby invited to submit ideas, general topics or specific, for presentations starting at the February, 2008, meeting. Thanks to Alain Bouchet, Yves Esquerre and Thierry Jacques for their time and efforts in translating the presentation material for the Workshop.

The Task Group wants to make sure that everyone understands there will be no NDT Supplier Workshop at either the July or October meetings. The Task Group will look to reinstate a Supplier Workshop format in 2008, based on data collected from a year of Baseline audits and input from User Primes and Suppliers.

The next NDT meeting is scheduled for July 16 – 18 in Istanbul, Turkey. Hope to see you there.

Sincerely,

Phil Keown – NDT Task Group Chair

October 2007, Auditor Training

It is critical to this program to have the most competent, well informed and best trained auditors possible. To this end, the NDT Task Group present auditor training on an annual basis. The sessions held in the recent past have focused on User Prime requirements and the development of the Baseline Checklists. Although these are still important topics, the Task Group feels it is time to introduce some new material, to get more creative in our approach to presenting the material, and to make the sessions more interactive. This initiative not only provides an opportunity to think 'outside the box' in planning the training, it also allows the Task Group to utilize the newly introduced Method Sub-Committees to work the issues. These Sub-Committees, comprised of Task Group members focused on the different NDT methods covered by the Nadcap program, will meet to brainstorm the training needs to be addressed for October. Another new approach is to request supplier participation. If you are interested in working with the User Prime representatives in identifying topics for auditor training, and willing to make a commitment to one of the method Sub-

Committees, then the Task Group welcomes your participation. Simply contact one of the Sub-Committee members and let them know of your interest. The Sub-Committee chairperson (identified below) will determine the size and make-up of the group and notify requestors of his plans.

This effort is going to require teleconference sessions, independent work and a face-to-face session at the July Nadcap meeting. Please make certain of your commitment to provide resource prior to offering contribution as a team member. The face-to-face session is being added to the agenda, showing that these meetings will be held Monday morning, July 16, 2007. The teleconference calls will be agreed upon by the Sub-Committees and scheduled by the Chairman.

This is a great opportunity to identify items that you feel are pertinent to auditor training, and to provide your creativity to the process. Thanks, in advance, for those who are going to step up to help make this program as good as it can be

Group Quality AC 7114	PT Group AC 7114/1	MT Group AC 7114/2	UT Group AC 7114/3	RT Group AC 7114/4
Scott Sullivan (Chair)	Pete Torrelli (Chair)	Bob Hogan (Chair)	Mike Mitchell (Chair)	Ron Rogers (Chair)
Alain Bouchet	Chris Dootson	Gary Gatham	Chuck Alvarez	Steve Garner
Yves Esquerre	Trevor Hiscox	Bob Reynolds	Yves Esquerre	Leo Going
Leo Going	Mike Mitchell	Bobby Scott	Greg Hall	Carl Roche
Manfred Podlech	Andrea Steen		Thierry Jaques	Mike Shiplett
David Vaughn	Pat Thompson		Doug Ladd	Chris Stevenson
			Jerry Smith	Pat Thompson

Phil Keown – NDT Task Group Chair

Water content of waterwashable penetrants

ASTM-E-1417, as well as many other specs from Aerospace primes, requires that the water content of in-use waterwashable (WW) penetrants is measured on a regular basis.

Note that SAE-AMS-2644, designed for manufacturers of penetrant materials requires that the manufacturer calculates a water-tolerance test value which shall be greater than 5 %.

ASTM-E-1417 requires water content be less than 5 %.

Firstly, let us clarify this difference, as some specs of major primes are somewhat confusing.

The goal of SAE-AMS-2644 is that a WW penetrant containing 5 % of water must still give the same performance (sensitivity) as if containing a very small amount of water (completely water-free WW penetrants do not exist, see later explanation).

This is the reason we test water tolerance of every batch of brand new WW penetrant. A water tolerance of 8 to 15% is quite common. Some WW penetrants have an infinite water tolerance (i.e. they never become "cloudy", "gellified" with water addition). Whether this infinite tolerance is a "plus" or a "minus" in the overall quality of the penetrant is a completely different topic.

If the batch of the WW penetrant shows, say, a 9% water tolerance, it meets the AMS requirement of at least 5 %.

Measuring the water tolerance of in-use WW penetrants is not required. This test is not the same as the required "water content" check as specified in ASTM-E-1417 and other specs.

ASTM-E-1417 allows test method ASTM-D-95 or a modified Karl-Fischer method to be used to determine this water content.

Many primes ask only for ASTM-D-95, explicitly forbidding the Karl-Fischer method.

ASTM-D-95 has an important drawback: it cannot be used for penetrants!!

Its scope specifies it is for:

- The determination of water in petroleum products, tars and other bituminous materials by the distillation method.

Fortunately for us, penetrants are not very close to tars or other bituminous materials! When reading this standard, one sees that all the "petroleum products" it refers to are "heavy" or viscous and they are not water washable. Is water washability another drawback for this method?

The answer is definitely "Yes"!

What does happen when distilling the above-listed products? First, to help "release" water from these materials, water free, water-immiscible solvents must be used but these solvents will dissolve a large part of the WW penetrants.

Which raw materials are used in penetrants?

- Excluding water-based penetrants.
- In "classic" penetrants, aliphatic hydrocarbons and heavy aromatics comprise around 50 to 70% of WW penetrants.
- The remaining 30 to 50% is mainly hydrophilic and lipophilic surfactants, with a small percentage of dyes, brighteners, co-solvents, etc.
- In "non oil-based" WW penetrants, the hydrocarbons are almost completely replaced by surfactants, except for a small amount of dye solution.

So these materials are nothing like the products listed in the scope of ASTM-D-95.

What do we see when distilling such a preparation?

The surfactants retain a certain amount of water, coming, for example, from the atmosphere. This could be between 0.2 and 1% and may depend on the water content of the air (low or high relative humidity).

Hydrophilic surfactants have some attraction to water. During distillation, some of the surfactants may be steam distilled, and increase the "water content figure".

Another drawback of any distillation method is that it needs quite a lot of time for preparation, heating and cooling down.

To make several tests on the same sample would be a very protracted process.

Using the modified Karl Fischer (KF) method is far easier. Care must be taken with the chemicals used but similarly, dangerous chemicals are also required for the distillation process. Care must also be taken to be sure that water from the atmosphere does not interfere with the reagents. But again, other precautions are required when using the distillation method.

Once the "blank" has been made using the Karl Fischer method, you need about 20 minutes to carry out 5 different tests on the same sample (i.e.: 0.5 mL each time of the in-use penetrant). Doing so, and averaging 5 results leads to greater confidence in the results, particularly valuable if it is close to 5 %. Also it is not necessary to know in advance whether 0.5 %, or 1 %, or 4.9 %, is anticipated.

This method, when used as described in ASTM-E-1417 Annex A1, and as per the reagent suppliers recommendations by chemists, is:

- Far more accurate than ASTM-D-95.
- Cheaper.
- The right method, chemically speaking.

Therefore it is recommend that primes, at least allow the use of either D95 or KF, as stated in ASTM-E-1417.

Better still would be to delete the option to use ASTM-D-95 to measure water content in WW penetrants as it is obviously not the right method.

*Patrick Dubosc – Sherwin Babb Co, France
& Andy Bakewell – Supplier Voting Member,
EM Inspection Company, UK*

Baseline – Handbooks & Supplements

Since the baseline criteria audits began in December 2006, PRI Staff, User Primes and Supplier representatives have discussed in detail changes to the Handbooks and Supplements for additional clarification purposes. This should be of no surprise to anyone as these documents were always intended (especially the handbook) to be 'living documents' that were changed as and when necessary to reflect current or changing customer requirements, expectations and practice in the industry. During the writing of this article, there is a new revision of the handbook and supplements released into the system. The handbooks

will be implemented effective immediately while the supplemental criteria will be undergoing the 90 day implementation period.

In order to quickly identify the changes to the documents, you will find a vertical line on the left hand side of the paragraph number on the applicable page. Please make every effort to fully review the changes accordingly to determine if this affects your system or not.

James E. Bennett – Senior NDT Staff Engineer

120 Day Cycle Time Metric

Nadcap and the NDT Task Group have reported on many different metric data over the years. There have been the top ten and then top five NCR "hits". That was followed by average numbers of majors and minors, supplier cycle time, staff cycle time, first pass yield, merit eligibility and many more. An area of recent focus being viewed closely by the Nadcap Management Council (NMC) and one that you will be seeing more and hearing more of is "120 day cycle time". This metric focuses on Council's attempt to reduce the total cycle time of an audit as measured from the day the audit ends to the day the certificate is issued down to 120 days maximum while maintaining the high technical standards expected by all of our customers.

The NMC and PRI are focusing on this issue for many reasons, I will outline a couple. The first could be summed up with the words, "Customer Service". Simply put, providing an expedient accreditation to a deserving supplier helps everyone in the program. The primes are happy because they can utilize that supplier to their full potential; the supplier is happy because they improve their process and can present their company to the primes as one deserving of consideration when contracts are cut; and PRI staff is happy because time not spent on that audit report is time freed up for other pressing issues.

The second reason expands on the "time" issue. Every audit report that sits in the queue to go through another round of responses causes extra work for staff and the supplier. Extra time and energy is spent in re-reviews, submissions, contacts with the primes, discussing issues on the phone, appeals, etc. Each of these items costs time, and, the time spent on that audit is time lost for other audits, therefore there is a definite "snowball effect". Recent changes to the Nadcap process such as the new "overdue" policy have already had an effect on the cycle time of many audits. Specifically the 45 days total overdue time being allowed before failure of the audit may be considered. One only has to go to the NDT metrics for March 2007 (refer to April 2007 NDT Task Group Minutes) to see an audit that is outside of the norm. The chart for supplier cycle time for initial audits shows the minimum days for any one audit at 5 and the maximum at 133. There is no doubt that the 133 day audit caused excessive drain on resources for all parties involved and draws attention to the fact that something must be done to alleviate this issue.

The 120 days cycle time metric then, will provide an avenue to concentrate efforts in this area and help to reduce the burden of some of these audits with excessive cycle times. How can you help you ask? Firstly; do a thorough pre-audit of your procedures, system and personnel performance. Consider also the NCSI (Nadcap Customer Support Initiative) training that is available for initial and re-accreditation audits. In other words 'Be Prepared'. This will certainly reduce the number of NCR's written during your audit and drastically cut the amount of time you must spend in resolving them after the audit. Secondly; respond to all open issues in a timely and thorough manner. Remember that it is every bit as important to send in a "good" response as it is to respond quickly, perhaps more important. Thirdly; do not go three rounds before contacting the staff engineer that is reviewing your audit. Use the phone, get issues clarified and send in an informed response.

Stay alert for much more information on this topic in the coming months.

Mark D Aubele - Senior NDT Staff Engineer (Lead)

Audit Scope Verification

Since the implementations of the new checklists in December 2006, there has been an added step in the NDT audit process... audit scope verification. Previously audit scope was defined as what methods the audit would cover and it was simple to define thus no additional verification was required. However with the new checklists it now becomes critical for a supplier to define the scope of their audit for not only the methods being audited but for whom they conduct work.

Scope verifications are required for all Nadcap commodities with the exception of AQS AC7004 audits. It is expected that the supplier will have identified all Nadcap Users for which they hold NDT process approval. This is key in establishing which questions will apply from the NDT Supplemental checklists.

Scope of the audit is established initially when the audit is scheduled. The supplier can access the information in eAuditNet and check the appropriate box next to the name of the Nadcap User (that contains supplemental criteria) for whom they hold approvals. Remember, not performing work for a User Prime recently does not mean it is not necessary to meet those unique requirements. If a company is still listed as an approved source then it is necessary to meet those requirements.

An additional form for identifying Nadcap Users is located in eAuditNet, under 'Public Documents', scroll down to 'Nondestructive Testing'. This form can be printed or downloaded and completed to assure all Users are identified. The auditor will attach a completed copy of this form in the audit.

When the auditor arrives on-site at the supplier's facility it is required that both the auditor and supplier log on to eAuditNet to verify the audit scope. This entails the auditor accessing eAuditNet with the supplier inputting their user id and password in the required box verifying that all Users have been included in the scope of the audit. Please keep in mind it is the responsibility of the supplier to identify all Nadcap Users.

The new Nadcap NDT checklists establish a minimum set of criteria the supplier must meet to become accredited. In addition, it also verifies compliance to unique customer requirements that go beyond the basic Nadcap checklist. These are referred to as the supplement checklists, identified with the letter "S" at the end of the checklist number (example, AC7114/1S). Applicable Nadcap Users have been assigned a user number (example, U-1, U-2, U-3...). For those Users that have supplemental questions they will be listed at the beginning of each supplement checklist. Therefore if they do not appear in the list they do not have additional questions for compliance.

So why is scope verification so important? Based on what has been told so far the auditor will only ask questions pertaining to those customers the supplier has identified. If the supplier fails to identify a customer in the scope then most likely another audit (scope addition) will be conducted at the supplier's expense to address the items previously missed. The impact is immediate when the Nadcap User states the supplier is on their approved list but failed to address the customer's unique requirements noted in the supplement. The actions taken may also include removal as a supplier to that Nadcap User and no further processing allowed. All of these impact the business and flow of hardware to meet defined schedules.

The bottom line is take time to review who your customer base is. Identify those you currently hold approvals for, not just those you have performed work for recently. Complete the attachment identifying your Nadcap User customers and give a copy to the auditor during the scope verification process.

If you have any questions please contact a PRI NDT Staff Engineer for guidance. All of our contact information is noted within this newsletter or in eAuditNet.

*P. Michael Gutridge - Senior NDT Staff Engineer
(NDT / Weld / AQS)*

Nadcap Meeting Schedule

Month	2007	2008
February		Rome, Italy 25-29
July	Istanbul, Turkey 16-20	Pittsburgh, USA 21-25
October	Pittsburgh, PA 22-26	Yokohama, Japan 6-10

Approval process for the NDT Audit Handbook

Among the several very interesting topics discussed during the Tuesday Open Session (4/24/07) of the April 2007 NDT Task Group meeting, this is a brief review of the work that is on-going in regard to the audit HANDBOOK:

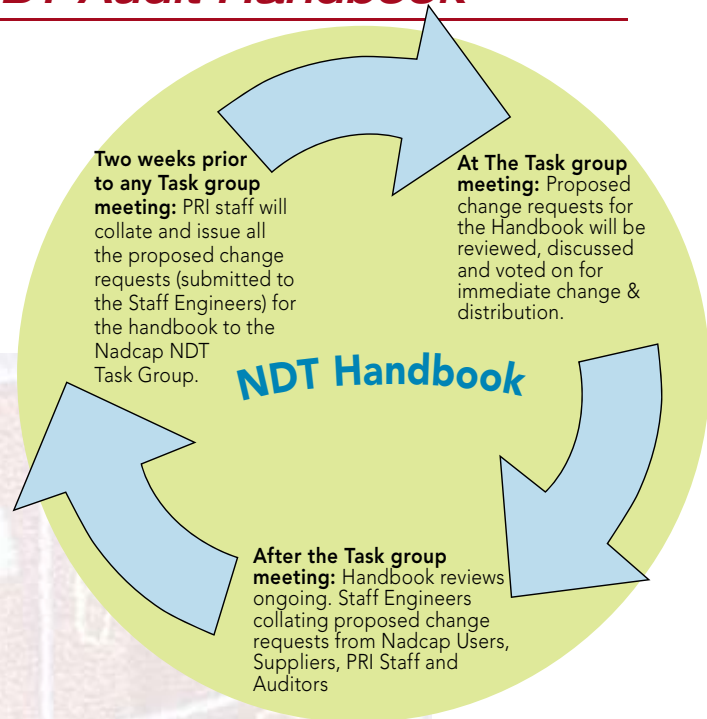
As you may know our task group has been revising the handbooks to reflect current or changing customer requirements, expectations and practice within the industry. This initiative strives to bring customer (Nadcap User member) requirements closer together toward one criteria.

While at this time not all user members are verbatim with the Checklist - some have actually changed their documents to now reflect the Nadcap Checklist (AC). Those user members who have not changed or not completely changed to reflect the AC were tasked to create a Supplement for use in conjunction with the AC reflecting those areas that are unique to their needs.

Some of these unique user member needs will benefit from a proper description reflecting the unique needs in ways so that we all can understand their intent. There are certain areas of the checklists that would also benefit from further defining the task group's intentions thus improving the consistency of interpretation.

The NDT Handbook is the place for providing interpretation and direction for what might otherwise be somewhat ambiguous. The Handbook also helps with audit consistency – always a big topic at Nadcap meetings.

- The direction for the review and quick release of the Handbook was discussed as it can be critical to have this in the Auditors & Suppliers hands as soon as possible.
- To assure a quick release for the Handbook the task group voted, and approved to have any change requests to the Handbooks submitted to NDT Staff Engineers. Two (2) weeks prior to any Task group meeting, PRI staff will issue out these change requests to the Nadcap NDT Task Group



in preparation for discussion prior to the meeting and subsequent voting. Any changes that are brought forward after the cut-off will be addressed at the following Task Group Meeting / Handbook ballot.

Ryan Soule - Supplier Voting Member (SVM), Alcoa Power and Propulsion, Alcoa- Howmet, Corporate NDE manager, Responsible Level 3.

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Documentation Location

Editorial Note: This article is being published again to remind everyone where the documentation can be located.

A number of individuals have asked where they can locate the various Baseline documentation. Firstly all the information is located in eAuditNet (www.eauditnet.com).

Checklists and Supplements

Under **Applications** on the left hand column, select Checklists and then select NonDestructive Testing as the commodity.

Handbooks

Under **Resources** on the left hand column, select Public Documents, scroll down to the NonDestructive Testing documents. The last set of documents contain the handbooks for the specific methods.

Attachments

To access the attachment information (as identified in the applicable checklists), follow instructions as identified for the Handbooks. The attachment documents are located above the handbook documents. Note: The attachments are in Word format to allow the supplier to complete the data electronically (if preferred) and submit to the auditor prior to the audit.

James E. Bennett – NDT Senior Staff Engineer

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Upcoming Nadcap Training

Effective Root Cause Corrective Action is one of the key components of successfully achieving your Nadcap accreditation. Currently, the average rounds of responses for NDT is three, this means that your audit could take as long as 77 days or more to be closed and for you to receive your accreditation. At 4 cycles, the audit may be balloted for audit failure.

To ensure that you receive your accreditation quicker, and to save you time, it is important that you fully understand Root Cause Corrective Action and the Nadcap requirements.

The Nadcap system requires five key areas to be answered when you respond to your NCR's:

Immediate Corrective Action

In this area, you should describe what was accomplished to correct the non-conforming condition, what you did to assess any damage, contain all effects, and if appropriate, did you notify any affected customers. If the product was not affected, tell us how you know it was not affected. Your response here addresses the direct cause of the NCR only.

Root Cause

Simply put, Root Cause is the last cause in any cause chain. To obtain the Root Cause you must spend time collecting data and developing cause chains. A true Root Cause will require a 5 Why analysis. Only the Root Cause should be listed in this area, but you may include supplemental information to support your conclusion.

Impact of all Identified Causes and the Root Cause:

Detail the impact of all the identified causes and the root cause. Was there product impact? How did you determine that there was/was not product impact?

Action Taken to Prevent Recurrence:

This cannot be determined until the direct, contributing, and root causes have been identified. Tell us what has been implemented to correct the NCR from occurring in the long-term. In other words, this response must address the Root Cause. It is important to spend time considering the effectiveness of your actions. Remember, a repeat finding will prohibit you from achieving supplier merit.

Objective Evidence

Objective evidence is required for all NCR's for an initial audit and for major NCR's for a reaccreditation audit. HOWEVER even for minor NCR's, if you make a procedural change, we still need to see the exact text of that change. If you offer training, we need to see verification of the training, etc. To be sure you're response is fully understood, it is recommended that you attach objective evidence if it will assist the Staff Engineer and the Task Group in understanding and accepting your response.

Some final words, some of the top reasons that NCR responses are not accepted are:

- Operator Error identified as the Root Cause. This is seldom ever an acceptable reply. If you come to this conclusion, ask yourself; "If I replace this operator, could the next person make this mistake?"
- Lack of Objective evidence; ensure that you attach supporting documentation for procedural changes, customer notification and acceptance, and training.
- Restatement of the finding as the Root Cause. Remember to use the 5 Why technique to ensure you are truly identifying the Root Cause and not just rewording the NCR.

To assist you with learning more about Root Cause Corrective Action, we invite you to register for one of our upcoming training programs:

Seattle, WA US	15 Aug 2007
Hamburg, Germany	12 Sept 2007
Birmingham, UK	15 Oct 2007
Pittsburgh, PA, US	24 Oct 2007
Dallas, TX, US	7 Nov 2007

To download a registration form, go to the following link on the PRI website: <http://www.pri-network.org/PRI/Supplier-Training-Programs.id.384.htm>

NEW COURSE!! – INTERNAL AUDITING

This is a two-day training class. Day One will teach you how to develop and implement an effective internal audit program including developing an audit plan and audit schedule. Day Two will teach you important audit techniques such as interviewing, writing findings, reviewing objective evidence, closing out the audit, and more. We encourage you to register for the complete program, but you may also choose to only participate in one of the days, based on what material is most important to you. It is recommended, that if you choose to take Day Two, you participate in Day One as this provides a strong foundation of the importance of an internal audit program and how it can be used as a way to continually improve your operations. Cost: \$600.00 (\$300.00 per day) includes continental breakfast, lunch, course materials and a certificate of completion.

Hotel Dedeman Istanbul, Turkey - 16-17 July 2007

To download a registration form, go to the following link on the PRI website: <http://www.pri-network.org/resource/attach/384/IAregistrationform.doc> or contact Jennifer Gallagher, Program Developer, +1 724 772 8693 or jjgall@sae.org.

NDT Newsletter – News to You?

Are you a new reader of the NDT newsletter? If so, here is some information:

The NDT newsletter is published four times a year prior to the quarterly Task Group meetings. 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. In the spirit of continuous improvement please provide articles or request articles of interest and forward these to the NDT Staff Engineers (contact details at the end of the newsletter) for future inclusions.

James E. Bennett – NDT Senior Staff Engineer

Staff Engineer Contact Details - NDT Task Group

Please note the new telephone numbers for PRI Warrendale staff.

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