Nadcap Asia Symposium
2011

Phil Ford
PRI Staff Engineer
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Agenda

- Nadcap NDT Task Group
- Nadcap Audit Preparation
- The Nadcap Audit
- Checklist Review
- Top NCRs and NCR response
- Web Tools & Additional Information
The Nadcap NDT Task Group

NDT Task Group

Chair

Vice Chair

Secretary

NDT Task Group Representatives
(Subscribers and Suppliers)

Method Committees
PT, MT, UT, RT, ET & Qualifications / Quality
PRI NDT Staff

Headquarters – Warrendale, PA, USA

Senior Program Manager – Mark D. Aubele - maubele@sae.org
+1 724 772 8654

Senior Staff Engineer – James E. Bennett - jbennett@sae.org
+1 724 772 8651
PRI NDT Staff

Headquarters – Warrendale, PA, USA

CSR – Rhonda Joseph - rjoseph@sae.org
+1 724 772 8644

CSR – Melanie Petrucci - mpetrucci@sae.org
+1 724 772 8642

Ohio Office - USA

Lead Senior Staff Engineer – P. Michael Gutridge - mikeg@sae.org
+1 740 587 9841
PRI NDT Staff (cont.)

PRI Europe Offices – Derby, Wales & London, UK

Staff Engineer – Andy Statham
andy.statham@pri-europe.org.uk
+44 1332 869276

Senior Staff Engineer – Phil Ford
phil.ford@pri-europe.org.uk
+44 1443 225545

CSR – Amanda Bonar
Amanda.Bonar@pri-europe.org.uk
+44 207 034 1249
Key NDT Task Group Representatives

Chairman – Phil Keown - philip.keown@ae.ge.com  
+1 781 594 2856
Vice Chair – Bobby Scott - bobby.scott@aero.bombardier.com  
+44 2890 733183
Secretary – Dave Royce - david.royce@pw.utc.com  
+1 860 565 0104

Method Committees
PT – Pete Torelli (Boeing)
MT – Bob Hogan (Honeywell)
UT – Michael Mitchell (Hamilton Sundstrand)
RT – Dave Royce (Pratt & Whitney)
ET – David Vaughn (Spirit AeroSystems)
Qualifications / Quality – Scott Sullivan (Honeywell)
NDT Task Group

NDT Task Group is currently made up of 42 subscribers that participate in the Task Group meetings.
NDT Task Group

Task Group Member List
Nadcap Task Group Meetings

The NDT Task Group schedules three ‘face to face’ meetings during the year.

– Address issues relating to Nadcap NDT
  • Checklists & Procedures, Consistency, Auditors, Metrics, Special Projects

– Location varies but for 2012: (refer to www.pri-network.com/nadcap for details on meeting locations)
  • US – San Diego
  • Europe – Berlin
  • US – Pittsburgh – Auditor Training

[Image of a conference room with people]
Nadcap – Accreditation

• The Nadcap NDT Task Group (established 1990) is responsible for the operation of the Non-Destructive Testing accreditation program and currently utilize the following Nadcap NDT checklists:
Nadcap Checklists

- AC7114 – Nondestructive Testing
- AC7114/1 – Liquid Penetrant
- AC7114/2 – Magnetic Particle
- AC7114/3 – Ultrasonic
- AC7114/4 – Radiography
- AC7114/5 – Eddy Current (In ballot)
Nadcap – Accreditation (cont.)

• The previous mentioned checklists contain “Compliance Assessment Guidance” where clarification is necessary to confirm the requirement of the Task Group

• In addition to these checklists, the supplier is also audited to Subscribing User requirements as addressed in the “Supplemental Checklists”
Relationship between Supplements and Subscriber Requirements

- These supplements contain various requirements as defined by those subscribers wishing to establish supplemental criteria.

- These are not new requirements but existing requirements contained within the subscriber specifications.
Nadcap – Accreditation (cont.)

- AC7114S – Supplemental Audit Criteria Nondestructive Testing
- AC7114/1S – Supplemental Audit Criteria Liquid Penetrant
- AC7114/2S – Supplemental Audit Criteria Magnetic Particle
- AC7114/3S – Supplemental Audit Criteria Ultrasonic
- AC7114/4S – Supplemental Audit Criteria Radiography
Nadcap eAuditNet Process

1. Suppliers
2. Request Audit
3. PRI Audit Scheduled
4. Auditor Assigned
5. Audit Completed
6. PRI Technical Staff Review
7. Task Group Approval
8. Issue Cert
9. Request Audit

Diagram flow:
- Suppliers to Request Audit
- Request Audit to PRI Audit Scheduled
- PRI Audit Scheduled to Auditor Assigned
- Auditor Assigned to Audit Completed
- Audit Completed to PRI Technical Staff Review
- PRI Technical Staff Review to Task Group Approval
- Task Group Approval to Issue Cert
- Issue Cert to Suppliers
Satellite Facility Criteria

- Facility is within 25 miles/40 Kilometers radius distance from the main facility
- Facility uses the same Quality Manual and Procedures as the main facility
- The Quality Manager (day-to-day operational control) / NDT Level 3 is the same as the main facility
- The satellite facility has an on site individual who is part of the Quality Function and reports directly to the Quality Manager / NDT Level 3
- The facility is owned by the same company
Operational Documents

• NIP – Nadcap Internal Procedure
  – Details specific procedures by which PRI/Nadcap Staff operates.

• NTGOP – Nadcap Task Group Operating Procedure
  – Defines the scope and general operating procedure for each specific Nadcap commodity program.

• NOP – Nadcap Operating Procedure
  – Documents detailing the specific procedures by which Nadcap operates.
Operational Documents
Additional

• Quality Manual – Performance Review Institute (PRI) Quality Process
  – PRI Quality System requirements

• AS7003 – Nadcap Program Requirements
  – Aerospace Standard which documents the requirements for implementing Nadcap industry consensus-based accreditation programs
Procedural Hierarchy

- Forms
- Processes

AS7003
NOP
NTGOP
NIP
QUALITY MANUAL
Notable Procedures

- NOP 002 General Task Group Operating Procedure
- NOP 008 Supplier Merit Program
- NOP 011 Audit Failure Process
- NTGOP 001 Nadcap Task Group Operating Procedure-Appendix 1
  Additional Requirements for the NDT Task Group
- NIP 4-01 Document Control Procedure
- NIP 6-01 Auditor Selection, Approval and Training-Appendix
  NDT– Guidelines for Selection of Auditors of NDT

These are found at www.eAuditNet.com
Resources > Documents > Nadcap Procedures
Checkpoint

Any Questions
Agenda

- **Nadcap NDT Task Group**
- **Preparing for the Audit**
  - The Nadcap audit
  - Checklist Review
  - Top NCRs and NCR response
- **Web Tools & Additional Information**
AC7114 para. 2.2

• 2.2.1 - Prior to the Audit

The supplier **must complete a self-audit** using AC7114 in preparation for the Nadcap audit. All internally identified nonconformance's should be corrected prior to the actual audit.
Timeline – Prior to Initial Audit

• At least Six months prior to your scheduled audit:
  – Download the required checklists
    • Consider including the checklists in the documentation control system as you would for customer specifications. These are after all requirements
  – Create an audit plan
  – Select and train auditors on the audit checklist and reporting
Timeline – Prior to Initial Audit

• Four months prior to your Nadcap audit:
  – Conduct audits and identify NCRs
  – Do a thorough RCCA analysis
  – Create a plan for corrective actions, ensure corrective actions are flowed out to all areas

• One month prior to your Nadcap audit
  – Conduct a follow-up audit of NCRs and corrective actions
Six months prior to your scheduled audit

• Download the required checklists.
  – AC7114 – Nondestructive Testing
    • AC7114/1 – Liquid Penetrant
    • AC7114/2 – Magnetic Particle
    • AC7114/3 – Ultrasonic
    • AC7114/4 – Radiography
    • Include applicable supplements as necessary (AC7114S, /1S, /2S, /3S & /4S)
Six months prior to your scheduled audit

Create an audit plan

- Split the audits by reviewing one checklist at a time over a period of two weeks
- Include job (compliance) audits
- Involve everybody
Six months prior to your scheduled audit

- Select and train auditors on the audit checklist requirements and reporting.
  - Consider AC7114 requirements
    - Qualified NDT Level 2
    - General NDT knowledge
Timeline – Prior to Initial Audit

Four months prior to your Nadcap audit

- Conduct audits and identify NCRs
- Do a thorough RCCA analysis
- Create a plan for corrective actions, ensure corrective actions are flowed out to all areas
Four months prior to your scheduled audit

Conduct audits and identify NCRs

- Review audit checklists and ensure performed objectively against each checklist item. For example, record where the evidence can be found against the checklist question (examples on the next slides)
  - Verbal verification (do not accept)
  - Assumptions (do not make)
  - Should there be an N/A on the checklist question or could the answer be No?
- Obtain clarification / interpretation with the PRI Staff Engineer
Four months prior to your scheduled audit

Example:

• AC7114
  – 4.3.1 Is there a procedure requiring an annual internal audit of the NDT System and does it address a review of the NDT inspection process, the associated documentation, personnel certifications, NDT process procedure adequacy and equipment? YES/NO QS101, rev 2, para 1.2
Four months prior to your scheduled audit

• Involve all personnel that could be questioned or witnessed during the audit
  – Nervous / Apprehensive

• Actual practice and procedural requirements consistent

• Assign NCRs to suitable people

• 90 days prior to the Nadcap audit, review eAuditNet website to assure checklist is the latest version
Four months prior to your scheduled audit

Do a thorough RCCA analysis

- Immediate corrective action for items identified
- Review other similar documentation / processes for further instances
  E.g. incorrect revision of customer specification used for compliance
- Create a team to determine the root cause. Carry out "5-Why" analysis
Four months prior to your scheduled audit

Create a plan for corrective actions, ensure corrective actions are flowed out to all areas affected.

- NDT calibration house
- NDT internal calibration department
- NDT Level 3
- Inspectors
- Planners
- Purchasing
- Quality
Timeline – Prior to Initial Audit

One month prior to your Nadcap audit

- Conduct a follow-up audit of NCRs and corrective actions
- Send documentation to auditor
One month prior to your scheduled audit

- Conduct a follow-up audit of NCRs and corrective actions
  - Review specific items identified and verify they have been corrected
  - Verify procedures/instructions are amended and relevant personnel trained
    - Any additional procedural changes made since
    - Are the requirements still satisfied
    - Are the requirements fully understood
  - Review new job packages to verify if they are correct
One month prior to your scheduled audit

The supplier should forward the following information as identified in AC7114 para 2.2.1, 30 days prior to the scheduled audit:

- **General Data:**
  - List of subscribing Nadcap Users that have approved the supplier for NDT. This approval listing must be accurate as it will be the basis for the scope of the audit. Failure to provide accurate information may be cause for a follow-up audit
  - List of current quality systems approvals (by Users, Registrars, etc.)
  - List of procedures (index/table of contents only)
One month prior to your scheduled audit

• NDT Data:
  – List of processes to be approved
  – Copy of applicable NDT process procedure(s) and certification procedure
  – Copy of the completed supplier self audit using the applicable Nadcap checklists
  – List of Approved NDT Personnel including Level 3s. Supplier may use NDT Attachment AC7114-A or another format as long as all of the identified information is present (name, stamp/identification number, certification dates, eye exam dates, vision correction required, years of experience, certification levels and NDT method)
One month prior to your scheduled audit

• NDT Data:
  – List of NDT procedures (index/table of contents only).
  – List of applicable NDT processing specifications (military, government, industry, [AMS, etc.], customer)

• Documentation provided must be in English unless agreed between the auditor and the supplier. Note – responses to NCRs shall be in English

• All documentation will be destroyed or left with the supplier after the audit
Other Considerations

- Personnel availability
  - Able to assist when required
  - Vacation
  - Part time personnel

- Availability of Records – Calibration, personnel records, training, qualification and other documents

- Hardware availability for compliance
Prepare!

• Prepare, Prepare, Prepare!

• Attention to detail – The Nadcap audit is 1 day per process plus one

• Leads to a successful audit
Checkpoint

Any Questions
Agenda

• Nadcap NDT Task Group

• Preparing for the Audit

• The Nadcap Audit

• Checklist Review

• Top NCRs and NCR response

• Web Tools & Additional Information
Export Control

• Certain documentation, platforms, components, drawings, etc may reference Export Control. This presentation does not intend to address Export Control other than identifying:
  
  – Suppliers are responsible for maintaining Export Control and notifying PRI if Export Controlled hardware is processed at the facility (during the scheduling of the audit)
  
  – Nadcap Internal Procedure (NIP) 7-07 addresses Export Control with materials and information
  
  – ITAR/EAR and the Nadcap Audit 2 hour webinar training is available from eQuaLearn
The Audit: Initial Meeting

Purpose

• To provide all participants with the opportunity to anticipate and prepare for obstacles, or situations, that might interrupt the audit
• Assess the supplier’s readiness for the audit
• Communicate with senior representatives of the supplier who will not be actively involved with the audit, except for the daily briefing
• Review any safety/security issues
The Audit: Initial Meeting

• General introductions
• Confirm understanding of ITAR/EAR - auditor, data and reporting restrictions
• Clarify audit being performed
  – NDT methods
  – Customer base, Subscribers, approvals held
• Agenda for the audit
  – Availability of personnel – any personnel away from work
  – Personnel working hours
  – Availability of examinations
Initial Meeting (cont.)

- Compliance jobs – job / paper audits.
  - Not intended to be a nervous experience
  - Will speak with personnel during the compliance
  - Need to witness auxiliary processes that affect the NDT process. e.g. pre-cleaning prior to PT
  - Trainees (if used) will also be asked to perform certain functions during the compliance
Initial Meeting (cont.)

• Nonconformance Reports (NCRs)
  – NCR Classifications (Major and Minor)
  – NCRs accepted on site by the auditor (auditor discretion)
  – Supplier kept up to date on NCRs. Discussed at end of day
  – NCRs from previous audit. Objective evidence to show they are closed out
    • Verified during the audit
Initial Meeting (cont.)

- Miscellaneous
  - Procedural / personnel changes since the submittal of documentation to auditor
  - Proprietary / Export Controlled documentation
  - Lunch times
  - Language
  - Brief tour of the facility
  - Scope Verification
Checklist Completion

• The Nadcap audit is like no other
  – Auditor requires compliance procedurally and in practice to the checklist requirements:
    • Documentation to show procedural coverage
    • Witness the inspector / processor working in accordance with the procedure and demonstrates (verbally) a sound knowledge of the requirements
  – Lack of objective evidence may result in an Nonconformance
  – Clear communication is imperative
Daily Briefing

- Purpose is to allow the supplier time to listen to the progress summary of the audits:
  - NCRs
    - The supplier should be aware of NCRs or potential issues throughout the day
    - If compliance jobs are still being witnessed, auditor may not indicate an issue until the end (to determine if systemic)
The Daily Briefing

- Intent is to promote discussion, not to re-address topics previously discussed or debated

- Allows the supplier to address any items of concern or documentation retrieval to prevent issuance of a nonconformance

- Confirm the agenda for the following day
Compliance Jobs
Task Group Expectation

- 3 job audits and 3 paper audits per NDT method to cover the companies Nadcap Subscribing User Base

- Review 3 inspectors
  - Include the use of trainees

- Paper audits not required if Subscribing Users are addressed in job compliance
Compliance Jobs
Task Group Expectation (cont.)

• 1 Subscribing User per paper audit package per method, if not addressed in job audit. Max of 3 paper audit packages per method required

• ITAR/EAR & Proprietary Requirements
Compliance Jobs
Availability of Hardware

• Supplier must take steps to obtain subscriber hardware, if available, pull from stock
  • Do not borrow hardware unless approved by customer
  • Must be aerospace

• Know the customer of the component being processed and the applicable specifications that apply
Compliance Jobs (cont.)

• Availability of hardware
  – NO jobs available means a NO on the checklist. A NO on the checklist means an NCR
  – Any problems, contact the PRI Staff Engineer
Compliance Jobs (cont.)

• NDT Personnel
  – Inspector needs to feel comfortable, prevents errors
    • Get inspectors involved in the audit process (prior to Nadcap audit)
      – Better understanding and appreciation
    • Conduct regular oversight and discussions. Have the President or Director of the company witness the NDT process
Compliance Jobs (cont.)

• NDT Personnel
  – The auditor will explain the Process personally to the Inspectors
    • Inspector will be asked to process as they would normally, e.g. control checks first, then process job
  – It is not auditors intent to change the process to allow errors
Compliance Jobs (cont.)

• NDT Personnel
  – Inspector MUST communicate with the auditor. Prevents nonconformance's
    • Explain the process as it is being done, let the auditor see what is taking place
    • Verify the auditor wishes to see a particular aspect of the process or if acceptable to continue
Compliance
Jobs (cont.)

• NDT Personnel
  - If the inspector requires clarification
    • Acceptable to review additional procedures
    • Inspector required to work alone, but may ask clarification with internal personnel (not with external consultant – consultant is typically not present to answer such clarifications)
  - If the inspector has made a mistake, they are expected to fix it, e.g. re-process hardware
Final Out Briefing

• Review all nonconformance's / issues identified during the audit
  - Leave copy of NCR report – written or electronic
  - "0" NCRs requires feedback within 3 days from submittal of electronic audit report by the auditor
Final Out Briefing (cont.)

• Outline the process for addressing Nonconformances and utilizing eAuditNet
  – Initial response to findings is 21 days from submittal of electronic audit report by the auditor
    • Corrective action plan and objective evidence
  – For second, third and fourth (max) response cycles, 7 days is required
  – ‘Late’ days are accumulated when the response date is past due. Shall not exceed 30 cumulative late days for the audit report package
    • Late days affects the merit process (discussed later)
Final Out Briefing (cont.)

- Advise Supplier of RCCA Tutorial for corrective action help [www.pri-network.org](http://www.pri-network.org)

- Review availability of key procedures on eAuditNet > Resources > Documents > Nadcap Procedures
  - Audit Process NIP 7-02
  - Merit Process NOP-008
  - Audit Failure NOP-011
  - Accreditation Process NOP-001
  - Audit Report Processing NIP 7-03

- Supplier Feedback Form
Checkpoint

Any Questions
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- Nadcap NDT Task Group
- Preparing for the Audit
- The Nadcap Audit
- Checklist Review
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- Web Tools & Additional Information
Checklist Format

The format for the process checklists have been kept the same as far as possible

1 - Scope
2 – General Information
3 – Materials & Equipment
4 – Procedures
5 – Process Controls*
6 – Compliance*

Plus generic supplements required by Task Group

* For MT (AC7114/2) section 6 is equipment calibration and section 7 is compliance
Checklist Review

AC7114
AC7114/1
AC7114/2
AC7114/3
AC7114/4

AC7114S
AC7114/1S
AC7114/2S
AC7114/3S
AC7114/4S
Checkpoint

Any Questions
Agenda

- Nadcap NDT Task Group
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AC7114/4 & Sups Paragraph Callout

- NDT Process Controls
- Compliance
- NDT Facility Written Procedures

Number of References

Checklist Section

NDT Facility Written Procedures

NDT Process Controls

Compliance

AC7114/4S

AC7114/4
NCR Response Contents

- Introduction
- Section 1 - Basic RCCA For Nadcap
- Section 2 – Good And Not So Good Responses
- Section 3 – Supplier Responses
- Final Points and Questions
Introduction - What is the Issue?

Responding to NCR’s – Problem???

Initial Audits – Average 2.4 cycles

Re-accreditation Audits – Average 2.2 cycles
What is the Issue?

- Cycle Count does NOT seem to be an issue.....
- That is if we assume that a couple of cycles on the average is acceptable....
- OK then why cover RCCA???????
What is the Issue?

- 90% of all audits go back for a second or third cycle
- 75% of those go back for Root Cause and/or Preventive Action Statements
- So the issue is that even though the actual number of cycles is acceptable, most of the cycles are for a singular cause. This fact is not acceptable.
Section 1

Basic RCCA For Nadcap
RCCA for Nonconformance’s

– A requirement of the aerospace industry for many years
– A process of determining the causes that led to a nonconformance or event
– An effective method for implementing corrective actions to prevent recurrence
– Requirements are not new - may not have been aggressively enforced in the past
RCCA for Nonconformance's

– A full and complete NCR response to Nadcap criteria will aid in acceptance of NCR corrective action, shorten cycle time, and provide a continuous improvement tool
– There is nothing unique about Nadcap’s expectations for corrective action
– Nadcap will strictly enforce the requirements for corrective action
RCCA for Nonconformance's

Don’t look at cause analysis only as a way to get through the NCR response portion of a Nadcap audit.

– Can be applied to all aspects of business for problem solving and process improvement
– Approach varies based on differences in the organization and size of businesses
– Multiple uses of the process that go beyond response to NCRs
– Effective tool for problem solving
RCCA

There are six areas that a supplier must address in an NCR:

1. Immediate corrective action taken (containment actions)
2. Root cause of nonconformance
3. Impact of all identified causes
4. Action Taken to Prevent Recurrence
5. Objective Evidence
6. Effectivity Date
Immediate Corrective Action

What action was taken following the issue being discovered during the audit?

• Did you stop the problem from continuing?
  – Become compliant with the requirement

• Did you contain the problem found?
  – Were any other aspects (procedure, hardware, etc) affected by this NCR?
Root Cause

Why did this occur? 5 Whys, Fishbone

• Why was this not identified during the pre-audit using the Nadcap checklists?

• How was the question answered and what objective evidence was reviewed to consider the item as compliant?

• Why did the engineer not identify this issue? What involvement do they have in the system?

The Root Cause is the last logical cause in the chain
  – Think you have it?
  – Go one more…..
Potential Impact to Hardware

What impact did the nonconformance actually have?

• Were parts or the integrity of the process affected in any way?

• Contacting of customer – Failing to comply with customer requirements may result in need to contact customer for additional investigation or corrective action

• Were parts shipped to customer?
Preventive Action Statement

What is the long term action to prevent recurrence?

• Can only be addressed when the root cause is understood

• Do not rush, consider the effectiveness, feasibility, suitability to the company, and the company's budget
Objective Evidence

What information can you provide to demonstrate the RCCA process applied to the NCR?

• If a procedure changed, clearly specify what the change was and show evidence to the NDT Staff Engineer of the approved procedure (as applicable)
• Potential for Impact Hardware investigations. Provide the investigation report, include photographs
• Training/awareness of personnel. Provide evidence (sign off sheet)
• Change or create a procedure? Implement a new system or method? Perform training / awareness, propose audits, new checklists, etc? SHOW IT.
Effectivity Date

• When will the corrective actions become effective?
There are six areas that a supplier must address in an NCR but we said two cause the most issues:

1. Immediate corrective action taken (containment actions)
2. *Root Cause of Non-conformance*
3. Impact of all identified causes
4. *Action Taken to Prevent Recurrence*
5. Objective Evidence
6. Effectivity Date
Root Cause

- Determine causes.
- Using the results of our investigation and data, we are going to build a cause chain that leads to the root cause(s).
Caution: Remember – step back and analyze

Jumping to conclusions leads to a ‘Band-aid’ approach.

This wastes time and effort.

I wonder how long it will take them to figure out I have no battery and am unplugged?

I bet someone spilled coffee on it!

The board must be fried!

The switch must be bad!

It’s busted!
Five Distracters

Five major distracters that negatively influence our ability to perform effective RCCA.

– Inadequate understanding of the RCCA process and tools used to accomplish the process.
– Failure to use the team approach.
– Failure to correctly identify the problem(s).
– Predetermined assumptions.
– Jumping to conclusions.
There are many ways to get to the basic causes of problems.
We want to find out why the problem happened so that we can prevent repeats.
So the simple way to start is to do just that,

Ask “Why”

This was the problem question.
The five-why method is suggested.
Analysis

The “5-Why” method:

- Used to build a cause chain.
- A natural logical progression for thinking through a problem.
- The answer to the first “Why” is the *direct cause*.
- The logical end of each chain is a *root cause*.
- The causes in between are *contributing causes*. 
Consideration for Analysis!

**Act on Fact**

- The process requires complete honesty and no predetermined assumptions!
- Follow the data... stick to the facts.
- Ask simple single questions.
- Don’t Get Personal!
  - It is **not** a witch hunt!
- What we really want to know is:
  - "Why did it happen?"
  - Not “Who did it?”
Not Root Causes

- Operator error (most common).
- Honest mistake.
- Second shift did it.
- We didn’t include the requirement in our internal procedure.
- We didn’t know it was a requirement.
- Not familiar with the specification.
- All prompt the question “Why xxx?”
Yes, it does happen, but it is:

- Used as “root cause” much too often.
- Used as an easy way out.

So ask:

If the operator was replaced, could the next person make the same mistake?

If so, then you probably have not determined the Root Cause.
“Operator Error”? Before deciding it was operator error, you must ask These six questions:

1. Are there *Proper Instructions*?
2. Are there *Proper Tools*?
3. Was there *Proper Training*?
4. Were there *Clear Expectations / Goals*?
5. Was the process *Complex or Unusual*?
6. Does the operator have sufficient *Skill Level*?
Just Keep Asking “Why?”

Event: Didn’t get to work on time.

↓ EQ: Why were you late?

Car wouldn’t start.

↓ Why didn’t the car start?

Battery was dead.

↓ Why was the battery dead?

Interior light was on all night.

↓ Why was the light on?

Kids played in the car, left door ajar!

↓ Why were the kids playing in the car?

Babysitter wasn’t watching them!
A True Statement?

**Root Cause:**
The fundamental reason for an event, which if corrected, would prevent recurrence.

- There may be more than one root cause.
- Do not try to categorize causes by perceived importance or significance.
Root Cause

An important thing about “Root Cause”

• It is not always the most significant cause in the chain.
• Just focus on the fact that it is the last cause in the chain.
Corrective Action is a set of planned activities (actions) implemented for the sole purpose of permanently resolving the problem.
Types of Corrective Action

*Specific* (immediate) corrective actions change only the direct cause.
  - Specific correction is applied at the event to stop the event.

*Preventive* corrective actions change contributing and root causes.
  - Preventive corrective actions are applied at the root cause level to eliminate the problem.
Remember

We want to break the “Cause Chain.”
Preventive CA

• Preventive corrective actions focus on changing root cause(s) and/or contributing cause(s) near the root cause.

• If you have only identified one cause, you probably won’t get a 100% effective fix.

• Remember – today’s contributing cause could be tomorrow's root cause.
Choosing Corrective Actions

• Brainstorm.
  – What COULD you do?
  – These are the possible actions.

• Then ASSESS.
  – Consider the actions and choose.
Preventing Recurrence

• Means preventing recurrence everywhere.

  • There may be multiple occurrences and far reaching effects outside the boundaries of the original event. The team must take responsibility for extending the corrective actions.

• How does the cause chain affect other areas and how widespread is it?

  • How severe is this event? How many times has it happened before?

• Was it as predicted by risk analysis?
Preventive Action

Applying preventive corrective actions plant-wide is a quality system requirement and a management expectation!

Review all potential areas of impact and fix the problem everywhere.

– Expand the team.
– Create a second team.
– Pass it up to management.
– Do whatever it takes – just don’t ignore the problem if it is a company-wide issue.
Preventive Action Test

Test each *preventive action* by asking:

1. Do the preventative corrective actions *lower the risk* of the event reoccurring to an acceptable level?

2. Are there *adverse effects* caused by implementing the corrective actions that make them undesirable?
Writing the Actions

• Use the ‘3 W’s.’
• What, Who, When.
  – What is the corrective action?
  – Who is responsible for doing it?
  – When is it going to be done?
• Consider how you will know if the action works (desirable outcome).
Caution!

Avoid:

• Assigning corrective actions to someone who is not on the team!

• No vested interest!
Section 2

Good And Not So Good Responses
Example – The Non Conformance

NCR001
The procedure for the Qualification and Certification of NDT Personnel (QA-OP-01, Rev J) does not meet NAS 410-3 for the following:

A. Incorrect classroom training hours for PT level 2,
B. Does not require the level 2 candidate to document the NDT results during the practical examination,
C. Allows administration of Practical exams by Level 2’s,
D. Does not require the designation of a “Responsible Level 3”,
E. Does not provide the method for the approval of person(s) administering eye exams,
F. Etc……
How **not** to respond to NCR’s

- Immediate corrective action taken:  
  Modified procedure
- Root cause:  
  We have been audited by many customers and Nadcap in the past. This has never been a problem.
- Impact to hardware:  
  None
- Action taken to prevent recurrence:  
  Revised procedure
- Training:  
  None
- Objective evidence:  
  See attached revised procedure
How **not** to respond to NCR’s

- NCR002 (an actual NCR taken from an NDT audit)
- UV light meter used within evaluation area is verified through a comparison between the calibrated Master UV 340 light meter SN AC. 08992 in Calibration Department's hands; calibration certificate of the master fully complies with Nadcap requirements. The in use UV light meter verification is performed with one point only, without any possibility for adjustment; the last certificate shows a deviation of -4.7% at a value of 1500 microwatt/cm².

Authority: Nadcap checklist
Major, Supplier to evaluate impact on parts.
How not to respond to NCR’s

- Immediate Corrective Action Taken (Containment Actions):
  - UV Light Meter Calibrated at 3 points
  - Root Cause of Non-conformance:
  - Calibration report initially formed for fixed position calibration
  - Impact of all Identified Causes and the Root Cause:
  - No impact on the process or the part since UV Light meter calibrated at the using range up today
  - Action Taken to Prevent Recurrence:
  - New Calibration report has been established
  - Objective Evidence Attached:
  - See attached calibration report (123456-01-A)
  - Effectivity Date: 12 April 2011
How not to respond to NCR’s

NCR003
Actual root cause provided to staff:
Our responsible level 3 is also responsible level 3 for other companies, who had the same Nadcap auditor for a recent audit, where he had also looked deeply (back to several months ago) in the process control sheets until he had found a record with a non appropriate correction on it. “If you walk long enough on the beach you always end up finding a crab!”
How **not** to respond to NCR’s

NCR 004
Actual preventative action provided to staff:
I have spoken to myself emphasising the need to ensure that all documentation is completed correctly without any typing errors. I have agreed with myself that I should take more care when completing NDT technique cards. This action has been backed up with a quality memorandum to All level II and level III NDT engineers.
How to respond to NCR’s

• So for NCR001 shown earlier:
  • Immediate corrective action taken:
    • Procedure was reviewed in its entirety against the requirements of NAS 410 rev 3 and approved by our responsible level 3. Procedure attached, note – changes made are specifically identified on our procedure change sheet.

• Root cause:
  • Inadequate review of our procedure against the customer / industry standards due to language difficulties.

• Impact to hardware:
  • None. This discrepancy was procedural only. All NDT records were reviewed and found to be compliant with NAS410 rev 3.
How to respond to NCR’s

• Action taken to prevent recurrence:
  • Review teams have been created to address the review of special processes including NDT. The teams will comprise of three individuals (for NDT, one of the team members will be the responsible level 3 and one will be fluent in English) and will perform a back to back review of the process specification against the customer / industry standard, for compliance. The reviewers will complete a document review sheet, the procedure will be changed as identified on the review sheet and forwarded to the relevant personnel for final approval.
How to respond to NCR’s

• Training:
  • Training completed for the individuals who will comprise of the review teams.
  • Personnel utilizing the revised training procedure were the originator of the document (Responsible level 3) and the Quality Manager, both of whom approve the document, therefore training / awareness is not necessary in this case.

• Objective evidence:
  • See attached revised procedure (QA-OP-01, Rev K) for the training and approval of NDT Personnel. Note: Includes approval by the responsible level 3.
  • See attached procedure (QA-01 Rev B) addressing the addition of the specification review teams.
  • See attached completed document review sheet for QA-OP-01 against NAS410 rev 3.
  • See attached training log sheet for affected personnel.
How to respond to NCR’s

• Actual NCR addressed by the supplier and accepted by staff on the first posting:

• While processing the first compliance job - line 1 electrostatic application - (6.1.a), the PSM 5 panel (Working - daily check) shows 4 stars instead of 5. After cleaning, the working panel was reprocessed with the master PSM 5 panel, when the process was completed, both panels shows acceptable results according the reference photographs.
How to respond to NCR’s

• Immediate Corrective Action Taken (Containment Actions):

  Three possible factors that affect the results are indentified:
  • 1. The quality of the product
  • 2. An operator mistake
  • 3. Not proper process carried out
How to respond to NCR’s

• Following Immediate Corrective action are taken:

• 1. Stop the processed part and assess the cause (this was done by the operator during the audit).

• 2. Do not process more parts affected by this process (985P14) until the cause is known and corrected.

• 3. Suspend temporally the certification of the inspector who made the job. See in the attachment-1 status of the certification for the operator John Doe
How to respond to NCR’s

• Three other additional actions are taken to know the cause.

1. A second operator with a new penetrant batch (not used) made the process with the tam panel. The result is OK

2. This second operator, process the tam panel with the penetrant batch used during the audit. The result is also correct.

3. The operator who did the job during the audit, process the Tam panel the next day with the penetrant batch used during the audit and the result is correct. Attachment-2 shows photographs of the tam panel processed by the operator involved, after the audit. Equivalent result was obtained with the second operator
How to respond to NCR’s

• Root Cause of Non-conformance;

Lack of definition of the tam panel processing instruction

The operator during the audit, processed the part with the tam panel hanging from the part as in the attachment 3. Usually this is not the way to process the tam panel, because due to the tam panel is very close to the part, when you are washing the excess of penetrant of the part (much bigger than the tam panel), you are over washing the tam panel (which is much smaller part and is located “below” the part, where it is falling on all the water). Additionally, the tam panel is not “fixed” when the water gun is being spraying and start to balancing and swinging. In this tam panel the 5th indication (the smaller one) is no so clear, and the operator during the audit over washed the tam panel processing the tam panel in this way.
How to respond to NCR’s

• The initial calibration of the tam panel has done taking out the tam panel from the part, with exactly (same parameter but not affecting the washing of the part, a bigger area). The second operator did the process correctly and this operator involved in the audit also repeat the correct the process the next day taking off the tam panel from the part. Asking the affected operator how usually process the tam panel, he answered that always processed the tam panel taking it off from the part during the washing operation but during the audit he understood wrongly (His level of English is not enough) to the auditor “Process the tam panel with the part” Then he was afraid that the auditor were ordering to process tam panel close to the part and proceed in that way.
How to respond to NCR’s

- The operator explained this due to he was involved in the root cause analysis. See attachment -4 root cause analysis signed by the people involved in the analysis including the operator (John Doe)

The operator did not have a clear and specific instruction to process the tam panel to avoid potential over washing (Instruction allows him to process the tam panel, out or close to the first part to be inspected) and during the audit chose an incorrect way to do it.
How to respond to NCR’s

- Impact of All Identified Causes and the Root Cause:

No product impact is expected as it has been demonstrated that it is a punctual mistake made by only one operator during the audit. A specific review for all operators has been done in all lines, checking the correct processing of the tam panel and the parts, to confirm this point. No deficiencies have been observed having a correct result in all cases. See attachment -5 (specific performance review of tam panel for all operators).
How to respond to NCR’s

- Impact of All Identified Causes and the Root Cause: (cont’d)

An additional specific performance review for the tam panel has been done to the operator involved with another penetrant also, and acceptable results has been obtained. See attachment-6 (photograph of the tam panel for the 985P13 penetrant carried out by the operator involved in the finding in the audit). All results of the penetrant system performance has been checked in the control logs of all lines. All of them are acceptable.
How to respond to NCR’s

• Action Taken to Prevent Recurrence:

  1. Modify the internal procedure SND-103-002 describing more specifically how to process the Tam panel (see attachment-7 SND-103-002).

  2. A training/Notification plan has been defined to explain to all operators the requirement for processing the tam panel and the procedure modification. This training/notification was held in the weeks of the 25 of April and the next one commencing 2 of May, to cover the three shifts. See Attachment -8 Technical notice and Attachment-9 Training plan.
How to respond to NCR’s

• Action Taken to Prevent Recurrence: (cont’d)

3. A follow up plan has been defined to see the correct process of the tam panel, doing specific check during the year. Each 3 months different operators in each line are going to be checked, and in February next year all of them in the annual performance review to the certified personnel. See attachment 9 (follow up plan)

4. Ensure during future audits the auditor is understood.

Objective Evidence Attached:
Final Points

• DO NOT ask the auditor about how to respond to the NCR. The auditors job is to report the findings.
• Have a problem or do not understand how to address an NCR?
• Refer to the tutorials provided underneath the NCR on the supplier discussion screen.
• “Click here for instructions on How to respond to NCR.
• Additionally, a Root Cause Corrective Action tutorial is available at
  • http://www.pri-network.org/resource/docs/1046/RCCANadcapStyle.pdf”
• Cannot meet required time frames, call or email the Staff Engineer
• Further problems – Call the Staff Engineer
Checkpoint

Any Questions
Agenda

• Nadcap NDT Task Group
• Preparing for the Audit
• The Nadcap Audit
• Checklist Review
• Top NCRs and NCR response

• Web Tools & Additional Information
Available Training

• Please visit [www.pri-network.org](http://www.pri-network.org) for the following training material:
  – Prime Orientation and Tutorial
  –Supplier Orientation and Tutorial
  – Supplier Workshops
  – Nadcap Customer Support Initiative (NCSI)
  – Task Group Symposia
  – Basic eAuditNet for Primes and Suppliers
PRI/eQuaLearn Trainings

eQuaLearn has two core tracks:

• General Quality understanding of principles, including:
  – Internal Auditing
  – Problem solving
  – PFMEA
  – Root Cause Corrective Action
  – Introduction to Aerospace Quality
  – Contract Review
  – SPC
  – AS9100 Rev C
PRI/eQuaLearn Program

eQuaLearn has two core tracks:

• General understanding of Nadcap and industry requirements
  – Nadcap Audit Preparations – NDT, Heat Treating, Chemical Processing, and Welding
  – Introduction to Pyrometry

• www.eQuaLearn.com
  – New website that contains details on eQuaLearn program