A STEP BY STEP APPROACH TO NADCAP ACCREDITATION

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ABSTRACT

The Nadcap program is recognized as the premier accreditation program for aerospace and defense contractor supplier accreditation. With this accreditation, an anodizer can effectively access the supplier world of the aerospace and defense industries.

But as recent articles point our ("Becoming an Approved Aerospace Anodizer Supplier, W. J. Fullen, 19th Annual International Anodizing Conference & Symposium, October 6, 2010, Montreal, QC, Canada) the process is rigorous and requires a dedication of resources including time, money and psychological energy.

Why is it so difficult to achieve this accreditation? This paper attempts to lay out a road map for accreditation that is logical and achievable for someone committed to the excellence required to get to the end goal. Accreditation requires a complete understanding of the AC7108D checklist which is the bible of suppliers, auditors and Chemical Processing staff engineers at PRI, and the task group of primes and suppliers who administer the checklist.

You need to start with accreditation to an acceptable quality system by an acceptable registration body before you can proceed to Nadcap and the AC7108D checklist. That would be considered tier one of a system that controls all procedures and processes for a chemical processing supplier. That Accreditation is where the work starts; one needs a systemic approach to Nadcap that will lead to procedures, work instructions and forms that impose control over the processing and will assure compliance with prime specifications, drawings and requirements.

This paper is entitled "A STEP BY STEP APPROACH" because the author believes that the rigors of achieving Nadcap accreditation require a systematic, linear approach over a long enough period of time in order to permit the applicant organization to be able to absorb the systemic and procedural changes that must be adopted. As anodizers, you will be audited under the Chemical Processing Checklist (AC7108, Rev. D).

To begin with, your company must have an acceptable quality system in place or verifiable at your initial audit by including your quality system audit with the chemical processing audit, by complying with AC7004 which is the Nadcap Quality Management System. This system is administered by PRI (the Performance Review Institute), which acts as Registrar for the system. The checklist is available on eAuditNet.com in the documents section, as described later in the paper. One of the appealing things about AC7004 is the manner in which the content identified in section 4, et al, aligns with the AC7108 checklist. This is worth examining before selecting the quality system you wish to use.

Many suppliers (anodizers, platers, painters, etc.) choose to be accredited pursuant to the Aerospace and Defense Quality Standard (AS9100, Rev. C). This standard is under a new revision and it incorporates the ISO9001:2008 base requirements. It is also in alignment with IAQG strategies for on-time, on-quality performance. This certification, in conjunction with Nadcap, can increase the probability that your organization is providing

fault-free products and services and improve performance continuously as required by Nadcap.

The best architecture of a "quality system" usually has several tiers which support the complete "process control". The first tier is the Quality Manual (AC7004 or AS9100). It serves as your "mission statement" or "statement of core philosophy". Below this core document is the "procedures" manual. It should contain all of the procedures required by AC7108D. Some of the best examples the author has seen are structured to follow the structure of AC7004 and AC7108, section by section. The next tier should be specific "work instructions" which describe in detail how each procedure is actually performed. For example, a "water break free" work instruction will instruct the tank operator how to conduct a water break free test as called out in the traveler. The fourth tier should be the forms that verify compliance with any procedures or work instructions requiring "sign off" or verification of compliance with the work instructions or procedure.

This paper will focus on the essentials of the Nadcap chemical processing checklist, AC7108D, and the requirements it imposes on the supplier. This checklist uses the word "procedure" nearly 100 times which should alert you to the need to have robust, revision controlled procedures in every phase of your operations. Accreditation is difficult because Nadcap imposes plant wide process control of everything happening in your plant through the AC7108D checklist. But before commencing on the checklist journey, the author recommends registering with PRI which administers Nadcap. This can be done by contacting PRI through its web site, filling out a preliminary questionnaire on eAuditNet.com and submitting it to PRI for a quote. On receipt of the quote, the supplier can then contact PRI for full eAuditnet access. With full access to the eAuditnet web site, one can access a wealth of resources. In fact, on the web site there is a link called "resources" which will lead to "Public Documents" which contains your reading list to begin the journey.

While in **Public Documents**, go to "**General Documents**" and review and/or download everything from "**Supplier Guidance** to "**Supplier Post-Audit Tutorial**". Be sure to review the tutorials throughout the documents section. Become as familiar as you can with the web site and the resources available to you. The philosophy of PRI is to encourage and help whenever possible. But ultimately you will hold success in your own hands when the initial accreditation audit takes place. Preparing well in advance will serve you best.

After you have done your reading from the web site, print out copies of the AC7108D checklist for your Nadcap Team. Bring people into the process from all parts or your organization. Involve employees early and thoroughly. Don't make the mistake of allowing people to regard the Nadcap audit as something residing in the domain of "quality" and that it is not the concern of others. The best approach is to embrace the concept of "process control" of everything: every bath, every test, every instrument, everybody. Have your team go through the checklist line by line, analyzing and comparing their understanding of the requirements. For smaller suppliers, people will have to assume responsibility for multiple areas.

Be mindful throughtout your preparation that the auditor must clearly indicate, where a nonconformance is found, whether the finding is based on "existence, adequacy, and/or compliance. Existence relates to evidence of a documented procedure or policy. Adequacy relates to the completeness of the procedure or policy and compliance relates to evidence of the effective implementation of the procedure or policy. This should alert you to the fact that just having a policy or procedure is not enough. It must be adequately complete and the implementation must be effective. You will be measured against these standards.

Begin your study of the checklist at page one, section 1; Quality System Approval and Other General Requirements. Pay close attention to the laboratory testing and analysis requirements, as the selection of outside labs requires that you confirm that the lab is properly accredited. Take the checklist literally. If it asks for a procedure then there needs to be an actual procedure. Make sure your procedures are robust and complete; not "sort of got it".

Section 2 of the checklist imposes a requirement that the supplier conduct a self-audit. While this is described as a critical first step, the supplier and the Nadcap team need to have studied the checklist and need to understand the myriad requirements before conducting the self-audit. When you eventually conduct a self-audit, involve your employees early and often. Do the self audit honestly and with a critical eye to whether you can answer "yes" to the checklist questions. Your auditor is going to dig in to areas of doubt. Also, remember that "Murphy's Law" applies when being audited. If there is a test date that is out of compliance with the specification, or a sign-off missing for the review of data, the auditor will find it.

Also, in the self-audit that is to be submitted to the auditor 30 days prior to the audit, don't miss the language in **bold** in section 2.1.1 requiring the supplier to make note of the location and identification of all applicable documentation on the self-audit form. This is a requirement and there will be a finding if you fail to do this. See also section 2.1.3.1 and 3.0.2 regarding the same topic. The rest of section 2 is self-explanatory but do not ignore anything. Understand that the Task Group and the Staff Engineers do not put extraneous language into documents such as the checklist. Every word, phrase, sentence or question is there for a reason. Also be sure to read and understand the definitions contained in section 2 as well as those contained in ISO2080 regarding chemical processing.

Section 3 of the checklist focuses initially on the General Quality System and Process Integrity. It begins with questions about Process Integrity and immediately incorporates Appendix A by reference. Be sure to study Appendix A and its requirements for Continuous Improvement as managed by a "Control Plan". The Chemical Processing Task Group believes strongly in the discipline of continuous improvement. If the supplier is not improving then the opposite is probably taking place.

Also included in Section 3 is Training, Job Documentation, Process & Quality Planning, Purchasing-Source Selection, Receiving Procedures, Housekeeping, Product Handling, Calibration of Processing and Testing Equipment and Control of Non-Conforming Parts. Each of those sections calls for "procedures". These subsections of Section 3 cover much of what goes on in the chemical processing plant; the physical activity that is subject to

"procedures" and "process control". Study them closely and institute appropriately. You will want to create systems of procedures and forms that give your company control and verification of compliance with all of these sections. Be sure to have training procedures, records of training, job descriptions, and a training log. Frequently "training" is used by suppliers as a root cause for a finding where someone made a mistake or did not follow a work instruction to the letter. But the staff engineers at Nadcap are not going to accept this as a root cause. You will need a systemic solution to "operator error".

And, finally Section 3 addresses Internal Quality Audits. Essentially we come full circle in Sections 2 & 3 concerning the importance of Internal Audits/Self Audits. Effective self audits will identify where objective evidence is to show compliance with a checklist question or will honestly identify a shortcoming which needs to be corrected. Remember to audit everything with respect to existence, adequacy and compliance. Internal audit findings should generate a root cause analysis and corrective action that is documented. It is essential that the supplier selects and trains internal auditors to be effective and objective in conducting the audits. This is continuous improvement at work. The material on eAuditNet.com contain some excellent presentations on root cause analysis and corrective action. Be sure to review them.

Section 4 of the AC7108/D checklist deals with Periodic Testing, Lot Testing and Solution Analysis. These disciplines, often set out in industry specifications, establish methods to measure the results of a process and control the chemistry used in the process. Lot testing is the testing that is conducted on a "lot" of parts that are being, or have been processed. For example, visual appearance or thickness. Periodic testing is the testing conducted periodically, according to specification requirements, to assure quality results that comply with the specification. For example, corrosion testing or coating weight testing. To emphasize the degree of detail Nadcap requires, know that if you use more than one seal, then you need to run coupons for each and every seal; separate test coupons for dichromate, high temp nickel, mid temp nickel and hot DI water. The section also addresses your tank chemistry and your laboratory. Chemistry is always changing and being able to accurately measure and adjust chemistry in a timely way is essential to meeting the process control requirements in the aerospace industry and under Nadcap.

Download a copy of Table 1 from eAuditNet.com and compare the requirements of Table 1 to the Test Matrix required in section 4.1.1. If an internal testing matrix does not exist, create one.

Review solution analysis records; check testing intervals for compliance with Table 1 as well. Be sure to have a solution analysis matrix like the one in Appendix C.

When reviewing Section 4, pay particular attention to Test Failure, Replacement Testing and Retesting of Periodic Test Pieces. This is an area that can be tricky and it is essential to understand the definitional differences. Be sure to have procedures covering these tests.

Section 5 deals with Process Equipment Control and Maintenance. There are several sections which may not apply and can be marked NA for anodizers. Be sure to check

closely. Also, don't take for granted that you have everything covered in this section under control. Read the question closely and with a critical eye. Pay attention to labeling, layout design, hoist disconnect, tank agitation and fixture design. Be sure timers are calibrated along with anything else that is used to "measure". You will also need a "calibration log" in which to record your calibration schedule and compliance. Be sure your power supplies require manual restart if there is a power loss. Do your instruction or traveler give specific instructions about masking; or specific locations for thickness testing?

After you have completed your journey through the first five sections of the checklist and have a thorough understanding of the requirements and have achieved compliance with the requirements of these sections, turn your attention to job audits. Download "The Chemical Processing Auditor's Handbook". Review it to get an understanding of the manner and method of the Nadcap auditor. Section 6 is the part of the checklist auditors use to determine compliance with specifications and the checklist when processing jobs. This is where the rubber meets the road. It is most stressful on your employees, particularly tank operators, and can lead to mistakes or errors just because of nerves. It is extremely important that the elements of Appendix E be accounted for in your traveler and by your operators. Operator Controlled Variables (OCV) are examined very closely to be sure they are done correctly and appropriately signed off. Perform your job audits using the Section 6 form, but also use the remainder of the checklist. Be sure to audit all of your processes, conducting a minimum of four job audits. Conduct the job audit initially as though the shop paper or traveler is your only guide. Don't coach operators; let them do the job as they normally would. At the end of the job audit, verify compliance with specifications completely; all elements of the specification.

When you have findings, which you should, generate corrective actions for the findings. This allows for documentation of what has been done through the appropriate use of continuous improvement methodologies. Be sure to follow-up on the corrective actions to be sure they were effective. If not, start again until the results are satisfactory.

When you have your real audit, don't be surprised when there are findings. And don't engage in arguments with the auditor. The auditors are trained to be objective and to look for objective evidence upon which he/she can answer "yes" to the checklist. If the evidence is inadequate (existence, compliance, adequacy) then the answer will be no. Auditors see black and white. After the audit report is filed, you will have a chance to respond to the findings and communicate with the staff engineer assigned to you. Staff engineers are more apt to see gray. Also listen to the staff engineer. After the first supplier submittal and staff engineer response, study the response from the staff engineer and schedule a conversation by emailing him and arranging a mutually agreeable time. Staff Engineers are extremely busy and recognizing their schedule limitations is the diplomatic thing to do. Listen closely to the answers the staff engineer provides to you questions. What the staff engineer says can be a road map to effective responses.

If you wish to access the aerospace finishing business, engage Nadcap fully; it will improve your company and open new avenues of business.