

ENIQ position on

## NDE Personnel Re-qualification or a Need to Maintain Proficiency

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## ABSTRACT

The qualification of a non-destructive examination (NDE) system provides a licensee with confidence the results from an inspection are reliable. Today, the initial qualification of NDE systems used for the inspection of nuclear power plants is considered routine and well understood. However, concerning the need and, if required, a method to re-qualify NDE personnel there is a wide diversity of opinions. After some discussion on the subject it is recognized that it would be of immense value to licensees' and others if the NUGENIA Technical Area 8 (TA8) – European Network for Inspection and Qualification (ENIQ) were to provide a consensus on this divisive subject.

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## 1. Definition of personnel re-qualification

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In this document, personnel re-qualification is defined to be a process, usually conducted at defined intervals, whereby a previously qualified inspector re-confirms his/her competency before an Independent Qualification Body (IQB) with respect to their performance using a qualified inspection procedure. Re-qualification is a separate process from requirements related to re-certification of personnel as defined, for example, under a general NDE certification scheme such as ISO 9712/EN473.

## 2. The need for consensus on re-qualification

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The qualification process required for the NDE system (procedure, equipment and personnel) must be sufficient to demonstrate the capability to achieve a licensee's specified performance requirements. ENIQ guidelines recommend the qualification should be carried out through a combination of theoretical evidence and practical trials. Most commonly the performance requirements are described within a technical inspection specification prepared by, or for, the licensee and then shared with others such as regulatory agencies and candidate inspection vendors / service providers. For situations where the inspection application is a periodic inspection, the licensee must consider the impact of many factors (including the time interval between subsequent inspections) to be included in their calculations to arrive at the performance specifications. Consistent with the performance specification, the accredited inspection laboratory (also referred to as the inspection vendor or inspection service provider) that will carry out the inspection will assemble an inspection system and prepare for the qualification and subsequent inspection.

Preferably the qualification process is facilitated by an independent third party, i.e. an IQB, whose role is to confirm that all essential components of the NDE system perform their designated function. Upon the successful completion of the qualification process, the IQB will issue a statement, or other form of attestation, informing the licensee of the qualification results.

When issuing the qualification results, it is understood by all parties that any changes to the licensee's plant or significant operational events may cause the licensee to modify the technical specifications. In turn, this is likely to invalidate the whole or part of the qualification results, requiring additional qualification activities. Likewise, it is understood that a change in the qualified NDE system may also cause additional qualification activities. Providing there are no changes to the technical specification or the NDE system it is understood that no further equipment and procedure qualification activities are required.

Generally, upon completion of a successful qualification there is no time frame specified between the initial qualification of the NDE system, including personnel, and the time it is applied by the inspection vendor at the licensee's plant. Similarly there is no statement or restriction on the amount of time allowed between subsequent applications of the qualified NDE system. This leads to the conclusion that, providing all essential elements of the qualification remain the same, then regardless of the elapsed time the qualification remains valid. These conclusions can be supported and are justifiable within the nuclear industry. This is because licensees rely on a quality assurance (QA) program to control the customary practices and essential parameters within a qualified NDE system. These include document control, equipment calibration, equipment substitution and personnel certification. Unfortunately, the conclusions cannot be uniformly applied since, in some countries, there are regulatory requirements in place to re-qualify the NDE personnel on a periodic basis.

Experience has shown that, prior to the qualification practical trials, NDE personnel benefit from training in the application of the procedure and an opportunity to practice using test specimens simulating the inspection application and being similar to those used for the qualification. It can be shown that these actions have a positive impact on the initial qualification results, but whether the proficiency of the inspector at the time of the qualification can be maintained over time is questionable. This question appears to be the primary driver for the re-qualification of NDE personnel.

To date the experience with re-qualification of inspectors is limited and may appear to be troubling. For example, for the period of 1999-2006, re-qualification for the detection of inter granular stress corrosion cracking (IGSCC) shows a pass rate of only 56% (EPRI Report 1015150) and caused the United States Nuclear Regulatory Commission (NRC) to question the effectiveness of the IGSCC re-qualification system. During a meeting on January 8, 2014 NRC representatives reported they had recently completed work to calculate the approximate probability of detection (POD) characteristics of inspectors in ideal conditions using the pass rates of the EPRI Performance Demonstration Initiative (PDI). As part of this work the NRC revisited the question “Why are re-qualification pass rates for IGSCC testing similar to the initial tests?” The conclusion was “This appears to be a result of the difficulty of the test and the skill distribution of the inspectors.” Experience from other countries remains largely undocumented and it appears that the most common approach to re-qualifying personnel is limited to performing a similar practical test to the original practical trial. However, others have described a much more comprehensive approach, which is understood to include, training, evaluations, and written examinations. Unfortunately, even when specified as a regulatory requirement, there is little open information available on either approach.

Where regulatory requirements for inspector re-qualification exist, for example in Sweden and Switzerland, an informal literature search failed to discover the technical basis of personnel re-qualification requirements. With the exception of ENIQ Recommended Practice 10, ENIQ report No. 38, Personnel Qualification, it is evident that ENIQ has largely remained silent in terms of providing guidance on the subject of re-qualification of personnel. Within ENIQ report no. 38, it is stated that the qualification assigned to an inspector will expire following a pre-determined length of time and there may be the need for such qualifications to be renewed. As already discussed, this statement is only partially accurate since some European countries that embrace ENIQ methodology do not have time based expiration requirements.

When the subject of personnel re-qualification was discussed with members of the Sub-Area on Qualification (SA8.1) and the Sub-Area on IQB (SA8.3) there are diverse opinions. Both extremes appear to have no technical basis and appear to be driven either by one or more of the following:

- A situation where the initial qualification of personnel is not required, e.g. in France.
- Existing QA Programs.
- Regulatory requirements, e.g. in Switzerland, Sweden and Spain.
- Personal experience where the results from a re-qualification were not favourable.
- A perception that an individual's experience declines following the qualification.
- Re-qualification after a fixed pre-determined period (e.g. 5 years) may not be the most efficient way, if the next inspection with the qualified procedure is 1-3 years in the future.

The lack of a technical basis raises concerns, since ENIQ was established in the early 1990s by European nuclear utilities with the intent of sharing inspection qualification expertise and resources and to establish a common approach to inspection qualification.

Licensees may conclude that there are many operational, technical and economic issues associated with the subject of personnel re-qualification, which need to be addressed. Some inspection vendors are wary of the demands on qualification / re-qualification as they consider it a bureaucratic and costly hurdle, which is not achieving its goals in an efficient manner, especially as the feedback they receive seems to be mostly rather sketchy. Globally the lack of requirements or inconsistencies in the qualification / re-qualification of personnel add a substantial barrier for the transport of qualification beyond national borders. But perhaps most troublesome is the loss of public confidence and the potential consequence to a licensee's operations

should a qualified inspector fail a re-qualification test and unintentionally bring into question his/her in-plant results since the initial qualification. This issue alone is of significant concern and until nuclear industry can agree upon a common position, the unjustified re-qualification of NDE personnel should be avoided.<sup>1</sup>

Accordingly, the purpose of this paper is to initiate the dialogue necessary for ENIQ / NUGENIA to find a common position enabling NDE personnel proficiency and the qualifications they hold to be maintained in an efficient and cost-effective way without unnecessary burden to the licensee.

### 3. What the licensee needs

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Foremost, a licensee needs confidence that the results of an inspection are reliable. Generally, for a specified task, establishing the reliability of an inspection system is determined prior to the inspection through the initial qualification process. During this process all aspects of the inspection system are subjected to rigorous evaluation. Thereafter for compliance, the periodic in-service inspection campaign or in readiness of emergent needs, a licensee needs to have assurance of the qualified NDE system, including the personnel, that it can be re-deployed to the same level of reliability as originally demonstrated.

### 4. Consensus opinion

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Licensees can agree that the proficiency of the inspection personnel at the time of the inspection needs to be at least equal to, if not even better than, at the time of the initial qualification. How this is established and maintained has yet to be agreed upon.

By introducing qualification requirements, licensees initially established an individual's proficiency during the NDE qualification process, in which it is attested that the inspection personnel has the required pre-requisite training and NDE certification specified within the inspection procedure. Thereafter, a licensee requires it to be the responsibility of the individual and his/her employer to maintain the credentials (the pre-requisite training and NDE certification) in accordance with a quality assurance program, procedures and practices applicable to the qualified procedure. In some cases, the regulatory authority may demand periodic re-qualification and it is acknowledged that changing such demands is beyond the scope of this document.

### 5. ENIQ's role in establishing a common position on re-qualification

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To arrive at a common position on the NDE re-qualification for personnel, it is proposed that the TA8 (ENIQ) Steering Committee takes a leadership role to enable research to provide licensees and others with sufficient assurance that the qualified NDE personnel maintains its proficiency and that the NDE system can be re-deployed, so that it can operate to the same level of reliability as originally demonstrated.

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<sup>1</sup> Note that in some countries the regulatory authorities may demand periodic re-qualification of personnel and it is acknowledged the statements made are beyond the scope of this document.

It is recommended that SA8.3 performs a study on the needs, experience, benefit and recommended approaches for maintaining the proficiency of NDE personnel. The study should answer the following questions:

- What similar schemes exist in the nuclear industry and in other relevant industrial areas where an individual is expected to maintain proficiency, e.g. welder qualifications?
- What is the experience and lessons-learned with existing schemes?
- What are the arguments in favour or against re-qualification of NDE personnel?
- What is the recommended common approach for future qualification of NDE personnel?