

**Personnel Qualification and Certification Program in Pressure Decay Leak Testing on the RT-100 Type (B) Cask - 17229**

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**ABSTRACT**

The requirements for qualifications and certification of leak test personnel on Type (B) shipping casks have been more clearly defined with the recent release of ANSI N14.5-2014, Leak Tests on Radioactive Packages for Shipment. The latest version creates a standardized approach for qualifying and certifying personnel to conduct pre-shipment leakage tests on Type (B) packages. The U.S Nuclear Regulatory Commission (NRC) is currently updating the Regulatory Guide R.G 7.4, Leakage Tests on Packages for shipment of Radioactive Material, to endorse ANSI N14.5-2014.

According to ANSI N14.5-2014, leakage testing shall be performed in accordance with written procedures by qualified and certified personnel in accordance with the requirements of ASNT SNT-TC-1A-2006, Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing. This is a significant modification to the old standard, ANSI N14.5-1997, which simply states that pressure leak testing shall be conducted by trained and certified personnel without reference to any specific certification standards or regulations.

SNT-TC-1A published by the American Society for Nondestructive Testing (ASNT) has several advantages to employers; namely, it allows for a Limited NDT Level II certification program. Limited certifications are especially valuable for personnel who possess limited experience and wish to become a certified Limited NDT Level II in a specific technique on a specific cask using a specific procedure and equipment.

Robatel Technologies recently developed a comprehensive qualification and training program based on the recommendations of SNT-TC-1A for Exelon Corporation to certify their employees to a Limited NDT Level II in Pressure Decay Leak Testing on the RT-100 Cask. The project scope included the development of a training and qualification program (Written practice), writing a pressure decay leak test procedure, the design of a pressure decay leak test manifold, and the delivery of classroom training. The written practice outlines the requirements to ensure that

personnel participating in the program have the necessary qualification, experience, and training to become certified in the leak test method.

The program will give Exelon the liberty to conduct their own leak testing on the RT-100 without the need to rely on outside resources for leak testing. When fully implemented, the program is expected to improve productivity and eliminate schedule delays, along with substantial economic benefits. Following the appropriate standards and industry best practices, the project was successfully completed and scheduled to be fully implemented by Exelon's Nuclear Stations by the end of 2016.

## **INTRODUCTION**

ANSI N14.5 provides an acceptable methods for demonstrating that Type B packages designed for transport of normal-form radioactive material comply with the regulatory containment requirements specified in Title 10 of the Code of Federal Regulations, Part 71. The latest release of this standard ANSI N14.5-2014 recommended a new mechanism for qualifying and certifying leak test personnel in accordance with the recommendations of SNT-TC-1A-2006, Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing. The NRC expressed an interest in adapting the new change in their Regulatory Guide R.G 7.4, Leakage Tests on Packages for shipment of Radioactive Material. Proactively, Exelon initiated the development of a comprehensive training program according to the recommendations of SNT-TC-1A-2006, and is one of the first utilities to implement such a program. The project scope included the development of a training and qualification program that outlines the minimum requirements for the leak test personnel to conduct a pressure decay leak test on the RT-100 cask, writing a pressure decay leak test procedure, the design of a pressure decay leak test manifold, and finally the delivery of classroom training to ensure that personnel are familiar with the fundamentals of pressure change leak testing in general and pressure decay in particular.

## **METHODS AND RESULTS**

SNT-TC-1A-2006 is a recommended practice for personnel qualification and certification in nondestructive testing that allows for a limited type certifications for specific functions unlike the ASNT-CP-189 standard which does not allow for limited certification or any deviation from the written requirements. The Exelon's qualification program for limited NDT level II in pressure decay leak testing was written based on the recommendations of SNT-TC-1A-2006 and in close collaboration with a certified NDT level III in leak testing. The program outlines the minimum requirements for NDT instructors to train qualified candidates on the principles of leak testing, the minimum requirements for personnel qualifications, and the minimum requirements to obtain the certification. For instance, personnel minimum

qualification requirements are 200 experience hours in nondestructive testing including 35 hours in pressure change leak testing techniques. To obtain the limited certification, a candidate shall attend an organized 16 hours of classroom training and pass two written and one practical examinations administered by a NDT level III in leak testing or qualified representative. The training program also mandates that each candidate pass a vision examination for near distance and color differentiation. The certificate obtained per this program is valid for 5 years as long as the personnel continues to perform the functions to which certified at minimum once every 6 months.

The 16 hours of classroom training are utilized to educate the candidates in the basic principles of leak testing and divided into five main courses, fundamentals in leak testing course, pressure rise leak testing course, pressure decay leak testing course, safety in leak testing course, and specific training course. The fundamentals course concentrates on the basic concepts in pressure change leak testing such as, terminology, leak testing units, reasons for leak testing, functions of leak testing, vacuum fundamentals, characteristics of gases, flow characteristics, and physical units in leak testing (Volume, pressure, time, and temperature). The second and third courses concentrates on pressure rise and pressure decay techniques respectively. Topics addressed are basic principles and practices, testing material and equipment, effect of temperature and ambient conditions, troubleshooting techniques, acceptance criteria, advantages, and limitations for each technique. The fourth course addresses safety in leak testing such as, safety precautions, pressure precautions, and most commonly used safety devices in leak testing. The final training segment focuses on the specific technique to which the candidates are certified, the specific procedure that will be used to perform the pressure decay leak test on the RT-100 cask, and the RT-100 manifold design and specifications.

On the third training day, each candidate will take three exams. The first exam, is a general multiple choices exam that covers first four topic areas covered during the 16 hours of classroom training. The second exam, is a specific multiple choice exam focused on the fifth topic area discussed during the classroom training (RT-100 pressure decay leak test technique, leak test procedure, and manifold design and specifications). The third exam, is a practical mock up exam administered by a NDT level III in leak testing to assess the candidates' ability to perform pressure decay leak testing following the written procedures and the ability to document the results accurately.

Robatel conducted two training sessions to date, the first training session was conducted in August of 2016 to train and qualify five candidates from LaSalle, Byron, Braidwood, and Dresden nuclear stations. The second training session was conducted in November of 2016 to train and qualify seven candidates from Nine mile point, Calvert cliffs, Limerick, LaSalle, and Peach bottom nuclear power stations. With 12

certified leak test personnel, Exelon now can rely solely on their internal staff to perform pressure decay leakage testing on the RT-100 cask. Additionally, Exelon is expected to have a substantial financial savings in the coming years as a result of this training program.

## **CONCLUSION**

The Exelon's training program eliminates some of the ambiguity surrounding the requirements leak test personnel qualifications and training. The training program gives Exelon a methodical and consistent procedure to train their leak test personnel on the RT-100 periodically, and ensures that personnel are well versed in the leak test method and equipment before leak testing the RT-100 Cask. By the end of November 2016 Exelon will have 12 certified leak personnel which gives Exelon the liberty to conduct their own leak testing on the RT-100 Cask. Having internal staff certified should also improve productivity, eliminate schedule delays, and eliminate the reliance on outside resources.

## **REFERENCES**

1. American National Standards Institute (2014). ANSI N14.5, for Radioactive Materials — Leakage Tests on Packages for Shipment.
2. U.S Nuclear Regulatory Commission (2011). Regulatory Guide 7.4, Leakage Tests on Packages for Shipment of Radioactive Material.
3. American Society for Nondestructive Testing (2006). SNT-TC-1A, Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing.
4. American Society for Nondestructive Testing (1995). ASNT-CP-189, Standard for Qualification and Certification of Nondestructive Testing Personnel.
5. Robatel Technologies, RT-100 Cask Pressure Decay Leak Test Procedure. Revision 1. Dated Sep 13, 2016.