Status of Developing the Regulatory Guideline to Buried Piping & Tanks in Korea

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1. Introduction

Damage of buried piping is one of the important issues facing the nuclear power industry in recent years. Unlike the above ground piping, the buried piping is exposed to the harsh environment such as corrosion and high load condition by water and soil. If the leakage occurs on the buried piping, it is very difficult to find its cause and to repair it in a timely manner. In Korea, if the leakage on buried piping is identified, the corrective actions are implemented with temporary repair method. However, the preventive actions to damage of buried piping is fairly limited. Therefore, the effective aging and integrity management program to buried piping including the preventive actions is necessary, that is applicable to the Korean nuclear power industry. In this study, the US regulatory trends to buried piping & tanks are investigated through the regulatory requirement and the utilities' management documents to develop the Korean regulatory guidelines. This guideline will be used for in-service inspection and licensing of continued operation of nuclear power plant.

2. Guidelines for in-service inspection to buried and underground piping & tanks in U.S.

The utilities of nuclear power plant (NPP) in U.S. review the management program to buried and underground piping & tanks using the guidelines themselves of Nuclear Energy Institute (NEI), NEI 09-14, according to the requirement of US Nuclear Regulatory Commission (US NRC) [1]. And Electric Power Research Institute (EPRI) has published the guideline for systematic management to buried and underground piping & tanks (EPRI-1016456) [2]. In 2009, the American utilities organized the buried pipe integrity group (BPIG) with mutual consent to support their technical issues related to buried and underground piping & tanks.

The US NRC oversight the buried and underground piping and tanks of NPP utilities using the temporary inspection manual TI-2515-182 [3]. They evaluate whether the utilities have integrity management plans and execute their plans, and perform the inspection to structural integrity and leakage of buried and underground piping & tanks.

Recently, the American Society of Mechanical Engineers (ASME) is developing the Boiler & Pressure Vessel Code (BPVC) code case which is periodic inspection program to buried and underground piping & tanks. The US NRC's temporary inspection manual will be substituted to this code case.

The regulatory systems for in-service inspection of Korea is similar to those of US system. Therefore, Korean regulatory body has a plan to use the US system with some modification taking into account Korean regulatory and industry situation.

3. Guidelines for license renewal to buried and underground piping & tanks in U.S.

Generic Aging Lessons Learned (GALL) Report (NUREG-1801, Rev.2) is technical guidelines for license renewal of NPP in U.S. In the NUREG-1801, the aging management program to buried and underground piping & tanks (XI.M41) was proposed [4]. However, US NRC decided that the LR-ISG-2015-01 [5] including some requirement changes is applied as regulatory guideline until the NUREG-1801, Rev.3 is developed.

In Korea, the evaluation for licensing of continued operation is performed by regulatory body. This legal system is similar to the US license renewal system. So, the US system for license renewal is also applicable to Korea

4. Conclusion

In this study, status of management program to buried and underground piping & tanks was investigated in all aspects of regulatory and industry fields. And comparing and analyzing between Korean and U.S. system was performed. It was confirmed that the Korean management system of buried and underground piping & tanks is not established at the same level as the U.S. However, the similarity of legal and regulatory systems exists between Korea and U.S. So, the draft regulatory guideline to buried and underground piping & tanks will be developed referencing the U.S. management systems.

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