Development of a One-Time Inspection Program for the Continued Operation of Hanbit Units 1 and 2

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1. Introduction

A One-Time Inspection (OTI) is a critical aging management program (AMP) required prior to the restart of nuclear power plants for continued operation. Korea Hydro & Nuclear Power (KHNP) is currently pursuing the continued operation licensing for Hanbit Units 1 and 2. Accordingly, a new OTI program has been developed and implemented. This paper presents the development results of the OTI program tailored for Hanbit Units 1 and 2.

2. Methods and Results

The OTI program for Hanbit Units 1 and 2 was developed based on the regulatory requirements outlined in NUREG-1801 Rev.2 and LR-ISG-2011-01 Rev.1 [1,2].

2.1 Program Purpose

The OTI is designed to verify the effectiveness of existing AMPs for components where aging effects are either not expected or expected to progress very slowly. By conducting a one-time inspection no earlier than 10 years prior to the period of extended operation - targeting components exposed to slow aging over 30 years - the program confirms that aging degradation will remain insignificant during the continued operation period [1].

2.2 Target Selection

To verify the effectiveness of system-wide aging management programs, the program focuses on three primary AMPs: Water Chemisty, Fuel Oil Chemistry, and Lubricating Oil Analysis, by selecting and inspecting specific, representative locations within the systems. Components were categorized into 14 distinct groups based on combinations of material, environment, and potential aging effects (loss of material, cracking, reduction of heat transfer). A representative sampling methodology was applied, selecting 20% of the population or a maximum of 25 components per group [1]. Consequently, 53 sample categories were selected from a total population of 107 component categories (e.g., piping, valves, tanks, and heat exchangers) [3,4].

2.3 Inspection Methods

In accordance with NUREG-1801 Rev.2, non-destructive examination techniques were systematically mapped to specific aging effects. The selected methods include visual examinations (VT-1, VT-3, EVT-1) and volumetric testing (UT, UTM) [3,4].

2.4 Acceptance Criteria and Corrective Actions

Since NUREG-1801 does not provide explicit acceptance criteria, the Hanbit Units 1 and 2 OTI program established quantitative criteria based on applicable industry standards, such as ASME codes. If these acceptance criteria are not met, the procedure outlines the need for follow-up inspections to expand the inspection sample size and scope. If necessary, periodic inspections will be implemented during the continued operation period [3,4].

Fig.1 below presents the flowchart for the OTI program of Hanbit Units 1 and 2 [4].

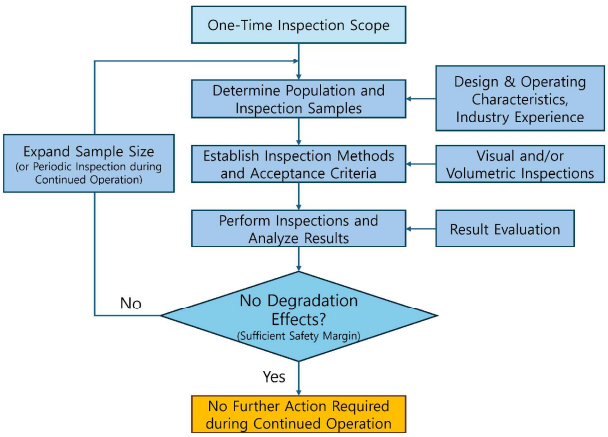


Fig. 1. Flowchart of the One-Time Inspection Procedure

3. Conclusions

The newly developed One-Time Inspection program for Hanbit Units 1 and 2 establishes a robust and systematic framework to verify the effectiveness of system-wide aging management programs through targeted inspections of specific locations. By successfully aligning with NRC guidelines and defining

clear, quantitative acceptace criteria based on industry standards such as ASME codes, the program ensures that any unforeseen aging degradation will be proactively identified and managed. This provides a strong technical basis for structural integrity, ultimately supporting the safe and reliable long-term operation of the NPPs.

REFERENCES

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