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Request from: Public Utilities Regulatory Authority

Question:

Describe the methodologies the Company uses to analyze remainder-of-life and asset health for station transformers (e.g., dissolved gas analysis). Provide any documents describing Eversource's internal methodologies, standards and procedures for testing and evaluating transformer asset health, disseminating test results to the Company's planning staff, and triggering an infrastructure replacement project.

Response:

Eversource evaluates the remainder-of-life and overall health of station transformers through a condition-based asset management approach that integrates diagnostic testing, inspection results, operational experience, engineering evaluation, and system planning considerations. Transformer replacement decisions are not driven by age alone and are not based on any single test or metric. Asset age is considered as one contextual factor within a broader assessment of condition, performance, and system risk.

Station transformers are designed with an expected service life of approximately 40 years; however, actual longevity varies depending on loading history, maintenance practices, environmental conditions, and operating stresses. As a result, Eversource emphasizes observed condition and performance trends, with age used to help inform relative risk and prioritization rather than to establish prescriptive replacement timing.

Transformer condition is monitored throughout the asset's service life through routine inspections, maintenance activities, and diagnostic testing. Information from these activities is reviewed collectively to identify degrading conditions, adverse trends, or potential reliability concerns that may warrant further engineering evaluation.

A primary diagnostic method used is dissolved gas analysis (DGA) and oil quality testing. Oil samples are periodically obtained from substation transformers, including main tanks and load tap changers, and are analyzed in accordance with applicable ASTM and IEC standards. Results are evaluated and trended over time to identify indicators of abnormal thermal, electrical, mechanical, or oil-related conditions. Engineering personnel review these results and determine appropriate actions, which may include maintenance activities, enhanced monitoring, or additional technical evaluation.

Eversource utilizes industry-supported analytical tools, including the Electric Power Research Institute (EPRI) Power Transformer Expert System (PTX), to support consistent transformer condition assessment across the fleet. PTX considers multiple factors when developing qualitative health indices, including; normal degradation, abnormal thermal conditions, abnormal electrical conditions, abnormal core conditions, oil quality, and age.

These factors are evaluated collectively to provide insight into overall asset condition and relative risk. PTX outputs are used as decision-support information and do not serve as automatic replacement criteria. Engineering judgment and operational experience remain central to evaluating results and identifying appropriate actions.

When assessments indicate declining condition or increased risk, transformers may be identified for additional consideration. Potential refurbishment or replacement actions are informed through coordination among Asset Management, System Planning, Substation Engineering, Substation Technical Engineering, and Substation Operations, using the available condition information, operational knowledge, and planning input to determine appropriate next steps.

In parallel, System Planning evaluates station transformers relative to current and forecasted system capacity needs. Where projected system needs exceed existing capability, planning considerations are evaluated alongside transformer condition, age, and operational risk to identify suitable solutions.

Through this integrated process—combining condition monitoring, diagnostic testing, qualitative health indicators, age as a supplemental factor, engineering judgment, and planning coordination—Eversource manages the health of its station transformer fleet while avoiding prescriptive, age-based replacement practices.