Dominion Engineering, Inc.

Ultrasonic Jet Pump Cleaning

Background

During normal operation of a BWR, impurities lead to fouling of the jet pumps which recirculate the reactor water. Jet pump fouling can lead to performance degradation issues including vibration, accelerated wear and increases in plant dose rates (because Stellite® wear surfaces release Co-59 which is activated to Co-60 during normal plant operation). Wear can also release metallic fragments, resulting in degradation of hydraulic performance of the jet pumps, and challenging plant reliability and fuel performance.

Description

Jet pump repair or replacement is a costly way to address or mitigate fouling-related degradation. Ultrasonic jet pump cleaning provides a cost-effective means to address fouling, and restore performance without jet pump repair or replacement. During the process, ultrasonic cleaning equipment is inserted into the jet pump to disrupt the fouling deposits that have accumulated during operation. Simultaneously, the liberated deposits are collected using an integrated vacuum head. Suction flow and filtration during the process are provided by an AMFM-B500 filtration system or, if desired, an alternate filter system.

Insertion of transducer into BWR jet pump

BWR ultrasonic jet pump cleaning

Plant Experience and Benefits

- Joint development effort with Exelon that has been applied at BWR units within the Exelon fleet
- Provides a cost-effective option for mitigating jet pump fouling and restoring performance without jet pump repair or replacement
- Improves radiological performance, plant reliability and fuel performance by mitigating wear and ingress of activated metallic fragments to the reactor

Features

- Ultrasonic cleaning wand designed for insertion in BWR jet pump
- Integrated suction head for collection of liberated deposits
- Designed for use with an AMFM-B500 for suction and filtration
- Requires one 3-phase, 480 V receptacle for ultrasonic cleaning and filtration equipment

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