[Form 2 (to be reported to Committee on Countermeasures for Contaminated Water Treatment and to be disclosed to public)

Technology Information	
Area	1 (Select the number from “Areas of Technologies Requested”)
Title	Accumulation of contaminated water
Submitted by	EPRI

1. Overview of Technologies (features, specification, functions, owners, etc.)

As discussed below, EPRI does not have specific technologies that are directly applicable to the questions outlined in this area. However, based on the practical experience of the EPRI staff, EPRI offers the following observations and advice. EPRI will be pleased to assist the IRID and TEPCO in the area of tank and water management, including evaluation of metal decontamination techniques, water filtration and leakage detection.

Tank Fabrication: EPRI does not have specific technology or experience in tank fabrication techniques. It is understood that the tanks will be fabricated from carbon steel. Given the high salt content of much of the accumulated water, this is a good material choice. However, to enhance long-term material reliability and eventual decontamination, it is recommended that the tanks be coated if practicable (epoxy or other service-suitable coating). Tanks constructed of stainless steel should be considered for very clean water to minimize contamination of both the tank material and stored water.

It is understood that site access by road and sea is limited, and that the space on site is limited so that tall, high capacity tanks are preferred. However, having a small number of mobile tanks on site for flexibility should be considered. Larger capacity, trailer mounted coated carbon steel and stainless steel tanks are commercially available. These tanks cannot be used to transport liquids, but offer storage up to 79 m^3. The tanks are generally called FRAC tanks (short for fractionalization).

Leak Detection: EPRI does not have specific technology for local leak detection around tanks, including mobile shielded detectors. However, it is recommended consideration of use of swipes for leakage monitoring. Such swipes can be monitored in a small purpose-built shielded enclosure constructed adjacent to the tank location. This approach is routinely used at plant sites for field monitoring of contamination.

EPRI likewise does not have specific technologies for leak detection using dyes. However, EPRI staff members are familiar with use of fluorescent dyes in similar applications. These dyes, such as fluorescein, are routinely used in both biomedical testing and for leak detection in pipelines and tanks. They may be applied at very low concentrations and are considered environmentally benign.

In addition to detection of leakage from the tanks to the secondary containment berm, a robust

procedure should be established to control release of rainwater from the berm and for monitoring of leakage to the environment. This should include a protocol for sampling and approval of release of the accumulated rainwater. It is understood that leakage from the tank storage area to the environment occurred at the 1F site through a rainwater drain valve that was maintained open. This is an atypical practice.

Tank Removal: EPRI does not have specific technology related to decommissioning of radioactive waste storage tanks. However, based on staff experience, the following observations are offered:

- Since water with a high dissolved solids concentration was stored in the carbon steel tanks, it is expected that the tanks will contain a high solids burden from corrosion of the tank material. This material will need to be removed as liquids are transferred to new tanks. Generally, EPRI recommends limiting the use of disposable filters due to dose associated with handling and waste generation considerations. Alternate means of particulate material removal should be considered. This may include alternate media for filtration such as charcoal or alternate particulate removal methods such as cyclone separators. If filters have to be used, consider the use of back-washable filters.
- For filters that are generated, employ processing strategies such as filter crushing or shearing to reduce storage space requirements. Also consider the use of absorbents for capture of liquids that will be released from the waste filters.
- Initially, the emptied tanks could be hydrolazed to remove gross surface contamination and reduce dose associated with subsequent decontamination activities. To the extent practicable, the material may be reused after gross decontamination to fabricate new tanks. Generally, many technologies exist to decontaminate metal surfaces. Chemical decontamination, strippable coatings, CO_2 or liquid nitrogen blasting, high pressure water washing and coatings to fix contamination are of few of the possible techniques to be applied.
- Large tanks at Trojan were chemically decontaminated to lower dose for dismantlement (see EPRI TR-109036). Chemical decontamination using a spray application could effectively be used for the carbon steel tanks at the 1F site prior to tank dismantlement to remove the majority of the surface contamination and reduce worker dose during dismantlement. This would also facilitate reuse of the material.

2. Notes (Please provide following information if possible.)

- Technology readiness level (including cases of application, not limited to nuclear industry, time line for application)

As noted above, EPRI does not have specific technologies readily available in any of the areas discussed above. However, EPRI is prepared to offer assistance in evaluation and/or implementation of the provided recommendations.

- Challenges

- Others (referential information on patent if any)

【Areas of Technologies Requested】

(1) Accumulation of contaminated water (Storage Tanks, etc.)
(2) Treatment of contaminated water (Tritium, etc.)
(3) Removal of radioactive materials from the seawater in the harbor
(4) Management of contaminated water inside the buildings
(5) Management measures to block groundwater from flowing into the site
(6) Understanding the groundwater flow