

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

Technology Information	
Area	4 (Select the number from "Areas of Technologies Requested")
Title	Management of contaminated water inside the buildings
Submitted by	EPRI
<p>1. Overview of Technologies (features, specification, functions, owners, etc.)</p> <p>It is understood that the following methods are currently being used to preclude flow of contaminated water out from the Fukushima Daiichi buildings:</p> <ul style="list-style-type: none"> • By controlling water level inside buildings below that outside the buildings, water flow out of the buildings is prevented • Water level measurements from the Sub Drains are currently used for the comparison of water level inside and outside of buildings. <p>At the July 2013 TEPCO/EPRI Decommissioning Workshop, EPRI provided the following comments on the current approach on management of flow in and out of buildings at Fukushima Daiichi (Presentation name, "<i>Fukushima Daiichi Site – Current Environmental Challenges and Remedial Measures</i>", see Appendix 1):</p> <p>A.) Using Sub Drains to measure groundwater elevation</p> <ul style="list-style-type: none"> • Sub Drain groundwater elevations do not match the site-wide groundwater elevation and contour color flood map • Possible rationale for this discrepancy are: <ul style="list-style-type: none"> ○ Lack of on-site groundwater monitoring wells ○ Sub Drains are not effectively communicating with the sandstone below the plant ○ Sub Drains were flooded with sea water during the tsunami, resulting in significant inflow of "debris" into the Sub Drains that had to be removed • Significance of elevation discrepancy <ul style="list-style-type: none"> ○ Need to balance water levels outside versus inside of plant (prevent flow of highly contaminated water out from the buildings) ○ If Sub Drain groundwater elevations are not representative, TEPCO may be using non-reliable data for water level balance issue <p>B.) Concerning the conclusion that water will not flow out of buildings with the current level management approach:</p> <ul style="list-style-type: none"> • Groundwater flow through the seismic gaps between the buildings should be considered. • The gaps are "open" on the upgradient (west) and downgradient (east) side of the 	

buildings, and are essentially narrow pathways for groundwater flow across the Power Block

- This flow path could have significant implications on the ability for contaminated water inside the building to flow out of the building

C.) Long Term Risk of Vertical Releases through the Bottom of the Power Block:

- The muddy layer is assumed to be impermeable, it is therefore assumed that contamination cannot escape (flow out) through the bottom of the Power Block
- If muddy layer has permeability, this assumption is not accurate and contamination could be released
- Need to review detailed geologic drilling logs of the muddy layer and testing data to confirm the assumption of a confining layer (any silt or sandy layers could act as a preferential migration pathway)
- Need to assess groundwater elevation in deeper aquifers and flow zones to assess vertical hydraulic gradient and potential for downward migration
- This assessment should be part of planning of the landside barrier

On request, EPRI can provide a more in-depth assessment of the data that can be used to evaluate the above factors.

Technologies to block water inside the buildings: EPRI does not have any specific information on techniques for blocking water from entering buildings. EPRI understands that there is an ongoing evaluation of the use of grout for this purpose and to reduce the overall volume of water in the buildings. EPRI considers that this is a good approach to pursue and notes that the US Department of Energy has expertise in this area. Additionally, EPRI does have in-house expertise to perform research in this area.

Technologies for soil improvement: EPRI does not have any specific information on techniques for soil improvement. However, EPRI does have in-house expertise to perform research to look for these types of techniques.

Summary of EPRI Reply to TEPCO on IRID Subject Area 4

EPRI has performed a number of detailed Groundwater Assessments at power plant sites in the U.S and in other countries. The type of EPRI assessment would provide feedback that could be factored into the many initiatives being performed to address the soil and groundwater contamination issues at Fukushima Daiichi. EPRI could also perform additional research to gather information that addresses the technology needs identified in IRID Subject Area #4.

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

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

- 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