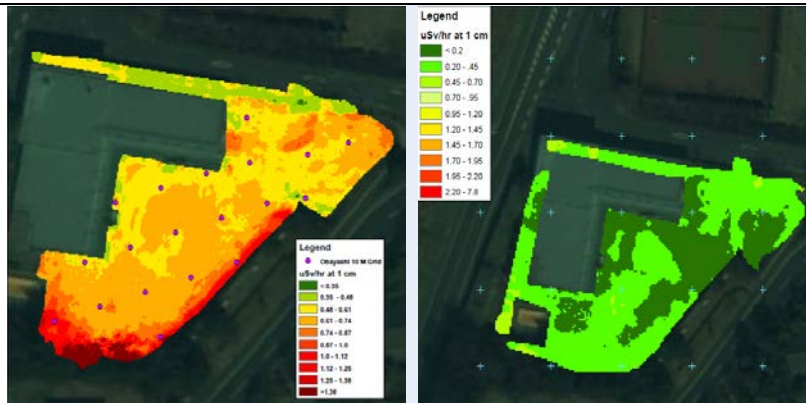


[Form 2 (to be reported to Committee on Countermeasures for Contaminated Water Treatment
and to be disclosed to public)]

Technology Information	
Area	2: Treatment of contaminated water
Title	Overland Radiation Scanning & Mapping System (Orion <i>ScanPlot</i> SM)
Submitted by	AMEC
<p>1. Overview of Technology (Advantage, Specification, Performance)</p> <p>In summary the <i>ScanPlot</i>SM and <i>ScanSort</i>SM (see separate submission) proven systems can be deployed on areas that have been contaminated in order to identify and quantify radioactivity (<i>ScanPlot</i>SM) which can subsequently be cleaned up with automatic segregation and sorting (<i>ScanSort</i>SM).</p> <p>AMEC's Orion <i>ScanPlot</i>SM is an advanced radiation detection/measurement system that employs scanning spectroscopy to isotopically identify and quantify radioactivity. It is a mobile platform that can undertake radiological field surveys identifying contaminated land and verifying the effectiveness of remedial action. Benefits of the system are:</p> <ul style="list-style-type: none"> • <i>The systems integrated GPS sensor provides high resolution spatial position sensing and mapping to provide the analysts and decision makers with unprecedented insight into the radiological environment represented by the data it collects;</i> • <i>The mobile platform can survey 10 – 20 acres / day;</i> • <i>Faster survey and data processing (than conventional methods) reduces the project schedule;</i> • <i>There are a number of variants of deployment platform that range from backpack carried systems to large towed-array platforms designed for operating in marshlands, tidal wetlands and foreshore areas, uneven or rocky terrain, and vegetated areas.</i> 	
<p>2. Notes (Plant in Japan, overseas plant, application in other industries, etc.)</p> <ul style="list-style-type: none"> • <u>“Japan Town” Technology Demonstration Project for JAEA.</u> Used to perform surveys of school yards in Hirona Town in December 2011. AMEC's <i>ScanPlot</i>SM demonstrated highly accurate field survey results. 	





A sample of the map reports generated with data collected with the Orion ScanPlotSM system is presented below.

Summary of Orion ScanPlotSM Survey Projects

Project	Coverage	Limits		
		U-238 (Ra-226) K-40, Th-232	Any identifiable signal above background	
Tuba City Dump Site RI	515 Acres	U-238 (Ra-226) K-40, Th-232	Any identifiable signal above background	
Fukushima, Japan	3 School Yards	Cs-137 Dose Rate	500 Bq/kg 1 μ Sv/h	13.5 pCi/g 0.1 mRem/h
UNC Church Rock	1.2 acre	Ra-226	185 mBq/g	5 pCi/g
El Toro Naval Air Station	1.5 acre	Ra-226	37 mBq/g	1 pCi/g
Hunters Point Naval Shipyard/ CA	Demo	Ra-226 Cs-137	37 mBq/g 37 mBq/g	1 pCi/g 1 pCi/g
UKAEA Beach Monitoring Trials 2005	Demo	Cs-137	30 kBq Cs-137	0.8 μ Ci
		Cs-137/Co-60	100 kBq Cs-137	2.7 μ Ci
		Cs-137	300 kBq Cs-137	8.1 μ Ci
LaSalle County Nuclear Generating Station	15 acre	Cs-137	0.4 Bq	11 pCi/g
		Co-60	0.1 Bq	3.8 pCi/g
Nuclear Fuel Services	5 acre	Any identifiable signal above background including U-234, U-235, U-238, Th-232, Ra-226, TRU and Am-241		
Saxton: Radiological Site Survey	8 acre open grass land, 7 acre wooded	Cs-137	0.3 Bq/g	8.5 pCi/g
Yankee Rowe Nuclear Generating Station	1 acre	Cs-137	41 mBq/g	1.1 pCi/g
		Co-60	141 mBq/g	3.8 pCi/g
Rancho Seco Nuclear Generating Station	76 acre	Cs-137	204 mBq/g	5.5 pCi/g
		Co-60	70 mBq/g	1.9 pCi/g
		Cs-134	105 mBq/g	2.85 pCi/g

Point Beach Nuclear Generating Station	1 acre	Cs-137	37 mBq/g	1 pCi/g
Forked River Site Oyster Creek Nuclear Generating Station	1 acre	Cs-137	136 mBq/g	3.68 pCi/g
ETTP K-1070a Landfill	Demo	Any Enriched Uranium Signal		
ORAU Scarboro Facility	Demo	Cs-137 at 16 inch (40 cm) depth	0.4 kBq	1 μ Ci

Challenges

- Orion *ScanPlot*SM is uniquely designed to deploy large volume gamma spectrometers as well as a variety of other sensors that may be used to characterize the radiation environment in a spatial context. Auxiliary detectors such as gamma radiation dose rate sensors (μ Sv/hr) can be readily added to the system.
- Difficult terrain is always the greatest technical challenge. With a variety of *ScanPlot*SM deployment platforms, most of the terrain issues that may be encountered can be accommodated.

Technology Development (Example)

- Typically, *ScanPlot*SM surveys are performed to characterize environmental contaminants after significant discrete sources of radiation have been removed. The conditions at the Dai-ichi facility create unique challenges with respect to radiation levels. AMEC has conceived the design of collimation collars that could be fitted to the external housing of the detector modules to dramatically reduce the influences of nearby discrete sources of radiation and allow a more accurate assessment of radioactivity in the adjacent "environment."

Other

- AMEC has teamed with Obayashi and has demonstrated *ScanPlot*SM to JAEA.
- The equipment is already in storage in Japan.

【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