

# Technology Safety Data Sheet

## RadScan 700 Gamma Scanner

### Section 1: Technology Identity

<b>Technology Name(s):</b>		<b>Emergency Contact:</b>	
RadScan 700 Gamma Scanner DOE OST TMS # 1793		Jim Gramling 716-942-2119	
<b>Manufacturer's Name and Address:</b>		<b>Information Contact:</b>	
David Heath BNFL Instruments, Inc. 4001 Office Court Drive, #800 Santa Fe, NM 87507 505-424-6660		Jeff Choroser Test Engineer West Valley Nuclear Services co. 10282 Rock Springs Road West Valley, NY 15171 716-942-4972	
<b>Date Prepared:</b>	October, 2002	<b>Date Revised:</b>	Not yet revised

### Section 2: Technology Picture



Figure 1: RadScan 700.

## Section 3: Technology Description

The RadScan 700 Gamma Scanner is a product of BNFL Instruments, and uses a thallium-activated cesium iodide [CsI (TI)] scintillator photodiode detector. The detector is used in tandem with a video camera, allowing for real-time radiometric data overlaid on a visual image of the area being surveyed. The inspection head (consisting of the detector and the camera, with associated shielding and electronics) can be mounted on various platforms including a fixed or mobile stand, crane, or tripod. Deployment of the inspector head can be done manually or remotely, depending on the application. The system is operated from a remote location using a PC-based workstation running the Windows operating system. On-screen information includes a high-definition color video picture of the area being surveyed with the geometric and radiometric data from the detector overlaid on the image. The video and overlaid data is recorded by a video recorder for later observation. Radiometric data can be presented in four ways: the raw count rate; a count rate corrected for the distance between the detector and an object being surveyed; a normalized count rate so that the observer can determine relative shifts in radiation intensities; and a dose rate indication.

## Section 4: Safety Hazards

### Hazard Category:

(Adapted from Appendix A to MIL-STD-882D, February 10, 2000, Department of Defense Standard Practice for System Safety.)

- 4 - Could result in death or permanent total disability
- 3 - Could result in permanent partial disability or injuries or occupational illness that may result in hospitalization of at least three persons
- 2 - Could result in injury or occupational illness resulting in one or more lost work days
- 1 - Could result in injury or illness not resulting in a lost work day
- N/A - Is not applicable to this technology and poses no appreciable risk

<b>A. Buried Utilities, Drums, and Tanks</b>	<b>Hazard Rating: NA</b>
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This is a non-intrusive technique and; therefore, does not require any surface disturbance.

<b>B. Chemical (Reactive, Corrosive, Pyrophoric, etc)</b>	<b>Hazard Rating: NA</b>
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This technology does not use any chemicals. Site-specific use should be evaluated to determine any potential exposure to chemical hazards.

<b>C. Confined Space</b>	<b>Hazard Rating: NA</b>
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This system is remotely operated; therefore, confined space entry is not anticipated.

<b>D. Electrical</b>	<b>Hazard Rating: 2</b>
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The technology has the potential to present electrical hazards. Assure proper grounding and use of ground fault circuit interrupters on all equipment. Compliance with applicable electrical standards and codes and lockout/tagout procedures must be followed to assure the safety of personnel.

<b>E. Explosives</b>	<b>Hazard Rating: NA</b>
This technology does not use any explosives.	
<b>F. Fire Protection</b>	<b>Hazard Rating: NA</b>
There is no fire protection requirements imposed by the use of this technology. Site-specific fire protection programs should be followed.	
<b>G. Gas Cylinders</b>	<b>Hazard Rating: NA</b>
This technology does not use compressed gases.	
<b>H. Ladders/Platforms</b>	<b>Hazard Rating: NA</b>
This technology can be used with platforms, but it is not the primary application.	
<b>I. Lockout/Tagout</b>	<b>Hazard Rating: 2</b>
The technology has the potential to present electrical hazards. Assure proper grounding and use of ground fault circuit interrupters on all equipment. Compliance with applicable electrical standards and codes and lockout/tagout procedures must be followed to assure the safety of personnel.	
<b>J. Mechanical Hazards</b>	<b>Hazard Rating: 1</b>
The unit is typically assembled manually, and there is a potential to pinch a hand or finger from the detector head on the pan and tilt unit. Assembly of the system with the power off will preclude accidental movement of the head. The technology may be used in conjunction with remote manipulators or motion devices, but that is not the primary application.	
<b>K. Moving Vehicles</b>	<b>Hazard Rating: NA</b>
There are no moving vehicles specific to this technology.	
<b>L. Overhead Hazards</b>	<b>Hazard Rating: 1</b>
During testing of field operations may require locating the system by a crane. Crane failure or its cable, or of the lifting eye on the assembly stand could result in dropping the unit. Use qualified crane operators, and do not work under the load.	
<b>M. Pressure Hazards</b>	<b>Hazard Rating: NA</b>
There are no pressure hazards specific to this technology.	
<b>N. Slips/Trips/Falls</b>	<b>Hazard Rating: 1</b>
There is the potential of a trip and fall if the cable connecting the detector system and computer drops to ground level. The connecting cable should be managed to keep it at knee level or above, or consider a wireless connection	

<b>O. Suspended Loads</b>	<b>Hazard Rating: 1</b>
During testing or field operations may require locating the system by a crane. Crane failure or its cable, or of the lifting eye on the assembly stand could result in dropping the unit. Use qualified crane operators, and do not work under the load.	
<b>P. Trenching/Excavation</b>	<b>Hazard Rating: NA</b>
There is no trenching or excavation specific to this technology.	
<b>Section 5: Health Hazards</b>	
<b>A. Inhalation</b>	<b>Hazard Rating: NA</b>
There are no inhalation hazards specific to this technology; however, site-specific use will determine if any monitoring is required.	
<b>B. Skin Absorption</b>	<b>Hazard Rating: NA</b>
There are no skin absorption hazards specific to this technology.	
<b>C. Noise</b>	<b>Hazard Rating: NA</b>
There are no noise hazards specific to this technology.	
<b>D. Heat Stress/Cold Stress</b>	<b>Hazard Rating: NA</b>
This technology does not require the worker to be in extreme heat or cold, nor does it require the use of personal protective equipment (PPE). Site-specific use may require PPE; therefore, heat and cold stress may be possible.	
<b>E. Ergonomics</b>	<b>Hazard Rating: 1</b>
The unit is typically assembled manually and it takes two people to lift and position the heavy components. Proper ergonomic position should be used, and help requested in lifting heavy loads. The only ergonomic issue associated with this technology when operating is use of the computer and keyboard; however, use is for only a brief time; therefore, a hazard is not anticipated.	
<b>F. Ionizing Radiation</b>	<b>Hazard Rating: 1</b>
The worker may be exposed to radiation or come into contact with contamination during system calibration and decontamination procedures.	
<b>G. Non-ionizing Radiation</b>	<b>Hazard Rating: NA</b>
There are no non-ionizing radiation hazards specific to this technology.	

<b>H. Biological Hazards</b>	<b>Hazard Rating: NA</b>
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There are no biological hazards specific to this technology.

<b>I. Other</b>	<b>Hazard Rating: NA</b>
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None

## Section 6: Phase Analysis

### A. Construction/Start-up

- Assemble RadScan 700 parts.
- Calibrate RadScan 700 per manufacturer's procedure.
- Place RadScan 700 in area to be surveyed.
- Install required cables through the hot cell port.
- Connect cables to operating PC.
- The unit is typically assembled manually, and there is a potential to pinch a hand or finger from the detector head on the pan and tilt unit. Assembly of the system with the power off will preclude accidental movement of the head.
- It takes two people to lift and position the heavy components. Proper ergonomic position should be used, and help requested in lifting heavy loads.

### B. Operation

- Remotely manipulate RadScan 700 for proper placement.
- Operate the data and video collection from the PC.

### C. Maintenance (Emergency and Routine)

Components are manufacturer repaired or replaced.

### D. Shutdown (Emergency and Routine)

- Turn system off.
- Remove from power source.

### E. Decontamination/Decommissioning

Survey and decontaminate the detector system before it is removed from a radiologically controlled area.

## Section 7: Worker Protection Measures

### A. Exposure Monitoring

Radiological monitoring depends on the characteristics of the area entered and the task being performed. Radiological monitoring may include wearing radiation dosimeters, collecting air samples, frisking with radioactivity detectors and biological monitoring (bioassay, whole body counting).

## B. Worker Training

- Installation and operation of the technology.
- Employees entering and working in DOE facility radiological areas may also require additional training, and must participate in the radiological monitoring identified in the Radiation Work Permit (RWP). The level of additional training depends on the characteristics of the area entered (level of radiation or contamination) and the task performed. Training levels include Orientation Training, General Employee Radiological Training (GERT), Radiological Worker I Training (RWI), and Radiological Worker II Training (RWII).

## C. Medical Surveillance

There are no additional medical surveillance requirements above the site-specific requirements.

## D. Engineering Controls

- Consider raising the cables above knee-length or using wireless technology to reduce tripping hazard.
- Use GFCI and appropriate grounding to reduce electrical shock hazard.

## E. Administrative Controls

Radiological Work Permit

## F. Personal Protective Equipment

Site-specific for radiological protection.

## Section 8: Emergency Preparedness

Site-specific requirements should be met.

## Section 9: Comments, Lessons Learned, & Special Considerations

The most likely route of worker exposure to radioactive contamination is during equipment decontamination. Extra caution should be taken during that process.

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Copies of this Technology Safety Data Sheet and others developed by the Operating Engineers National Hazmat Program can be found on the internet at: [www.iuoeiettc.org](http://www.iuoeiettc.org).