

Technology Safety Data Sheet

Linseed Oil Fogging

Section 1: Technology Identity

Technology Name(s):		Emergency Contact:	
Linseed Oil Fogging		Jim Gramling 716-942-2119	
Manufacturer's Name and Address:		Information Contact:	
Encapsulation Technologies 3150 E. Pico Boulevard Los Angeles CA 90023 Telephone: (323) 266-6531 FAX: 323-780-9940		Jeff Choroser Test Engineer West Valley Nuclear Services Co. 10282 Rock Springs Road West Valley, NY 15171 Telephone: 716 942-4972	
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Section 2: Technology Picture



Figure 1: Fogging System Previously Deployed at West Valley.

Section 3: Technology Description

Linseed Oil Fogging uses a Passive Aerosol Generator, Model PK-2000 (PAG), to create an aerosol of organic material that is slowly introduced into an area such as a room, glove box, or ventilation duct. The aerosol encapsulates contamination and prevents resuspension of contaminants by slowly and evenly coating all surfaces within the area. Deployment of this technology is at the Product Purification Cell (PPC-S), which is currently inaccessible for manned entry.

The system is composed of the PAG aerosol generator and connecting tubes of predetermined diameter to deliver the aerosol to the contaminated area. The aerosol that enters the process area adheres to the surfaces with the excess exhausted and collected in the recovery system. The recovery system is a spray-condensing chamber utilizing a recirculation pump system to supply pump spray. The unused aerosol is recovered before exhausting the remaining gases through a high-efficiency particulate air (HEPA) filtration system. The HEPA filtration system is a standard design, with specification of removing 99.97 percent of 0.3 micron Mass Median Aerosol Diameter (MMAD) particulate material.

During operation of the unit, no personnel or equipment is required to enter the area being treated, eliminating risk of exposure to radiological hazards.

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

A. Buried Utilities, Drums, and Tanks	Hazard Rating: NA
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Is not applicable to this technology and poses no appreciable risk.

B. Chemical (Reactive, Corrosive, Pyrophoric, etc)	Hazard Rating: NA
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Is not applicable to this technology and poses no appreciable risk.

C. Confined Space	Hazard Rating: NA
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Is not applicable to this technology and poses no appreciable risk.

D. Electrical	Hazard Rating: 2
Lockout/tagout is not required for plug and cord equipment as long as the cord/plug is in the employee's control during maintenance. The mechanical moving parts, such as the fan and 2000-watt heater element, would require lockout/tagout during maintenance. Follow manufacturer procedures for maintenance.	
E. Explosives	Hazard Rating: NA
Is not applicable to this technology and poses no appreciable risk.	
F. Fire Protection	Hazard Rating: 1
Follow site-specific fire protection plan.	
G. Gas Cylinders	Hazard Rating: NA
Is not applicable to this technology and poses no appreciable risk.	
H. Ladders/Platforms	Hazard Rating: 2
Use proper equipment in accessing ports at elevated levels.	
I. Lockout/Tagout	Hazard Rating: 2
Lockout/tagout is not required for plug and cord equipment as long as the cord/plug is in the employee's control during maintenance. The mechanical moving parts, such as the fan and 2000-watt heater element, would require lockout/tagout during maintenance.	
J. Mechanical Hazards	Hazard Rating: 2
During maintenance, worker will be exposed to fans. There is a potential for cuts or abrasions.	
K. Moving Vehicles	Hazard Rating: 2
Move the unit (400 pounds) on casters or with a forklift. Use certified operators and sufficient personnel to avoid potential of workers being pinned or crushed between unit and stationary objects or facility.	
L. Overhead Hazards	Hazard Rating: NA
Is not applicable to this technology and poses no appreciable risk.	
M. Pressure Hazards	Hazard Rating: NA
Is not applicable to this technology and poses no appreciable risk.	
N. Slips/Trips/Falls	Hazard Rating: 1
Potential for oily surfaces during setup and accessing the treated area.	

O. Suspended Loads	Hazard Rating: NA
Is not applicable to this technology and poses no appreciable risk.	
P. Trenching/Excavation	Hazard Rating: NA
Is not applicable to this technology and poses no appreciable risk.	
Section 5: Health Hazards	
A. Inhalation	Hazard Rating: 2
During operation and dismantlement, air monitoring is recommended. Exposure limits are 50 ppm OSHA PEL; 25 ppm ACGIH TLV for 2-Butoxyethanol, ethylene glycol butyl ether component of the modified linseed oil.	
B. Skin Absorption	Hazard Rating: 1
During dismantlement and maintenance, chemical resistant gloves should be worn to avoid skin contact with oil fogging agent.	
C. Noise	Hazard Rating: NA
Is not applicable to this technology and poses no appreciable risk.	
D. Heat Stress/Cold Stress	Hazard Rating: NA
Is not applicable to this technology and poses no appreciable risk.	
E. Ergonomics	Hazard Rating: 1
Move the unit (400 pounds) on casters or with a forklift. Use certified operators and sufficient personnel to avoid potential of workers being pinned or crushed between unit and stationary objects or facility. Use proper body positions when handling the unit for placement to avoid back or muscle injury.	
F. Ionizing Radiation	Hazard Rating: NA
Follow site-specific requirements and RWP.	
G. Non-ionizing Radiation	Hazard Rating: NA
Is not applicable to this technology and poses no appreciable risk.	
H. Biological Hazards	Hazard Rating: NA
Is not applicable to this technology and poses no appreciable risk.	

I. Other	Hazard Rating: NA
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None

Section 6: Phase Analysis

A. Construction/Start-up

- Move the unit (400 pounds) on casters or with a forklift. Use certified operators and sufficient personnel to avoid potential of workers being pinned or crushed between unit and stationary objects or facility. Use proper body positions when handling the unit for placement to avoid back or muscle injury.
- During filling of the system, chemical resistant gloves should be worn to avoid skin contact with oil fogging agent.
- When equipment is connected to the ports of area to be fogged, monitoring should be done as specified in the RWP.

B. Operation

Fogging of contaminated area, worker removed from contaminated area.

C. Maintenance (Emergency and Routine)

Maintenance-follow manufacturer procedure, LO/TO.

D. Shutdown (Emergency and Routine)

- Shutdown fogging unit.
- Check for possible contamination at connection point.
- Remove fogging hose from inlets.
- Remove fogging agent from system.
- Secure unit for transport.

E. Decontamination/Decommissioning

Check for potential contamination, and dispose of contaminated equipment following approved procedures.

Section 7: Worker Protection Measures

A. Exposure Monitoring

RWP requirements and air monitoring during operation; during cleanup of cell.

B. Worker Training

- 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).
- Procedures for operation of equipment
- Lockout/tagout procedures

C. Medical Surveillance

None in addition to site requirements.

D. Engineering Controls

Remote operation is an engineering control. Workers are removed from the area during operation.

E. Administrative Controls

Radiological Work Permit

F. Personal Protective Equipment

- None required for equipment operation.
- Chemical resistant gloves for handling fogging agent

Section 8: Emergency Preparedness

Site-specific requirements should be met.

Section 9: Comments, Lessons Learned, & Special Considerations

This technology reduces worker exposure to hazardous environments. There is wide application of this system with different agents, and each agent should be evaluated for protection level; *i.e.*, polyurethane.

This Technology Safety Data Sheet Was Prepared By:

Team Leader:

John J. Kovach, MS
Operating Engineers National Hazmat Program
3775 Morgantown Industrial Park
Morgantown, WV 26501
304-284-9129 FAX: 304-284-9130

Team Members:

Bruce Lippy, CIH, CSP
Operating Engineers National Hazmat Program
1293 Airport Road
Beaver, WV 25813
304-253-8674 FAX: 304-253-1384

Chip Booth, M.S.
Operating Engineers National Hazmat Program
1293 Airport Road
Beaver, WV 25813
304-253-8674 FAX: 304-253-1384

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