



U.S. Department of Energy

**Office of River Protection**

P.O. Box 450  
Richland, Washington 99352

04-TOD-054

**JUL 30 2004**

United States Nuclear Regulatory Commission  
Headquarters Operations Officer  
Document Control Room  
Washington, DC 20555

Dear Sir:

**COURTESY NOTIFICATION OF A POTENTIAL TITLE 10 CODE OF FEDERAL  
REGULATION (CFR) PART 21 SAFETY HAZARD WITH RADĒCO PORTABLE AIR  
SAMPLER MODEL H-809VI, SERIAL NUMBER 8499**

The Department of Energy (DOE), Office of River Protection (ORP) in Richland, Washington has identified a potential safety issue with RADĒCO, portable air sampler, model H-809VI. This type of portable air sampler is utilized in the commercial nuclear industry. Therefore, the DOE would like to make the Nuclear Regulatory Commission aware of this potential hazard.

A Health Physics Technician experienced a mild shock while handling a RADĒCO, portable air sampler model H-809VI, when the sample holder was touched. Follow up inspection indicated a measurable voltage of 117 – 120 VAC at the sample holder when measured by qualified electricians. A "Recommendation or Opinion for H-809V Series Electrical Grounding" was provided by RADĒCO, Inc. and is included in the attachment.

Per 10 CFR § 21.21, Notification of Failure to Comply or Existence of a Defect and its Evaluation, section (4) the following information is being provided.

- (i) U.S. Department of Energy  
Office of River Protection,  
John H. Swailes, Project Manager  
Tank Farms Operations  
P.O. Box 450  
Richland, Washington 99354-1874
- (ii) DOE-ORP Tank Farm Operations identified a potential electrical shock safety issue with RADĒCO, portable air sampler model H-809VI, serial number 8499.  
RADĒCO, LLC  
509 Norwich Ave.  
Taftville, Connecticut 06380  
Phone: (860) 823-1220, Fax (860) 823-1521
- (iii) Ametek Electric manufactured the blower assembly P/N 119414-00 for this unit.

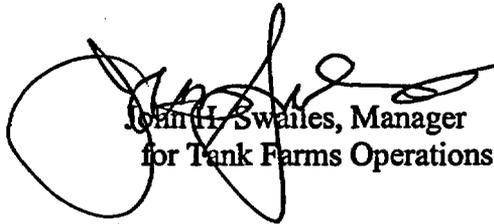
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- (iv) Measurable voltage (117-120VAC) at the sample holder was confirmed by electricians. Internal inspection of the air sampler unit found no physical indication of internal short, e.g., burn marks, compromised insulation, etc. However, the slip ring providing the ground path to rotating parts provided only intermittent contact, resulting in intermittent isolation from ground. The sample holder body is isolated from the grounded external case, but is connected to internal components. The only potential sample holder body path to ground by design is through the holder jamb nut to the case, however, the case is painted with a durable non-conductive coating. This creates an insulating layer between the jamb nut and the case, preventing electrical contact. Consequently, if a short to the sample holder body occurs, there is no ground path until one is provided, such as a grounded person contacting it.
- (v) The date of the electrical shock was July 15, 2004.
- (vi) Several of these samplers are in use at DOE-ORP Tank Farms. These items have been isolated.
- (vii) See (vi).
- (viii) Facilities should check sample holders on the RADCO H-809 and H-810 series samplers to assure proper grounding and no voltage on the sample holder. Repairs should be made in accordance with the "Procedure for Grounding Head Adapter Nut on AC Powered H-809 Air Samplers," included in the attachment.

If you have any questions, you may call me, or your staff may contact Michael J. Royack, Tank Farm Operations, (509) 376-4420.

Sincerely,



John H. Swales, Manager  
for Tank Farms Operations

TOD:MJR

Attachment

cc w/attach:  
E. S. Aromi, CH2M HILL  
J. A. McDonald, CH2M HILL  
R. C. Robinson, CH2M HILL  
CH2M Correspondence Control

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860-823-1521

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**RADeCO, INC.**

509 Norwich Avenue  
Taftville CT 06380  
Phone: 860-823-1220  
Facsimile: 860-823-1521

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July 21, 2004

Eric E. Bickel  
CH2M Hill Hanford  
P.O. Box 1500  
MS RI-05  
Richland, WA 99352

Subject: Recommendation/Opinion for H-809V series Electrical Grounding

Dear Eric:

It is RADeCO's opinion that there are no electrical safety issues with our H-809V series of Air Samplers.

We understand that an individual has received an electrical shock from our H-809VI, s/n 8499 manufactured in December 2002. However, we have not had the opportunity to evaluate the unit for damage or to determine the root cause of the incident.

The blower assembly (P/N 119414-00) for this unit is manufactured by Armetek Electric and is UL listed. The blower in question has a fan shell (item 6) that is electrically isolated, therefore not grounded. The head adapter (item 1, see fig 1) and nut, for the head adapter (item 2) are ungrounded. We believe this arrangement is electrically acceptable and passes the UL's requirement for grounding, "An item must be grounded if it is likely to become live in the event of an electrical failure." These items would not become alive in the event of an electrical failure due to a physical separation of greater than 3/32" another UL specification.

In our opinion, 2 modes of failure must occur in order for the fan shell to become live. One, there must be an electrical failure and a physical failure at the same time. It is well known that our units can take a fairly good amount of physical abuse, however, it's possible the unit was subjected to an excessive amount of abuse; and there is also the potential that water or moisture entered the unit due to being left out in the environment over night.

In the event your electrical review board does not share our confidence there is the possibility a substitute blower could be used that does not isolate the fan shell from ground. RADeCO would be willing to provide these to CH2MHill at cost for their technicians to install or you may send the air samplers back to RADeCO and we would install them with no labor cost, just the cost of the replacement blower and components.

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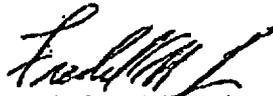
We can also change the power cord on the air samplers to utilize a cord mounted GFCI. This could provide additional protection in the event the unit is used improperly, such as being left in the environment over night or during rain/misty conditions.

To summarize, we do not believe any changes need to be made to the H-809V series of Air Samplers. They are safe today and have been for many years. The electrical malfunction experienced at your facility, though not validated, would appear to be the result of a dual mode failure both physically and electrically.

RADeCO has provided quality equipment to the Hanford site for decades and we wish to continue doing so. We want to support your efforts in an expeditious manner that is safe and economical.

If you have any questions please feel free to give us a call at 860-823-1220.

Sincerely,



Frederick N. Lucci  
General Manager, VP



**LEGEND - FIGURE 1  
MODEL H-809V MOTOR ASSEMBLY**

<u>ITEM NO.</u> <u>(FROM FIGURE 1)</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	2500-74	Head Adaptor
2	2500-73	Nut, Head Adaptor
3	2201-10	O-Ring
4	0301-46	Mounting Ring, Air Mover Assembly
5	6050-04	Motor Brush Assembly
6	6050-15	Fan Shell
7	0100-03	Air Mover Assembly, 110V, 60Hz
8	0100-12	Air Mover Assembly, 220V, 50Hz

## **Procedure for Grounding Head Adapter Nut on AC Powered H809 Air Samplers**

The following describes in detail how to Ground the head adapter nut on the AC powered H809 Series of Air Samplers.

**Tools Required – one each of the following**

Safety Glasses or suitable eye protection  
# 2 Phillips Screwdriver  
5/16" Open end wrench  
Pipe or Spanner Wrench  
Orbital Sander w/150 grit Sand Paper or equivalent  
Electrical Connection Corrosion Inhibitor  
Loctite 242 or equivalent

**Before performing the installation, MAKE SURE TO REMOVE POWER FROM THE AIR SAMPLER.** Then follow these steps:

1. Using the 5/16" wrench, remove the screw securing the handle to handle bracket.
2. Using the pipe wrench, remove the Head Adapter Nut (large nut located where the sample holder threads into the sampler) securing the head adapter to the chassis.
3. Using the #2 Phillips screwdriver, remove the four screws located on the perimeter of the motor cone.
4. Carefully remove the motor cone and then the motor assembly. There is no need to disconnect the motor wires. The motor should stand on the head adapter with chassis lying next to it.
5. Using an Orbital Sander remove the paint on the flat surface on the right side of the Air Sampler (using the front plate as a reference.) This surface is approximately 5/16" in diameter. Stop when a shiny aluminum surface is the result. Light hand sand or polish the inner surface of the head adapter nut. Apply a drop of loctite 242 to the threads of the Head Adapter.
6. Reassembly the Air Sampler applying Electrical Connection Corrosion Inhibitor (sparingly) on the inside of the head adapter nut (Silver colored Aluminum nut removed in step 1.) This coating should be between the Head Adapter Nut and the H809 case.

**Note:** Electrical ground checks will now show that a full continuity exists between the Head adapter nut, Head Adapter and electrical ground. There may be areas that are covered in aluminum oxide, these spots may not read as conductive as aluminum oxide acts as an insulator. If a concern exists you may scratch the Head Adapter nut to pierce the oxide film and verify the unit is properly grounded.

