37-23527-01
0303793
139970

From: <fred.ferate@dot.gov>
To: <EXU@nrc.gov>
Date: Tue, Apr 3, 2007 11:09 AM
Subject: RE: a question regarding 173.443

Hi Betsy

We have for several years told or implied to people in the regulated community that DOT does not require 100% sampling in performing package surface contamination determinations, and in fact we have interpreted 173.443(a)(2) ["Alternatively, the level of non-fixed radioactive contamination may be determined by using other methods of equal or greater efficiency."] to mean that 100% sampling is not always necessary. I have attached a couple of our letters of interpretation for your perusal.

That said, we emphasize that the consignors must use their professional judgment, and must be convinced that the method they choose does provide reasonable assurance that there is in fact no contamination (and, of course, must be able to convince an inspector of this also).

In general that means that not doing 100% sampling does not usually mean that one is free to do no sampling at all. I.e., "another method" which doesn't involve 100% sampling would presumably involve periodic sampling of a subset of shipped items, to check that (1) the assumptions didn't lead to an incorrect conclusion, and (2) that there hasn't been a change in circumstances, obvious or not so obvious, for which the initial assumptions are no longer valid. My personal feeling is that this is particularly important when tritium is being transported, since once tritium escapes from its packaging it rapidly contaminates everything in its path, and who is to say that some small change in the manufacturing process might not lead to leaks which would never be caught if the licensee did not at least perform occasional contamination measurements.

The licensee cites "prior experience with thousands of returned items." You may wish to check whether they actually did contamination measurements on those items. (That is not a DOT requirement, but is a 10 CFR 20 requirement when the package is expected to contain greater than a Type A quantity.)

From the content of the licensee's response, it appears to me that the licensee may not realize the difficulties in dealing with escaped tritium. Another misconception I have sometimes found (usually these are persons who don't normally ship RAM), is the assumption that a gamma measuring instrument is sufficient to determine contamination and external radiation levels - this, of course, would not be appropriate for tritium.

I hope this helps.

Sincerely,

Fred Ferate, Ph.D., CHP
U. S. Department of Transportation
PHMSA/OHMS/OHMT
Radioactive Materials Branch, PHH-23
400 Seventh Street SW
Washington, DC 20590
Phone: 202-366-4498
Fax: 202-366-3753
E-mail: fred.ferate@dot.gov

-----Original Message-----
From: Elizabeth Ullrich [mailto:EXU@nrc.gov]

Sent: Tuesday, April 03, 2007 10:19 AM
To: Ferate, Fred <PHMSA>
Cc: Farrah Gaskins; Michelle Beardsley
Subject: a question regarding 173.443

Mr. Ferate,

I am working with a licensee who will be the importer/distributor of tritium EXIT and aircraft signs. They also plan to ship these devices to trade shows for demonstration.

Because I know that they have no on-site equipment for contamination assessment, I requested that they provide me their procedures for meeting 173.443 requirements to demonstrate that packages meet the contamination limits. Based on their response, I believe they mis-understand 173.443 but want to check with you before I go back to them for more informaiton. Here is their response:

"The USDOT permits alternative means to estimate if surface contamination limits are met (173.443(a)). In that regard, Isolite wished to use logical deduction and numerous years of experience to conclude that packages shipped from Berwyn are free of contamination. For example, if Isolite re-ships a product in an undamaged box originally received from the manufacturer, we can logically conclude that the removable contamination would not have changed from the time of the manufacturer's shipment (which had undergone a successful contamination survey at the manufacturer's facility). Similarly, if Isolite personnel re-packages a device using a new shipping box that has never been used for radioactive materials and never has been in a controlled area, then we can logically conclude that the removable contamiantnion would be at background which is far less than 220 dpm/sa cm. Prior experience with thousands of returned self-luminous products at Shield Source, Safety Light and SPL has shown no detectable contamination on the exterior of any undamaged shipping container containing these devices."

I believe the "alternative" in 173.443(a)(2) refers only to the efficieny of the wipe test, although a wipe test is only referred to in 173.4432(a)(1) but not in the 173.443(a) paragraph.

If they can use the alternative evaluation of the past experience at actual manufacturers of the devices (Shield Source, Safety Light, and SPL [of which only Shield Source will exist after December 2007]), I need to know this. If so, who would do the evaluation of the alternative method...NRC, or DOT? If DOT, please let me know who/how I should have the licensee contact.

By the way, damaged devices are considered rad waste and will be so packaged.

Thanks,
Betsy

Betsy Ullrich, Senior Health Physicist
US NRC Region I Office
(610) 337-5040
exu@nrc.gov

CC: <FCG@nrc.gov>, <MRB@nrc.gov>, <rick.boyle@dot.gov>

Mail Envelope Properties (46126DF8.638 : 7 : 38456)

Subject: RE: a question regarding 173.443
Creation Date Tue, Apr 3, 2007 11:08 AM
From: <fred.ferate@dot.gov>

Created By: fred.ferate@dot.gov

Recipients
nrc.gov
kp1_po.KP_DO
EXU (Elizabeth Ullrich)
FCG CC (Farrah Gaskins)
MRB CC (Michelle Beardsley)

dot.gov
rick.boyle CC

Post Office	Route
kp1_po.KP_DO	nrc.gov
	dot.gov

Files	Size	Date & Time
MESSAGE	5290	Tuesday, April 3, 2007 11:08 AM
990119.pdf	372593	
020116.pdf	271210	
040047.pdf	162286	
Mime.822	1111008	

Options
Expiration Date: None
Priority: Standard
ReplyRequested: No
Return Notification: None

Concealed Subject: No
Security: Standard

Junk Mail Handling Evaluation Results
Message is eligible for Junk Mail handling
This message was not classified as Junk Mail

Junk Mail settings when this message was delivered
Junk Mail handling disabled by User
Junk List is not enabled
Junk Mail using personal address books is not enabled
Block List is not enabled

173.443

U.S. Department
of Transportation

**Research and
Special Programs
Administration**

400 Seventh Street, S.W.
Washington, D.C. 20590

JUN 10 1999

Ref. No. 99-0119

Mr. Vernon E. Vondera
Chief, Safety Office
Department of the Army
U.S. Army Tank-Automotive and
Armament Command
Armament and Chemical Acquisition
and Logistics Activity
Rock Island, IL 61299-7630

Dear Mr. Vondera:

This is in response to your letter dated May 4, 1999, requesting a clarification of the requirements in 49 CFR 173.443, concerning the control of contamination on the external surfaces of packages of radioactive material offered for transportation.

You state that before the regulations were revised (Docket HM-169A, which became effective on April 1, 1996), the second sentence in § 173.443 (a) read: "The level of non-fixed radioactive contamination may be determined by wiping an area of 300 square centimeters of the surface concerned....," whereas after April 1, 1996, the wording was changed to: "The level of non-fixed radioactive contamination may not exceed the limits set forth in table 11 and must be determined by either:

(1) Wiping an area of 300 square centimeters of the surface concerned .... : or
(2) Using other methods of assessment of equal or greater efficiency, in which case the efficiency of the method must be taken into account: ...."

You also state that in 1985 the Department of the Army requested a clarification of § 173.443. You enclosed a copy of RSPA's response, in which we stated "... it is desirable to allow flexibility in the manner of ensuring compliance," and "if a shipper utilizes methods which do not rely on actual wipe samples, such as new packaging material which is protected from on-site contamination, it is acceptable as long as it ensures compliance." You asked if the current regulations allow the same degree of flexibility.

The answer is yes. Sections 173.443 (a)(1) and 173.443 (a)(2) allow a shipper the same degree of flexibility as before. The shipper must either make one or more wipe measurements and compare the results against the limits in table 11, or use another method of equal or greater efficiency.

990119

As used in § 173.443(a)(2), "efficiency" means either the ratio of a measured value of contamination (such as from a wipe) divided by the actual contamination on the surface of the package, or, in a more general sense, an alternate method which gives the same or greater assurance that the package contamination levels do not exceed the stated regulatory limits.

I hope this information is helpful. Should you have further questions, please contact us.

Sincerely,

Hattie L. Mitchell

Hattie L. Mitchell, Chief
Regulatory Review and Reinvention
Office of Hazardous Materials Standards

DEPARTMENT OF THE ARMY
UNITED STATES ARMY TANK - AUTOMOTIVE AND ARMAMENTS COMMAND
ARMAMENT AND CHEMICAL ACQUISITION AND LOGISTICS ACTIVITY
ROCK ISLAND, ILLINOIS 61299-7630

4 May 99

REPLY TO
ATTENTION OF

Safety Office, Armament and Chemical
Acquisition and Logistics Activity

Betts
§ 173.443
99-0119

Mr. Edward T. Mazzullo
Director, Office of Hazardous Materials Standards
U.S. DOT/RSPA (DHM-10)
400 7th Street SW
Washington, D.C. 20590-0001

Dear Mr. Mazzullo,

This is in reference to Title 49. We would like an interpretation of section 173.443, Contamination Control requirements and how it applies to the U.S. Army.

First a little background information. Our Command procures and manages Nuclear Regulatory Commission (NRC) licensed radioactive material for use in Army weapon systems. These weapon systems are distributed throughout the country and the world to be used for military purposes (exercises and otherwise). Many of these systems were procured and distributed twenty or thirty years ago and are still in the field. The radioactive material consists of low level radioactive material that qualifies it to be shipped as "excepted packages-instruments or articles" under Title 49 Code of Federal Regulations (CFR) 173.424.

The NRC requires our Command, as the entry point for these weapons systems into the Army arsenal, to hold a NRC license. As the NRC licensee, we are responsible to ensure that end users have a radiation protection program (RPP) that meets the minimum CFR and NRC license requirements. The RPP consists of written documents, guidance, newsletters, website material, and periodic inspections or visits.

In 1985, we requested an interpretation of 49 CFR 173.443 and obtained the enclosed DOT letter (September 25, 1985). However, we feel that this issue needs to be revisited due to the amendment of 49 CFR in 1995. Prior to 1995, the rule for contamination control (49 CFR 173.443) stated: "The level of

non-fixed radioactive contamination **may** be determined by wiping an area of 300 square centimeters." The wording was changed to: "The level of non-fixed radioactive contamination may not exceed the limits set forth in Table 11 and **must** be determined by either (a) Wiping an area of 300 square centimeters... or (b) Using other methods of assessment of equal or greater efficiency."

We always assumed the CFR provided a wide degree of variance or flexibility based on the 1985 letter (like a performance standard). However, its seems that it has become more rigid in specifying (like a specification standard) the exact steps to take in shipping packages.

What alternative "methods of assessment" can be justified by the statement of 173.443(2)? We are not sure how much variance this statement allows us. For example, many times the device is wipe tested prior to maintenance. If the device is clean and new packaging material is used, is this acceptable? However, the terms "equal or greater efficiency" implies nothing less than a wipe tests analysis of the package surface.

Typical shipment methods the Army uses in lieu of wiping the surface of the package may include any or all of the following precautions:

- Using new packaging materials.
- Wiping the device instead of wiping the surface of the package.
- Invoking 49 CFR 173.7(b).
- Personally transporting the device instead of consigning it to a carrier.
- Checking the annual leak test records (for those items that require it).

- Checking tritium devices for illumination. The assumption is that if all sources are illuminated, it can safely be shipped.

- Shipping the instrument or article as "Limited Quantity."

Our program is based on the cooperation of a great many people. We can make recommendations to limit the spread of contamination. However, we cannot mandate that all installations set up and use counting laboratories. The funds are just not available. Sending wipe samples off to a qualified laboratory is another options that many installations take. However, the turn around time may be up to two weeks. This delay is often not acceptable.

Title 10 CFR 20.1906(d) requires us as licensee to report immediately to the NRC and the final delivery carrier any time the surface contamination exceeds the limits of 173.443. This has become a point of constant emphasis in our program. It is in our best interest to find away to comply.

You are welcome to review our draft transportation guidelines. It can be downloaded from the following FTP site: ftp://ftpserver.ria.army.mil/Safety/TB430197/Draft/. More information can be found at: http://www-acala1.ria.army.mil/ACALA/SAFETY/safe.htm.

We appreciate any comments, interpretation, or advice on how we may best comply with the regulatory requirements.

The point of contact is Mr. Gavin Ziegler, (309) 782-2995.

Sincerely,

Vernon E. Vondera
Chief, Safety Office

Enclosure

Enclosure

Copy Furnished:

Mr. Fred Ferate
Radioactive Materials Branch
U.S. DOT/RSPA (DHM-23)
400 7th Street SW
Washington, D.C. 20590-0001

U.S. Department
of Transportation

Research and
Special Programs
Administration

400 Seventh St., S.W.
Washington, D.C. 20590

SEP 25 1985

Commander, U.S. Army Armament,
Munitions and Chemical Command
ATTN: AMSMC-SFS
Department of the Army
Rock Island, Illinois 61299-6000

Dear Sir:

Thank you for your letter of August 22, 1985, concerning compliance with the removable contamination limits specified in 49 CFR 173.443.

As with many of the DOT requirements, the removable contamination limits specify what must be accomplished and do not elaborate on how this must be accomplished. Given the very diverse shipping situations to which these limits apply it is desirable to allow flexibility in the manner of ensuring compliance.

The shipper has responsibility for ensuring that every package complies with the stated limits. If a shipper utilizes methods which do not rely on actual wipe samples, such as new packaging material which is protected from on-site contamination, it is acceptable as long as it ensures compliance.

Sincerely,

Richard R. Rawl
Chief, Radioactive Materials Branch
Office of Hazardous Materials Regulation
Materials Transportation Bureau

Encl 1 to Encl

U.S. Department
of Transportation
**Research and
Special Programs
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

JUN 4 2002

Mr. James R. Price
Senior Environmental Compliance
& Health and Safety Officer
Science Applications International Corporation
10260 Campus Point Drive
M/S B2-M
San Diego, CA 92121

Reference No.: 02-0116

Dear Mr. Price:

This is in response to your letter requesting clarification of the shipping paper and contamination control requirements for radioactive materials under the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180). Your company operates Mobile Vehicle and Cargo Inspection Systems (VACIS) to inspect the contents of trucks, containers, cargo and passenger vehicles for explosive devices and/or contraband. Each Mobile VACIS is equipped with a semi-permanently mounted gauge device (Type A package) containing either a 59 Gbq Cesium-137 or 37 Gbq Cobalt-60 radioactive material sealed source.

Your questions are paraphrased and answered as follows:

Q1. Science Applications International Corporation (SAIC) prepares a shipping paper when the Mobile VACIS first enters a public highway. Can the same shipping paper remain with the vehicle for its lifetime or until the Type A package is reshipped or transferred to another vehicle?

A1. The answer is yes. The same shipping paper may remain with the Mobile VACIS for its lifetime provided the content (including quantity) of the Type A package remains the same or the Type A package is reshipped or transferred to another vehicle.

Q2. Section 173.443(a) requires a determination of the level of non-fixed radioactive contamination. SAIC interprets this to mean that a wipe survey must be performed prior to putting the vehicle into service on a public highway. SAIC would perform subsequent wipe surveys in accordance with the requirements of its Device Registry which requires leak testing prior to initial use and at intervals not to exceed 12 months. The techniques used would be capable of detecting 185 Bq of removable contamination. Additional contamination surveys would not be required each time the truck is driven on a public highway. Would our procedures satisfy the requirements of the HMR?

020116

173.443

A2. Section 173.443(a) requires the level of non-fixed (removable) radioactive contamination on the external surfaces of a package offered for transportation to be kept as low as reasonably achievable. The HMR require that the non-fixed radiation contamination not exceed the limits set forth in Table 11 and authorize the use of a wipe survey or other assessment method to check for non-fixed radioactive contamination. The HMR do not prescribe surveys at scheduled intervals. However, the shipper should have an assessment methodology in place to ensure compliance whenever the material is in transport.

I hope this information is helpful. If you have further questions, please do not hesitate to contact this office.

Sincerely,

Hattie L. Mitchell

Hattie L. Mitchell
Chief, Regulatory Review and Reinvention
Office of Hazardous Materials Standards

Corbin
§ 172.200
§ 173.443 (a)
Shipping Papers/RAM

Science Applications International Corporation
An Employee-Owned Company

April 17, 2002
Transmitted Via Facsimile

02-0116

Mr. Edward T. Mazzullo
Director, Office of Hazardous Material Standards
U.S. DOT/RSPA (DHM-10)
400 7th St. SW
Washington DC 20590-0001

Re: Request for Regulatory Interpretation

Dear Mr. Mazzullo:

Science Applications International Corporation (SAIC) appreciates your assistance in helping us clarify the applicability of the U.S. DOT Hazardous Material Regulations (HMRs) to our Mobile Vehicle and Cargo Inspection System (Mobile VACIS) product.

Mobile VACIS is a truck-mounted gamma-ray imaging system (see picture attached) designed to non-intrusively inspect the contents of trucks, containers, cargo and passenger vehicles for explosive devices and/or contraband. Operators viewing Mobile VACIS radiographic images of scanned cargo are able to quickly and easily identify hidden compartments associated with the transportation of explosives, weapons and other threats. To accomplish this, each Mobile VACIS is equipped with a semi-permanently mounted gauge device (Type A package) containing either a 59 GBq Cesium-137, or a 37 GBq Cobalt-60, radioactive material sealed source. The vehicle with source does not require a hazardous material placard. The Mobile VACIS holds a "Registry of Radioactive Sealed Sources and Devices, Safety Evaluation of Device" (Device Registry No.: CA0215D103S for the Cs-137 unit and CA0215D107S for the Co-60) issued by the California Department of Health Services, as a U.S. NRC Agreement State, and is distributed to specific licensees. Mobile VACIS customers presently include various U.S. government agencies (U.S. Customs operates several dozen systems) and other non-governmental parties.

SAIC has interpreted the HMRs as being applicable to the Mobile VACIS (equipped with the radioactive material source) whenever it travels in commerce over public roadways, but is seeking your concurrence/clarification on the applicability of certain specific requirements, as follows:

1. Subpart C of 49 CFR Part 172 requires each person who offers a hazardous material for transportation to describe the hazardous material on a shipping paper. SAIC has interpreted this requirement, as it relates to the use of the Mobile VACIS in commerce, as requiring a shipping paper covering the Type A package being carried on the Mobile VACIS at the point it first enters a public road. This same shipping paper would then accompany the Mobile VACIS for its lifetime or until such time the Mobile VACIS (or

more specifically, the Type A package) was re-shipped or transferred from one carrier to another. Therefore, new shipping papers would not be required/completed each time the truck was driven over a public highway.

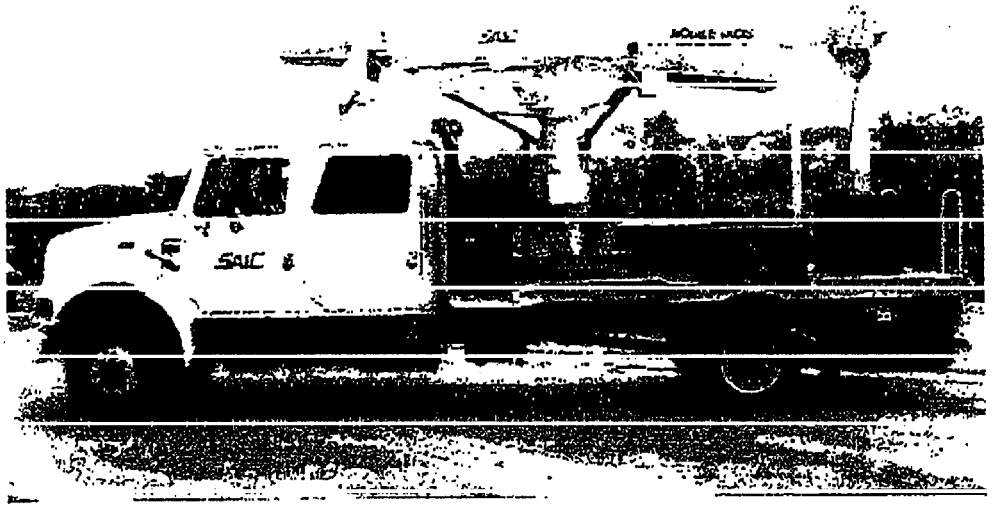
2. 49 CFR 173.443(a) requires, in part, a determination of the level of non-fixed radioactive contamination by performing a wipe survey on the external surfaces of each package offered for transport. SAIC has interpreted this requirement, as it relates to the use of the Mobile VACIS in commerce, as requiring a wipe survey of its Type A package prior to the vehicle first being driven onto a public road. Once the Mobile VACIS is deployed, subsequent wipe surveys of the Mobile VACIS Type A package would be performed in accordance with the requirements of its Device Registry. The Device Registry requires leak testing prior to initial use and at intervals not to exceed 12 months using techniques capable of detecting 185 Bq of removable contamination. Therefore, additional contamination surveys would not be required/performed each time the truck was driven over a public highway.

Your timely assistance in this matter is greatly appreciated. If you have any questions with regard to the issues addressed in this letter, please don't hesitate to contact our technical representative, Linda Bray at (858) 826-9664, or the undersigned at (858) 826-4359.

Sincerely,
SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

JAMES R. PRICE
Senior Environmental Compliance
& Health and Safety Officer

Attachment


SAIC

U.S. Department
of Transportation
**Research and
Special Programs
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

MAR 30 2004

Mr. Steven McKew
Manger, Compliance Engineering
Northrop Grumman Electronic
P. O. Box 746, Mail Stop 1401
Baltimore, MD 21203

Ref No.: 04-0047

Dear Mr. McKew:

This is in response to your letter dated February 25, 2004, concerning the requirements for measuring levels of radioactive contamination on the external surfaces of packages of radioactive material offered for transportation under the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-181).

Section 173.443(a) requires the level of non-fixed (removable) radioactive contamination on the external surfaces of a package offered for transportation to be kept as low as reasonably achievable. The HMR prohibit the non-fixed radiation contamination to exceed the limits set forth in Table 11 and authorize the use of a wipe survey or other assessment method to check for non-fixed radioactive contamination. The use of wipes is a suggested technique; however, there is no specification for the type of instrument to be used to measure the amount of activity on the wipe. The regulations permit other methods to be used to assure that contamination is within acceptable limits. The HMR provide shippers considerable flexibility to determine the most appropriate method among recognized procedures to achieve the performance standard.

I hope this information is helpful. Please contact us if you require additional assistance

Sincerely,

John A. Gale
Chief, Regulations Development
Office of Hazardous Materials Standards

040047

173.443

Retained
§173.443
RAM
04-0047

NORTHROP GRUMMAN

Electronic Systems
Northrop Grumman Corporation
Post Office Box 746
Baltimore, Maryland 21203

February 25, 2004

Mr. Edward T. Mazzullo
Director, Office of Hazardous Materials Standards
Research and Special Programs Administration
400 7th Street, S.W.
Washington, D.C. 20590-001

Subject: Clarification concerning contamination control of external packages containing radioactive material (HMR; 49CFR Part 173.44)

Dear Mr. Mazzullo,

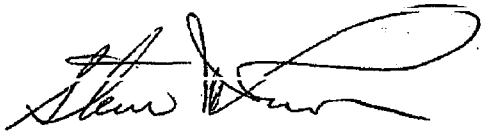
Northrop Grumman Electronic Systems has historically shipped an electronic component that contains trace quantities of a radioactive isotope. We currently ship this as "Radioactive material, excepted package-instruments or articles, UN2911".

Our manufacturing process takes a small glass ampule slightly larger than the size of your average pill capsule. This ampule has a trace amount of radioactive material sealed inside what we deem an electronic tube. Once sealed, we wipe/smear and ensure no external contamination exists on the external surface of the ampule/tube. Our manufacturing process then has the electronic tube connected to additional electronics and further encased within a sealed metal housing. At this point in the manufacturing process, the external surfaces are again smeared to ensure there is no external contamination on the surface of the sealed metal housing. As a reference, once it is incorporated in the larger assembly, the approximate size of the unit is that of a VCR tape. At this level of assembly, all requirements for labeling are verified, and there is a zero radiation reading on all surfaces. The unit is then cleared by our radiation safety procedures as to not posing any handling hazard, not possessing any surface contamination, and not having any surface readings.

At this point the unit is moved to the shipping department for transportation to another facility for incorporation into a larger electronic component.

My question involves our interpretation of 49CFR 173.443, and if that interpretation would require wipe testing of the surface on the box being shipped to our other facility, or can we utilize the documented wipe testing performed at the two previous quality check points as verification of contamination control. Our operational goal is to ensure there is no surface contamination at two key manufacturing points, and then release the sealed unit as free and clear. Our approach is to ensure the unit never leave the manufacturing area with any reading of radioactivity, and always with zero surface contamination, fixed or smearable. I liken this analysis to that of smoke detectors, and a case of detectors being readied for shipment.

I greatly appreciate your assistance in this manner, and look forward to your response.



Steven McKew
Manager, Compliance Engineering
Northrop Grumman Electronic Systems
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