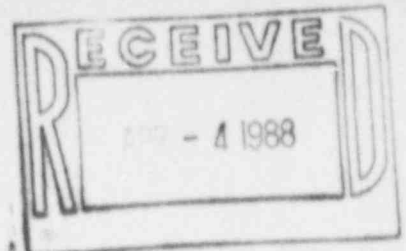




DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS UNITED STATES AIR FORCE  
BOLLING AFB DC 20332-6188



28 MAR 1988

REPLY TO AFOMS/  
ATTN OF BROOKS AFB TEXAS 78235-5000

SGPR

SUBJECT: Authorization for Continued Air Force Use of 3M Company Static Eliminators Under  
NRC License No. 42-23539-01AF, Docket No. 030-28641

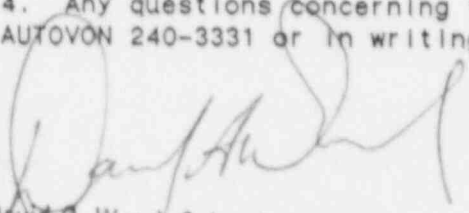
TO: US Nuclear Regulatory Commission  
Region IV  
Nuclear Material Radiation Protection  
ATTN: J.B. Baird  
611 Ryan Plaza Drive, Suite 1000  
Arlington TX 76011

1. Request the US Nuclear Regulatory Commission (NRC) grant an exception to the orders for recall of 3M Co. static eliminators to allow the Air Force to continue use of Polonium 210 in 3M Model 911 blowers and Models 210 and 220 sources.

2. Sources maintained under our Master Materials License would be limited to those possessed by organizations using the devices to protect critical electronic components vital to the Air Force mission, and to those users who specifically request authorization for continued use of the sources in accordance with guidance contained in paragraph 6 of our message at Attachment 1. Sources and users will be accounted for by issuance of specific USAF Radioactive Material Permits. We will require increased surveillance of the 3M Co. sources, through permit condition, as indicated in paragraph 6 of our message. We will furthermore restrict the use of the sources to areas having controlled environments and areas wherein the sources are unlikely to be exposed to mechanical abrasion, moisture, or corrosive/solvent vapors.

3. As indicated by the correspondence at Attachment 2, these devices are deemed essential to the Air Force mission; we are aware of at least one other Air Force organization at this time in which the sources are critical to their mission. Your prompt consideration of this request would be appreciated in order that our users not be required to return sources they are now using to 3M Co. by 18 May 1988 in accordance with the NRC's recall order.

4. Any questions concerning the above should be directed to the undersigned at AUTOVON 240-3331 or in writing.

  
David G. Wood, Colonel, USAF, BSC  
Executive Secretary  
USAF Radioisotope Committee  
Office of the Surgeon General

2 Atch

1. HQ AFOMS/SGPR 041700Z Mar 88  
Message
2. AGMC/SNM Ltr, 4 Mar 1988

cc: HQ AFLC/SGBE  
HQ AFLC/MMEEE (Capt Cukr)  
AGMC/SN  
AGMC/SNM  
AGMC/MLMTM (C. Froberg)  
AGMC/MAQSE (B. Russler)  
Det 42/SM-ALC/RQS  
Bldg 938 (W. Moore)  
Norton AFB CA 93409-6447

88-659  
8804120321 880328  
REG4 LIC30  
42-23539-01AF PDR

11  
IE-07

UNCLASSIFIED

01 04 041700Z MAR 88 RR RR UUUU

SGPR 041200

HQ AFOMS BROOKS AFB TX//SGPR//

AIG 8201

INFO 3380AMS KEESLER AFB MS//MAAP//

1606ABW KIRTLAND AFB NM//CC//

56CRS MACDILL AFB FL//MACBL//

63AMS NORTON AFB CA//MAACI//

AGMC NEWARK AFS OH//ML//

HQ AFISC NORTON AFB CA//SGMA//

HQ AFTAC PATRICK AFB CA//SE//

HQ USAF BOLLING AFB DC//SGP//

UNCLAS

REF: HQ AFOMS/SGPR 041700Z FEB 88 MSG, LEAKING IONIZING AIR GUNS.

SUBJ: RECALL OF 3M BRAND NUCLEAR STATIC ELIMINATION DEVICES  
CONTAINING POLONIUM 210 (PO-210).

1. THE NUCLEAR REGULATORY COMMISSION (NRC) HAS TAKEN ADDITIONAL  
ACTIONS AS A RESULT OF PROBLEMS WITH LEAKING SOURCES IN STATIC  
ELIMINATORS IDENTIFIED IN REFERENCED MESSAGE.

2. THE NRC HAS ISSUED A CHANGE ORDER TO THE GENERAL LICENSE GIVEN  
IN TITLE 10, PART 31.5, CODE OF FEDERAL REGULATIONS (10 CFR 31.5)  
REQUIRING THAT ALL, REPEAT ALL, 3M COMPANY STATIC ELIMINATORS

USNRC REGION IV  
ARLINGTON TX 76011

USAFOEHL/RZ

JAMES H. DUNLAP, LTCOL, 43331  
HQ AFOMS/SGPR

DANIEL E. CHAPMAN, CMSGT, 43461

*Daniel E. Chapman*

UNCLASSIFIED

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SGPR 041200

CONTAINING PO-210 AND DISTRIBUTED UNDER THE GENERAL LICENSE OF 10 CFR 31.5 AND BM LICENSE NUMBERS 22-00057-06 AND 22-00057-326 BE IMMEDIATELY REMOVED FROM USE AND RETURNED TO THE BM COMPANY NLT 18 MAY 1988. THIS CHANGE ORDER TO 10 CFR 31.5 IS ACCOMPANIED BY A CORRESPONDING ORDER TO BM REQUIRING THEM TO ISSUE A RECALL NOTICE WITH DISPOSITION INSTRUCTIONS TO USERS. THE BM STATIC ELIMINATORS INVOLVED ARE ALL THOSE IN THE 200, 300 AND 900 MODEL NUMBER SERIES.

3. REQUEST BASE RADIATION SAFETY OFFICERS ENSURE WIDEST POSSIBLE DISSEMINATION OF THIS MESSAGE TO POTENTIAL USERS OF BM BRAND STATIC ELIMINATION DEVICES AND VERIFY BY MESSAGE TO THIS HEADQUARTERS WHEN UNITS AT THEIR INSTALLATIONS IDENTIFIED AS HAVING BM DEVICES HAVE COMPLIED WITH THE RECALL ORDER.

4. AIR FORCE UNITS USING THE ABOVE BM COMPANY STATIC ELIMINATORS ARE GENERAL LICENSEES UNDER 10 CFR 31.5 AND MUST, BY LAW, COMPLY WITH THE NRC'S ORDER. UNITS POSSESSING BM DEVICES AND WHO DO NOT RECEIVE A LETTER FROM BM GIVING DISPOSITION INSTRUCTIONS BY 31 MAR 1988 SHOULD CONTACT BM'S STATIC AND ELECTROMAGNETIC CONTROL DIVISION IN AUSTIN, TEXAS AT (512) 834-1800 AND REQUEST INSTRUCTIONS.

5. WE HAVE REQUESTED A LISTING OF AFFECTED AIR FORCE ORGANIZATIONS FROM BM, THROUGH THE NRC, AND WILL PROVIDE THE LIST WHEN RECEIVED.

*DR*

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SGPR 041200

HOWEVER, WE ARE UNCERTAIN AS TO ITS USEFULNESS IN IDENTIFYING SPECIFIC BASE USERS IN ALL CASES.

6. IF A USING ORGANIZATION IDENTIFIES A BM STATIC ELIMINATION DEVICE AS BEING ESSENTIAL TO SAFETY OR AS NECESSARY BECAUSE OF CRITICAL OPERATIONAL REQUIREMENTS, THE USING ORGANIZATION SHOULD NOTIFY US IMMEDIATELY IN WRITING AND REQUEST THAT WE MAKE APPLICATION TO THE NRC FOR APPROVAL FOR CONTINUED USE ON A TEMPORARY BASIS. ~~DO NOT CONTACT THE NRC DIRECTLY FOR AN EXEMPTION.~~ REQUESTS MUST BE MADE THROUGH THE USAF RADIOISOTOPE COMMITTEE (RIC), HQ AFOMS/SGPR, BROOKS AFB TX 78235-5000. REQUESTS MUST CONTAIN SUBSTANTIVE JUSTIFICATION OF THE NEED AND THE SAFETY OR MISSION IMPACT. ADDITIONALLY, A SURVEILLANCE PROGRAM TO IDENTIFY SOURCE LEAKAGE MUST BE SPECIFIED. WE SUGGEST THE MINIMUM FOR SUCH A PROGRAM BE A COMMITMENT TO IMMEDIATELY, AND QUARTERLY, SWIPE TEST SOURCES AS OUTLINED IN OUR REFERENCED MESSAGE AND IAW AFTO DD-11DN-3. THIS SHOULD BE SUPPLEMENTED BY MONTHLY USER INSTRUMENT SURVEYS FOR PO-210 ON WORK SURFACES USING AN ALPHA SCINTILLATION METER SUCH AS THE PAC-15 OR AN/PDR 56F. REQUESTS MUST BE PROMPTLY SUBMITTED IN ORDER FOR US TO RECEIVE A WRITTEN RESPONSE FROM THE NRC BEFORE THE 18 MAY 1988 DEADLINE FOR RETURN OF THE DEVICES.

04 04

RR RR UUUU

SGPR 041200

7. AT PRESENT, WE BELIEVE ANY POTENTIAL HEALTH HAZARD FROM A "LEAKING" SOURCE IS LIMITED. THE RESIN USED TO BIND TOGETHER THE MICROSPHERES ENCAPSULATING THE PO-210 AND THUS FORMING THE SOURCE MAY FAIL UNDER CERTAIN CONDITIONS RESULTING IN THE RELEASE OF INTACT MICROSPHERES. THE MICROSPHERES ARE DESIGNED TO CONTAIN THE PO-210 IN A FORM WHICH IS OF A NON-RESPIRABLE SIZE AND WHICH, IF INGESTED, PASSES READILY THROUGH THE INTESTINAL TRACT WITHOUT ABSORPTION OF PO-210 FROM THE MICROSPHERE.

8. OUR POC IS LT COL DUNLAP AT AUTOVON 240-3331.

*DPL*



DEPARTMENT OF THE AIR FORCE  
HQ AEROSPACE GUIDANCE AND METROLOGY CENTER (AFLC)  
NEWARK AIR FORCE STATION, OHIO 43057-5000

4 MAR 1988

REPLY TO  
ATTN OF: SNM

SUBJECT: Use of Nuclear Ionizers for Electrostatic Discharge (ESD) Control

TO: HQ AFOMS/SGPR (Col Dave Wood)

1. Per our recent telephone conversations, I have developed the attached information outlining the reasons why nuclear static eliminators are an essential part of the Air Force ESD Control Program. Many years have been spent incorporating ESD Controls into everyday Air Force operations in an effort to minimize the effects of ESD on expensive, mission critical Air Force electronic equipment. The discontinued use of the bench top ionizers that incorporate nuclear ionization sources would not only set the progress of the Air Force ESD Control Program back many years, but would also immediately increase the chance for latent ESD failure to occur in any Air Force hardware containing ESD sensitive items. If this failure occurs during a critical SAC or TAC operation such as a fighter aircraft mission or ballistic missile launch, we can see what impact it could have.

2. Please review the attached information and use it in your attempts to retain the use of bench top nuclear static eliminators in response to the recent Nuclear Regulatory Commission (NRC) orders to suspend their use. Feel free to contact me as you feel necessary concerning this matter. I can be reached at AV 580-7383 (lab) or AV 580-7326 (office).

*Steven C. Gerken*

STEVEN C. GERKEN  
AGMC ESD Control Program Manager  
AFLC ESD Technology Center  
Directorate of Inertial Engineering

1 Atch  
Ionization Information

cc: HQ AFLC/MMEEE (Capt Cukr)  
AGMC/SN  
AGMC/MLMTM (C. Froberg)  
AGMC/MAQSE (B. Russler)



AFLC - Lifeline of the Aerospace Team

*Atch 2*

Use of Nuclear Static Eliminators  
in  
Air Force Electrostatic Discharge (ESD) Control Operations

BACKGROUND

As you know, the Nuclear Regulatory Commission recently suspended the use of all Minnesota Manufacturing and Mining (3M) Brand Nuclear Static Eliminators that use Polonium 210 as the air ionizing agent. This suspension was based on the accumulation of evidence that significant alpha contamination had occurred in several facilities using 3M 900 series static eliminators. No evidence has been found as of 29 February 1988 that suggests that 3M Model 210 static eliminators, used in bench top ionizers were also a source of contamination. 3M Model 210 static eliminators were also suspended by the NRC based on their decision to ban all 3M nuclear static eliminators. Air Force Logistics Command (AFLC) and other Air Force facilities commonly use the 3M Model 911 bench top ionizer that utilizes a 3M Model 210 static eliminator in ESD Control operations. We feel there is a critical need to retain the use of the 3M 911 bench top ionizers while insuring that they are used in accordance with the recommended environmental conditions and not in environments such as those where alpha contamination was found.

WHY ARE BENCH TOP IONIZERS NECESSARY?

The ESD threshold voltage of most of today's integrated circuits and semiconductors is commonly less than 500 volts. It is not uncommon for human beings to generate several thousand volts by common activities such as raising an arm or lifting a leg. Insulative or non-conductive materials can possess as much as 30,000 volts of static electricity. With voltage thresholds (breakdown levels) at 500 volts, it is not hard to understand why ESD poses a threat to the electrical circuitry used to support the Air Force.

In our efforts to control static electricity and in preventing damage to valuable Air Force electronic equipment, it is imperative that the individual handling ESD sensitive items and the item itself be grounded so that no transfer of electrical charge is possible from one to the other. Secondly, and just as important, we must ensure that all insulative or non-conductive items that are necessary to do the required tasks in the work area do not possess a net positive or negative charge that could be discharged to ESD sensitive items being handled at the workbench. Since non-conductors are not groundable, they can possess static charge indefinitely. Ionization neutralizes these charged insulators or non-conductors by providing ions to the charged surface of the opposite polarity.

Many feel that ionization is expensive and not worth the added expense. The alternative to ionization at the bench top is to remove all insulative or non-conductive items and replace them with conductive items. This just is not economically feasible based on the multitude of non-conductive items that are necessary to repair or maintain the wide variety of electronic components that are handled each day by Air Force personnel. A typical module or circuit board repair bench may contain non-conductive work folders, tapes, syringes,



tech order pages, tool handles, part holders, personnel clothing (shirt or blouse sleeves) and many, many more. All of these items are non-groundable and can possess static charges of several thousand volts indefinitely. What complicates this situation is that conductive varieties of the insulative items mentioned above are not available in some cases. Even if conductive replacement items were available, the cost to replace them all would be astronomical. Ionized Air is the more economical alternative in eliminating the threat to circuitry posed by non-conductive or insulative objects.

Another important benefit provided by bench top ionization is the fact that it aids significantly in particulate or contamination control. Prior to our use of bench top ionizers, one of our maintenance areas responsible for repair and test of the Minuteman D37 Flight Computer's Magnetic Memory had been experiencing severe particulate contamination of the memory components they were repairing. This problem intensified in the winter months when humidity levels were low. Bench top ionizers were installed on the work benches in an attempt to neutralize the charged areas that attracted particulates. Significantly lower levels of contamination were noted on these workbenches after the ionizers were installed. These reductions in particulates minimized the time required to repair the memory components which improved their maintainability as well as allowing for a much cleaner component that is consequently more reliable.

Bench top ionization is a critical part of the Air Force ESD Control Program because it neutralizes charges on job related tools and equipment that cannot be grounded or substituted with conductive materials. To lose it would be subjecting our expensive Air Force assets to static charges that could degrade or destroy them.

#### BENCH TOP IONIZER ENVIRONMENTS

Bench top Ionizers currently used throughout AFLC are required by local regulations in some cases but for the most part are recommended for use by the AFLC ESD Technology Center here at Newark AFB. They are to be used during module or circuit board repair operations or in situations where discreet individual integrated circuits and semiconductors are handled in the presence of insulative materials. We feel that when discreet parts are handled directly, they are most vulnerable to static damage. Newark AFB alone possesses 125 such ionizers to serve this purpose. The ionizers are placed on one end of the workbench so that the airstream generated by the blower is directed across the length of the bench.

For the most part, these module or circuit board repair facilities are clean, maintained at constant temperature and free of solvents, moisture, vibration and flying abrasive matter that could damage the 3M Model 210 nuclear static eliminators found in the 3M 911 bench top ionizers.



## NUCLEAR IONIZATION VS ELECTRICAL IONIZATION

Although some electrical bench top ionizers are being used within the Air Force, their effectiveness over time in terms of their neutralization efficiency, ozone generation, Electromagnetic Interference (EMI) and space charging capabilities has not been proven. It is known that the neutralization efficiency of nuclear static eliminators decreases over time because the Polonium 210 used to ionize the air has a half life of 12 months, but inherent problems such as ozone, needle erosion, space charging, EMI, and periodic calibration requirements do not exist as with electrical ionizers.

ESD Control should be as passive as possible. In other words, we should minimize the number of procedures required of personnel to effectively control static. Nuclear bench top ionizers require that the operator turn it on. Electrical ionizers require periodic cleaning of the emitter needles and periodic calibration to ensure positive and negative ion balance. They also require the operator to constantly make sure field sensitive devices are not placed too close to the ionizer because of space charging that is inherently produced by electrical ionizers. We doubt that any of these procedures will ever be done as religiously as they should, so from the standpoint of what is required of the user, the nuclear static eliminator is much better.

In an effort to compare the effectiveness of nuclear and electrical bench top ionizers, we have begun a study that will monitor several characteristics of each over a period of one year. Key parameters, such as ozone generation, charge decay, space charging, calibration requirements, EMI and particulate generation will be tested for each ionizer. Until this study is complete, the continued use of nuclear static eliminators is essential.

### SUMMARY

The Air Force has expended much time, effort and expense over the past five years to incorporate ESD Control throughout all phases of its operations to try and minimize the effects that ESD can have on the reliability, maintainability and mission capability of the electronic equipment used therein.

Bench top ionization generated by nuclear means has played a major role in eliminating static charge in areas where discreet ESD sensitive items are handled. Without a proven or economically feasible alternative, such as electrical ionization or the replacement of all non-conductive items at the workbench with conductive items, our only option is to continue to use nuclear static eliminators.

The Air Force cannot afford to risk ESD damage to our expensive electronic assets. ESD damage in latent or "walking wounded" form poses a mission capable threat to the Air Force when we consider that an integrated circuit or semiconductor in this condition may be the one that is providing crucial coordinate information during a missile launch or aids in providing directional information during a fighter aircraft mission. For these reasons, it is imperative that nuclear bench top ionization and the ESD protection that it provides be maintained throughout the Air Force.