# RULEMAKING ISSUE
(Notation Vote)

October 21, 2004 SECY-04-0194

FOR: The Commissioners

FROM: Luis A. Reyes
Executive Director for Operations /RA/

SUBJECT: DENIAL OF PETITION FOR RULEMAKING (PRM-40-28) - DONALD A. BARBOUR, PHILOTECHNICS

PURPOSE:

To obtain Commission approval to deny PRM-40-28.

BACKGROUND:

By letter dated August 30, 1999, Mr. Donald A. Barbour, Philotechnics, submitted a petition for rulemaking (PRM-40-28) requesting the U. S. Nuclear Regulatory Commission (NRC) to amend its regulations governing the use of uranium counterweights under the exemption in 10 CFR 40.13(c)(5). The petitioner requested that NRC amend its regulations to clarify a number of issues associated with the effective control of these counterweights.

A notice of receipt of the petition was published in the Federal Register on January 21, 2000 (65 FR 3394), with the comment period ending April 5, 2000. Two comments were submitted in response to the petition during the comment period, both of which supported the petition. One of these comments was from the petitioner, providing additional information. The other comment, from a member of the public, provided an example of the potential cost associated with mishandling the counterweights and suggested that distribution requirements be added to the regulation. Additionally, Mr. Barbour provided a supplement to his petition on February 14, 2001, in which he suggested additional details to be included in the rulemaking to: (1) specify

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NOTE: TO BE MADE PUBLICLY AVAILABLE 5 BUSINESS DAYS AFTER THE LETTER TO PETITIONER IS DISPATCHED.

that only counterweights manufactured from depleted uranium, and not natural uranium, are covered under the exemption; and (2) clarify the scope of activities allowed to repair or restore counterweight platings or coverings under 10 CFR 40.13(c)(5)(iv). Mr. Barbour's petition and supplements to the petition are provided as Attachments 1-3.

In April 2001, the staff submitted a rulemaking plan to the Commission in SECY-01-0072, "Draft Rulemaking Plan: Distribution of Source Material to Exempt Persons and to General Licensees and Revision of 10 CFR 40.22 General License," which provided an analysis of options for revising requirements in 10 CFR Part 40 related to general licenses and exemptions. Among the many broad regulatory issues addressed in SECY-01-0072, the rulemaking plan included options for addressing PRM-40-28. At the time, the staff believed it would be more efficient to resolve the petition as part of the other broader, related actions discussed in the rulemaking plan.

The only detailed discussion of the staff's proposed approach for dealing with PRM-40-28 in SECY-01-0072 is found as part of an option (Option 2 in the rule plan), which states: "... the staff would provide clarification regarding the exemption for depleted uranium aircraft counterweights in §40.13(c)(5) to require specific licensing for long-term storage and uses other than those indicated in the exemption, and identify requirements for disposal options in approved facilities." The staff's recommendations were based upon a review of the petitioner's documents and the staff's preliminary review of the issue. The staff planned to expend the resources on the more in-depth analysis required to support a rulemaking for this and the broader issues addressed in SECY-01-0072 after the Commission directed the staff to move forward. On June 5, 2003, the Commission directed the staff, through a Staff Requirements Memorandum (SRM), to make no changes to 10 CFR Part 40 at that time; however, the Commission directed the staff to grant PRM-40-28 "that raises concerns about the disposition of depleted uranium in aircraft counterweights."

Following the issuance of the Commission's SRM to SECY-01-0072, the staff evaluated PRM-40-28 as a separate rulemaking. During the more detailed analysis required to support the rulemaking, the staff concluded that the existing regulations sufficiently address the underlying bases for the petition. Therefore, for the reasons set forth in the following discussion and in a draft *Federal Register* notice addressing the petitioner's requested actions (Attachment 4), the staff requests that the Commission review its original direction in the SRM to SECY-01-0072 in consideration of the additional information provided in this Commission paper, and re-direct the staff to deny the petition. Although Mr. Barbour's 2001 supplement was not addressed during the development of SECY-01-0072, the issues raised in the supplement are also addressed in the draft *Federal Register* notice supporting the denial of PRM-40-28 (Attachment 4).

DISCUSSION:

In his petition, Mr. Barbour requested that NRC amend its regulations to provide for additional provisions to define and clarify responsibilities for the effective control of depleted uranium aircraft counterweights. The petitioner believes that the amendment should clarify: (1) at what point and under what circumstances the licensing exemption for these uranium counterweights held under 10 CFR 40.13(c)(5) is no longer applicable to these devices; (2) the length of time counterweights, for which there is no demand or plans for further use, may be stored as exempt material; (3) the regulations that apply to aircraft that have been removed from service, but still contain uranium counterweights; and (4) the need for radiological surveillance of long-term

aircraft storage parks and facilities where aircraft with depleted uranium counterweights are regularly stored for protracted periods under unmonitored conditions. Additionally, the petitioner stated his belief that an immediate notification was necessary to advise those organizations that currently possess depleted uranium aircraft counterweights of their regulatory responsibilities.

The staff considered the petition and its supporting rationale. In response to the petitioner's request to immediately advise those organizations possessing depleted uranium aircraft counterweights of their regulatory responsibilities, the staff issued a regulatory issues summary (RIS-01-013) in July 2001. This RIS provides information regarding the proper disposal channels for uranium counterweights and reminds holders of counterweights of their responsibilities under the existing regulation.

To address the petitioner's other concerns, the staff considered: (1) the language in the current exemption in 10 CFR 40.13(c)(5); (2) the regulatory history of the exemption, including its safety basis; and (3) the current need for the exemption, i.e., the current use of depleted uranium in aircraft counterweights.

Based on its more detailed analysis of the issues discussed in PRM-40-28, the staff now concludes that additional rulemaking is not necessary. The staff has determined that the existing regulatory requirements in 10 CFR 40.13(c)(5) provide adequate protection in those areas for which the petitioner requested amendment of the regulation. Specifically, during the more detailed review of the petitioner's issues, the staff has determined:

(1) *At what point and under what circumstances the exemption is no longer applicable*: The regulation in 10 CFR 40.13(c)(5) states that counterweights are exempt only to the extent that they are installed in an aircraft, or stored or handled in connection with the installation or removal of the counterweights. The staff's position is that the exemption also applies to the transfer and appropriate disposal of the counterweights using any of the alternatives discussed in RIS-01-013. Persons holding counterweights are no longer exempted under 10 CFR 40.13(c)(5) if: (a) the counterweights are stored for long periods with no clear intent to reuse the counterweights or (b) the counterweights are modified or processed in any way. This prohibition does not include restoration of the plating. In fact, during any period of storage, the counterweights are expected to continue to be maintained such that the plating or other covering remains intact and the labeling requirements continue to be met.

(2) *Length of time the counterweights may be stored as exempt material:* Counterweights may only be stored incidental to the installation or removal from an aircraft. The staff's position is that the period of storage after removal of the counterweight from an aircraft includes a reasonable period of time (e.g., up to two years) to: (a) determine whether the counterweight will be reused, (b) if not, determine an appropriate method of disposal, and (c) accumulate a quantity of counterweights, within a reasonable time frame, to allow for a more economical disposal. During the period of storage, the counterweights must be properly maintained.

(3) *Applicable regulations for aircraft removed from service, but still containing uranium counterweights:* The staff's position is that the exemption applies only to

counterweights installed in aircraft that continue to be maintained per Federal Aviation Administration (FAA) regulations. The exemption is not considered to apply to counterweights installed in aircraft for which there are no plans to continue to maintain or use it for flight (and therefore would no longer be deemed an "aircraft" under the FAA definitions in 14 CFR 1.1). If there is no clear intent to continue to fly the former aircraft in which counterweights are installed, the exemption for the counterweights would continue to apply only for a reasonable period to allow the holder to remove the counterweights for reuse or appropriate disposal using one of the alternatives discussed in RIS-01-013.

(4) *Radiological surveillance during storage*: While the counterweights remain under the exemption, the radiological requirements, including monitoring, in 10 CFR Part 20 do not apply. It should be noted, however, that the exemption in 10 CFR 40.13(c)(5) does not exempt the holder from requirements of other government agencies (e.g., FAA or the Occupational Safety and Health Administration) that may require monitoring or other actions associated with the storage of the counterweights or their use in aircraft.

The staff's determination is based on the following: (1) the review of the regulatory history of the exemption indicates that the exemption was implemented in response to the same areas of concern raised in PRM-40-28, e.g., when and for how long the exemption is applicable to these devices, how long counterweights exempt from licensing can be stored, and what kind of restoration and repair is allowed under the exemption; (2) the health and safety basis provided in the regulatory history is representative of current practices; (3) a review of reported incidents, e.g., unauthorized alterations or shipments to recyclers, does not indicate a significant health and/or safety issue, with most events resulting in exposures under tens of microsieverts (a few millirem) to the impacted individuals; and (4) the number of aircraft counterweights being held under the exemption is decreasing as these devices are replaced by tungsten counterweights.

Additionally, the staff reviewed data included in NUREG-1717, "Systematic Radiological Assessment of Exemptions for Source and Byproduct Material," June 2001. Section 3.17 of NUREG-1717 provides background on the exemption in 10 CFR 40.13(c)(5) and updated estimates of exposures for a variety of scenarios related to the use of depleted uranium counterweights under the existing exemption. These scenarios include the use of counterweights under expected routine uses (including maintenance, flight operations, and storage) and accidents and misuse (including fires and loss of counterweights). The calculated range of exposures for routine operations ranged from a maximum of 0.9 millisievert per year (mSv/yr) (90 millirem per year [mrem/yr]) for maintenance workers to 0.01 mSv/yr (1 mrem/yr) or less for flight crew and warehouse workers (resulting from storage of the counterweights). Potential accident scenarios were calculated to result in exposures of 0.8 mSv/yr (80 mrem/yr) or less to individuals. These calculations are consistent with historical data used to originally support the exemption. Because these exposures are within the limits of 10 CFR Part 20 and are expected to impact a minimal number of individuals, NRC does not believe that the use of uranium counterweights under the current exemption have, or will, result in a significant impact to public health and safety or the environment.

In conclusion, the staff finds that the current requirements in 10 CFR 40.13(c)(5) provide adequate protection of the public health and safety as well as the common defense and security. Although the staff believes that rulemaking is not needed, the staff believes that

additional guidance would be useful to remind holders of counterweights of their obligations regarding long-term storage and restoration of counterweights. Therefore, the staff plans to issue a new RIS (Attachment 5) to provide additional guidance regarding the storage and repair or restoration of uranium counterweights. The staff believes that the new RIS, in conjunction with the RIS issued in 2001, will provide appropriate guidance regarding the proper use and disposal of uranium counterweights under the exemption in 10 CFR 40.13(c)(5), without increasing unnecessary burden on persons currently exempt from licensing.

For these reasons, the staff finds that the arguments presented in PRM-40-28 do not support a rulemaking to revise the regulations in 10 CFR 40.13(c)(5) regarding the use and storage of uranium counterweights, and the petition should be denied.

RECOMMENDATIONS:

That the Commission direct the staff to:

1. Approve the denial of the petition for rulemaking and publication of the *Federal Register* notice announcing the denial;

2. Inform appropriate Congressional committees; and

3. Inform the petitioner of the Commission's decision to deny the petition (Attachment 6).

COORDINATION:

The Office of the General Counsel has no legal objection to the denial of this petition.

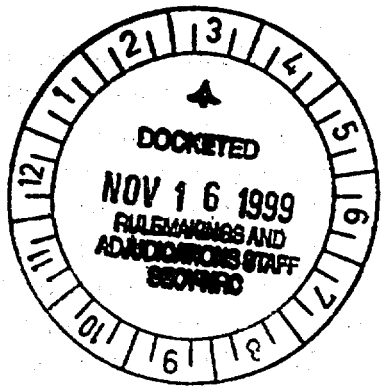
*/RA by William F. Kane Acting For/*

Luis A. Reyes
Executive Director
for Operations

Attachments:
1. Mr. Donald A. Barbour Petition Dated August 30, 1999
2. Mr. Donald A. Barbour Supplement Dated April 4, 2000
3. Mr. Donald A. Barbour Supplement Dated February 14, 2001
4. Draft *Federal Register* Notice of Denial
5. Draft RIS on storage and repair or restoration of uranium counterweights
6. Draft Letter to the Petitioner

DOCKET NUMBER
PETITION RULE PRM 40-28
(65FR3394)

PHILOTECHNICS




August 30, 1999
99-0870

U. S. Nuclear Regulatory Commission
Mr. Joe Decicco, NMSS/IMNS/OB
Washington, D.C. 20555-0001

Subject: Depleted Uranium Aircraft Counterweights

Dear Mr. Decicco,

We note that the NRC is currently engaged in a rulemaking to establish additional requirements for certain generally licensed devices containing by-product material. We believe that similar concerns are relevant to depleted uranium aircraft counterweights. Although they are not within the scope of the present rulemaking, we believe that these items actually pose a more immediate and larger potential for public exposure. We submitted the comments contained in this letter for consideration in the rulemaking because many of the issues had strong parallels, but we have been informed that an expansion of the current rulemaking scope is unlikely. The following discussion supports the need for additional rules to define and clarify responsibilities for the effective control of depleted uranium counterweights. It also substantiates a pressing need for timely guidance to advise users of the requirements already established for the proper management of these items. Perhaps an IEE notice would be an effective medium for accomplishing this. A summary of key points that should be considered for incorporation in such a notice is also attached.

The problems associated with depleted uranium (DU) aircraft counterweights must be understood in the context of the practices of the aviation industry. Counterweights, made of extremely dense material such as DU, are used to balance the control surfaces of ailerons and elevators to facilitate hydraulic adjustments during flight. When properly marked by a licensed manufacturer, depleted uranium counterweights are currently exempted from all licensing requirements as an "unimportant quantity" while installed on a plane or stored

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or handled incident to installation or removal. The implication, confirmed verbally by the NRC staff, is that when counterweights are removed from service, they lose their exemption. This means that when a fleet is "set down" or a plane is scrapped out, hundreds to thousands of pounds of DU counterweights suddenly become source material requiring a license. When this happens, they are generally in the possession of an organization that has no license and no knowledge of the hazards of the material or of any regulatory requirements. Over the past nine months, we have conducted extensive informal industry surveys that confirm widespread unawareness of responsibilities and the controls that are applicable to depleted uranium aircraft counterweights.

A general license cannot be invoked to control this material because the amount of DU that can be possessed under a general license is limited to 15 pounds. Very few counterweights weigh less than this, e.g. a 1524834-101 counterweight for the L-1011 weighs about 11 pounds. In contrast, an AMC-7226 counterweight from a DC-10 weighs approximately 191 pounds. Most DU counterweights for wide-body aircraft weigh between 20 and 50 pounds. Collectively, the quantities at issue almost always exceed the general license limit because a "ship set" of counterweights includes many counterweights and cumulatively weighs over 1,000 pounds for most aircraft models.

Depleted uranium counterweights were once widely used on the L-1011 Tristar, the DC-10 and the Boeing 747 wide-body commercial aircraft. DU was also used on general aviation planes such as the JetStar. Many military and naval aircraft employed DU for their counterweights. The A-7, F-111, C-5A, C-130, C-141, P-3C, S-3B are examples. Some, like the C-141, continue to use DU counterweights. Others, like the S-3B, are having their counterweights converted to tungsten. Some, like the A-7, have passed out of U.S. service to our allies, along with their DU components. So far we have been unable to locate an authoritative and comprehensive listing of all the planes for which DU counterweights were manufactured and distributed. Researching this may be complicated by the facts that some counterweights were manufactured in Canada and that a primary domestic producer, National Lead of Albany, went out of business in the 80's and decommissioned its Colonie, NY plant. As a result, DU counterweights may be in service on additional commercial aircraft types.

The use of depleted uranium for counterweights fell from favor, and today counterweights for new production aircraft are made from tungsten. A legacy of depleted uranium counterweights remains on the older planes. The total amount of these DU counterweights is difficult to determine accurately because the quantity varies for each different model of the wide-body types. We used

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parts listings and structural drawings to determine the amount of DU in ship sets of counterweights for representative L-1011, DC-10, 747 and JetStar aircraft. Based on the numbers of these planes in existence and a survey of the quantities of some of the counterweights in the inventories of aviation parts suppliers, we estimate that as many as two million pounds may be in service, world-wide, for commercial aircraft. As these planes approach the end of their economical service life, DU counterweights are beginning to enter uncontrolled disposal channels in a rapidly increasing stream.

The average of ages of existing wide-body commercial aircraft are 22.9 years for the L-1011, 23.4 years for the DC-10, and 15.8 years for the 747. Increasing numbers of these planes are now being "set down", "parted-out" and scrapped. Major airlines are knowledgeable enough to insure appropriate disposal of their surplus counterweight spares, although, in the process, they usually store the (now non-exempt) counterweights for prolonged periods without a license. The fate of counterweights entering parts and salvage channels generally consists of abandonment or of transfer to unlicensed operators and disposal in municipal and industrial landfills and other sites. Thousands of pounds are now being so disposed. It is clear that many of these companies are unaware of proper storage and disposal requirements.

Depleted uranium counterweights often remain on aircraft that are retired from service and consigned to long-term storage, parts recovery, or salvage. DU counterweights are corrosion prone but are plated and painted to retard oxidation. When they cease to be maintained in airworthy condition and subjected to systematic inspection, release of radioactive uranium oxides is highly probable. Although military aircraft are not subject to FAA inspection and maintenance directives, recent observations of the C-141 maintenance program confirm that without on-going surveillance, corrosion of DU counterweights can progress to the point where radiological contamination of maintenance facilities and long-term storage areas is threatened. This potential for environmental release could be minimized by terminating the exemption of counterweights on aircraft that are not in active use.

The findings of the NRC Study of Conformity with General License Conditions apply even more emphatically to the possessors of DU counterweights. Ignorance of the hazards and properties of the material and of regulatory controls on alteration, transfer and disposal are virtually total. During our inquiries, responsible managers have casually explained their company's regular procedures for turning over hundreds and thousands of pounds to unlicensed salvage operators and scrap dealers. They obviously have no idea that they are doing anything wrong or violating regulatory requirements. Although counterweights manufactured after 31 December 1969 were required

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to be marked "Unauthorized Alterations Prohibited", we have received anecdotal reports of individuals sawing up counterweights and using them for "bucking bars" to set rivets. State and municipal officials have begun to encounter abandoned counterweights at airports and discarded in trash dumpsters.

A recent incident involving a DU counterweight is illuminating. On 28 July 1999, the NRC published, in its Daily Events Report, an incident in which some Air Force mechanics at Robbins Air Force Base removed a DU counterweight from a C-141 aileron with a hammer and chisel, scattering a small quantity of dust and debris. This incident is now the subject of a formal investigation because someone at the scene was aware of the hazard. The irony of this level of response, while hundreds of thousands of pounds of the same material are being released into the public domain, speaks for itself.

Several complimentary regulatory responses to this situation may be appropriate. The existing regulations urgently require clarification of a number of issues including the point, and the circumstances under which, the exemption from licensing ceases, the length of time counterweights for which there is no demand or use can be stored as exempt material, the extent to which DU-bearing aircraft leaving service can be transferred to unlicensed parts dealers and salvage operators, and the need for radiological surveillance of long-term aircraft storage parks and facilities where counterweights have been stored for protracted periods under unmonitored conditions. As an attachment to this letter, some of these points are defined and discussed in more detail. Many of these issues closely parallel the ones that are being addressed in the current rule-making. This circumstance suggests the alternatives of expanding its scope or of initiating a separate one along similar lines.

In the interim, it is clear that some immediate notification is necessary to advise the organizations currently in possession of depleted uranium aircraft counterweights of their responsibilities to the public. The aviation community is a tightly regulated and law-biding one. There are extremely effective channels of communication with its primary regulator, the Federal Aviation Administration. Perhaps the NRC could take advantage of these existing channels by encouraging the FAA to issue an appropriate advisory bulletin informing the aviation community of its responsibilities for managing depleted uranium counterweights. An effective and practical solution must clearly involve the active participation of the aviation community and must be based on a detailed understanding of the realities that govern its daily activities and operations.

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The management of depleted uranium aircraft counterweights is a real problem that merits serious regulatory review. At this stage, it can probably be brought under control, and previous inappropriate disposals and releases can be corrected and remediated. If I can provide any additional information or insights, I will be glad to do so.

Sincerely,

Donald A. Barbour
Project Manager, Depleted Uranium Programs

Enclosures

c Dr. Thomas T. Holloway, Manager
Environment, Energy, and Employee Safety Division
Federal Aviation Administration

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# UNRESOLVED ISSUES AND QUESTIONS RE DEPLETED URANIUM AIRCRAFT COUNTERWEIGHTS

1. When an airline or operator "sets down" a fleet of DU-bearing aircraft, how long does it have to effect disposition of spare parts inventories of DU counterweights before it needs to apply for a source material license to maintain possession of them? Based on informal conversations with the NRC staff and with state regulators, one interpretation is that DU counterweights lose their exemption from licensing when they are no longer intended for their original use. Criteria based upon intent (such as intent to sell surplus counterweights to another operator) tend to be difficult to enforce. As aging planes are retired and "parted out", spare parts inventories will predictably swell even as real demand disappears, along with the number of aircraft to be supported. This development would reflect the fact that it may be cheaper to store DU counterweights indefinitely rather than to pay the costs of authorized disposal. Frequency of demand or period of non-use might afford one objective tool for determining the credibility of a representation of intent for future use. The NRC encountered an analogous problem in enforcing its requirement that licensees clean up and decommission their unused facilities. Licensees deferred clean-up costs by claiming possible future uses. The NRC finally promulgated the "Timeliness Rule", which requires that, if a licensed facility has remained idle for two years, the decommissioning process must be initiated. Perhaps, by analogy, DU aircraft counterweights should lose their exemption from licensing if they have not been used in flight (or, for a particular part number, have experienced no demand) for a specified period. Another objective indication of intended use relates to how the part is managed. Modern commercial aircraft incorporate over one million different parts. They are almost always managed by an automated data processing system. All parts are classified in such a system as either "repairable" or "consumable". Another common industry term for parts that may be economically repairable is "rotable". "Consumable" parts, on the other hand, that do not meet criteria for airworthiness are automatically directed to disposal channels. The "system" will not allow the issuance of a repair order for a "consumable" part. Categorization of DU counterweights as "consumable" parts in an organization's ADP system is therefor a clear indication that such a part loses its exemption from licensing as soon as it is removed from an aircraft.

2. Presumably, the exemption from licensing for DU counterweights, stored incident to installation on an aircraft, applies to counter-

weights in the inventories of aviation parts dealers who are attempting to sell them back to operators and maintenance organizations for their originally intended use. Do such counterweights, that are held in storage for a specified period without being sold, lose their exemption from licensing, requiring the aviation parts dealer to apply for a source material license or to transfer the parts to an appropriate special licensee, e.g. for controlled disposal?

3. Can DU counterweights in the possession of a salvor, scrap dealer, or parts broker be considered as exempt from licensing because of a (theoretical) possibility of future use on an aircraft? Such organizations often acquire parts (such as DU counterweights) that they do not expressly want because they are included in a large-scale consignment, transaction, or inventory transfer along with other high demand parts. An important factor in making such a determination should be the recognition that the Federal Aviation Administration requires a documentation of airworthiness for all parts used on an aircraft. This is effected by means of a completed FAA Form 8130-3 (Airworthiness Approval Tag) (or JAA Form One or equivalent for foreign carriers) that must accompany the part. Counterweights coming out of a tear-down facility would have to be shipped to an FAA licensed repair station for inspection, repair (if required), and issuance of the FAA Forms 8130-3 before they could be put to their original intended use. This is an expensive procedure and is not economically justified by the current negligible demand for DU counterweights. If a scrap or parts dealer accepted a consignment of material from an aircraft tear-down facility and did not obtain accompanying FAA Forms 8130-3 for the counterweights, it would be a good indication that there was no realistic prospect for their reuse. In fact, transfers of counterweights, without Forms 8130-3, from a tear-down activity to an unlicensed scrap or parts dealer is probably inconsistent with the intent of the regulations. From the time that DU counterweights are removed from an aircraft and enter either parts or salvage channels, the possessor should bear the burden of demonstrating a realistic probability of reuse, either by obtaining Forms 8130-3 immediately upon transfer or by other affirmative means.

4. Do DU counterweights installed on an aircraft lose their exemption from licensing if they remain installed on an aircraft that is placed in long-term storage, "moth-balled", or transferred for "parting out" or salvage? Aircraft that are not maintained in airworthy condition and subjected to periodic inspections and maintenance will eventually experience corrosion of counterweights and release of radioactive oxide onto storage areas and into the adjacent environment. The FAA defines an aircraft as a device intended for

flight, so aircraft taken out of service cease to be aircraft in its view. If installation, even on a non-operational aircraft, qualifies the counterweights for exemption from licensing, it means that the parts company performing a tear-down could remove engines, avionics and other high value components for refurbishment and reuse and leave the counterweights attached to the carcass consigned for scrapping. At what point does the stripped aircraft cease to be an aircraft? Can the DU counterweights be left attached to a bare airframe or a subassembly and legally abandoned?

5. Under the proposed rule-making, devices containing by-product material that were stored for two years without being used are going to require disposition. By analogy, should depleted uranium counterweights installed on aircraft parked in long-term storage and not flown for a specified period lose their exemption? Would the owner/operator of the storage facility be required to obtain a source material license, remove the counterweights and place them in controlled storage, or perform periodic radiation monitoring and surveillance to insure against release of corrosion products into the environment?

6. Military aircraft with DU counterweights, e.g. the A-7 Corsair, have been transferred to allied governments through foreign military sales. The gaining organizations are not always aware of the presence of the DU or of the controls that are appropriate. The notifications and information requirements that are appropriate to such transfers should be established.

# SUGGESTED POINTS FOR AN INFORMATION NOTICE

- Depleted uranium (DU) counterweights installed in aircraft are exempt from the requirements for licensing.
- The exemption also applies to counterweights that are being handled or temporarily stored incident to installation or removal.
- When these conditions are not met, DU counterweights are not exempt, and an organization must possess an NRC (or "agreement state") radioactive material license to retain possession of them.
- When DU counterweights lose their exempt status, there are three ways by which they may properly be brought under license control. The possessor may apply for his own radioactive material license. He may, alternatively, contract with a special licensee whose "umbrella" type license authorizes him to provide radiological protection support services to a third party. He may also transfer the counterweights to a special licensee, such as a radioactive waste broker, for authorized management or disposal.
- Depleted uranium aircraft counterweights may not enter unlicensed disposal channels. Transfer of DU counterweights to unlicensed scrap dealers, salvors, or disposal facilities is prohibited.
- The exemption of counterweights from licensing while they are being stored incident to removal or installation is not an exemption for indefinite storage. Factors and circumstances that would indicate counterweights were not exempt from licensing include: low recorded demand for a counterweight part number or prolonged storage period for a particular counterweight, lack of a current accompanying FAA Form 8130-3 (Airworthiness Approval Tag), classification of a removed counterweight as a "consumable" part in the organization's automated data processing system (part not subject to repair orders), existence of a corporate decision or policy to replace DU counterweights with tungsten equivalents, and accumulation and storage of counterweights under conditions similar to those applied to scrap materials or wastes.
- Counterweight users should be aware that the uranium oxide corrosion products from improperly maintained counterweights are radioactive, chemically toxic, and easily spread. Maintenance and storage areas where depleted uranium corrosion products have been released should be radiologically surveyed. Radiological contamination of facilities should be reported to the NRC or appropriate state agency so that required clean-up actions can be verified.

PHILOTECHNICS

April 4, 2000
00-0409

Secretary, U.S. Nuclear Regulatory Commission
ATTN: Rulemakings and Adjudications Staff
Washington, D.C. 20555



REFERENCE: Docket No. PRM-40-28

SUBJECT: Comments on Proposed Rulemaking

Dear Sirs,

I am submitting these supplementary comments on the proposed rulemaking for your consideration. They are structured to correspond to the organization of PRM-40-28.

**The Regulatory Situation**

A more extensive examination of federal regulations indicates that the exemption from licensing and controls of Section 40.13 for depleted uranium aircraft counterweights (and other radioactive materials) only has the effect of transferring their regulation to another government agency. OSHA Standard 1910.1096 (Ionizing Radiation) establishes certain regulatory requirements for the management of radioactive materials. 1910.1096(p)(3)(i) recognizes Nuclear Regulatory Commission (or Agreement State) source material licensees as being in assumed compliance with the OSHA standard. Since the users of counter-weights (and other exempt radioactive materials) are not generally NRC or agreement state licensees, they are required to comply with the OSHA standard. This standard prescribes radiation exposure limits, radiological surveys and evaluations, signage requirements for storage areas and containers, employee information requirements, records, reports, disposal, etc. An analysis of some of its provisions specifically relevant to DU counterweights is provided as an attachment to these comments. It should be noted that the OSHA standard is based on the old system of radiation dose limits used by NRC prior to 1994 and is less restrictive than the current 10 CFR Part 20. If NRC's intent in Section 40.13 was to make the possession of DU counterweights less burdensome for users, it is not clear that much was achieved.

The question of <u>when</u> counterweights cease to be exempt is closely tied to question of <u>how</u> they are brought back under regulatory control. The possessor must somehow become a licensee, so that he will be subject to compliance with

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appropriate 10 CFR requirements. Although the amount of uranium in counterweight holdings usually exceeds the 15-lb. "small quantity" general license limit of Section 40.22, requiring possessors to apply for special licenses may not generally be practical or necessary. An alternative based on modifying Section 40.22 to include a limited duration general license for "previously exempt" quantities of source material was submitted on November 3, 1999 in response to Docket No. PRM-40-27 (received as Comment 10). The disposition of that comment should be considered in the current rulemaking.

**Use of Depleted Uranium Counterweights**

A further perspective on the distribution of depleted uranium counterweights being stocked, as parts, by aviation parts suppliers can be gained by examination of commercial automated databases, which are widely used by parts traders, repair organizations and operators. Since there is now a very low demand for DU counterweights, and because suppliers are charged for the line items they list in a database, these listings should not be considered a reflection of the total population of counterweight parts holdings. A recent search of a popular database revealed eighteen companies listing a total of 111 DU counterweights for the Boeing 747, nine companies listing a total of 51 DU counterweights for the DC-10, and nineteen companies listing 1,581 DU counterweights for the L-1011. Some of these companies are large businesses with substantial resources, while others are quite small. A comparison with past search results confirms little or no movement in these inventories. The condition codes associated with the counterweights are also informative. Most of the counterweights are so old that corrosion of their surfaces is probable, but it is especially likely on the many counterweights coded as "as removed" or "serviceable", which describe parts taken off aircraft and added to inventory without repair.

The rulemaking petition mentions the potential for corrosion of depleted uranium counterweights and refers to Air Force experience with the C-141 maintenance program. The subject of corrosion, personnel radiation exposures, and facilities contamination deserves elaboration. The commercial aviation organizations which use depleted uranium (DU) counterweights are exempted by the Nuclear Regulatory Commission from the requirements for possessing a radioactive material license or implementing a radiation protection program. As a result, the likelihood of radiation exposure incidents being observed, recognized and reported by these organizations is remote. Fortunately, it is possible to benefit from the reported experience of a large licensed organization that performs the same activities. The United States Air Force is an NRC licensee with a well established radiation protection program. Many of its military aircraft are equipped with depleted uranium counter-weights, and military and commercial operations involving the removal and handling of these parts are essentially identical. The Air Force has reported several instances to the NRC in which its maintenance technicians have been

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subjected to radiation overexposures while removing corroded DU counter-weights. I am attaching summary NRC reports of three relevant incidents to this letter. In each case, the operations being performed by the Air Force personnel correspond closely to operations routinely performed by civilian employees of unlicensed commercial aviation organizations without any radiological oversight. It is a reasonable and prudent expectation that these identical activities, conducted in the commercial sector, will result in similar (albeit unreported) overexposures.

The first Event Description from the NRC's NMED database is designated Item No. 990519. It refers to the "possible overexposure" of an employee who was removing a DU counterweight from a C-141 aileron. Some radioactive corrosion products were dislodged, dispersed in the air, and spread by a nearby fan. The surrounding work area was surveyed and determined to be contaminated, requiring a cleanup. Several workers in the immediate vicinity were medically evaluated for internal uranium uptake. The Air Force is still in the process of providing additional information requested by the NRC. The NRC indicates informally that initial bioassays (urine analyses) of the workers confirmed the overexposure.

Event Details for Item No. 970387 describes the potential exposure of four workers who were attempting to degrease a depleted uranium counterweight from which paint was flaking. Contamination of the hands of one of the individuals was confirmed. Licensee calculations reportedly indicated that none of the workers received an uptake in excess of the NRC 's Annual Limit on Intake (ALI) from this one exposure, but apparently OSHA's 1.25 rem quarterly limit was exceeded. Without appropriate personnel monitoring equipment and records of employee radiation exposures, workers engaged in handling DU counterweights on a regular basis could easily exceed their individual annual exposure limits through a combination of a few such incidents. The exposure that was incurred in this case would have been easy to prevent.

Perhaps the most serious of the reported Air Force incidents was Item No. 940856, which resulted in an extreme overexposure from cutting wing parts away from depleted uranium counterweights, an operation common to commercial parting out and salvage activities. One individual was confirmed to have received a total effective dose equivalent of 25 rems or more. This is a significant overexposure. Appendix B to 10 CRF Part 20 facilitates the interpretation of this dose, based on the assumption that all radiation dose was from inhalation of uranium$^{238}$. The corrosion products of depleted uranium metal are $UO_2$ (in dry air) and $UO_3$ (in water)[1], which are, respectively, retention class Y and W compounds. The formation of both oxides is likely under field conditions, and they cannot practicably be distinguished other than by x-ray

[1]"Corrosion of Uranium and Uranium Alloys" by Lawrence J. Weirick, in Metals Handbook Ninth Edition, American Society for Metals, pp. 813-822.

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diffraction analysis. For radiological effects, the Annual Limit on Intake (ALI) of concern for $U^{238}$ is the class Y inhalation value of $4 \times 10^{-2}$ μCi, which correlates to annual whole body committed effective dose equivalent of 5 rems. For chemical toxicity effects, however, conservative analysis should be based on the class W inhalation ALI of $8 \times 10^{-1}$ μCi. The reported total effective dose equivalent of 25 rems is five times the corresponding 5 rem committed effective dose equivalent limit and therefor indicates an intake of 4 μCi of $U^{238}$. At this level, chemical toxicity becomes an important concern, as indicated by Footnote 3 to Appendix B. The specific activity of depleted uranium is $3.6 \times 10^{-7}$ Ci/gram U. An uptake of 4 μCi represents 11,110 milligrams, which, according to 10 CFR 20.1201 (e), is over 1,100 times the 10-milligram per week intake limit for soluble uranium.

Several different radiation dose limits have been established by various government agencies. The following table compares the reported 25 rem radiation exposure from removing counterweights to the four regulatory standards. It should be borne in mind that the Nuclear Regulatory Commission ALIs in Appendix B are based on a 5 rem annual occupational dose for radiation workers. Maintenance technicians working for unlicensed aviation organizations are not radiation workers, but are members of the general public. The NRC's dose limit for members of the general public is only 0.1 rem per year. The U.S. Environmental Protection Agency advocates an annual limit of 0.01 rem for members of the general public. OSHA's exposure limit for workers in a restricted area is 1.25 rems of whole body radiation per calendar quarter (ref. Table G-18, OSHA Standard 1910.1096).

| Agency | Regulatory Limit | 25 Rem Exceeds Limit By |
|---|---|---|
| EPA | Gen. Public 0.01 rem/yr. | x 2,500 |
| NRC | Gen. Public 0.1 rem/yr. | x 250 |
| OSHA* | Rad Worker 1.25 rem/qtr. | x 20 |
| NRC* | Rad Worker 5 rem/yr. | x 5 |

*Note: Rad worker status does not apply.

There is a reason that the removal of depleted uranium aircraft counterweights is resulting in radiation exposures to employees. Uranium is a corrosion prone material. When counterweights are manufactured, consecutive platings of nickel, cadmium and chromium are applied to inhibit the oxidation of the uranium surface. Aircraft in active service are subjected to periodic maintenance procedures and inspections. When damage to the protective plating on a counterweight is noted, the part is removed and replaced. The

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defective counterweight must be replated before it can be reinstalled. When aircraft are "set down" and consigned to long-term storage, "parting out" or salvage, inspection and repair of counterweights is no longer required. As the protective plating deteriorates, corrosion of counterweights becomes extensive, and deposits of easily dispersible uranium oxide accumulate on the counterweights and on adjacent structural surfaces. A dramatic instance of this phenomenon came to light in 1997 and early 1998, as the United States Air Force implemented a maintenance and upgrade program to prolong the service life of its C-141 transport fleet. Because corrosion problems with the depleted uranium counterweights had been recognized, the program managers at Robins Air Force Base elected to have the counterweights replated by a private contractor. As a pilot demonstration, eight complete flight control surfaces (four ailerons and four elevators) were shipped to the contractor, who removed, refinished, and replaced the counterweights. The contractor performed radiological surveys of the control surfaces and decontaminated them before installing the refurbished counterweights. The contractor's report to Robins Air Force Base included a set of photographs documenting the extensive corrosion of the counterweights along with the rad survey data and summarized its findings as follows:
"The RAFB flight control surfaces contained elevated levels of depleted uranium contamination. A detailed radiological survey is provided in Appendix B. As shown, the average alpha contamination is 62 times greater than the release limit for unrestricted use and 39 times greater than the release limit for beta/gamma contamination. The average contamination levels are 50 times greater than the release limits. Photographs of the contamination are provided in Figure 14."
The contract for this demonstration was issued by the Air Force on or about August 15, 1997. I am certain that the Air Force would provide NRC with a copy that includes the rad survey data and usable photos.

There are two aspects of this Air Force action that should be noted. First, this extensive contamination was encountered on the control surfaces of aircraft in active operation. The logical implication is that comparable contamination would be even more likely on equivalent structures of commercial aircraft and detached control surfaces retired from service and not subject to periodic inspection and maintenance. The other point is that the Air Force, a radioactive material licensee with an established radiation protection program, could have effected the removal of the counterweights at Robins Air Force Base by its own personnel and shipped them to the contractor for refinishing. Instead, they elected to incur the additional expense of packaging and shipping the intact control surfaces to their contractor so that the counterweights could be removed and the adjacent surfaces decontaminated in a more controlled work environment. It is commendable that these special measures were implemented for the protection of the Air Force technicians. The health and safety of their civilian counterparts is also deserving of consideration.

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The NRC's original regulation exempting depleted uranium counterweights from licensing and controls (effective January 1, 1969) contained a provision that restricted the exemption to counterweights that had their protective plating intact. The exemption was subsequently revised to eliminate this requirement. As a result, it is now perfectly permissible for aviation organizations to possess, remove, handle, and store corroded DU counterweights. This is, in fact, occurring as the aircraft that used these parts are withdrawn from active service. While the Air Force continues to experience and report significant overexposures from handling these counterweights, identical operations are performed, with increasing frequency, by commercial aviation workers.

NUREG-1717, Systematic Radiological Assessment of Exemptions for Source and Byproduct Materials, was issued December 1999 as a draft for comment. Section 3.17 evaluated the exemption for DU counterweights. My comments dated March 13, 2000 call out several erroneous assumptions that result in substantial underestimates of the doses to workers handling these parts. These misperceptions reflect, in part, a lack of understanding of the operational realities of the aviation industry. They seem to be consistent, however, with the low priority accorded to the regulation and control of depleted uranium counterweights.

The original petition touches on the improper disposition of DU counterweights. A search of NRC's NMED database yields 18 cases involving the activation of scrap yard portal monitors by DU confirmed as, or suspected to be, aircraft counterweights and one case of an individual purchasing a DU counterweight in a surplus store. Since only a fraction of improper disposals will be detected and reported, these known cases are another compelling confirmation that better controls are needed.

The principle of exempting unimportant quantities of radioactive materials from regulation to facilitate their use in valuable products is a sound and reasonable one. It seems clear that the terms of the existing exemption for depleted uranium aircraft counterweights are no longer appropriate to today's changed patterns of distribution and usage. Please feel free to contact me if there is any additional information that I can provide.

Sincerely,

Donald A. Barbour
Manager, Aviation Programs

Enclosures a/s

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## FACT SHEET: Applicability of OSHA Standard 1910.1096 to Depleted Uranium Aircraft Counterweights

- OSHA Standard 1910.1096 (Ionizing Radiation) establishes certain regulatory requirements for the management of radioactive materials, including DU counterweights.

- Paragraph 1910.1096(p)(3)(i) recognizes Nuclear Regulatory Commission (or "Agreement State") source material licensees as being in assumed compliance with the OSHA standard. To the extent that DU counterweights are exempt from NRC licensing, compliance with the OSHA standard is required. Users should be familiar with their responsibilities under 1910.1096, which differ in some ways from analogous NRC requirements.

- Paragraph (d)(1) requires every employer to conduct surveys and evaluations of radiation hazards incident to the use and presence of radioactive material to insure compliance with the radiation exposure limits and protective measures prescribed by the standard. Depleted uranium counterweights that have had their protective plating damaged and/or exhibit corrosion could cause significant radiation exposure to employees who handle them, and the dispersible radioactive uranium oxides could contaminate adjacent surfaces and structures. Storage of large quantities of intact DU counter-weights can also expose workers in the immediate area to significant radiation doses. These possibilities need to be addressed in the surveys and evaluations of radiation hazards.

- Paragraph (e)(5)(i) requires that "Each area or room in which radioactive material is used or stored and which contains any radioactive material (other than natural uranium or thorium) in any amount exceeding 10 times the quantity of such material specified in Appendix C to 10 CFR Part 20 shall be conspicuously posted with a sign or signs bearing the radiation caution symbol described in paragraph (e)(1) of this section and the words: CAUTION, RADIOACTIVE MATERIALS." Counterweights are governed by this provision because they are made of depleted, not natural, uranium. Depleted uranium is uranium-238. The quantity of uranium-238 specified in Appendix C to 10 CFR Part 20 is 100 microCuries. 100 microCuries of uranium-238 is equivalent to 0.6 pounds. Ten times this quantity is six pounds. Therefor, any area or room where a depleted uranium counter-weight(s) weighing more than six pounds is stored must be posted with the radiation symbol and warning.

- Paragraph (e)(6)(i) requires that any container used to transport or store more than 0.6 pounds of DU counterweights must be similarly labeled and marked. Paragraph (e)(6)(iv) further requires that containers used for storage of must be labeled to indicate the quantities and kinds of radioactive materials in the containers and the date of measurement of the quantities.

- To the extent that employers possessing depleted uranium counterweights are exempt from regulation by the Nuclear Regulatory Commission, Paragraph (i)(2) requires that "All individuals working in or frequenting any portion of a radiation area shall be informed of the occurrence of radioactive materials or of radiation in such portions of the radiation area; shall be instructed in the safety problems associated with exposure to such materials or radiation and in precautions or devices to minimize exposure; shall be instructed in the applicable provisions of this section for the protection of employees from exposure to radiation or radioactive materials; and shall be advised of reports of radiation exposure which employees may request pursuant to the regulations in this section."

- Paragraph (i)(3) requires the posting of OSHA Standard 1910.1096 and "the operating procedures applicable to the work conspicuously in such locations as to insure that employees working in or frequenting radiation areas will observe these documents on the way to and from their place of employment..."

- Paragraph (k) directs that "No employer shall dispose of radioactive material except by transfer to an authorized recipient, or in a manner approved by the Nuclear Regulatory Commission" or an Agreement State.

- Other provisions of the OSHA standard deal with maintaining records of employee radiation exposures, reporting radiation exposure of employees, warning devices, and other topics. A careful evaluation should be made of 1910.1096 to insure full compliance with all of its applicable provisions.

- Philotechnics is committed to assisting the users of depleted uranium aircraft counterweights to manage this material in compliance with all regulations. We hope that you will find this information helpful and that you will call on us when you want technical program assistance or find it appropriate to dispose these items.

PHILOTECHNICS

November 3, 1999
99-1111

Secretary, U.S. Nuclear Regulatory Commission
ATTN: Rulemakings and Adjudications Staff
Washington, D.C. 20555

REFERENCE: Docket No. PRM-40-27

SUBJECT: Comments on Proposed Rulemaking

Dear Sirs,

I hope you will find it practical to consider these comments even though they were not submitted prior to September 20, 1999. I am also providing them to the Generic Actions Program Committee since they relate to a matter recently referred to them. If they are not considered in conjunction with PRM-40-27, they can be resubmitted as a separate petition for rulemaking.

I believe that the petition for a rulemaking (PRM-40-27) is well considered and should be approved. The Commission should be aware, however, that effecting this proposed rulemaking, as presented, will aggravate certain anomalies and inconsistencies in the regulation of source material that already exist in its regulations. The origin of these is Section 40.13 (c) (5), which exempts properly marked depleted uranium aircraft counterweights from licensing while they are installed on an aircraft or being stored or handled incident to installation or removal. The difficulties arise for two reasons. The first is that, unlike the exemptions for other "unimportant quantities of source material" specified in Section 40.13, the exemption for depleted uranium in counterweights is conditional upon the use of the material and terminates when the counterweights are withdrawn from use on an aircraft. The second is that the quantities of the counterweights accumulated in the aviation industry by aircraft operators, parts suppliers, tear-down operations, long-term storage facilities and salvage activities, are typically measured in thousands of pounds, which far exceed the possession limits for depleted uranium under a general license and render their description as "unimportant quantities" questionable. Although it is sometimes difficult to pinpoint the exact time that the exemption

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ceases to apply, it is clear that at some point every counterweight ever made will cease to be exempt. If a counterweight weighed less than fifteen pounds, its user would become a general licensee when it was taken out of service and would be susceptible to appropriate controls under Section 40.22. While a few counterweights do fall under the fifteen pound threshold (for example, a 1524834-101 counterweight from an L-1011 weighs about eleven pounds), most weigh more. An AMC-7226 counterweight from a DC-10, in contrast, weighs approximately 191 pounds. Another factor causing counterweight holdings to exceed the threshold is that they are very rarely limited to a single counterweight. A "ship set" of depleted uranium counterweights for a commercial wide-body aircraft can comprise dozens of individual weights totaling over a thousand pounds for some models, and spare parts inventories held by operators and dealers often exceed a ton. When these parts do lose their exemption from licensing, the user cannot be regulated as a general licensee because the fifteen pound possession limit will invariably be exceeded. Many aviation industry users do not have a special license (presumably the rationale behind creating the exemption). The result is licensable quantities of source material (often large) that are unregulated. The user automatically becomes the unauthorized possessor of source material in excess of the general license limit. NRC regulations and enforcement provisions are formulated to govern the actions of licensees. It is not clear what form enforcement actions against unlicensed organizations possessing licensable quantities of source material would take or what the statutory basis for such an enforcement action might be.

One simple solution that suggests itself would be to allow depleted uranium counterweights that lose their exempt status to come, for a limited period, under the authorization of a general license. By this means, the user would come under NRC jurisdiction and be afforded a reasonable time to bring the material under license controls, either by applying for a special license or by transferring the material to an appropriate special licensee. Some time limit is necessary to preclude the alternative of indefinite storage (without the appropriate controls that a special license would impose) as a means of avoiding disposal costs. These improvements in regulatory consistency and controls can be achieved by a simple modification of Section 40.22.

Section 40.22 should be re-titled and paragraph (a) amended to read as follows:
40.22 Small and previously exempt quantities of source material.

(a) A general license is hereby issued authorizing commercial and industrial firms, research, educational and medical institutions and Federal, State and local government agencies to use and transfer not more than fifteen (15)

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pounds of source material at any one time for research, development, educational, commercial or operational purposes. A person authorized to use or transfer source material, pursuant to this general license, may not receive more than a total of 150 pounds of source material in any one calendar year. The fifteen pound limit on use and transfer and the 150 pound annual limit on receipt do not apply to depleted uranium contained in counterweights formerly installed in aircraft, rockets, projectiles, and missiles, or stored or handled in connection with installation or removal of such counterweights, which were therefor exempt from regulation in this part and from the requirements for a license set forth in section 62 of the Act, according to the provisions of Section 40.13 (c) (5), for a period of one year after the conditions of such exemption cease to apply.

A limited duration general license for depleted uranium counterweights that have lost their exempt status from licensing would provide several benefits besides providing an orderly and compliant mechanism for bring licensable material under appropriate controls. If the rulemaking proposed in Docket No. PRM-40-27 were approved, counterweight storage areas would require posting during the duration of the general license according to Section 20.1902. Depleted uranium is not separately listed in Appendix C to Part 20, but both natural uranium and uranium 238 are assigned a labeling threshold value of 100 microCuries. 100 microCuries of depleted uranium is about 0.6 pounds, so ten times the Appendix C value, which would require posting, is 6 pounds. Almost all counterweights weigh more than this. As a result, if the proposed rulemaking and this suggested modification of Section 40.22 (a) were both adopted, counterweights that had lost their exemption and came under the provisions of a limited duration general license would also be subject to the appropriate provisions of parts 19, 20, and 21. This would impose at least some consideration of radiation protection measures and worker notification. The recent incident at Robbins Air Force Base, NRC Event No. 35964, illustrates that there are credible hazards associated with depleted uranium counter-weights. On July 26, 1999 maintenance personnel removing a DU counter-weight from a C-141 aircraft contaminated the work area with radioactive debris, necessitating a radiological survey and cleanup. Several workers in the area are being medically evaluated for internal radiation exposure. The probability of such events occurring in the unlicensed commercial sector is great, but the likelihood that they would even be recognized, much less reported, is slight.

There are three broad categories of solutions to the problem of controlling depleted uranium aircraft counterweights that have lost their exemption from

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licensing. The first alternative is to take no action. The second approach would be to eliminate or restrict the unimportant quantity exemption for the counterweights. The third option would be to bring counterweights which have lost their exemption under a general license.

The no-action alternative is inappropriate. Our studies indicate that as much as two million pounds of depleted uranium aircraft counterweights are in circulation in support of commercial and general aviation aircraft. These parts are now being withdrawn from service at an increasing rate and in quantities that cannot reasonably be deemed "unimportant." It is logically inconsistent to require general license control for a 15 pound quantity of a material, a special license for 16 pounds, and no license for a ton or more. Our informal survey of the aviation industry confirms that the lack of understanding of regulations and responsibilities noted during the NRC's study of general licensees applies with even greater force to the possessors of formerly exempt depleted uranium aircraft counterweights and that violations, exposures, and unauthorized modifications, transfers and disposals are commonplace. This situation is not surprising. As regulations are presently structured, a person or organization possessing counterweights that lose their exemption should apply for a general license, contract with a special licensee for radiation control support, or transfer the items to a special licensee for management or disposal. This is not happening. The NRC's admitted problems in communicating with general licensees indicate that it would take massive expenditures of resources to educate users to their responsibilities. It should be noted that the potential for inter-agency cooperation with the Federal Aviation Administration could facilitate communications by exploiting the FAA's excellent channels to members of the aviation industry. Once a regulatory requirement has been advertised, however, there must be an effective mechanism for enforcement. The basis for enforcement, when dealing with companies that are not even general licensees, may not be satisfactory.

There are only three regulatory conditions that can apply to radioactive material: a special license, a general license or an exemption from licensing. Modifying or restricting the current exempt status of DU aircraft counterweights would be tantamount to requiring either a general or special license. Bringing the counterweights that have lost their exemption under a limited duration general license is the recommended alternative discussed above. Requiring all counterweight users to apply for special licenses (i.e. revoking the "unimportant quantity" exemption for counterweights) would re-establish regulatory consistency with the 15 pound general license limit for depleted uranium, would eliminate questions about enforcement authority, and would provide a basis for

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insuring the protection of aviation logistics workers and the proper disposal of the material. For the conditions to which the unimportant quantity exemption properly applies (well maintained counterweights mounted on an aircraft or being handled or stored incident to installation or removal) the controls associated with a special license may be excessive and would predictably encourage the aviation industry to discontinue the use of the depleted uranium counterweights which the exemption was designed to promote.

The recommended option of applying a limited duration general license to formerly exempt counterweights appears to be the more moderate and judicious choice. It would not perturb the existing exemption or precipitate an immediate withdrawal of legitimately exempt counterweights from service. It would eliminate an ambiguous discontinuity by which an (unlicensed) user who recognized that his counterweights had lost their exemption would be without a requisite license and, in some manner, out of compliance until he could apply for and receive one. It would insure a sound transitional basis for bringing the counterweights under the control of an appropriate special licensee and a clear basis for enforcement actions. It would promote a greater degree of consistency with the general license regulation of "small quantities" of the material. It would promote a greater understanding of the potential hazards of the material and more systematic and effective measures to provide workers with appropriate information.

Sincerely,

Donald A. Barbour
Project Manager, Depleted Uranium Programs

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# Event Details for Item No: 990519

| EVENT DATE | DISCOVER DATE | REPORT DATE |
|---|---|---|
| 26-JUL-99 | 26-JUL-99 | 27-JUL-99 |

**LICENSEE INFORMATION**

**Name:** AIR FORCE, DEPARTMENT OF THE **License Number:** 42-23539-01AF

**City:** BROOKS AFB **State:** TX **Region:** 4

**Agreement State Status:** NO **Reportable Event:** U **Abnormal Occurence:** N

**ABSTRACT:** The licensee reported a possible overexposure of an employee who inhaled depleted uranium (DU) dust. Licensee personnel were performing maintenance on a C-141 cargo aircraft aileron. A technician was found using a hammer and chisel to remove installed DU counterweights from the aileron. This process produced dust and debris, which was scattered by a nearby fan. The technician using a hammer and chisel on the DU was in violation of several rules. Upon discovery of this activity, the technician was told to immediately stop work. The area has been secured and decontamination procedures initiated. Bioassays of the technician and other workers in the area have been initiated. A Nuclear Research Corporation detector (model ADM-300), with a pancake probe was used to survey the area. Contamination levels in the room where the maintenance was being performed were found to be above background. The area of contamination has been confined to the Building 180 Maintenance Bay. Additional information has been requested by the INEEL for this event.

**EVENT CLASSIFICATION**

**Event Type:** EXP **Cause:** PROCEDURE NOT FOLLOWED

**KEY WORD INFORMATION**

**Key Word:** UNSEALED MATERIAL

**Key Word:** INTERNAL (CEDE)

**EQUIPMENT INFORMATION**

**System Level**

System ID: METAL, COUNTERWEIGHT/BALLAST

Serial Number: NA

Manufacturer: NR

Manufacture Date: NR

Model Number: NA

Consequences: FIELD NOT USED

**Component Level**

Component ID: UNSEALED MATERIAL, OTHER

Manufacture Date: NR

System ID: METAL, COUNTERWEIGHT/BALLAST

Isotope: U-DEP

Manufacturer: NR

Activity: NR

Model Number: NA

Leak Results: NA

Serial Number: NA

Consequences: FIELD NOT USED

**REFERENCE DOCUMENTS**

| Report ID Number | Type of Report |
|---|---|
| EN35964 | EVENT NOTIFICATION |

# Event Details for Item No: 970387

| EVENT DATE | DISCOVER DATE | REPORT DATE |
|---|---|---|
| 24-APR-97 | 24-APR-97 | 25-APR-97 |

**LICENSEE INFORMATION**

**Name:** AIR FORCE, DEPARTMENT OF THE **License Number:** 42-23539-01AF

**City:** BROOKS AFB **State:** TX **Region:** 4

**Agreement State Status:** NO **Reportable Event:** N **Abnormal Occurence:** N

**ABSTRACT:** The licensee reported that four individuals were potentially exposed to depleted uranium when they attempted to use chemical cleaner to degrease a painted counterweight, from which some paint was flaking. One individual was found to have contamination on his hands, and some contamination was detected on rags used to clean the counterweight. No airborne contamination was detected. Licensee calculations determined that none of the workers would have received an uptake in excess of 1 ALI for U-238 due to this event.

**EVENT CLASSIFICATION**

**Event Type:** EXP **Cause:** NOT REPORTED

**KEY WORD INFORMATION**

**Key Word:** UNSEALED MATERIAL, SNM

**Key Word:** METAL, COUNTERWEIGHT, U-DEP

**EQUIPMENT INFORMATION**

**System Level**

System ID: METAL, COUNTERWEIGHT/BALLAST

Serial Number: NR

Manufacturer: NR

Manufacture Date: NR

Model Number: NR

Consequences: FIELD NOT USED

**Component Level**

Component ID: UNSEALED MATERIAL, OTHER

Manufacture Date: NR

System ID: METAL, COUNTERWEIGHT/BALLAST

Isotope: U-DEP

Manufacturer: NR

Activity: NR

Model Number: NA

Leak Results: NA

Serial Number: NA

Consequences: FIELD NOT USED

**REFERENCE DOCUMENTS**

| Report ID Number | Type of Report |
|---|---|
| EN32225 | EVENT NOTIFICATION |
| R4-970515 | REGION REPORT |

# Event Details for Item No: 940856

| EVENT DATE | DISCOVER DATE | REPORT DATE |
|---|---|---|
| 11-DEC-93 | 11-DEC-93 | 19-JAN-94 |

**LICENSEE INFORMATION**

**Name:** AIR FORCE, DEPARTMENT OF THE **License Number:** 42-23539-01AF

**City:** BROOKS AFB **State:** TX **Region:** 4

**Agreement State Status:** NO **Reportable Event:** N **Abnormal Occurence:** N

**ABSTRACT:** THE LICENSEE REPORTED A POTENTIAL CONTAMINATION OF PERSONNEL DUE TO UNAUTHORIZED INDIVIDUALS CUTTING WING PARTS AWAY FROM DEPLETED URANIUM COUNTER WEIGHTS.

**EVENT CLASSIFICATION**

**Event Type:** EXP **Cause:** INADEQUATE TRAINING

**Reporting Requirements:** 20.2202(a)(1)(i) - AN INDIVIDUAL RECEIVED A TOTAL EFFECTIVE DOSE EQUIVALENT OF 25 REMS (0.25 Sv) OR MORE.

**KEY WORD INFORMATION**

**Key Word:** UNSEALED MATERIAL

**Key Word:** WHOLE BODY

**EQUIPMENT INFORMATION**

**System Level**

System ID: AIRCRAFT PART, ENGINE PART
Serial Number: NR
Manufacturer: NR
Manufacture Date: NR
Model Number: NR
Consequences: FIELD NOT USED

**Component Level**

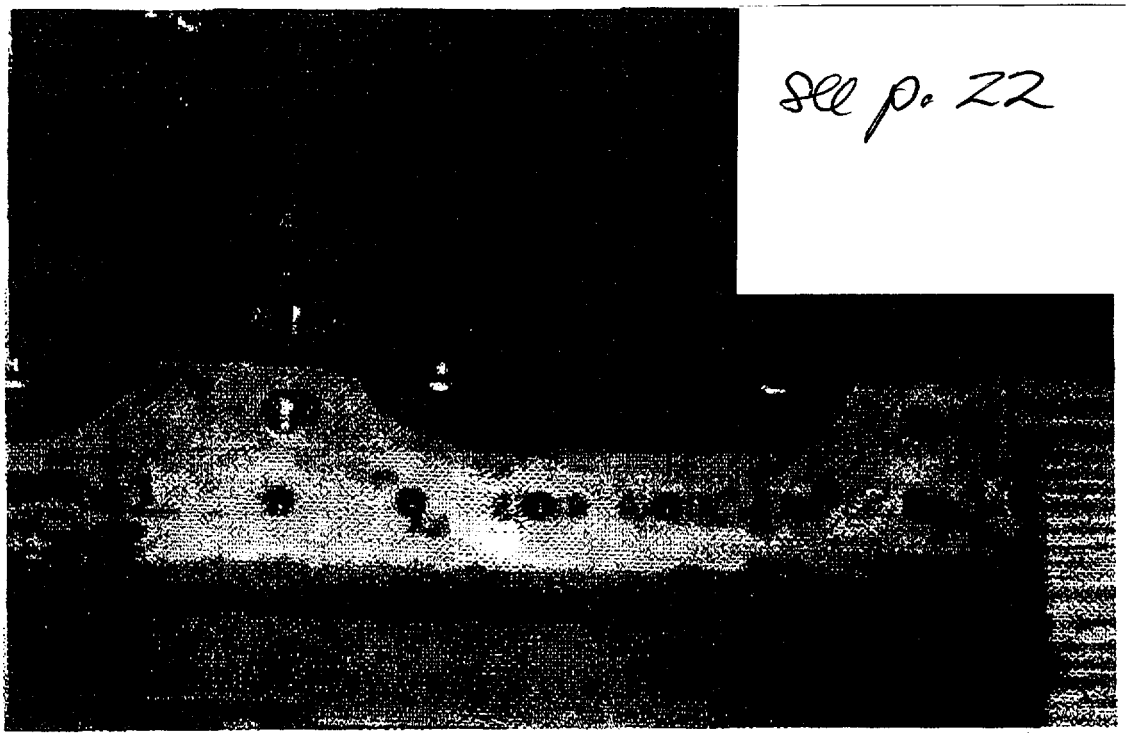
Component ID: METAL, COUNTERWEIGHT/BALLAST
Manufacture Date: NR
System ID: AIRCRAFT PART, ENGINE PART
Isotope: U-DEP
Manufacturer: NR
Activity: 0.065200 Curie(s)
Model Number: NR
Leak Results: NA
Serial Number: NR
Consequences: FIELD NOT USED

**REFERENCE DOCUMENTS**

| Report ID Number | Type of Report |
|---|---|
| EN26635 | EVENT NOTIFICATION |

# Department of the Air force
# Robins Airforce Base

## Report: Repair and Refurbishment of Aircraft Counterweights



See p. 22

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## 1.0 Introduction

The C-141 aircraft located at Robins Airforce Base (RAFB) contain depleted uranium (DU) counterweights located in the elevator and aileron sections of the flight control surfaces. Through several years of operation, the depleted uranium counterweights have corroded and contaminated the interior surfaces of these wing sections. The contamination is in the form of depleted uranium oxide. Periodically, maintenance is required on the elevator sections and, therefore, maintenance personnel are required to open this section of the wing. The uranium oxide contamination located inside these areas has created a personnel exposure and contamination control concern. When the elevator and/or aileron sections of the wings are opened, maintenance personnel are exposed to radioactive contamination and the spread of uranium oxide is a serious concern due to the potential to contaminate the surrounding maintenance areas.

The Department of the Air Force contracted Starmet to refurbish depleted uranium counterweights on several flight control surfaces and provide a detailed report summarizing the work performed and associated pricing. The wing sections of the aircraft were shipped intact to Starmet CMI's facility in Barnwell, SC for refurbishment. Since Starmet is licensed to handle radioactive material, all of the required controls are in-place and the work is controlled to ensure personnel exposure is minimized and the depleted uranium oxide is removed from the wing sections, collected, stabilized, and shipped to an approved disposal facility. The primary goal of this work is to control the spread of contamination, minimize exposure to RAFB maintenance personnel, properly handle the disposition of the depleted uranium oxide contamination, and refurbish the counterweights to prevent future problems.

Starmet CMI successfully performed the refurbishment of the wing sections and depleted uranium counterweights. This technical report summarizes the steps performed during the refurbishment work and provides a detailed cost report.

## 2.0 Scope of Work

The scope of work is to provide cost and delivery information to disassemble, repair and reassemble counterweights on eight (8) flight control surfaces (4 ailerons/4 elevators). In addition, cost data, including estimated cost to repair each remaining C-141 aircraft, is required. This work is in response to inquiry number 970666 from the Department of the Air Force WRALC/LJK.

Additional requirements written in the inquiry are listed below. This list includes the referenced section of the inquiry and specific requirements of the Statement of Objectives:

Section 1.3) Background

Some depleted uranium counterweights have excessive corrosion problems that would pose potential health concerns with maintenance personnel working with and around the contaminated weights.

Section 1.4) Purpose

To develop and document the process of refurbishing the depleted uranium counterweights located on the aileron and elevator flight control surfaces. This task will provide WR-ALC/LJ with two (2) complete sets of refurbished depleted uranium counterweights to serve as prototype exhibits. This will restore the counterweights to their original condition and prevent potential health hazards from arising. The prototype exhibits will establish the standard for future depleted uranium counterweight rework.

Section 3.1.b) Requirements

Repair depleted uranium counterweights as required to comply with drawings listed in paragraph 2.0 and with EPA requirements.

Section 3.1.c) Requirements

Install refurbished depleted uranium counterweights on control surface in accordance with I.O. 1C-141B-4-2. The maximum number of depleted uranium strip balance weights (two per shipment) shall be installed on elevator control surface regardless of the number installed when delivered to contractor's facility.

Section 3.3) Requirements

The contractor shall estimate the cost required to repair the depleted uranium counterweights for each remaining C-141 aircraft and provide a cost analysis.

Section 3.4) Requirements

The contractor shall document all efforts performed in paragraphs 3.1/3.2 and provide to the government a technical report detailing all procedures. The contractor data requirement list shall include as part of the technical report two subtitles (1) Condition Assessment and (2) Cost Analysis Report.

## 3.0 Condition Assessment

This technical report summarizes the steps performed during refurbishment of the depleted uranium counterweights located on the aileron and elevator flight control surfaces of the C-141 aircraft. A detailed description of the tasks performed is provided in the following subsections:

3.1 Project Planning
3.2 Unpacking
3.3 Disassembly
3.4 Counterweight Refurbishment
3.5 Re-assembly

Four (4) elevator and four (4) aileron flight control surfaces were shipped to Starmet CMI and successfully refurbished. A detailed schedule was not developed due to unknown conditions of the flight control surfaces. However, using the data gathered during this demonstration, a detailed schedule was developed for refurbishment of future flight control sets.

All work at Starmet CMI is performed under South Carolina Radioactive Materials License No. 322 and in accordance with applicable internal plans, procedures and work instructions.

### 3.1 Project Planning

A contract to perform the scope of work listed in Section 2.0 was received on August 15, 1997. Following contract award, Starmet personnel began reviewing the project requirements and developing detailed questions to be addressed during the Robins Airforce Base visit.

On August 19th Starmet personnel traveled to RAFB and met with Robins Airforce Base personnel. During the visit, the flight control surfaces were inspected and the Balance Technician was questioned about specific removal and assembly operations. Information collected during the site visit was used to develop a list of required tools and supplies. These tools and supplies were procured once Starmet personnel returned from the site visit.

### 3.2 Unpacking

The four (4) elevator flight control surfaces were shipped to Starmet CMI via a commercial freight carrier. The shipment was received on August 25, 1997. Starmet had difficulty removing the crates from the trailer. In the future, if commercial freight carriers are used, a maximum of three (3) crates should be carried on a single trailer. Once offloaded from the trailer, the crates were moved inside the Starmet CMI facility and staged for inspection and unloading.

The four (4) aileron flight control surfaces were shipped to Starmet CMI on a lowboy trailer. The shipment arrived on October 7, 1997. The crates were

moved inside the Starmet CMI facility and staged for inspection and unloading. This shipment also presented a problem in offloading because the lowboy trailer was not compatible with the receiving dock. It is recommended that lowboy trailers not be used in the future and only three (3) crates should be placed in each enclosed transport trailer.

Prior to removing the flight control surfaces, four (4) wheel dollies are placed under each crate to enable the boxes to be easily moved while inside Starmet CMI's facility. The crates are then positioned under a hoist for unloading. The hoist was specifically designed with a spreader lifting bar to enable the flight control surfaces to be removed without damaging the units. The bolts/nails are removed from the top lid and side panel of each crate. The crane is then used to remove the lid from the crate. Once the lid is removed, the flight control unit is strapped to the lifting bar and removed from the crate using the crane. While suspended, the crate is rolled away and a worktable is rolled under the flight control unit. The flight control unit is then lowered onto the worktable and the hoist is disconnected. Any other parts located in the crates are also removed and placed on the worktable.

The worktable is then transported to the disassembly area and an inspection is performed to document any unusual conditions, note any damaged parts, and make a list of missing parts. The table, flight control unit and any other parts are labeled with the same unique identification number. The identification number will facilitate tracking during the refurbishment process. The flight control surfaces are now ready for disassembly.

It was noted that one of the flight control surfaces was damaged prior to arrival at Starmet CMI. Metal was disfigured and some of the paint was scrapped from the exterior surfaces. The damage is shown on photographs provided as Figure 1 and Figure 2. The damage to the flight control surfaces was probably due to uncontrolled movement of the flight control surfaces while inside the crate. If so, this can be prevented in the future by properly securing the item inside the crate.

### 3.3 Disassembly

Depleted uranium counterweights are removed from the flight control surfaces by removing the bolts and/or screws. Some counterweights are located inside covers. For these counterweights, the covers must first be removed. Broken or sheared bolts/screws are removed from the counterweight or housing by being drilled out or pressed out. Care is taken when removing the counterweights to prevent the spread of depleted uranium oxide contamination. Photographs of the counterweights following removal from the four (4) elevator sections of the flight control surfaces are provided as Figure 3, Figure 4, Figure 5, and Figure 6.

Following removal of all counterweights, the surfaces of the flight control unit are vacuumed to remove any loose depleted uranium oxide. Following removal of loose oxide, the covers, inside bays and other accessible surfaces are wiped

down to decontaminate the flight control surfaces. The accessible surfaces are decontaminated to the release limits for unrestricted use as specified in Regulatory Guide 1.86. Since the contamination levels cannot be monitored in the inaccessible areas, Starmet CMI cannot guarantee that these areas are free-released for unrestricted use. Figure 7 shows the cover of the one of the elevator sections prior to being removed. Figure 8 shows the amount and extent of depleted uranium oxide contamination in each elevator following counterweight removal.

The following discrepancies were noted on the received flight control surfaces:

1. The T.O.C. indicates one (1) of P/N 3T53066-105 per assembly. Three (3) were found as indicated in the diagram. In addition, the diagram incorrectly shows the positions of P/N 3T53066-105 and 3T53066-101.
2. The T.O.C. indicates two (2) of P/N 3T53070-103 per assembly. Three (3) were found as indicated in the diagram.
3. The T.O.C and diagram do not indicate inboard strip balance weights in bay eight (8) of the elevator. Three (3) were found per assembly with P/N 3T53067-101. One (1) inboard strip balance weight was damaged.
4. Five (5) defective counterweights were found with P/N 3T53066-107.
5. Two (2) counterweights were missing.

Items 1 and 2 must be addressed by RAFB. The T.O.C. should be modified by RAFB to reflect the actual number of counterweights. In addition, the diagram for Item 1 should be modified to reflect the correct position of P/N N 3T53066-105 and 3T53066-101.

Item 3 requires modification of the T.O.C and fabrication of a new counterweight to replace the damaged strip balance weight. The T.O.C. should be modified by RAFB to reflect the inboard strip balance weights. Starmet replaced the damaged inboard strip balance weight with a new counterweight. Starmet manufactured one (1) inboard strip weight as needed for bay eight (8) using recycled depleted uranium.

For Item 4, Starmet repaired the defective counterweights. In addition to the defective counterweights, Starmet could not place a chamfer in the base of the counter bore of the inboard counterweight on one (1) of the five (5) defective counterweights, P/N 3T53066-107. Starmet submitted a deviation/waver from the specifications for RAFB approval. Following fabrication, the counterweight was inspected, assigned a unique tracking number and sent for refurbishment in accordance with Section 3.4.

As indicated in Item 5, two (2) inboard counterweights were missing from CMI 1 or elevator number 1560.00.128.9001, counterweight part numbers 3T53070-101 and 3T53064-101. Starmet replaced the missing pieces by manufacturing new counterweights using drawings provided by RAFB. The new counterweights

were inspected, assigned a unique tracking number, and sent for refurbishment in accordance with Section 3.4.

RAFB requested that Starmet fabricate outboard strip weights. Starmet contracted LMITCO to fabricate the outboard strip weights from depleted uranium. Upon inspection at Starmet CMI, the weights were found defective due to the rough and sharp edges. In addition, the holes were cut thermally and therefore were not perfectly round. Starmet machined the edges and sent the weights for refurbishment in accordance with Section 3.4. Even though the holes were not perfectly round, they met the specifications. In the future, Starmet will require LMITCO to mechanically cut the holes and repair any rough and/or sharp edges.

One of the interior counterweights was previously incorrectly installed by RAFB. Figure 9 provides a photograph of two (2) screws that were installed to connect the counterweight. Apparently, the weight was turned over and did not properly fit the original bolt hole locations. Therefore, RAFB personnel increased the bolt hole sizes and installed the counterweight upside down. Washers were used to cover the enlarged bolt hole locations. Following refurbishment, Starmet installed the counterweight in the correct position with washers. Starmet could not repair the enlarged bolt hole openings.

Figure 1, Metal Disfigured During Transport

Figure 1, Paint Damaged During Transport

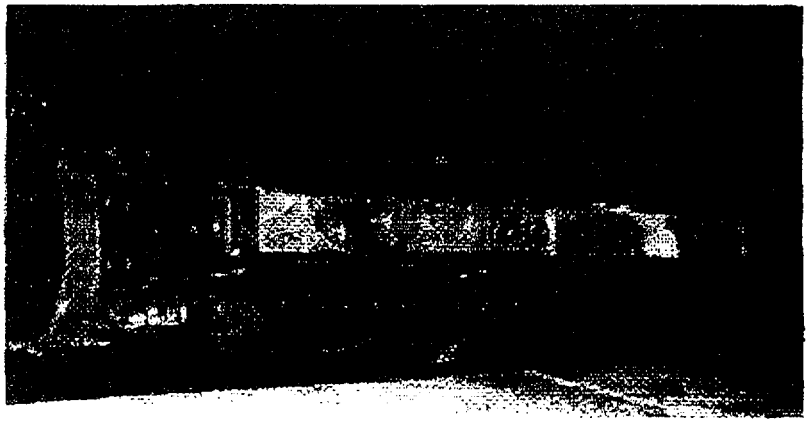
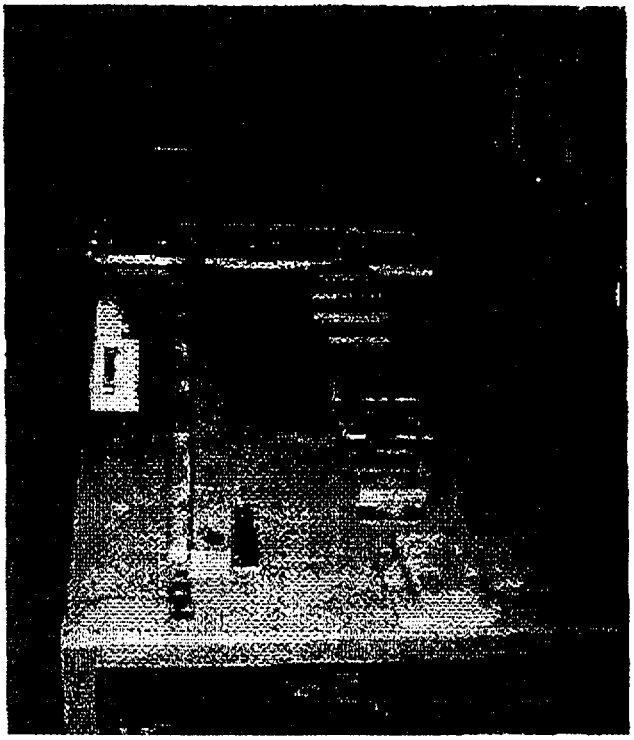


Figure 3, Counterweights Removed From Elevator 1



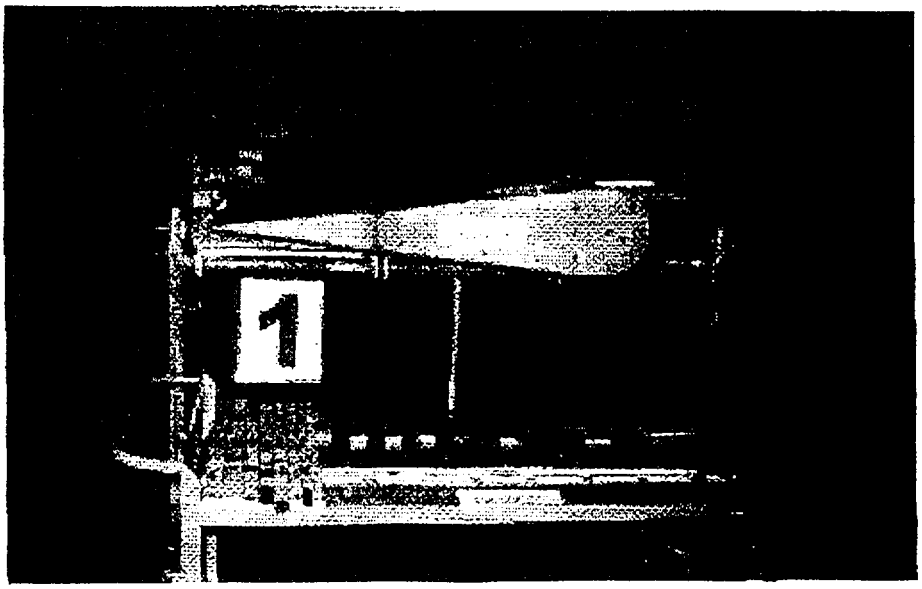
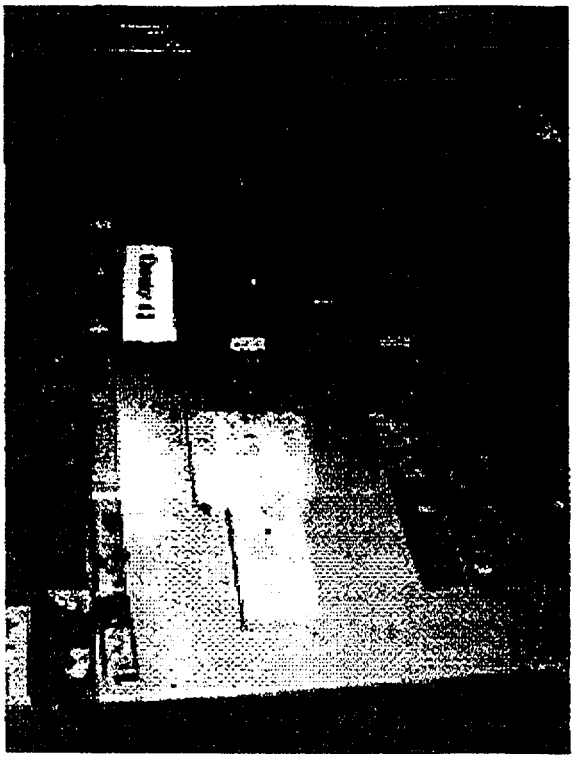


Figure 4, Counterweights Removed From Elevator 2



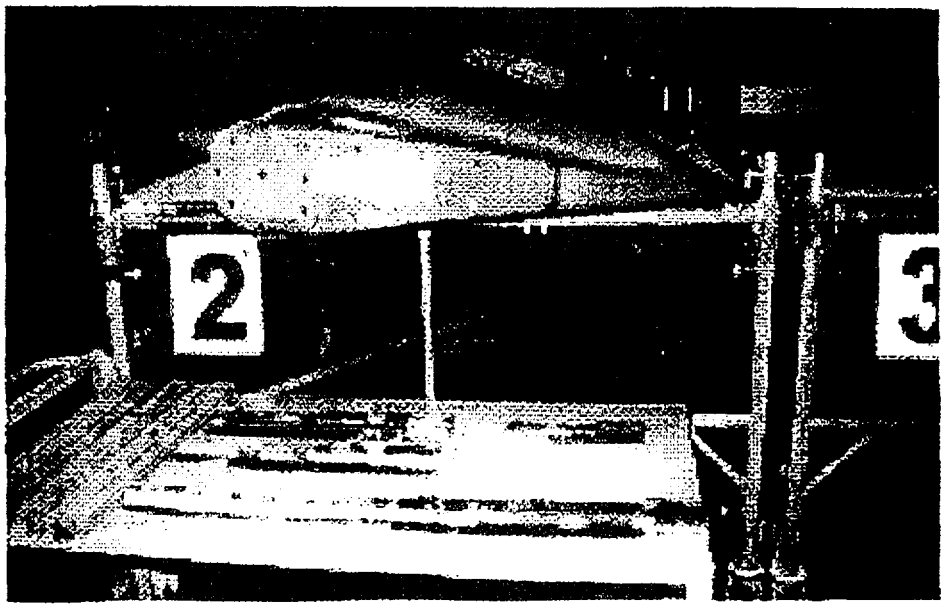
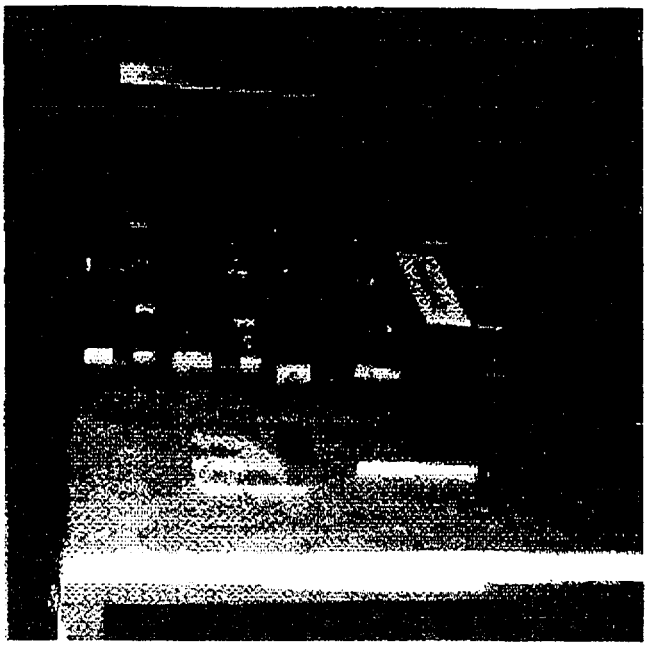


Figure 5, Counterweights Removed From Elevator 3



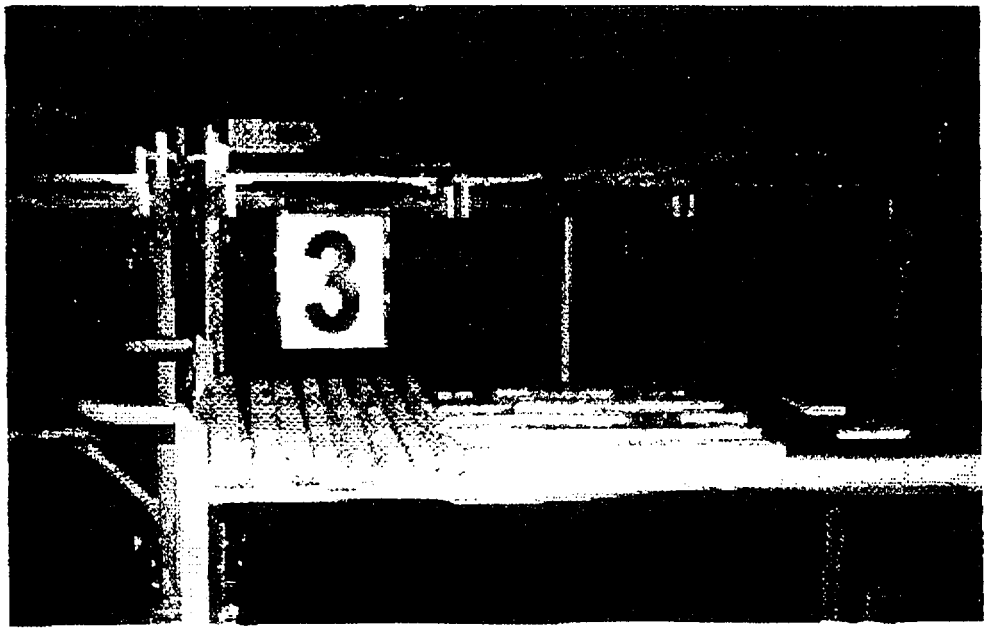
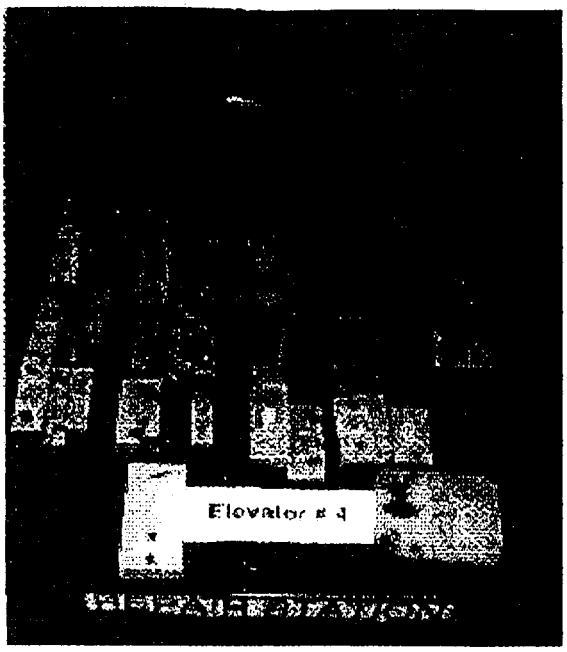


Figure 6, Counterweights Removed From Elevator 4



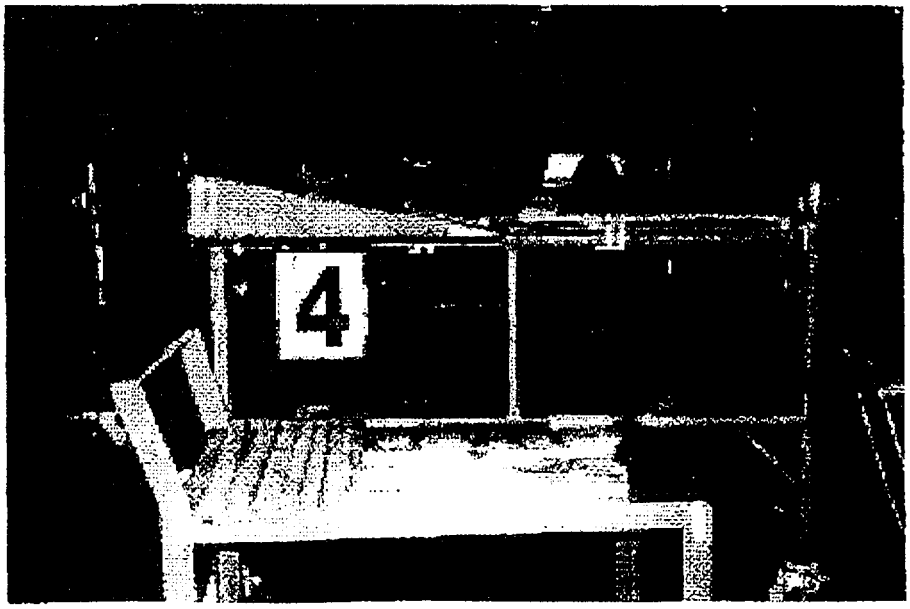



Figure 7, Elevator Cover Being Being Removed

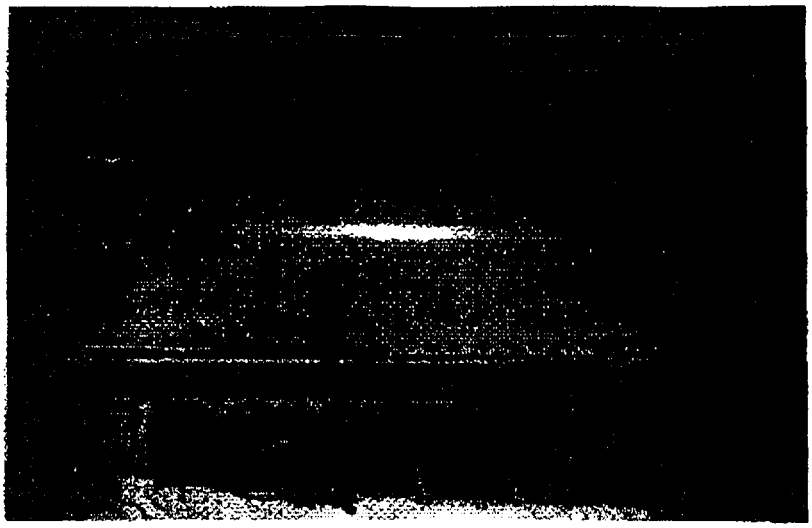
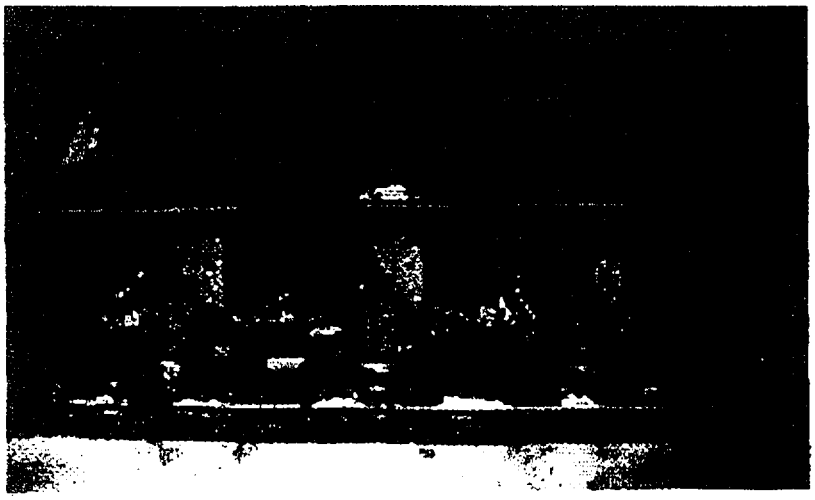


Figure 8, View of Elevator Interior Following Cover Removal



### 3.4 Counterweight Refurbishment

Once the depleted uranium counterweights are removed from the flight control surfaces, they are ready to be refurbished. The first step in the refurbishment process is to remove any oxides or coatings from the counterweights. This is done by abrasive decontamination followed by an acid etching process. Once the counterweights are clean, they are plated with a protective metallic layer. The counterweights are loaded into plating solutions and nickel and cadmium coatings are applied. Following the plating steps, the counterweights are flashed with chromate. Surface imperfections on the counterweights are then fared and detailed to create a smooth surface. The counterweights are then primed and painted. The final step is to label each counterweight with a unique identification number. Photographs showing the counterweights during installation are provided as Figures 10 through 13.

Following refurbishment, the counterweights undergo a series of inspections to ensure the counterweights meet the quality requirements. Dimensional, weight and surface quality are checked against the requirements to ensure compliance with the specifications. For this demonstration, all counterweights met the weight, surface quality, and dimensional specifications.

Starmet CMI performed the counterweight refurbishment in accordance with internal procedure number 500-1000, Carolina Metals, Inc., Aircraft Ballast Plating Process Operating Manual. Starmet CMI is licensed by the Federal Aviation Administration (FAA) to perform refurbishment of depleted uranium and tungsten aircraft counterweights, License No. M61R928J.

### 3.5 Re-assembly

The exterior and strip weights are installed and secured for shipping purposes. RAFB personnel shall re-inspect and verify proper installation prior to reuse. Photographs are provided which show the condition of the counterweights during installation.

Once the depleted uranium counterweights are installed, the flight control surfaces are loaded into the transportation crates. The flight control surfaces are secured in the crate, the side panel and top lid of the crate are replaced and secured. The crate is ready for return shipment to RAFB.

Figure 9, Modifled Bolt Hole Locations

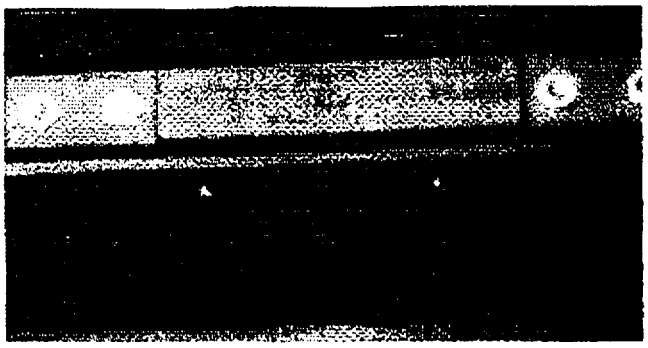


Figure 10, Re-Assembly of Counterweights

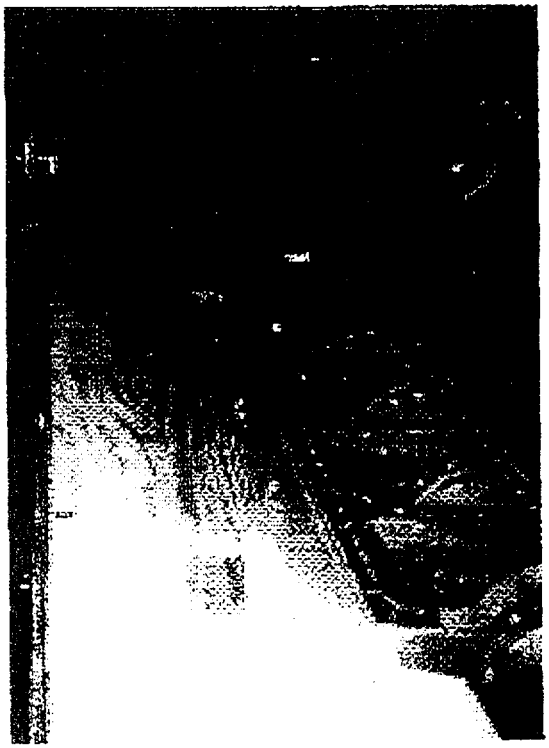
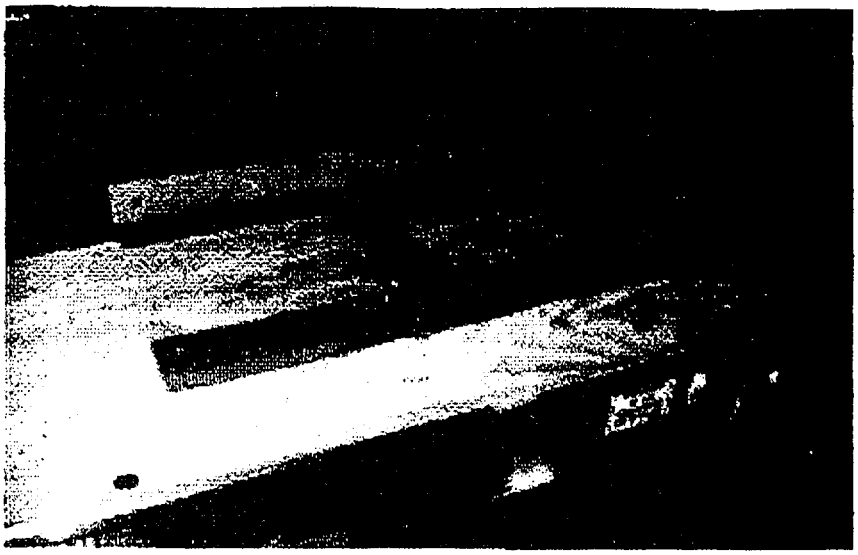


Figure 11, Photographs Taken During Installation of the Elevator Counterweights



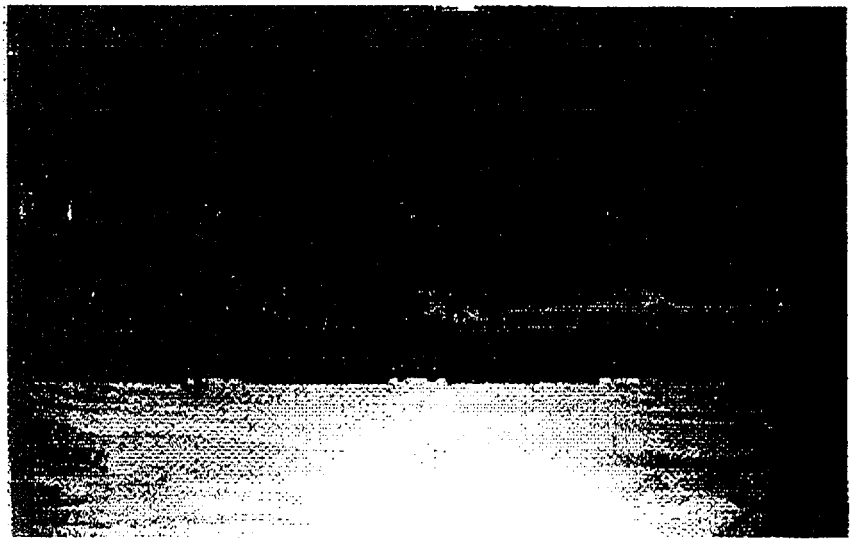
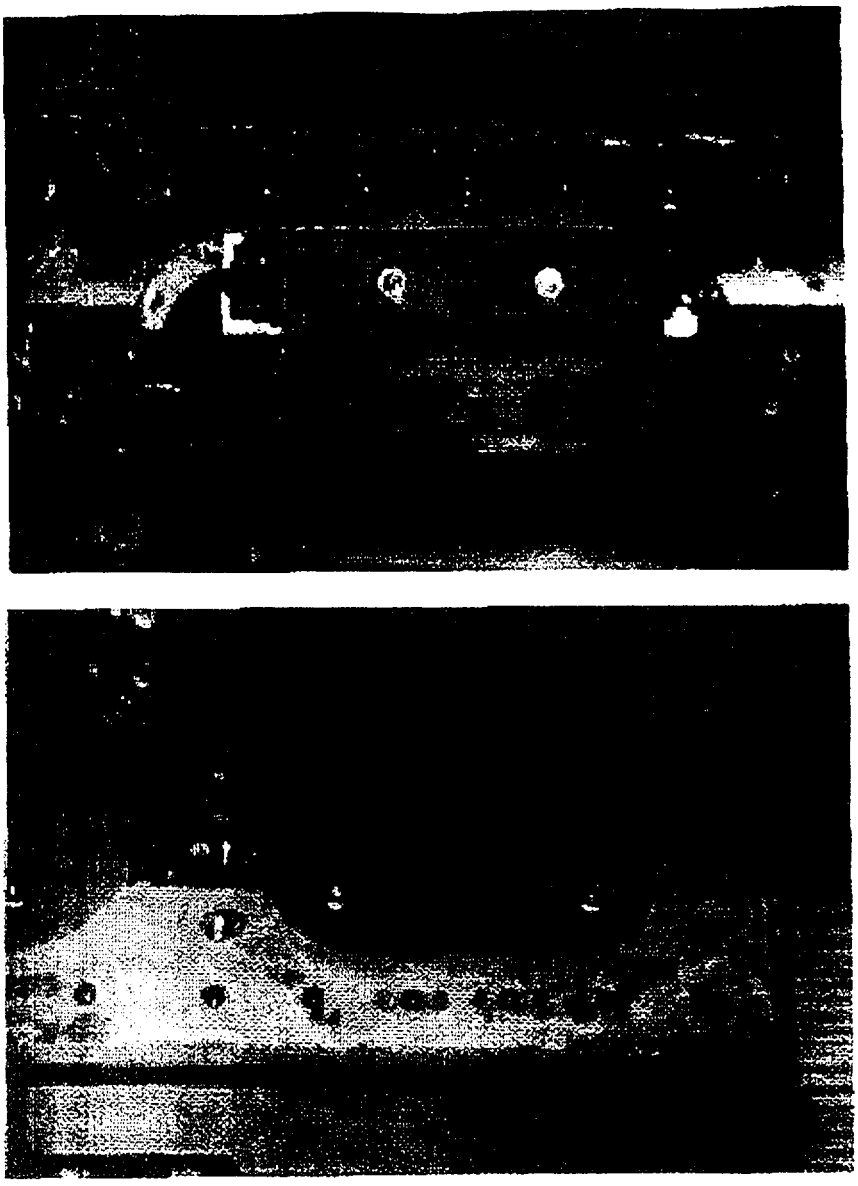
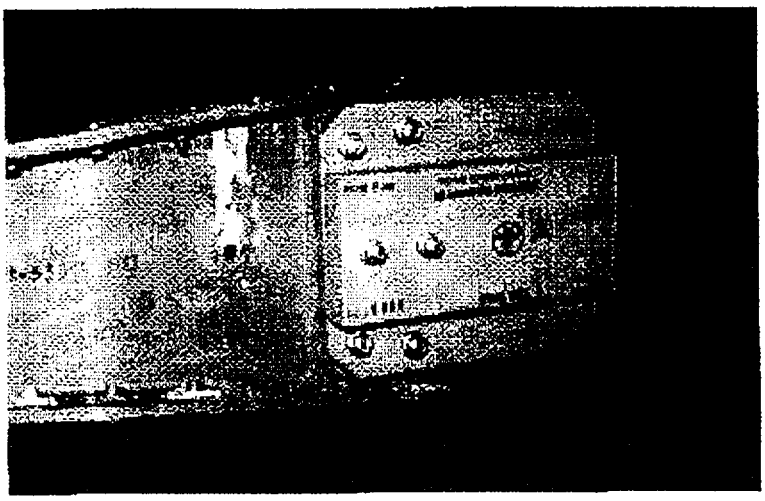


Figure 12, Closeup of Installed Elevator Counterweights



## 4.0 DU Contamination

Figure 13, Photograph of Installed Countorweights on End of Flight Control Surface



# 4.0 DU Contamination

## 4.1 Health Effects

The health effects of uranium are moderate when compared to those of other industrial material and radionuclides. The primary hazard associated with uranium depends upon its degree of enrichment, chemical form, and physical form. The enrichment level determines the gamma radiation intensity and the overall specific activity. Chemical and physical form determines solubility and consequent transportability in body fluids. The transportability of uranium, whether inhaled or ingested, determines its fate within the body and therefore, the resulting dose or chemical effect.

As uranium potentially poses both a radiological and chemical (toxic) hazard, determinations must be made as to which hazard is the most limiting. When radiological hazards are limiting, chemical hazards can generally be neglected. When chemical hazards are limiting, radiological hazards (i.e., organ doses and effective dose equivalent) can be neglected only when radiation doses are below regulatory concern as defined by the controlling regulation. The controlling regulations may be either the 10CFR series for Nuclear Regulatory Commission (NRC) licensees or Department of Energy Order 5480.11 for most governmental activities. In general, these regulations require radiological monitoring for individuals who might exceed 10% of an established limit. For this reason, it is prudent to calculate organ doses and effective dose equivalent for all significant intakes, as additional exposures in the same year may result in a total dose in excess of 10% of the applicable dose limit. Even in low potential exposure situations, it is advisable to provide sufficient monitoring to demonstrate comprehensive dosimetry/control, which is invaluable in possible future legal litigation in addition to providing basic worker protection.

Aircraft counterweights are typically made of depleted uranium, where the chemical form of the uranium is an oxide with the International Congress of Radiation Protection (ICRP) solubility class of "D" or "W" (i.e., the uranium remains in the body on the order of days or weeks respectively). Therefore, the radiological hazards are minimal but still regulated relative to the larger chemical toxicity hazard. The NRC and the Conference of Governmental Industrial Hygienists (ACGIH) have established an airborne concentration limit of 0.2 mg/m3. The Occupational Safety and Health Administration (OSHA) has adopted a limit of 0.050 mg/m3. (As a comparison, the ACGIH has established similar limits for lead at 0.15 mg/m3 and arsenic at 0.2 mg/m3.) These limits generally preclude any likelihood of individuals demonstrating the toxic effects (i.e., renal dysfunction) of uranium intake.

Uranium intakes greater than about 5.9 mg have been demonstrated to result in transient albuminuria, presence of red blood cells and casts in the urine, retention of urea and non-protein nitrogen in the blood. Proteinuria to 50% of a healthy population has been demonstrated at intakes of about 300 mg. The

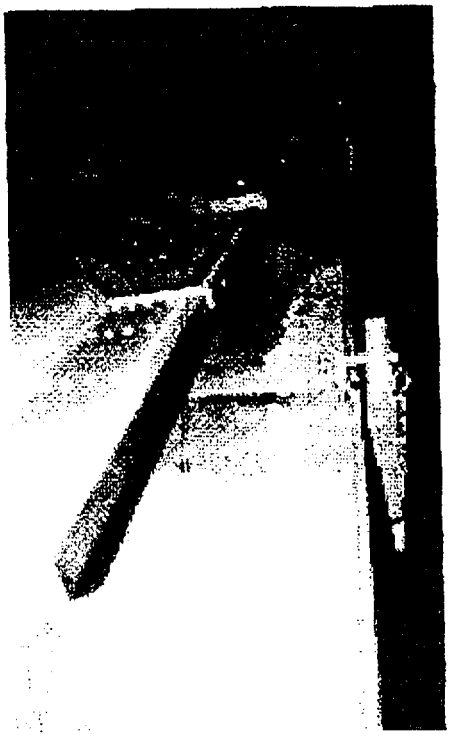
urinary and blood abnormalities are the result of inhibited resorption in the renal tubules.

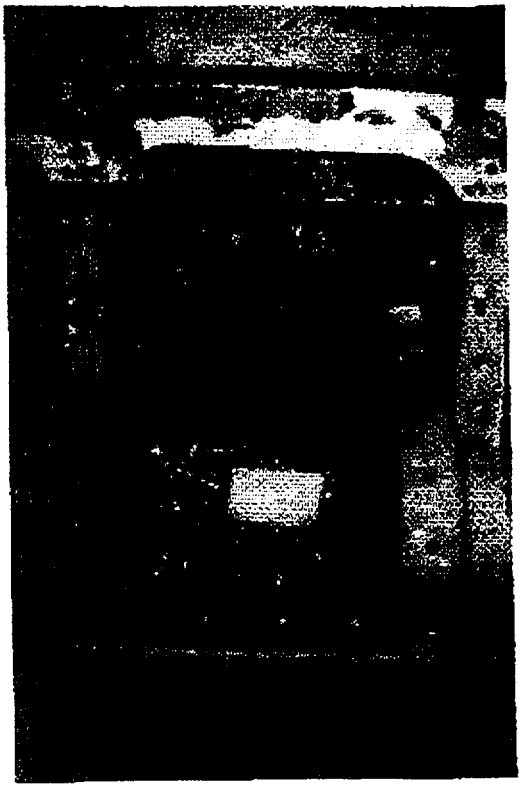
### 4.2 Contamination Levels

The RAFB flight control surfaces contained elevated levels of depleted uranium contamination. A detailed radiological survey is provided in Appendix B. As shown, the average alpha contamination is 62 times greater than the release limits for unrestricted use and 39 times greater than the release limit for beta/gamma contamination. The average contamination levels are 50 times greater than the release limits. Photographs of the contamination are provided in Figure 14.

Following removal of the depleted uranium counterweights, the accessible surfaces were cleaned to free-release limits.

Figure 14, Photographs Demonstrating the Extent of Contamination Present in the Elevators





## 5.0 Cost Analysis Report

This section provides detailed pricing for processing each flight set for RAFB. A summary of the pricing for each flight set is provided in Table 1. As shown, the overall price for each aircraft is ???. Pricing for fabrication of new counterweights due to missing or damaged counterweights will be provided upon request.

**Table 1, Pricing Breakdown**

| Task | Price |
|---|---|
| Unpacking | $442.00 |
| Disassembly | $947.00 |
| Counterweight Refurbishment | $70,512.00 |
| Fabrication of Strip Weights | $???.00 |
| Re-assembly | $482.00 |
| Total | $???.00 |

### 5.1 Unpacking

Unpacking of each flight set requires 11 man-hours. The price to unpack each flight set is $442.

### 5.2 Disassembly

Disassembly of each flight set requires 23 man-hours. In addition to the manpower, screws and bolts are replaced. The replacement cost for these materials equates to approximately $24 per flight set. The price to disassemble each flight set is $947.

### 5.3 Counterweight Refurbishment

Pricing for counterweight refurbishment is provided in accordance with Starmet's published price list. This price list is provided in Appendix B. The total price for each flight set is $70,512.

### 5.4 New Strip Weights

Pricing for fabrication of the strip weights for each flight set is ???.

### 5.5 Re-assembly

Re-assembly of each flight set requires 12 man hours. The price to re-assemble each flight set is $482.

### 5.6 Transportation

Transportation arranged by Starmet CMI will be performed at cost plus a 7.5% markup.

## 6.0 Schedule

Starmet has developed a detailed schedule for startup and refurbishment of RAFB flight sets. The detailed schedule is provided in Appendix C. The schedule is based upon receiving the first flight set no later than March 1, 1998. As shown, Starmet will begin by processing one (1) flight set per month and work up to processing four (4) flight sets per month until all of RAFB flight sets are refurbished.

PHILOTECHNICS

March 13, 2000
00-0328

Chief, Rules Review and Directives Branch
U.S. Nuclear Regulatory Commission
Mail Stop T6-D59
Washington, DC 20555-0001

Dear Sirs,

I would like to offer some comments on draft NUREG-1717. This document is comprehensive and well organized. It can be a valuable reference tool. It will be improved if individuals with current knowledge of the various materials and products and their patterns of use are willing to comment on the draft. My comments pertain to Section 3.17, Uranium in Counterweights. This letter comprises some general observations and recommendations. A set of detailed comments keyed to the individual paragraphs of Section 3.17 will be forwarded separately.

The application of the basic methodology of the study to aircraft counterweights ignored some operational and technical factors. The study correctly identifies maintenance personnel engaged in installing and removing the counterweights as the critical group, but the resultant individual effective dose equivalent estimate of 20 mrem is unrealistically low. While several relevant industry studies were identified and considered, other pertinent sources of information were not taken into account. In summary, effective dose estimates were modeled using an excessive thickness of protective plating, EDEs did not consider the effects of damaged, de-plated surfaces or the internal uptake of uranium oxide corrosion products, the study did not consider the documented exposure experience reported by the U.S. Air Force resulting from similar operations, and EDEs did not consider the effects of changing patterns of distribution and use of counterweights e.g. growing activity involving the "parting-out" and salvage of overaged aircraft.

Plating Thickness

One aspect of the modeling that bears review involves the assumptions about the thickness of plating on the counterweights. The objective in plating is to coat the DU with cadmium. Since cadmium does not adhere well to uranium, an initial plating of nickel is applied because the cadmium will bond better to the nickel. According to Section

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3.17.4, the modeling assumes a $5.1x10^{-3}$ cm. layer of nickel and a $2.5x10^{-3}$ cm. layer of cadmium. The nickel layer applied during refinishing is nominally 1.0 to 1.5 mils ($2.5x10^{-3}$ to $3.8x10^{-3}$ cm.). The selection of a $5.1x10^{-3}$ cm. value for modeling appears to be excessive and inconsistent with the manufacturer's data provided by Michel (see discussion below). The re-plating process is controlled by regulating operating parameters such as electrolyte strength, voltage and residence time. Direct measurements of plating thickness are not routinely made, so nominal thickness values should treated with circumspection. If dose equivalent estimates are sensitive to plating thickness, NRC should use low range thickness values or confirm representative values by independent measurement. Section 3.17.3.1 cites a National Lead Study including measurements of a "typical" counterweight with a "$2.5x10^{-3}$ cm. nickel-cadmium" plating thickness. The description of the "typical nickel-cadmium plated (0.001 inch) counterweight" in the first column of Table 3.17.2 is consistent with the interpretation that this thickness applies to both the nickel and cadmium plating combined. If this is correct, the MicroShield modeling based on a combined plating thickness of $7.6x10^{-3}$ cm. ($5.1x10^{-3}$ Ni plus $2.5x10^{-3}$ Cd) is using a thickness that exceeds the plating on an actual representative counterweight by a factor of three. This could result in an unrealistically high attenuation estimates for the radiation from counterweights and yield low dose predictions.

Plating Deterioration

Estimates of effective dose equivalents for aircraft supply and maintenance workers have also been underestimated because of erroneous assumptions about industry practice. One of these is articulated in Section 3.17.4, Present Exemption Analysis. It is basically an assumption of symmetry for the operations of installing and removing counterweights from aircraft. For both operations, dose rates were calculated on the basis of a nickel-cadmium plated counterweight. In general, the reason that counterweights are removed from an aircraft is because the plating is no longer intact, and the counterweight requires refurbishment to restore it to airworthy condition. A conservative model for counterweight removal should assume a significant area of bare uranium exposed. The cited Boeing study indicates typical damage areas of from 1% to 50% of the exposed surface. The data from the National Lead study cited indicate that beta/gamma dose rates from the bare uranium are over six times greater than from a plated surface at 15 cm and over ten times greater at 31 cm. These data also indicate that the gamma dose rate is 15 times greater at 15 cm. and 25 times greater at 31 cm. These differences suggest that refined modeling to account for the presence of unplated areas on counterweights during removal would result in increased individual and collective dose estimates.

There is an important corollary to this because the presence of unplated DU implies the existence of corrosion products. As a result, the potential exposure of workers would not be solely external but would also include ingestion and inhalation of uranium oxide particles, which are far more serious health concerns (see below).

Available Contamination and Exposure Data

Since DU counterweights in the commercial sector are exempt from licensing and controls, removal and handling operations take place in unlicensed facilities under supervision that is not sensitive to the potential hazards of the material. As a result, there is little documentation of worker exposures or of the occurrence of uranium corrosion products. There is relevant information available, however, which the NRC can obtain to improve its understanding of these issues. The U.S. Air Force initiated a program last year to refurbish all the depleted uranium counterweights on its fleet of C-141 transport aircraft. Because initial inspections had confirmed that serious contamination problems would be encountered during removal of the counterweights, the Air Force elected to ship the control surfaces intact to a contractor with a radioactive material license and a radiation protection program so that the counterweights could be removed, re-plated and reinstalled in a controlled radiation area. Initial studies of the control surfaces during a pilot refurbishment operation revealed the presence of large amounts of uranium oxide corrosion products. The Air Force's contractor performed a demonstration of his processes on four C-141 ailerons and four C-141 elevators and furnished a report to Robbins Air Force Base. As part of the demonstration contract deliverables, the contractor provided a detailed radiological survey of the flight control surfaces and a set of photographs documenting the extensive corrosion of counterweight surfaces. The report summarized their findings by stating: "As shown, the average alpha contamination is 62 times greater than the release limits for unrestricted use and 39 times greater than the release limit for beta/gamma contamination. The average contamination levels are 50 times greater than release limits."

In spite of these precautions, the Air Force reported an instance of worker exposure to DU from a counterweight removal operation last summer at Robbins Air Force Base. This incident was reported in NRC's Daily Events Report as Event Number 35964. It occurred on 26 July 1999 when maintenance personnel were removing a corroded DU counterweight from a C-141 aileron. Radioactive dust and debris was dislodged and was further dispersed by a nearby fan. Detectable contamination levels were documented in the work area, and bioassays of several workers in the area revealed uranium uptake.

The final report on this incident has yet to be filed, as the Air Force reportedly pursues further tests to determine whether the elevated internal uranium levels were due to inhalation or ingestion.

Two other reported incidents involving radiation exposure of Air Force personnel working with depleted uranium counterweights are relevant. In one case (NRC Item No. 940856), an airman cutting wing parts away from DU counterweights received an exposure of 25 rems or more. NRC Item No. 970387 describes the potential exposure of four individuals who attempted to use a chemical cleaner to degrease a painted counterweight, from which some paint was flaking. One individual was found to have contamination on his hands, and contamination was detected on rags used to clean the counterweight. (The exemption for counterweights does authorize unlicensed personnel to "repair or restore any plating or other covering" [10 CFR 40.13 (c) (5) (iv)].)

Although the Air Force is a radioactive material licensee with an established radiation protection program, DU counterweights are exempt items subject to less stringent controls, and it is unlikely that all incidents of potential personnel exposure are noted and reported. Since the same counterweight removal operations that resulted in the radiation exposure of military personnel are performed with a much higher frequency by employees of unlicensed commercial maintenance, part-out and salvage activities, the occurrence of similar exposures to these workers can be reasonably expected. Many of the Boeing 747 Classics, L-1011 Tri Stars, and DC-10s that used DU counterweights have now exceeded their 20-year design service life and are being sold for part-out and salvage at a rate of dozens per month. These are the very activities that harbor the greatest potential for worker exposures.

There are real world contamination and exposure problems associated with depleted uranium counterweights. Modeling is no substitute for actual experience and data when it is reasonably available. NRC should obtain relevant information from the U.S. Air Force, and this information should become a major basis for a revised assessment of the effective dose equivalent for maintenance workers removing and handling these items. The Air Force, a major government radioactive material licensee, has determined that its own personnel are better protected by sending DU-bearing control surfaces to a specialized outside contractor for counterweight removal. They continue to record instances of maintenance worker radiation exposure from activities involving depleted uranium counterweights. In spite of this experience, workers of unlicensed commercial organizations are allowed to perform identical operations on DU counterweights with no radiological protection under the present NRC exemption policy for

these items. Either the Air Force's concerns for the health and safety of its personnel are excessively conservative, or the NRC's exemption policy is not providing appropriate protection to aviation industry workers. A serious reexamination of the potential for the radiation exposure of workers removing DU aircraft counterweights under current regulations appears warranted to resolve this apparent inconsistency.

Changing Patterns of Distribution and Use

Another implicit assumption that may result in erroneous dose projections is that there is some kind of equilibrium condition in the overall distribution and use of DU counterweights. The study assumes, for example, a small, constant stream of counterweights shipped for repair as their plating becomes defective and reduced amounts of counterweights in storage facilities as they are gradually replaced with tungsten parts (see 3.17.4.4.2). The reality is that the amount of commercial counterweights being sent for repair is disappearing while the quantities in storage facilities are growing rapidly. The demand for DU counterweights has essentially disappeared, as the operational fleet of older wide-body planes which used them is being rapidly retired from service. (Over 100 of these planes were "set down" by operators last year.) Concurrently, the supply of counterweights from "parted out" and scrapped planes and from discarded spares floats of operators burgeons. Quantities of several tons are commonly held indefinitely by operators, parts suppliers, and tear-down facilities in order to defer or avoid the costs of authorized disposal, since 10 CFR 40.13 does not specify any time limit for the storage exemption. Increasing quantities of DU counterweights are being abandoned, transferred to unlicensed parties, and disposed of by unauthorized means. This latter observation receives corroboration from the fact that a search of NRC's NMED data base yields 19 cases involving the activation of scrap yard portal monitors by DU confirmed as, or suspected to be, aircraft counterweights. There are other confirmed cases. Clearly, the patterns of distribution and usage today are very different from what they were when the exemption was adopted, and continuation of the exemption in its current form may no longer be appropriate.

To the extent that the current study is not based on today's realities, it is perhaps consistent that it ends with a whimsically hypothetical example of "misuse" -- a DU counterweight "fishing weight"! It would have been more realistic to have considered one of the many reported cases of illegal cutting of counterweights to make "bucking bars" to set rivets or trimming weights for racing car chassis'.

The principle of exempting unimportant quantities of radioactive materials from regulation to facilitate their use in valuable products is a sound one. At one time such an exemption for DU counterweights may have been warranted. One reason for studies such as NUREG 1717 is to revisit the initial assumptions and situational factors to determine whether they were sound at the time and whether they are still valid. The evidence is compelling that the existing exemption for aircraft counterweights is no longer appropriate under current conditions. An objective and conscientious reevaluation of the effective dose equivalents associated with the removal and management of depleted uranium aircraft counterweights will be a useful first step in bringing radiation protection regulations into line with realities of the aviation industry workplace.

Sincerely,

Donald A. Barbour
Manager, Aviation Programs

PHILOTECHNICS

DOCKET NUMBER
PETITION RULE PRM 40-28
(65FR 3394)

DOCKETED
USNRC

February 14, 2001
01-0231

'01 FEB 21 A11:17

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

Secretary, U.S. Nuclear Regulatory Commission
ATTN: Rulemakings and Adjudications Staff
Washington, D.C. 20555

Reference: Docket No. PRM-40-28

Subject: Comments on Proposed Rulemaking

Dear Sirs,

I am submitting these supplementary comments on the proposed rulemaking. I hope you will find them worthy of your consideration even though the period for mandatory address has expired.

Any revision of 10 CFR 40.13(c)(5) should incorporate the following changes to the description of the exempted material and to the operations on the counterweights which users are allowed to perform by 40.13(c)(5)(iv).

10 CFR 40.13(c)(5) extends the exemption of 40.13(c) to "Uranium contained in counterweights installed in aircraft, rockets, projectiles, and missiles....." As NUREG-1717 observes, "The exemption does not specify the type of uranium that can be used; however, depleted uranium (DU) appears to be the only type of uranium that has been used in counterweights." (One would hope.) (Reference: NUREG-1717, ¶3.17.2, p. 3-247) Even though 40.13(c)5)(ii) requires the counterweights to be impressed with the legend "DEPLETED URANIUM", the obvious intent of the exemption can be clarified by inserting the word "depleted" so that 40.13(c)(5) reads "Depleted uranium contained in counterweights installed in aircraft, rockets, projectiles, and missiles....."

10 CFR 40.13(c)(5)(iv) provides that "The exemption contained in this paragraph shall not be deemed to authorize the chemical, physical, or metallurgical treatment or processing of any such counterweights other than repair or restoration of any plating or other covering." This paragraph appears to be based upon a lack of understanding of the maintenance operations that are actually performed on aircraft counterweights. Depleted uranium aircraft counterweights are first plated and are subsequently painted. In some cases, an aluminum shield is also added to encase the part. The reason for the application of these barriers is to prevent the contact of oxygen with the

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Template = SECY-067

SECY-02

depleted uranium surface to retard corrosion of the counterweight. When an aluminum shield is present, it can be removed (destructively) to expose the counterweight for surface restoration. It is important to understand that there is a major difference between painting a counterweight and repairing its plating. Painting of counterweights by users is properly permitted. Airworthy counterweights are normally painted to conform to carriers liveries and aircraft color schemes. Counterweights that have developed exposed surface areas are also painted, as a temporary measure, to fix radioactive contamination and to retard further corrosion until the plating can be refurbished. The inclosed extract from the Lockheed Martin L-1011 Structural Repair Manual provides such temporary painting instructions for maintenance personnel. (Manufacturers of the Boeing 747 Classic and the McDonnell Douglas DC-10 provide similar instructions.)

Restoration of the plating is entirely another matter. The entire depleted uranium surface must be exposed and cleaned. Plating restoration cannot be performed on locally exposed areas of the counterweight surface. The enclosed brochure from a commercial company licensed by the Federal Aviation Administration as a Repair Station for depleted uranium aircraft counterweight refurbishment illustrates the plating restoration process by a series of photographs. The incoming counterweight is first stripped of all remaining plating and paint by abrasive blasting, cleaned by dipping in acid, and then completely replated. Restoring the plating thus includes a combination of chemical, physical and metallurgical treatments that generate spend abrasive blasting grit contaminated with depleted uranium oxide and metal particulates, contaminated acid solutions and sludges, and (over time) contaminated plating wastes. It is difficult to believe that NRC would actually approve of these processes being performed by an organization that was not a specific licensee in spite of the current wording of 40.13(c)(5)(iv). While no instances of non-licensees performing plating restoration operations are known, the wording of this subparagraph should clearly be changed to restrict permitted treatments to removal and installation of aluminum shields and to painting, either for cosmetic purposes or to temporarily fix surface contamination until the part can be refurbished by a licensed facility. Suggested wording for 40.13(c)(5)(iv) is "The exemption contained in this paragraph shall not be deemed to authorize the chemical, physical, or metallurgical treatment or processing of any such counterweights other than the removal or installation of aluminum shields (if applicable) or the application of paint."

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Your consideration of these comments is appreciated. If you have any questions about the material presented above, feel free to contact me for additional information.

Sincerely,

Donald A. Barbour
Manager, Aviation Programs

Inclosures a/s

cc: Gary Comfort, NMSS
Catherine Mattsen, NMSS

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## HEALTH & SAFETY FACTS

✓ Depleted uranium (DU) and tungsten are both toxic heavy metals but are isolated by protective counterweight platings and coatings.

✓ Well maintained counterweights are completely safe to store and handle.

✓ Refurbishment insures the integrity of the protective coatings and prevents the release of toxic particles through corrosion.

✓ DU in aircraft counterweights is determined by the NRC to be an "unimportant quantity" and is exempted from regulation. Unauthorized alteration by users is prohibited.

✓ DOT establishes standards for packaging, labeling and shipping DU in 49 CFR. (Shipping guidance available on request.)

STARMET Metallurgical Excellence


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Fax: (978) 369-4045
Corporate Headquarters


STARMET Metallurgical Excellence


**Starmet CMI**
(Repair Station)
P.O. Box 1366, Hwy. 80 (Mailing)
365 Metal Drive (Shipping)
Barnwell, SC 29812
Tel: (803) 259-2321
Fax: (803) 259-3622
General Inquiries & Administration
Shipping Instructions
Part Number Identification


STARMET Metallurgical Excellence


**Starmet CMI**
681 Emory Valley Road, Suite B
Oak Ridge, TN 37830
Tel: (423) 220-8300
Fax: (423) 220-8301
Contracts and technical assistance


**COU**
**REF**

For the:

**Starmet CMI operates the only FAA licensed repair station in the U.S. for refurbishment of depleted uranium (DU) and tungsten aircraft counterweights.**

FAA License No. M61R928J
Joint Aviation Authorities Approved

South Carolina Radioactive Material License No. 322

## WE SIMPLIFY HANDLING AND USE

- Quick turnaround: expedited processing on request
- Minimize contact handling: batch ship option - we identify parts on receipt
- Volume discounts for quantity shipments
- Reduce inventories: CMI offers storage with overnight delivery to meet your repair schedules
- Replacement of irreparable parts from float inventory at no extra charge (subject to availability)
- Technical and shipping assistance

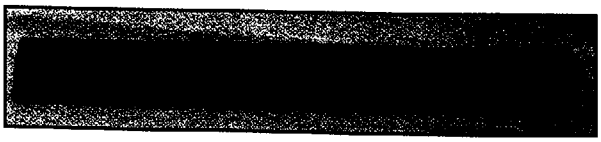
Corroded part as received

Abrasive blasted and acid dipped

Nickel plated

Cadmium plated

Chromate flashed



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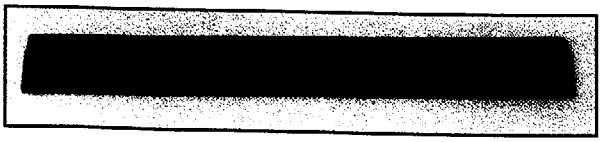
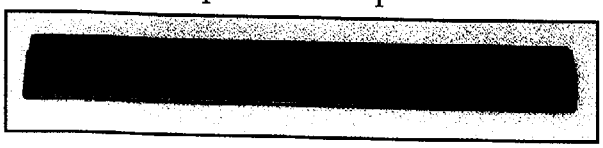


Part primed and painted



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5. Depleted Uranium Balance Weights

A. General

The balance weights installed on the elevators and rudder are made from depleted uranium. Each elevator has a series of incremental weights while the rudder has a large counterweight at its tip.

The weights are cast to shape, machined, drilled and cadmium plated at a facility licensed by the United States Nuclear Regulatory Commission (NRC). Any of the foregoing operations can only be performed in such a licensed facility.

The weights are coated with a phosphate ester resistant epoxy primer at Lockheed prior to installation. The latest configuration has an additional white high gloss polyurethane enamel top coat.

Handling of undamaged depleted uranium counterbalance weights does not require use of protective gloves or clothing.

WARNING:

- DEPLETED URANIUM IS A HIGH DENSITY MATERIAL WITH A NEGLIGIBLE AMOUNT OF RESIDUAL RADIATION. HOWEVER, GRINDING, DRILLING, SANDING, FILING, OR MACHINING OF ANY DEPLETED URANIUM SURFACE BY ANYONE NOT HOLDING AN NRC LICENSE IS PROHIBITED BY GOVERNMENT REGULATION.

- DEPLETED URANIUM OXIDE, YELLOW AND BLACK CORROSION PARTICLES, IS TOXIC.

- ALTERATION OF DEPLETED URANIUM MATERIAL BY MECHANICAL METHODS IS PROHIBITED BECAUSE FINELY DIVIDED URANIUM PARTICLES SUCH AS MIGHT CONSEQUENTLY BE PRODUCED AND INGESTED POSE THE SAME HEALTH HAZARD COMMON TO ALL HEAVY METALS (I.E. LEAD AND CADMIUM).

- HANDLING OF OXIDIZED COUNTERBALANCE WEIGHTS SHOULD BE HELD TO A MINIMUM TO PREVENT BROADCASTING OXIDE TO SURROUNDING PERSONNEL AND WORK AREAS.

- EATING AND SMOKING IN IMMEDIATE WORK AREA IS FORBIDDEN WHILE PERFORMING REPAIR WORK.

- PERSONNEL PERFORMING WORK ON OXIDIZED DEPLETED URANIUM WEIGHTS MUST WEAR DISPOSABLE PROTECTIVE GLOVES AND CLOTHES.

- DISPOSE OF ALL POTENTIALLY CONTAMINATED PROTECTIVE CLOTHING PER LOCAL STATE OR FEDERAL REGULATIONS REGARDING RADIOACTIVE CONTAMINATED MATERIALS.

- PERSONNAL HANDLING OXIDIXED DEPLETED URANIUM MUST THOROUGHLY WASH PRIOR TO EATING, SMOKING, ETC.

B. Repair of Depleted Uranium Counterbalances

Each counterbalance weight is a mass of depleted uranium with an exterior thin cadmium plating, and covered with chromate inhibited epoxy primer. A white corrosion residue, known as cadmium oxide can form over the cadmium plating surface. Repair as follows:

(1) Remove loose particles from counterbalance surface with clean lint-free cloths and LCM32-1086A petroleum base cleaner.

(2) Wipe surface dry with clean, lint-free cloths. Do not allow cleaner to air dry.

(3) Apply LCM37-1035A phosphate ester resistant epoxy primer coating to unpainted surfaces in accordance with Maintenance Manual 20-51-09. Apply C-37-1348 white high-gloss polyurethane enamel coating (LAC Color No. 1078A) to primer coated surface in accordance with Maintenance Manual 20-51-10.

CAUTION: REPAIR COUNTERWEIGHTS DISPLAYING YELLOW AND BLACK CORROSION PRODUCTS IN ACCORDANCE WITH PARAGRAPH C OR D.

(4) Solvent clean, epoxy prime and polyurethane topcoat scratch or gouge damages where black corrosion is not evident.

NOTE: A corrosion preventive coating such as LPS-3 (LPS Research Laboratories Inc., 2050 Cotner Ave., Los Angeles, CA 90025, or equivalent) is recommended for additional protection. A periodic reapplication will provide optimum protection.

C. Interim Repair of Depleted Uranium Counterweights Displaying Yellow and Black Corrosion Products Between the Weights and/or at the Attaching Bolts

The weights must be removed from the aircraft.

NOTE: It is permissible to press out bolts which are locked in the counterweight due to corrosion.

When it is not possible to replace depleted uranium counterweights that exhibit black and yellow corrosion products, repair as follows until the affected balance weight can be replaced:

CAUTION: DO NOT DIP WIPER CLOTH INTO SOLVENT SINCE OVER SATURATION MAY CAUSE DRIPPING OF CONTAMINATED SOLVENT.

(1) Solvent clean the damaged/corroded area with lint free cloths and 1,1,1 Trichloroethane (MIL-T-81533) or equivalent, taking care to remove all loose corrosion products and dirt. A solidly attached thin black oxide film need not be removed. Dispose of contaminated cloths to prevent exposure to toxic uranium oxide.

(2) Spray or brush two coats of FR primer, LCM 37-1035, on cleaned areas.

NOTE: For the most durable interim repair omit step (3) and proceed to step (4), then encapsulate entire assembled stack of weights with brush coat of sealant, PR-1422 Class A-2, or equivalent.

(3) Spray or brush one coat of white topcoat, C-37-1348, on primed areas.

NOTE: A color other than white may be applied to an interim repair to denote that counterbalance weight should be replaced at earliest convenience.

(4) Assemble weights using faying surface sealant, PR-1422 Class A-2, or equivalent, on all surfaces in contact with support structure or other weights. Install all fasteners through weights wet with sealant, PR-1422 Class A-2, or equivalent.

NOTE: For additional protection of assembled weights with topcoat per Step (3) an additional topcoat may be applied and/or a corrosion preventive coating of LPS-3.

(5) Dispose of all rags, gloves, etc., that come in contact with the uranium oxide, and carefully wash hands.

CAUTION:
- WEIGHT ASSEMBLIES REPAIRED WITH THESE PROCEDURES SHOULD BE INSPECTED AT NEXT "C" CHECK, AND AGAIN AFTER 5000 ADDITIONAL FLIGHT HOURS. IF THERE ARE NO INDICATIONS OF FURTHER DEGRADATION OR LOOSENESS, THE WEIGHTS MAY BE CONSIDERED SERVICEABLE AS LONG AS NORMAL INSPECTION FINDS NO CAUSE FOR REJECTION.
- THESE PROCEDURES SHOULD BE CONSIDERED ONLY AS INTERIM METHODS OF PROTECTION UNTIL THE COUNTERWEIGHTS CAN BE REMOVED AND REPLACED.

Depleted uranium balance weights that are either damaged or surplus should be wrapped in metal foil and packaged and shipped in accordance with Code of Federal Regulations Title 49 - Transportation Chapter 1 Parts 173.389 through 173.393. Ship to the N. L. Industries, Bearings Division Albany Plant, 1130 Central Avenue, New York 12205. The shipping container shall be tightly-lidded and labeled in accordance with ICC regulations.

D. Interim Repair of Depleted Uranium Counterweight Assemblies Displaying Yellow and Black Corrosion Products, But Not Between the Weights and/or at the Attaching Bolts.

CAUTION: DO NOT DIP WIPER CLOTH INTO SOLVENT SINCE OVER SATURATION MAY CAUSE DRIPPING OF CONTAMINATED SOLVENT.

(1) Solvent clean the damaged/corroded area in place with lint free cloths and 1,1,1 Trichloroethane (MIL-T-81533) or equivalent, taking care to remove all loose corrosion products and dirt. A solidly attached thin black oxide film need not be removed. Dispose of

contaminated cloths to prevent exposure to toxic uranium oxide.

(2) Spray or brush two coats of FR primer, LCM 37-1035, on cleaned areas.

(3) Encapsulate entire weight assembly with brush coat of sealant, PR-1422 Class A-2, or equivalent.

(4) Dispose of all rags, gloves, etc., that come in contact with the uranium oxide, and carefully wash hands.

CAUTION:
- WEIGHT ASSEMBLIES REPAIRED WITH THESE PROCEDURES SHOULD BE INSPECTED AT NEXT "C" CHECK, AND AGAIN AFTER 500 ADDITIONAL FLIGHT HOURS. IF THERE ARE NO INDICATIONS OF FURTHER DEGRADATION OR LOOSENESS, THE WEIGHTS MAY BE CONSIDERED SERVICEABLE AS LONG AS NORMAL INSPECTION FINDS NO CAUSE FOR REJECTION.
- THESE PROCEDURES SHOULD BE CONSIDERED ONLY AS INTERIM METHODS OF PROTECTION UNTIL THE COUNTERWEIGHTS CAN BE REMOVED AND REPLACED.

E. Materials

The following materials are required to repair depleted uranium counterbalance weights:

(1) Phosphate ester resistant epoxy primer coating, LCM37-1035A (Deft Inc., Chemical Coatings Div., 17451 Von Karman, Irvine, CA., 92664, Part No. 02-GN-42, or equivalent).

(2) Petroleum base cleaner, LCM32-1086A (TEC Manufacturing Co., 524 South Monterey Pass Road, Monterey Park, CA., 91754, Part No. 934-66, or equivalent).

(3) White high gloss polyurethane coating, thinner and catalyst, C-37-1348 (Sterling Lacquer Mfg. Co., 3150 Brannon Ave., St. Louis, MO., 63139, Part No. U1315 Thinner, U1635 White High Gloss Polyurethane Coating, U1636 Catalyst, or equivalent).

(4) Clean disposable lint-free cloths.

(5) Disposable rubber or polyethylene gloves. Disposable plastic laboratory gloves are acceptable.

(6) Disposable outer clothing.

(7) Disposable approved container (1 US quart capacity).

(8) Sealant, PR1422 Class A-2 (Products Research Corp., Burbank, California, or equivalent).

requirements.

[7590-01-P]

**NUCLEAR REGULATORY COMMISSION**

**10 CFR Part 40**

**[Docket No. PRM-40-28]**

**Donald A. Barbour, Philotechnics; Denial of Petition for Rulemaking**

**AGENCY:** Nuclear Regulatory Commission.

**ACTION:** Denial of petition for rulemaking.

**SUMMARY:** The Nuclear Regulatory Commission (NRC) is denying a petition for rulemaking (PRM-40-28) submitted by Mr. Donald A. Barbour, Philotechnics. The petitioner requested that the NRC amend its regulations governing the domestic licensing of source material to provide clarity regarding the effective control of depleted uranium aircraft counterweights held under the exemption in 10 CFR 40.13(c)(5). The petitioner believes that this amendment should address a number of issues concerning the exemption, storage, and disposal of these devices.

**ADDRESSES:** Copies of the petition for rulemaking, the public comments received, and NRC's letter to the petitioner may be examined at the NRC Public Document Room, Public File Area Room O1F21, 11555 Rockville Pike, Rockville, MD. These documents also may be viewed and downloaded electronically via the rulemaking website at http://ruleforum.llnl.gov. Address

questions about our rulemaking website to Carol Gallagher; (301) 415-5905; email cag@nrc.gov.

The NRC maintains an Agencywide Document Access and Management System (ADAMS), which provides text and image files of NRC's public documents. These documents may be accessed through the NRC's Public Electronic Reading Room on the Internet at http://www.nrc.gov/reading-rm/adams.html. If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC Public Document Room (PDR) Reference staff at 1-800-397-4209, 301-415-4737, or by email to pdr@nrc.gov.

**FOR FURTHER INFORMATION CONTACT:** Gary C. Comfort, Jr., Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone (301) 415-8106, e-mail gcc1@nrc.gov.

**SUPPLEMENTARY INFORMATION:**

## The Petition

On January 21, 2000 (65 FR 3394), the NRC published a notice of receipt of a petition for rulemaking filed by Donald A. Barbour, Philotechnics. The petitioner requested that the NRC amend its regulations to provide additional rules for the effective control of depleted uranium aircraft counterweights. The petitioner believes that this regulatory clarification should address a number of issues concerning the exemption, storage, and disposal of these devices.

The petitioner believes that the amendment should clarify at what point and under what circumstances, the licensing exemption in 10 CFR 40.13(c)(5) is no longer applicable to these devices; the length of time counterweights for which there is no demand or use may be stored

as exempt material; the regulations that apply to aircraft that have been removed from service which have depleted uranium counterweights that can be transferred to unlicensed parts dealers and salvage operators; and, the need for radiological surveillance of long-term aircraft storage parks and facilities where aircraft with depleted uranium counterweights are regularly stored for protracted periods under unmonitored conditions. Additionally, the petitioner believes that an immediate notification is necessary to advise those organizations that currently possess depleted uranium aircraft counterweights of their responsibilities to the public. The petitioner asserts that the aviation community is tightly regulated and law abiding and that there are extremely effective channels of communication between the industry and its primary regulator, the Federal Aviation Administration (FAA). The petitioner suggests that the NRC take advantage of this situation by encouraging the FAA to issue an appropriate advisory bulletin that informs the aviation community of its responsibilities for managing depleted uranium counterweights. The petitioner provided a summary of key points which he believes should be considered for incorporation in such a notification.

## Public Comments on the Petition

The notice of receipt of the petition for rulemaking invited interested persons to submit comments. The comment period closed on April 5, 2000. The NRC received two comment letters from individuals (one of which was from the petitioner himself). Both comment letters supported the petition. The petitioner provided supplementary information in support of the petition including his interpretation of the regulatory background and more detailed descriptions of how counterweights are used in industry. Additionally, the petitioner's comments referenced data related to the potential mishandling of the counterweights. The other commenter provided

an example of the potential costs associated with mishandling the counterweights and suggested that distribution requirements should be added to the regulation. By letter dated February 14, 2001, Mr. Barbour provided another supplement to his petition. In this supplement, the petitioner suggested additional rulemaking to (1) specify that only counterweights manufactured from depleted uranium, and not natural uranium, should be covered under the exemption; and (2) clarify the scope of activities allowed to repair or restore counterweight platings or coverings under 10 CFR 40.13(c)(5)(iv).

## Reasons for Denial

The NRC is denying the petition because it has determined that current NRC regulations provide adequate clarity and effectively address the petitioner's concerns. The NRC believes that clarification of the regulations for aircraft counterweights, as originally requested by the petitioner, can be most efficiently accomplished through the issuance of guidance rather than through rulemaking.

The NRC issued a regulatory information summary, RIS-01-013, "10 CFR Part 40 Exemptions For Uranium Contained in Aircraft Counterweights," dated July 20, 2001, in response to the petitioner's request for an immediate notification to advise those organizations that currently possess depleted uranium aircraft counterweights of their regulatory responsibilities. This RIS reminds persons holding depleted uranium counterweights that the counterweights may not be modified under the exemption in 10 CFR 40.13(c)(5). The RIS also provides four acceptable alternatives to transfer the counterweights from the possessor's inventory: (1) return the counterweights to the manufacturer or other facility licensed to process source material; (2) transfer the counterweights to another organization that will also use devices as aircraft counterweights; (3) transfer the counterweights for disposal at a facility

licensed for disposal of radioactive material; or (4) transfer the counterweights to an unlicensed disposal facility that accepts exempt radioactive material.

The petitioner's primary concern in the original petition is that some persons holding the depleted counterweights may inappropriately accumulate and store the counterweights for lengthy periods of time. The petitioner is concerned that this activity will result in unnecessary exposures and that corrosion of the counterweights could occur resulting in additional pathways of exposure and unnecessary contamination. During resolution of the petition, the NRC evaluated (1) the regulatory history of the exemption, including the safety basis; (2) the current use of depleted uranium aircraft counterweights; and (3) the current language in the exemption.

As part of the evaluation of the petition, the NRC reviewed the regulatory history of the exemption for uranium counterweights. In 1960, the original exemption was implemented to only apply to the counterweight while installed in the aircraft and the counterweight impressed with the label reading "Caution - Radioactive Material - Uranium." This 1960 exemption specifically prohibited the chemical, physical, metallurgical or other treatment or processing of the counterweight and the installation or removal of the counterweight. In 1961, the exemption was expanded to include "stored or handled in connection with installation or removal of such counterweights from aircraft." The 1961 amendment also replaced the prohibition against modification of counterweights with the requirement that there be "no removal or penetration of the plating" on the counterweight. In 1969, the exemption was further amended, primarily to change the labeling requirement from "Caution - Radioactive Material - Uranium" to "Depleted Uranium." Also, as part of the 1969 amendment, the specific requirement that there be "no removal or penetration of the plating" on the counterweight was returned to the prohibition against the chemical, physical, or metallurgical treatment or processing of any such counterweights. Under the 1969 amendment, however, repair or restoration of the plating or

other covering was allowed. Finally, a new requirement was added that each counterweight was to be "durably and legibly labeled or marked" with the identification of the manufacturer and the statement "Unauthorized Alterations Prohibited."

As part of the evaluation of the regulatory history, the NRC also reviewed the health and safety basis used during the initial implementation of the existing regulation. The original implementation was based upon calculations that indicated that exposures from installation and storage would be less than 10 percent of the limits in 10 CFR Part 20, with most of the exposure impacting the hands of the workers. This conclusion was based on a radiation dose rate at the surface of the counterweight of 1.3 millisievert per hour (mSv/hr) (130 millirems per hour [mrem/hr]) of beta and gamma radiation, of which the gamma component contribute only 0.03 mSv/hr (2.7 mrem/hr). Film badge studies from wrist bands of assembly line personnel verified that the exposures were low, with readings not exceeding 2 mSv (200 mrem) for a two-month period. Based upon reviews of reported incidents in the Nuclear Material Events Database (NMED), the NRC has no reason to believe that individuals are being significantly impacted by the use of aircraft counterweights under the exemption. In NUREG-1717, "Systematic Radiological Assessment of Exemptions for Source and Byproduct Material," June 2001, a more recent analyses of the exemption was made. This document evaluated the use of counterweights under expected routine uses (including maintenance, flight operations, and storage) and accidents and misuse (including fires and loss of counterweights). The calculated range of exposures for routine operations ranged from a maximum of 0.9 millisievert per year (mSv/yr) (90 millirem per year [mrem/yr]) for maintenance workers to 0.01 mSv/yr (1 mrem/yr) or less for flight crew and warehouse workers (resulting from storage of the counterweights). Potential accident scenarios were calculated to result in exposures of 0.8 mSv/yr (80 mrem/yr) or less to individuals. Because these calculated exposures are within the limits of 10 CFR

Part 20 and are expected to impact a minimal number of individuals, NRC does not believe that the use of uranium counterweights under the current exemption have, or will, result in a significant impact to public health and safety or the environment.

NRC's review has also indicated that depleted uranium counterweights are no longer being introduced into new aircraft. Furthermore, existing depleted uranium counterweights are generally being replaced, when replacement is needed, with counterweights made from tungsten. As a result, the number of depleted uranium counterweights in aircraft is diminishing, thus further reducing the need to revise the regulation because the number of individuals potentially being impacted should also decrease as time passes.

The current language for the exemption in 10 CFR 40.13(c)(5) includes "uranium contained in counterweights installed in aircraft, rockets, projectiles, and missiles, or stored or handled in connection with installation or removal of such counterweights..." Based upon a review of the actual language and the regulatory history, it is clear that the exemption applies to storage only to the extent that the storage is in connection with the planned installation or recent removal from the aircraft. As such, the exemption does not include long-term storage unless it can be clearly shown that such storage is related to an intent to reuse the counterweight and that the counterweight continues to be maintained (i.e., the plating and labeling remain intact).

Similarly, if an aircraft containing depleted uranium counterweights is permanently removed from service, the counterweights should be removed from the former aircraft within a reasonable time period. The definition of an aircraft according to FAA regulations found in 14 CFR 1.1 is "a device that is used or intended to be used for flight in the air." Therefore, if there is no clear intention to continue to use the aircraft for flight, the counterweights would no longer be considered "installed in the aircraft" under the exemption in 10 CFR 40.13(c)(5).

Instead, the counterweight would be considered “stored” on the former aircraft. A counterweight stored on a former aircraft would be held with conditions similar to those conditions that apply to counterweights stored in connection with installation or removal (i.e., long-term storage is not permitted in the former aircraft under the exemption). Should an aircraft be held for possible future use, but not operated for a lengthy period of time, the holder should maintain the aircraft per its FAA maintenance plan, including a periodic inspection of the counterweights to ensure the counterweights remain in proper condition (i.e., the plating and labeling remain intact).

In cases where the counterweights are no longer planned to be used or specifically licensed, the counterweights may still be covered under the exemption during a reasonable period while arrangements are made to properly transfer the counterweights, as long as the counterweights continue to be maintained in proper condition (i.e., the counterweights plating and labeling remain intact). The period of storage allows holders of the counterweights to: (1) determine the future use of the counterweights; (2) decide on appropriate transfer or disposal alternatives if they are no longer to be used; and (3) accumulate several counterweights, within a reasonable time frame, in order to permit a more economical one-time disposal. The exemption also applies to persons temporarily holding the material during transit or if the material is mistakenly sent to a recycle or scrap yard, if the counterweight is properly maintained and transferred within a reasonable period of time using an option listed in RIS-01-013.

The NRC recognizes that some counterweights have been inappropriately sent to scrap yards or recyclers in the past. As the petitioner points out, a review of data in NMED indicates that alarms have been set off at scrap yards. The current exemption does not expressly prohibit transfers to any persons, including scrap yards or recyclers. However, the physical,

metallurgical, or chemical modification of the counterweight is prohibited; therefore, counterweights should not be sent to locations where, in all likelihood, they will altered or modified. Further, the detection and recovery of counterweights inappropriately sent to scrap yards or recyclers can lead to additional costs for the transferor or recipient. Although the NRC could amend the existing exemption to prohibit transfers to recyclers or scrap yards, the NRC does not believe that such an amendment would significantly reduce the number of these inappropriate transfers. The current regulation requires that counterweights held under this exemption must be labeled “Unauthorized Alterations Prohibited.” The NRC believes that persons who have inappropriately transferred counterweights to a recycle or scrap yard, despite the existing labeling on the counterweight, may not be aware of the prohibitions listed in the exemption itself. If a regulation requiring reporting of transfers were implemented, the transfer report might make it easier to identify the transferor so that appropriate action to retrieve the counterweight could be taken. However, the NRC believes that if someone were aware of these reporting requirements, they would likely be cognizant that the transfer to a recycler or a scrap yard is not allowed to begin with.

During resolution of the petition, the NRC considered additional options for rulemaking that might clarify the intent of this regulation and increase control over the use of depleted uranium aircraft counterweights. The NRC considered two types of rulemaking actions: (1) specific licensing and (2) development of a general license specifically applicable to aircraft counterweights. In both cases, the NRC’s analysis concluded that any benefits of the action were small compared to the costs and potential impacts associated with the action.

In the case of specific licensing, the costs to the industry and government would involve development and review of applications, and inspection of the new licensees. Because the NRC has no evidence to indicate that public health and safety is significantly impacted under

the current exemption, the NRC believes the costs to implement specific licensing would outweigh the benefits of licensing. Additionally, should counterweights be required to be held under a specific license, disposal alternatives would be reduced to disposal in a low-level waste site which would further increase the regulatory burden and costs related to this action.

Although implementation of a general license would presumably add additional requirements to those found in the existing exemption, the general license would be less burdensome to both holders of the counterweights and the government than a specific license. However, the NRC believes that the costs related to regulatory development and implementation are still believed to outweigh any benefits that might be achieved by the creation of a general license. As with specific licensing, the options for disposal could be limited to low-level waste facilities, thus increasing the regulatory burden and costs for disposal. Although the NRC could develop a general license which allows some of the same disposal/transfer options that are currently available, State regulations and/or the licenses of disposal facilities may preempt the utilization of those options.

The NRC determined that modifying the exemption in 10 CFR 40.13(c)(5) or increasing the regulatory structure (through a new general license or specifically licensing the holders), pursuant to the petitioner's request would add little, if any, additional benefits to the protection of public health and safety. Therefore, the NRC is denying the petitioner's request that the exemption in 10 CFR 40.13(c)(5) be amended to clarify the requirements for storage. However, the NRC believes that most of the petitioner's apparent goals can be better achieved by publication of guidance in the form of a new RIS. The purpose of the guidance would be to clarify the intent of the existing regulations related to storage of depleted uranium aircraft counterweights. The NRC would issue the guidance to known holders of aircraft

counterweights and other agencies and organizations that may have occasion to be interested in counterweights.

In a supplement to this petition (February 2001), the petitioner suggested that 10 CFR 40.13(c)(5) should be amended to clarify that only counterweights manufactured from depleted uranium, and not natural uranium, are covered under the exemption. Currently 10 CFR 40.13(c)(5) begins "Uranium contained in...." The petitioner identifies an apparent inconsistency with the labeling requirements in 10 CFR 40.13(c)(5)(ii) that require the counterweight to be impressed with "Depleted Uranium." As a result, the petitioner states that the exemption should be more specific to begin the exemption with "Depleted uranium contained in...."

An historical review of this issue indicates that the exemption was originally meant to apply to counterweights manufactured from both natural uranium and depleted uranium. On July 18, 1969 (34 FR 12107), a proposed rule was published in the Federal Register proposing to modify the regulation to require that the counterweights be impressed with the word "Uranium" rather than "Caution - Radioactive Material - Uranium, " as was required before the 1969 amendment. However, when the final rule was published on September 5, 1969 (34 FR 14067), the regulation required the counterweight to be impressed with the words "Depleted Uranium," as exists in the current regulation. No explanation for this change was mentioned in the Federal Register notice or Commission papers related to this action. The presumption is that this change was made because most, if not all, aircraft counterweights were and have been made of depleted uranium. The cost of depleted uranium is significantly less than the cost of natural uranium. While the NRC believes that the modification in 1969 effectively limits the exemption to include only depleted uranium counterweights because of the new labeling requirement, the NRC also believes the generic use of the word uranium at the start of the

exemption is still necessary because footnote 2 to 10 CFR 40.13(c)(5) grandfathers counterweights properly labeled and made before June 30, 1969. These counterweights may have included a small number of natural uranium counterweights. The NRC is denying this issue in the petition to allow for the possibility that there are some counterweights still in existence that were made from natural uranium prior to 1969.

The petitioner also requested that the NRC modify its regulations in 10 CFR 40.13(c)(5)(iv) to better delineate the scope of activities allowed as part of the repair or restoration of the plating or covering of an aircraft counterweight. The petitioner is concerned that some activities could impact the depleted uranium within the counterweight. The paragraph in question states "The exemption contained in this paragraph shall not be deemed to authorize the chemical, physical, or metallurgical treatment or processing of any such counterweights other than repair or restoration of any plating or any other covering." The intent of this paragraph is to delineate the scope of activities allowed under the exemption. Although the counterweight may be modified to restore or repair the plating or covering around the counterweight, the depleted uranium within the counterweight cannot be altered at any time under the exemption, even as part of restoration or repair of the plating or other covering. As a result, actions such as chemical baths, sanding of oxidized depleted uranium, or electroplating, each of which would likely result in modification of the depleted uranium counterweight itself, are not permitted under the exemption. However, repainting or placing a new covering over the counterweight (to the extent it does not interact with the depleted uranium in the counterweight) is permitted under the exemption as the long as the impressings and other required markings remain legible as required under 10 CFR 40.13(c)(5)(ii) and (iii). The NRC is denying this issue in the petition because it has been determined that the existing regulation conforms with the petitioner's request and does not require additional clarification through rulemaking. However,

the NRC believes that it may be worthwhile to provide additional guidance related to this aspect of the exemption. Therefore, the NRC plans to address this issue in the proposed RIS by clarifying the intent of the existing regulations related to the restoration and repair of depleted uranium counterweights.

In conclusion, no new information has been provided by the petitioner to support the petitioner's request that additional rulemaking is necessary at this time. Existing NRC regulations provide the basis for reasonable assurance that the common defense and security and public health and safety are adequately protected. Additional rulemaking would impose unnecessary regulatory burden and does not appear to be warranted. However, NRC does believe that some additional clarification, as originally requested by the petitioner, can be provided through guidance. Therefore, the NRC plans to issue a regulatory information summary which will provide clarification of the existing exemption as related to (1) long-term storage of the counterweights and (2) restoration and repair of the counterweights.

For the reasons cited in this document, the NRC denies this petition.

Dated at Rockville, Maryland, this _____ day of _____ , 2004.

For the Nuclear Regulatory Commission.

_____
Luis A. Reyes,
Executive Director.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
WASHINGTON, DC 20555-0001

XXXXX XX, 2004

# NRC REGULATORY ISSUE SUMMARY 2004-XX
# 10 CFR PART 40 EXEMPTIONS FOR URANIUM CONTAINED IN AIRCRAFT COUNTERWEIGHTS - STORAGE AND REPAIR



## ADDRESSEES

All persons possessing aircraft counterweights containing uranium under the exemption in 10 CFR 40.13(c)(5).

## INTENT

The U.S. Nuclear Regulatory Commission (NRC) is issuing this regulatory issue summary (RIS) to emphasize the scope and restrictions of the exemption from licensing requirements in 10 CFR 40.13(c)(5) as applied to counterweights containing uranium. This RIS does not transmit any new requirements or new staff positions. No specific action or written response is required.

## BACKGROUND INFORMATION

NRC has received a petition (see Federal Register 65 FR 3394, January 21, 2000) which requests additional rulemaking to define and clarify the responsibilities associated with certain depleted uranium counterweights. In particular, the petitioner focused upon the applicability of the exemption to long-term storage of depleted uranium counterweights. In response to the petitioner's request for immediate notification to advise those organizations holding counterweights under the exemption of their responsibilities to the public, NRC issued RIS-01-013 on July 20, 2001. RIS-01-013 primarily discussed disposal alternatives for depleted uranium counterweights held under the exemption in 10 CFR 40.13(c)(5). This RIS responds to the petitioner's request for clarification of issues regarding long-term storage and restoration or repair of plating.

## SUMMARY OF ISSUE

Source material includes natural or depleted uranium or thorium, or any combination thereof, in any physical or chemical form. 10 CFR 40.13 describes unimportant quantities of source material, and provides exemptions from the requirements for a license, and from the regulations in Part 40, subject to certain restrictions. One provision, 10 CFR 40.13(c)(5), exempts persons receiving, possessing, using, or transferring the uranium contained in counterweights installed in aircraft, rockets, projectiles, and missiles. These counterweights may also be stored or handled in connection with the installation or removal from such vehicles. The restrictions associated with this exemption are: 1) the counterweights must have been manufactured in accordance with a specific license to manufacture and distribute such items; 2) each counterweight must be impressed, legibly, through any plating or covering, with the words

"Depleted Uranium;" 3) the counterweight must have durable and legible markings or labels with the identification of the manufacturer, and a statement, "Unauthorized Alteration Prohibited;" and 4) the exemption does not authorize any chemical, physical, or metallurgical treatment or processing of the counterweight, other than repair or restoration of any plating or other covering.

LONG-TERM STORAGE

Because storage is only permitted to the extent the storage is incidental to installation or removal of the counterweight, long-term storage of the counterweight is not considered to be covered under this exemption. As a result, when the counterweights are no longer to be used for their intended purposes, the end user should transfer the counterweights as discussed in RIS-01-013.

NRC believes that a period of 24 months is sufficient for a person holding a counterweight not installed in an aircraft to either reinstall the counterweight in an aircraft or dispose of the counterweight using an alternative provided in RIS-01-013. After a period of 24 months in storage, the counterweights should be deemed to no longer be stored incidental to installation or removal and the holder should apply for a specific license per 10 CFR 40.31 in order to continue to store the counterweights. Storage for a period of greater than 24 months may be considered allowable under the exemption if: (1) the person storing the counterweight can clearly show an intent to re-use the counterweight in an aircraft, (2) the counterweight has a part tag or some other means of indicating where the counterweight came from per the carrier's maintenance program, and (3) the counterweight is periodically inspected to ensure that the counterweight remains in proper condition (i.e., the plating remains intact) for use in an aircraft.

Similarly, counterweights stored in an aircraft that is no longer planned to be operated should be removed and disposed of using an alternative provided in RIS-01-013. If an aircraft is held for possible future use, but not operated, the holder should maintain the aircraft per its maintenance plan and minimally inspect the counterweights every 5 years to ensure the counterweight remains in proper condition (i.e., the plating remains intact).

REPAIR AND RESTORATION

In order to maintain the counterweight, 10 CFR 40.13(c)(5)(iv) allows repair or restoration of the plating or covering. However, the exemption does not allow any repair or restoration process that would disturb the integrity of the underlying uranium within the counterweight; such processes would require a specific license. Examples of restoration or repair processes that would not fall under the exemption include acid baths or electroplating, both of which may chemically or metallurgically impact the underlying uranium in the counterweight. Allowable restoration techniques may include painting or placing a new covering over the counterweight (to the extent that the process for installing the new covering does not result in chemical, physical, or metallurgical interactions with the underlying uranium). In addition, any repair or restoration must also maintain the legibility of the impressings, labels, and markings on the counterweight required under 10 CFR 40.13(c)(5)(ii) and (iii).

PAPERWORK REDUCTION ACT STATEMENT

This RIS does not request any information collection.

This RIS requires no specific action nor written response. If you have any questions about this summary, please get in touch with the contact person listed below, or the appropriate regional office.

/RA/
Charles Miller, Director
Division of Industrial and
Medical Nuclear Safety
Office of Nuclear Material Safety
and Safeguards

Technical contact: Gary Comfort
301-415-8106
E-mail: gcc1@nrc.gov

Attachment: List of Recently Issued NRC Regulatory Issue Summaries

Mr. Donald A. Barbour
Philotechnics
P.O. Box 4489
Oak Ridge, TN 37831-4489

Dear Mr. Barbour:

I am responding to the petition for rulemaking dated August 30, 1999, and supplemented by letters dated April 5, 2000, and February 14, 2001, that you submitted to the U.S. Nuclear Regulatory Commission (NRC). Your petition was docketed as PRM-40-28 and requested that NRC amend its regulations to provide additional rules for the effective control of depleted uranium aircraft counterweights. You stated that this regulatory clarification should address a number of issues concerning the exemption, storage, and disposal of these devices.

The notice of receipt of the petition was published in the Federal Register on January 21, 2000 (65 FR 3394). The comment period closed on April 5, 2000. Two comment letters were received, including one from yourself.

The NRC has considered the petition and your supporting rationale. For the reasons provided in the enclosed *Federal Register* notice, your petition is denied. In summary, the petition is being denied because we have determined that the current NRC regulations provide adequate clarity and appear to already accomplish what you request. The NRC believes that further clarifying the regulations for aircraft counterweights per your request can be more efficiently accomplished through the issuance of a Regulatory Issue Summary (RIS), rather than through rulemaking. A copy of the RIS will be provided to you when it is finalized.

The *Federal Register* notice denying the petition is being transmitted to the Office of the Federal Register for publication.

Sincerely,

Luis A. Reyes
Executive Director
for Operations

Enclosure: *Federal Register* Notice Denying Petition