

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
Jack R. Strosnider, Director

In the Matter of)	
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Department of the Army)	Docket No. 040-06394
)	License No. SMB-141
)	
)	Docket No. 040-07086
	)	License No. SUB-734
)	
	)	Docket No. 040-08814
	)	License No. SMB-1411
)	
	)	Docket No. 040-08838
	)	License No. SUB-1435
)	
	)	Docket No. 040-07354
	)	License No. SUB-834
)	
	)	Docket No. 040-08779
	)	License No. SUC-1391
)	
	)	Docket No. 040-08767
	)	License No. SUC-1380
)	
ATK Tactical Systems Company, LLC)	Docket No. 040-08850
)	License No. SUB-1440
)	
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Department of the Navy)	Docket No. 030-29462
)	License No. 45-23645-01NA
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)	
Department of the Air Force)	Docket No. 030-28641
)	License No. 42-23539-01AF
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)	(10 CFR 2.206)

I. Introduction

U.S. Nuclear Regulatory Commission (NRC) regulations provide members of the public with the means to request the Commission to take enforcement-related action to modify, suspend, or revoke a license, or to request other appropriate enforcement-related action, as may be proper. This policy is codified at Section 2.206 of Title 10 of the *Code of Federal Regulations* (10 CFR 2.206). The Commission may grant a request for action, in whole or in part, take other action that satisfies the concerns raised by the requester, or deny the request. Requests that raise health and safety and other concerns without requesting enforcement-related action will be reviewed by means other than the 10 CFR 2.206 process.

By electronic mail dated April 3, 2005, as supplemented on April 26, 2005, and May 4, 2005, James Salsman (Petitioner) filed a petition, pursuant to 10 CFR 2.206, requesting that NRC take “. . . immediate action to correct the alleged misconduct on the part of uranium licensees, for the protection of the health and safety of people, including United States citizens and personnel, and the environment.” The Petitioner states the basis for the requests is “. . . gross negligence on the part of the licensees that involved exceptionally grave issues and significant safety and environmental issues” and other serious misconduct including fraud and willful wrongdoing, involving the hazardous nature of hexavalent uranium trioxide (UO₃). The requests in the petition that involve enforcement-related corrective actions, under NRC jurisdiction, are summarized as follows:

1. Require the licensees, referenced in the petition, to document when and where significant quantities of hexavalent uranium have been ingested, inhaled, or released to the environment, and that each incident be recognized as a Severity Level I violation;
2. Find the licensees willfully negligent for their multiple Severity I violations because the licensees never detected hexavalent uranium, never attempted to detect it, and never recognized its hazards as a product of combustion of depleted uranium (DU) munitions;
3. Find that, had the Commission known the true risk of pyrophoric uranium munitions, the Commission likely would not have issued the existing licenses without substantial and restrictive modification, if at all;
4. Find 1) that a licensee’s officer’s incorrect statement on January 27, 2005, in asserting that “. . . scientific consensus is that remediation of sites where DU munitions were used is generally unnecessary,” was self-serving and was made to intentionally and fraudulently protect licensees; and 2) that the assertion involved willful misconduct in misrepresenting the safety of hazardous licensed material contamination. Order the licensee to 1) publish a correction to its officer’s false, willful, and fraudulent assertion of the statement; 2) modify licenses to prohibit licensees from making any willful, false, or fraudulent statements; and 3) impose a \$100,000 per day fine for any delay in compliance;
5. Find the licensee’s submission of invalid studies, provided in response to the Commission’s queries regarding D. Rokke’s 10 CFR 2.206 petition in October and November 2000, requires corrective action and corrective modification to licenses; and similarly, find that the continued willful publication of invalid statements and assertions

concerning the safety of pyrophoric uranium munitions requires corrective modification to licenses to require production of accurate valid studies of the safety of pyrophoric uranium, and publication of these studies; impose a \$100,000 per day fine for any delay; and suspend or revoke the license in case of delay in compliance;

6. Order licensees to accurately determine the risk to health and safety of any and all known forms of inhalation and ingestion exposure to pyrophoric uranium munitions combustion products, and risks associated with hexavalent uranium into the environment, risk ratios and their confidence interval under several sets of circumstances, modify their licenses based on this information, and impose a \$100,000 per day fine for any delays in complying with the order;
7. Order licensees, to 1) determine the best safe and effective medical therapies for uranium poison victims; 2) determine the best remediation of sites where munitions were burned or combustion products reached groundwater, plant or animal life, and mitigate and remediate these sites; and 3) modify their licenses based on this information; and 4) impose a \$100,000 per day fine for any delays in complying with the order;
8. Fine the munition licensees \$100,000 for each identified incident of all Severity Level I violations: each incident of gross conduct; each incident of willful misconduct; and each identified fraudulent assertion concerning the safety of DU munitions or related contamination; and suspend the licenses immediately until corrective actions for the above are completed.

The Petitioner made other requests to the Commission that were not enforcement-related¹, and thus not subject to the 10 CFR 2.206 process, or concerned matters not within NRC jurisdiction. Also, in the May 4, 2005, supplement to the petition, the Petitioner indicated that the quantities in Appendix B to 10 CFR Part 20 (Part 20) for allowable intake of uranium were designed to address only the radiological hazard of uranium, and not the heavy metal toxicity, and that soluble compounds are far more toxic than the insoluble compounds. Since the adequacy of Title 10 regulations is being questioned, and the Petitioner requests a change to the regulations, this part of the petition is being treated under the Petition for Rulemaking provisions of the regulations. A notice of receipt of a petition for rulemaking from the Petitioner was published in the *Federal Register* on June 15, 2005 (70 FR 34699).

The petition may be viewed in the NRC Agencywide Documents and Management System (ADAMS), Public Library component on NRC's web site, <http://www.nrc.gov> (the Public Reading Room), under accession number ML051240497.

¹In sections 3.0 and 4.0 of the petition, the Petitioner requests that the Commission reach certain conclusions regarding information provided in the petition, and requests notice and agreement to rules and inferences based on promulgated regulations, statutes, and definitions drawn from regulatory, legal, and referenced authorities. These requests are not requests to modify, suspend or revoke a license or for any other enforcement related type actions which are subject to resolution pursuant to 10 CFR 2.206.

The Petitioner met with the Nuclear Material Safety and Safeguards (NMSS) petition review board via a teleconference on May 4, 2005, to discuss the petition. The transcript of this meeting was treated as a supplement to the petition, and is available in ADAMS at the Commission's Public Document Room, located at One White Flint North, 11222 Rockville Pike (first floor), Rockville, Maryland, and from NRC's ADAMS web site, under accession number ML051390187.

In a letter dated May 26, 2005, NRC informed the Petitioner that the request for immediate modification of the licenses referenced in the petition was denied because there was no apparent immediate threat to public health and safety from continued operations under the current DU munitions licenses, and that the issues of the petition were being referred to the NMSS for appropriate action.

NRC sent a copy of the proposed director's decision to the Petitioner and to the affected licensees for comment on September 23, 2005. The Petitioner responded with comments on [date] and the licensees responded on [date]. The comments and the NRC staff's response to them are included in this final director's decision.

II. Discussion

A. DU Munitions Licenses

DU is a byproduct of the uranium fuel-enrichment process, having a higher percentage of uranium-238 and lower percentage (depletion) of uranium-235 than natural uranium. DU is used in military munitions. Because of its higher density and pyrophoric characteristics, it is more efficient in penetrating hard targets than conventional kinetic projectiles.

NRC has granted licenses to U.S. Department of the Army (U.S. Army), U.S. Department of the Navy (U.S. Navy), U.S. Department of the Air Force (U.S. Air Force), and to a civilian manufacturing firm, authorizing the possession of DU for the purpose of using it in munitions. The U.S. Army possesses individual licenses for seven sites. The U.S. Navy and U.S. Air Force each has a master material license which includes authorization for DU munitions. The civilian organization has a single DU munitions license. Half the licenses do not authorize the firing of ammunition containing DU material. These licenses are for possessing, storing, transporting, and transferring DU munitions, or for operating with DU in activities other than actively firing the munitions (such as manufacturing or deactivating the munition, or possession incident to the decommissioning of a site). Several of the remaining licenses give authority to test-fire DU munitions, but only in an enclosed environment (i.e., a building where the munition impacts its target in an environmentally closed system). Firing the DU munitions in an enclosed environment minimizes the impact of pyrophoric characteristics, radiologic hazard, and chemical toxicity to personnel and the environment.

B. Jurisdictional Limitations

The Petitioner requests remediation and mitigation of conditions resulting from licensed activities and from warfare use of DU munitions. The U.S. Army, U. S. Navy, and the U.S. Air Force are permitted by their licenses to test-fire DU munitions. NRC licenses do not, however, address the warfare use of DU munitions, since NRC has no statutory authority to regulate such

use. Accordingly, the Petitioner's request for NRC action regarding the warfare use of DU munitions is denied. With respect to Petitioner's request for remediation and mitigation of conditions resulting from test-firing of DU munitions pursuant to NRC licenses, the Petitioner's request is considered here, in so far as NRC regulates the decontamination and decommissioning of nuclear facilities, with the ultimate goal of license termination and release of a site for unrestricted use. (See Subpart E of 10 CFR Part 20, and 10 CFR 40.42)

C. Regulatory Limits for Uranium

The radioactive material concentration levels, contained in the tables of Appendix B to Part 20 regulations, are based on the recommendations of the International Commission on Radiological Protection (ICRP), and the U.S. counterpart to the ICRP, the National Council on Radiation Protection and Measurements (NCRP). The radionuclide levels in Appendix B to Part 20 relate solely to the radiation dose, and do not reflect chemical toxicity. The annual limits on intake (ALI) of a given radionuclide are levels of intake within a year, that would result in either a committed effective dose equivalent of 0.05 sieverts (5 rem) or a committed dose equivalent of 0.5 sieverts (50 rem) to an organ or tissue. These quantities are based on the dose an individual would receive, from the radionuclide listed, once the radionuclide enters the body. For radionuclides inhaled, the different clearance rates from the lung to the blood or to the gastrointestinal tract depend on the chemical form of the radionuclide, and are classified as D, W, and Y, for clearance times of days, weeks, and years. The level listed for a given ALI pertains to the total quantity of the radionuclide, regardless of its original chemical composition when it entered the body.

For uranium, the chemical toxicity may be the limiting factor for intake. The value for the uranium air concentrations in footnote 3 in Appendix B to Part 20 is based on the recommendations of the American Conference of Government Industrial Hygienists (ACGIH). The ACGIH is an organization devoted to the administrative and technical aspects of occupational and environmental health. It is a professional society and not a government agency. The Occupational Safety and Health Administration (OSHA) pointed out, in 54FR2332 (January 19, 1989), that the ACGIH is an organization of experts very knowledgeable about the American workplace and the health literature. OSHA also noted that the ACGIH permits outside participation in development of exposure limits and solicits comment on proposed recommendations. OSHA relies on ACGIH research and recommendations to facilitate its rulemaking on limits for various substances.

From the 2001 ACGIH World-Wide "Documentations of the Threshold Limit Value and Biological Exposure Indices (Seventh Edition-2001)," a Threshold Limit Value (TLV) refers to airborne concentration of a substance and represents conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects. TVLs are based on available information from industrial experience, experimental human and animal studies, or a combination of all three, when possible.

Currently, the ACGIH has assigned 0.2 milligram per cubic meter, as a TLV-Time Weighted Average (time-weighted average concentration for a conventional 8-hour workday and a 40-hour work week), for soluble and insoluble natural uranium. This level appears in footnote 3 in Appendix B to Part 20, which states that chemical toxicity may be the limiting factor for soluble uranium-238, uranium-234, and uranium-245 in air. The uranium air concentration limit for a

40-hour work week is stated as 0.2 milligrams per cubic meter of air average. Section 20.1201(e) of Part 20 contains the limit for chemical toxicity; it states that the soluble uranium intake limit is 10 milligrams per week. This quantity is derived by multiplying the 0.2 milligram per cubic meter air concentration level by the amount of air an individual breathes in 40 hours. Natural uranium and DU are chemically the same.

D. Petitioner's Bases

The Petitioner based his request for corrective action on “. . . gross negligence and other serious misconduct including fraud, willful wrongdoing, and a serious breach of the public trust on the part of uranium munitions licensees and their officers, employees, contractors, and agents.” He believes that significant quantities of hexavalent UO_3 are released in combustion of DU, that these are particularly hazardous, and that licensees have not acknowledged the hazard.

The Petitioner indicated that the experiments, conducted and reported by researchers performing work for the Army concerning DU aerosol generation during use of DU munitions, failed to find or report an expected chemical state of uranium in the form of hexavalent uranium, particularly UO_3 . The Petitioner stated that “. . . the uranium munitions licensees were never able to detect, and have never been able to detect monomolecular UO_3 .” The Petitioner cites numerous professional texts and journal articles to support his assertion that hexavalent uranium should be present after the use or testing of DU munitions, and that UO_3 is more similar to soluble uranyl salts than to the insoluble oxides. The Petitioner infers that rapid removal of UO_3 from the lung “. . . indicates that uranium trioxide is is (sic) as non-radiologically toxic as the most hazardous uranium compound,” and states “(T)he non-radiological heavy metal toxicity of uranium is a million-times worse than its radioactivity, with regard to certain aspects of biological poisoning, including genetic damage.”

The Petitioner states that the wrongdoing entails licensees making intentional false statements to misrepresent the hazardous nature of licensed material and activities. The Petitioner considers the failure to find or report the presence hexavalent UO_3 in the license application a false statement to the Commission, upon which the Commission granted the license for the possession and use of DU munitions. The Petitioner further asserts that granting a license based on such information failed to protect public health and safety.

Also, in a meeting with the Petition Review Board on May 4, 2005, the Petitioner indicated that the Army submitted a list of studies and reports to NRC, in response to a June 2000 petition concerning DU munitions. The Petitioner indicates that two studies, one from 1979 and one from 1995, were submitted as authoritative and accurate regarding aspects of combustion products caused by the firing of DU munitions. The Petitioner asserts that the information submitted by the Army in response to the June 2000 petition, and particularly these two reported studies, is inaccurate because the studies did not find or indicate the presence of UO_3 as a product of DU munitions firing.

E. Licensees' Responses to the Petition

On June 10, 2005, NRC notified affected licensees that a 10 CFR 2.206 petition had been submitted that involved their licenses. The correspondence also informed these licensees that

they could respond to the petition if they desired. NRC received three letters in response to this notification.

The U.S. Air Force's response (ADAMS Accession Number ML052270194) to the petition indicates that it has no data to support the contention that uranyl nitrate or UO_3 is a significant combustion product. The Air Force refers to Army research on DU munitions testing that does not indicate uranyl nitrate or UO_3 to be a significant combustion product when DU munitions have been fired. The Air Force attached a copy of a recent *Health Physics Journal* to its response letter, which indicates that components of samples of dust resulting from DU munitions live fire consisted of the uranium oxides U_3O_7 , U_3O_8 , and UO_2 . The Air Force also indicates that it is in full compliance with its Master Material License and with all applicable NRC regulations, and that its use of DU munitions does not pose any significant exposure hazard to either its employees or members of the general public.

The U. S. Navy, in its response (ADAMS Accession Number ML052270196), indicates that, before and after its use of DU munitions, health and environmental aspects were carefully considered. Its involvement in studies extends beyond the Navy to efforts involving the Department of Veteran Affairs and the Armed Forces Radiobiological Research Institute. The Navy's response references the 33 soldiers exposed to DU as a result of friendly fire, and the results of follow-up studies of these soldiers, which are consistent with the initial estimate of no significant health effects. The Navy also mentions studies by international organizations on the environmental impacts in Kosovo, Bosnia, and Iraq and the Gulf War, noting that these studies indicate that no widespread contamination and no current impact on the health of the general public nor deployed personnel have been attributed to the use of DU munitions. The Navy states that the documentation submitted or referenced by the Petitioner fails to add information to what has already been published to date, that the allegations are based on the Petitioner's assumptions about chemical reactivity, and that putative resultant chemical components will cause undocumented human harm. Because of the speculative nature of the Petitioner's allegations and the lack of empirical data to support them, the Navy does not believe this petition raises safety concerns not previously addressed.

The U.S. Army addresses several issues in its response (ADAMS Accession Number ML052380089). The response cites the studies on human health effects of Gulf War Veterans with imbedded DU from friendly fire. The studies' assessments conclude that there are no health effects attributable to DU on the group other than increased uranium in urine. The Army also references an Agency for Toxic Substances and Disease Registry "Toxicology Profile for Uranium" (Update) 1999, which indicates it is doubtful that human exposure to uranium compounds at or near a hazardous waste site could result in interference with normal reproduction. The Army also cites "The Capstone Depleted Uranium Aerosol Study and Human Health Risk Assessment," which indicates that recent studies could not determine if UO_3 were in aerosols of fired DU munitions because of overlapping X-ray diffraction patterns with U_3O_8 . In that case, results were reported as a single quantity " $\text{U}_3\text{O}_8/\text{UO}_3$." The Army response also addresses issues of cloud behavior of high concentration of aerosols; the solubility of UO_3 ; oxidation states of DU recovered in range and soil samples; the Iraq cleanup of DU contaminated sites and equipment; environmental monitoring at Army ranges; and the impact of uranyl nitrate on workers exposed to DU. The letter also includes a March 10, 2005, Fact Sheet on the "U.S. Army Capstone Depleted Uranium Aerosol Study and Human Health Risk Assessment," and a list of study reports and publications.

F. NRC Evaluation of Petition Items

Petition Summary Item 1. The Petitioner requests that licensees document when and where significant quantities of hexavalent uranium have been ingested, inhaled, or released to the environment, and that each incident be recognized as a Severity Level I violation.

NRC already requires documentation and reporting of releases and exposure to numerous radioactive and nonradioactive substances. NRC regulations specifically establish exposure limits for hexavalent UO_3 . See 10 CFR 20.1201(e), 10 CFR 20.1302(b), and Appendix B to Part 20. NRC requires monitoring of exposure of workers and members of the public to licensed material (Subpart F of Part 20). The regulations require the use of surveys, equipment, and instruments that are necessary to comply with the exposure limit regulations of Part 20. Subpart C of Part 20 addresses occupational work limits, whereas Subpart D addresses the radiation dose limits for individual members of the public. Subpart L contains requirements for documentation and recordkeeping of radiation protection programs, surveys, and records of exposure to occupational workers as well as individual members of the public. Subpart M contains reporting requirements for notification of incidents and exposure, radiation levels, and concentrations of radioactive material exceeding the constraints or limits. To the extent that the Petitioner requests, in item 1, that licensees be subject to existing documentation requirements, the request is granted.

The request that NRC treat all releases and exposures of UO_3 as violations is a challenge to exposure limits established by NRC regulations. Such a request is outside the scope of 10 CFR 2.206 and is not considered here. It is noted that, on May 6, 2005, the Petitioner filed a petition for rulemaking, requesting that NRC revise its Part 20 regulations, that specify limits for ingestion and inhalation occupational values, effluent concentrations, and releases to sewers, for all heavy-metal radionuclides (including UO_3) with nonradiological chemical toxicity hazards exceeding their radiological hazards, so that those limits properly reflect the hazards associated with reproductive toxicity, danger to organs, and all other known nonradiological aspects of heavy metal toxicity. The Petitioner's concerns regarding the adequacy of these exposure values in NRC regulations is being addressed in that rulemaking process. See the *Federal Register* on June 15, 2005 (70 FR 34699).

The request that NRC classify all releases and exposures of UO_3 as Severity Level I violations is a challenge to the NRC Enforcement Policy. (See "NRC Enforcement Policy," at <http://www.nrc.gov/what-we-do/regulatory/enforcement/enforc-pol.pdf>) The NRC Enforcement Policy articulates the process used to assign severity levels for violations of NRC requirements. For example, Severity Level I violations involve levels of radiation exposure many times the limits specified in Part 20. (See NRC Enforcement Policy, Supplement IV) To the extent that the Petition challenges NRC policy regarding the dispositioning of violations involving exposures above regulatory limits and reporting of releases, the Petition fails to raise a concern properly subject to 10 CFR 2.206. Therefore, the request, in item 1, to recognize each incident of ingestion, inhalation, or release of hexavalent uranium to the environment be recognized as a Severity Level I violation is denied.

Petition Summary Item 2. The Petitioner requests that the Commission find the licensees, individually and jointly, willfully negligent for their multiple Severity I violations because the licensees never detected hexavalent uranium or recognized its danger, never attempted to

detect it, and never recognized or assumed it was both hazardous and a product of combustion of DU munitions.

The Petitioner notes that two DU aerosol studies, performed by or for DU munition licensees, did not find UO_3 when DU munitions were fired or subject to high-temperature fires. The Petitioner cites journal and text book references that argue that UO_3 should be present in these cases, and that hexavalent uranium is of very serious importance in evaluating the safety of a uranium fire.

The Petitioner cites a November 1979 report entitled "Characterization of Airborne Uranium from Test Firings of XM774 Ammunition," PNL-2944, as having no indication of the detection of UO_3 . A licensee had listed the report in its response to a June 2000 2.206 petition. On page 49, the 1979 report indicates that uranium at elevated temperatures can ignite and oxidize rapidly, and "(F)our oxides have been established-- UO_2 , U_4O_9 , U_3O_8 , and UO_3 -. . ." The report describes the difficulty in certifying the presence or quantifying the amount of UO_3 , because of the problem of overlap of x-ray diffraction profiles from U_3O_8 and UO_3 creating uncertainty in the evaluation of UO_3 . The data in the report indicate the presence of U_3O_8 and UO_2 , in the ratio of 75 percent to 25 percent, respectively.

That the licensees have not detected hexavalent UO_3 , or recognized the hazard arising from licensed activities as asserted by the Petitioner is not a violation of any NRC requirement. In addition, there is no basis for the Petitioner's assertion that the licensees, individually or jointly, were willfully negligent in this regard. Accordingly, the request in item 2 is denied.

Petition Summary Item 3. The Petitioner requests the Commission find that, had the Commission known the true risk of pyrophoric uranium munitions, the Commission likely would not have issued the existing licenses without substantial and restrictive modification, if at all.

The Commission uses the recommendation of the ICRP and NCRP for radiological bases of NRC regulations. These two scientific bodies collect, review, analyze, and develop information about protection against radiation, and have established levels to provide safety and prevent detrimental effects from exposure to radiation sources. The Commission, in realizing that the chemical toxicity of uranium may be more limiting than levels associated with radiological limits, has used the AGCIH recommendation as an additional limit to the annual radiological dose limit.

The inherent risk or hazard of a material is not the sole basis for decisions to grant a license or authorize its use. The license applicant must demonstrate that it can safely possess and use the authorized material while protecting public health and safety, and the environment, through acceptable design, procedure, construction, operation, maintenance, and quality assurance measures. At the time of the review, the Commission considers the known hazards of the material being requested, and considers the current regulatory requirements. The review of a license application includes the overall ability of the licensee to meet all regulatory requirements and maintain public health and safety.

NRC licenses which authorize test firing DU munitions contain certain restrictions and conditions, such as limited firing positions and locations, limiting test firing to an enclosed environment, and implementation of monitoring programs. The restrictions control releases of

material generated by test firing. The monitoring programs verify the concentration levels of the facility's restricted and unrestricted areas, in order to ensure that exposures to those engaged in licensed activities and to members of the public, if they occur, are within allowable limits.

For radiological considerations, radionuclides have three different inhalation intake and air concentration allowable levels, based on the chemical form of the compound. These different levels reflect the solubility of the material in the lung, and the retention time in the pulmonary region of the lung. Solubility classes are D (clearance half-times less than 10 days) for soluble material, W (10 to 100 days (weeks)) for moderately soluble material, and Y (greater than 100 days (years)) for insoluble material. UO_3 is classified in Part 20 as having a solubility class of W, or moderately soluble, while U_3O_8 has a solubility class of Y, insoluble. For uranium-238, the predominate radionuclide in DU munitions, the Y class is the more restrictive (smaller) allowable intake and concentration levels than the W class. Licensees, that encounter both UO_3 and U_3O_8 , in aerosols, would classify the aerosols proportionately as class W and class Y, or as all class Y, the most restrictive level, and would be in compliance when UO_3 is present, regardless of its relative concentration in the aerosol.

Moreover, with regard to chemical toxicity, NRC regulations limit the intake of all soluble uranium to 10 milligrams in a week, which is based on the ACGIH TVL of 0.2 milligrams uranium per cubic meter of air. ACGIH determined this level based on the impact to the most sensitive organ to uranium toxicity in humans and animal, the kidney.

Based on a review of scientific literature by the Petitioner, and scientific and technical information otherwise available, NRC staff is unable to conclude that the presence of UO_3 during test firing of DU munitions represents a safety hazard greater or different than recognized when the DU munitions licenses were granted. That hazard is addressed by both the terms and conditions of the DU munitions licenses and by NRC regulations regarding dose limits and reporting exposures, radiation levels, and concentrations of radioactive material. NRC DU munition licensees have not reported any incidents exceeding these limits in the activities relating to the testing DU munitions, nor has NRC found any incidents of regulatory limits being exceeded in activities related to DU munitions.

The Petitioner has supplied no information that could provide a basis to conclude that licensed activities may have involved any violation of NRC requirements, or that the presence of UO_3 during test firing of DU munitions represents a safety hazard greater or different than that recognized when the DU munitions licenses were granted. During review of DU munitions license applications, the Commission considered the hazards and the applicable regulatory requirements, including requirements for acceptable design, procedures, construction, operation, maintenance, and quality assurance measures. Licenses were granted after NRC staff's determined that the authorized use would meet all NRC requirements. Accordingly, the request in item 3 is denied.

As indicated above, the Petitioner has also submitted a petition for rulemaking on May 6, 2005, docketed by NRC on May 13, 2005, requesting that NRC amend its regulations, in Part 20, to modify exposure and environmental limits of heavy metal (Docket No. PRM-20-26). NRC is addressing the safety hazard of UO_3 in this rulemaking process.

Petition Summary Item 4. The Petitioner asserts that a licensee's statement on January 27, 2005, that ". . . scientific consensus is that remediation of sites where DU munitions were used

is generally unnecessary . . . ,” intentionally and fraudulently misrepresented the safety of the hazardous licensed material contamination during the time of deliberations concerning actions required at the Jefferson Proving Ground and other contaminated sites, in violation of NRC requirements.

Petitioner claims that wrongdoing occurred when General Richard Myers, Chairman of the United States Joint Chiefs of Staff, made a false statement on January 27, 2005, in a letter to a non-NRC individual, that the scientific consensus is that remediation of sites where DU munitions are used is generally unnecessary. For a licensee statement to be treated as a false or inaccurate statement subject to NRC enforcement, i.e., a violation of Section 186 of the Atomic Energy Act, the rule on completeness and accuracy, 10 CFR 40.9(a), or the deliberate misconduct rule, 10 CFR 40.10(a)(2), the statement must be made to NRC, and it must be material to NRC. Because the alleged statement was made to a third party and not to NRC, it did not violate NRC requirements. Even if the statement had been made to NRC, it would not be a violation of NRC requirements because it is not material. Because the alleged false statement is a mere opinion about a scientific consensus, NRC staff would not use it to make a decision as to whether remediation of sites where DU munitions are used is necessary to protect public health and safety. Accordingly, NRC does not find that the alleged statements violate any NRC requirement, and the request in item 4 is denied.

Petition Summary Item 5. The Petitioner requests that the Commission find the licensee’s submission of “invalid” studies, provided in response to the Commission’s queries regarding D. Rokke’s 2.206 petition in October and November 2000, requires corrective action and corrective modification to licenses. Similarly, the Petitioner requests that the Commission find that the continued willful publication of invalid statements and assertions concerning the safe use of pyrophoric uranium munitions requires corrective modification of DU munition licenses to require the DU munition licensees to produce accurate, valid studies of the safety of pyrophoric uranium, and to publish these studies. The Petitioner requests that a \$100,000 per day fine should be imposed for any delay in making and publishing said studies, and that NRC suspend or revoke the licenses of those licensees that delay compliance.

The studies to which the Petitioner refers are those that the Army submitted as authoritative, in June 2000, in response to a 10 CFR 2.206 petition. At the May 4, 2005, Petition Review Board meeting, the Petitioner referenced a 1979 research paper entitled *Characterization of Airborne Uranium from Test Firings of XM774 Ammunition*, PNL-2944, and a 1995 publication entitled *Evaluation of Depleted Uranium Aerosol Data: Its Adequacy for Inhalation Modeling*, PNL-10903. The Petitioner asserts that the Army used the test information to claim that there were no serious health and environmental consequences from DU munitions test firing. The Petitioner considers the report invalid because he asserts that, through interpretation of other references, UO_3 should have been present. On page 49, the 1979 report indicates that uranium at elevated temperatures can ignite and oxidize rapidly, and four oxides have been established (i.e., UO_2 , U_4O_9 , U_3O_8 , and UO_3). The report’s findings, however, were that the aerosolized sample collected indicated 75 percent U_3O_8 and 25 percent UO_2 , analyzed for relative abundance, semi-quantitatively, by X-ray diffraction analysis. No UO_3 was identified in the analysis. The 1995 publication abstract indicated that more than 20 Battelle’s studies and 20 more studies conducted by other researchers were reviewed. Although the researchers cited several areas as needing further research (e.g., resuspension and particle-size distribution), the researchers deemed the overall quality of the data, from the reviewed reports,

adequate to conservatively estimate dispersion and health effects. The two studies were among numerous studies in a list enclosed with the Army's response to a 10 CFR 2.206 petition submitted in June 2000. The list was prefaced with encouragement to review the studies listed, along with other documents that could be viewed on certain websites.

Some DU munition licensees have been producing tests and studies (some performed by the licensees and others performed for the licensee by outside researchers) starting in the 1970s'. Publications have been documented and/or published by government and non-government agencies, both internal and external to the licensees, by institutes and academies, by advisory committees, and by specially appointed boards. A recent Army-sponsored endeavor (along with the Department of Defense) was the U. S Army Capstone Aerosols "Depleted Uranium Aerosol Doses and Risks: Summary of U.S. Assessments, October 2004," which can be viewed at http://deploymentlink.osd.mil/du_library/du_capstone/index.pdf.

To the extent this request intends to assert that submission of the allegedly invalid studies constitutes a violation of NRC requirements concerning the completeness and accuracy of information, the request is denied. The studies' conclusions constitute technical judgments or statements of opinion on a scientific matter, and are not subject to NRC requirements on completeness and accuracy of information. Mere disagreement with scientific conclusions or technical judgments of the studies in question does not render them violations of NRC requirements on completeness and accuracy of information. The Petitioner has identified no violation of NRC requirements concerning completeness and accuracy of information, nor any deliberate misconduct. Therefore, this request in item 5 is denied.

To the extent this request is based on an assertion that licensed activities involving firing of DU munitions creates hazardous levels of UO_3 not previously recognized by NRC, this issue is addressed in the Petition Summary Item 3 above. As to the levels of UO_3 allowable, that issue is being address in the Petitioner's petition for rulemaking. (See the *Federal Register* on June 15, 2005 (70 FR 34699)).

Petition Summary Item 6. The Petition requests that the Commission modify all DU munition licenses to require licensees to accurately account for the risk to health and safety of any and all known forms of inhalation and ingestion exposure to pyrophoric uranium munitions combustion products, and risks associated with hexavalent uranium into the environment, risk ratios and their confidence interval under several sets of circumstances, and to impose a fine of \$100,000 per day for any delays in complying with the order.

NRC generally follows the basic radiation protection recommendations of the ICRP, and its U.S. counterpart, the NCRP, in formulating basic radiation protection standards. There are also scientific bodies that analyze data on sources and effects of radiation, and publish series of reports containing summaries of sources of radiation, doses received by workers and members of the public, and analyze the potential health risks from these exposures (i.e., the United Nations Scientific Committee on the Effects of Atomic Radiation and the National Academy of Sciences' Committee on the Biological Effects of Ionizing Radiation). As stated above, in the case of uranium, NRC has used a chemical toxicity limit established by the ACGIH and endorsed by OSHA. NRC uses information concerning risk and impact on health from established scientific bodies dedicated to this subject.

NRC regulations impose dose limits based on generally accepted radiological risk analyses performed by the ICRP, and NCRP, and in the case of chemical toxicity of uranium, the ACGIH. The Petitioner's request is an impermissible challenge to NRC regulations. We note that the Petitioner filed a petition for rulemaking (under 10 CFR 2.802) on May 6, 2005, requesting that NRC amend its regulations to modify the exposure and environmental limits of heavy metal radionuclides, including UO_3 . The Petitioner's concern regarding NRC dose limits for UO_3 will be addressed in the rulemaking. Therefore, the request in item 6 is denied.

Petition Summary Item 7. The Petitioner requests the Commission to order licensees to determine the best, safe, and effective medical therapies for uranium poison victims, and the best remediation of sites where munitions were burned or combustion products reached groundwater, plant or animal life; to modify their licenses to include this information; to mitigate and remediate these sites; and to impose a \$100,000 per day fine for any delays in complying with the order.

The request to require licensees to determine the best, safe, and effective medical therapies for uranium poisoning is outside the scope of NRC jurisdiction. NRC has no authority to require medical treatment of any human malady.

NRC regulates the decontamination and decommissioning of nuclear facilities with the ultimate goal of license termination and release of a site for unrestricted use, including DU munition facilities. (See Part 20, Subpart E, and 10 CFR 40.42). One uranium munition licensee was released recently from special attention on decommissioning oversight (Aberdeen Proving Ground 1996), and one is currently in this decommissioning oversight program (Jefferson Proving Ground).

The Petitioner has identified no violations of NRC requirements concerning decontamination or decommissioning. To the extent Petitioner seeks remediation requirements that go beyond NRC requirements, the request does not constitute a request for enforcement action of current NRC requirements. Accordingly, for all the above reasons, the request in item 7 is denied.

Petition Summary Item 8. The Petitioner requests that the Commission fine the munition licensees \$100,000 for each identified incident of all Severity Level I violations, each incident of gross negligence, each incident of willful misconduct, and each identified fraudulent assertion concerning the safety of DU munitions or related contamination, and suspend the DU licenses immediately until corrective actions for the above are completed.

Petitioner has identified no violations of NRC requirements. Accordingly, this request in item 8 is denied

III. Conclusions

The Petitioner has introduced concerns about chemical components generated during the use of DU munitions, and has made hypotheses and assumptions regarding the potential level of hazard and the health effects that are produced when DU munitions are fired or are subject to intense heat. The Petitioner suggests that the hazard from the chemical toxicity of DU munition firing is greater than has been understood, and that DU munition licensees expose the public to risks that are not adequately addressed in current NRC regulations. The Petitioner also

considers the amount of information available on the effects of uranium on the human reproductive system to be inadequate.

NRC staff has considered this information, with the Petitioner's requests, and has determined that several of the issues do not fall under the enforcement-related corrective action provisions of the 10 CFR 2.206 process. For those issues that do fall under the enforcement-related corrective action provisions of 10 CFR 2.206, the Petitioner has not shown that DU munition licensees have willfully or negligently ignored relevant studies addressing the use of DU munitions. Nor has the Petitioner identified any violation of NRC requirements by DU munitions licensees. The issue of adequacy of NRC regulations addressing the hazards of hexavalent uranium is being addressed in a petition for rulemaking process.

Therefore, the NMSS Director has determined that the Petitioner's requests for licensees to report incidents and exposures in excess of NRC requirements, and to remediate their facilities in accordance with current regulations have been, in effect, granted. The NMSS Director has also determined that Petitioner's requests for modification and/or revocation of DU munitions licenses and for the imposition of fines, are denied.

As provided in 10 CFR 2.206(c), a copy of this Director's Decision will be filed with the Secretary of the Commission for the Commission to review. As provided for by this regulation, this decision will constitute the final action of the Commission 25 days after the date of the decision unless the Commission, on its own motion, institutes a review of this decision within that time.

Dated at Rockville, Maryland, this day of 2005.

FOR THE NUCLEAR REGULATORY COMMISSION

Jack R. Strosnider, Director
Office of Nuclear Material Safety
and Safeguards

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Dated at Rockville, Maryland, this day of 2005.

FOR THE NUCLEAR REGULATORY COMMISSION

Jack R. Strosnider, Director
Office of Nuclear Material Safety
and Safeguard

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