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Dated at Rockville, Maryland, this 7th day of April, 2004.

For the Nuclear Regulatory Commission.

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NUCLEAR REGULATORY COMMISSION

U.S. Armed Forces: Environmental Assessment and Final Finding of No Significant Impact, Exemption to the Requirements in 10 CFR 20.1801, 20.1802 and 20.2201

I. Summary

The U.S. Nuclear Regulatory Commission (NRC) has performed an Environmental Assessment (EA) to evaluate a license amendment that would add a license condition exempting the U.S. Armed Forces (Armed Forces) from certain requirements involving the use and storage of radioactive sealed source devices used for monitoring and detecting chemical warfare agents during military exercises and maneuvers. During these times, the Armed Forces would be specifically exempt from requirements contained in: (1) 10 CFR 20.1801, "Security of stored material," when the Armed Forces store authorized radioactive sealed source devices that are used for monitoring and detecting chemical warfare agents during military exercises or maneuvers on U.S. Government-controlled property;¹ (2) 10 CFR 20.1802, "Control of material not in storage," when the Armed Forces employ these devices during exercises or maneuvers on U.S. Government-controlled property; and (3) 10 CFR 20.2201, "Reports of theft or loss of licensed byproduct material," when these devices are lost when they are stored or used during military exercises or maneuvers on U.S. Government-controlled property. The conclusion of the EA is a Finding of No

Significant Impact (FONSI) for the proposed licensing action.

II. Environmental Assessment

1.0 Introduction

1.1 Background

U.S. Department of the Army reported a number of lost licensed radioactive sealed source devices that are used for monitoring and detecting chemical warfare agents. In response to this, NRC performed a reactive inspection (Report No. 030-35349/2002-001). In an "Exercise of Enforcement Discretion" letter dated October 3, 2003, to the Director, Integrated Material Management Center, U.S. Department of the Army (Army), NRC stated that the NRC plans to amend the Army's license to exempt the licensee from the requirements in 10 CFR 20.1801, 20.1802, and 20.2201 when the licensee is storing or using devices intended to monitor and detect chemical warfare agents during military exercises or maneuvers on U.S. Government-controlled property. The U.S. Navy and U.S. Air Force have also acquired these types of devices and are using them under Master Materials Licenses issued by the NRC. Thus, NRC plans to grant them the same license amendment.

NRC staff has evaluated the environmental impacts of a license amendment that would exempt the Armed Forces from the requirement in: (1) 10 CFR 20.1801, "Security of stored material," when the Armed Forces store authorized radioactive sealed source devices that are used for monitoring and detecting chemical warfare agents during military exercises or maneuvers on U.S. Government-controlled property; (2) 10 CFR 20.1802, "Control of material not in storage," when the Armed Forces employ these devices during exercises or maneuvers on U.S. Government-controlled property; and (3) 10 CFR 20.2201, "Reports of theft or loss of licensed byproduct material," when these devices are lost when they are stored or used during military exercises or maneuvers on U.S. Government-controlled property.

This EA has been prepared pursuant to the NRC regulations in 10 CFR part 51, which implement the requirements of the National Environmental Policy Act (NEPA) of 1969. The purpose of this document is to assess the environmental consequences of the proposed action and the alternatives to the proposed action.

1.2 Review Scope

In accordance with part 51, this EA: (1) Presents information and analysis for determining whether to issue a FONSI

or to prepare an Environmental Impact Statement (EIS); (2) fulfills NRC's compliance with NEPA when no EIS is necessary; and (3) facilitates preparation of an EIS if one is necessary. Should NRC issue a FONSI, no EIS would be prepared and NRC would issue a license condition to the Armed Forces exempting them from meeting the requirements in 10 CFR 20.1801, 20.1802, and 20.2201, when the Armed Forces use authorized radioactive sealed source devices for monitoring and detecting chemical warfare agents during planned military exercises or maneuvers on U.S. Government-controlled property located in the United States, as described herein. This EA applies to consideration of amendments to licenses held by the Army, Navy and Air Force as discussed hereafter.

The Army holds NRC Byproduct Material License No. 12-00722-16, (Ref. 2) (previously License No. 19-30563-01), pursuant to 10 CFR part 30, which authorizes the possession and use of chemical agent detectors or chemical agent monitors containing small amounts of radioactive sealed source material.

NRC has established a license category known as a Master Materials License (MML). An MML can be issued only to a Federal organization that successfully meets the criteria stated in 10 CFR 30.33 (and 10 CFR 40.32 or 10 CFR 70.31, as appropriate), and can demonstrate to NRC, through its diverse licensing activities, experience of complex radiation-program centralized management, inspection, education, qualification, training, and experience as outlined in NRC NUREG-1556 Volume 10, (Ref. 4) that it is able to administer effectively a licensing program.

The U.S. Navy (Navy) holds MML No. 45-23645-01NA, (Ref. 3) from NRC, that allows the Navy to possess and use sealed sources as required. The Navy and Marine Corps use the Navy's license for chemical agent detectors in their possession. NRC issued MML No. 42-23539-01AF, (Ref. 1) to the U.S. Air Force (Air Force) for byproduct, source, and special nuclear material, as needed. The Air Force has acquired and uses chemical detectors under this license.

Armed Forces licenses authorize possession and use of devices containing up to 300 microcuries of Americium-241 (Am-241) or up to 30 millicuries of Nickel-63 (Ni-63). The U.S. Armed Forces use these chemical detecting and monitoring devices on Department of Defense (DOD) installations and temporary job sites, where NRC has jurisdiction.

¹ Government-controlled property refers to property that is permanently maintained by the U.S. Federal Government for planned training exercises or maneuvers by individual units, commands, and inter-commands of the U.S. Armed Forces, including friendly foreign military elements.

A chemical detector typically consists of a detector cell; electronic circuitry; a power source; an air pump (air or vapor sample ingress is much smaller than the human finger); a heater; and a robust outside case. The detector cells contain a radioactive source that is normally coiled into a cylindrical shape, with the radioactive side inward. Am-241 is extracted from Plutonium-241 generated during normal operations of nuclear reactors. The Ni-63 sources are made by electroplating the nickel onto a metallic foil, which then can be formed into a cylindrical source. NRC regulations require that generally licensed devices be tamper-resistant. Normally, tamper-resistant screws are used to restrict unauthorized human access to the radioactive source or sources installed in the generally and exempt licensed chemical detector. There is a wide variety of devices; numerous U.S. and foreign-based organizations manufacture them.

Devices that the Armed Forces acquire are intended for the soldiers to use in training and in the battlefield to monitor and detect chemical warfare agents. NRC regulations require that the manufactures, distributors, or maintenance providers of devices using radioactive sealed sources have a specific license. The regulations allow general licensees to use certain tamper-proofed certified radioactive sealed source devices. Individuals who would be responsible for conducting any maintenance on generally licensed sealed source devices that requires opening the device casing, housing, or modules must have a specific license. In real-time battlefield-simulated military exercises, the Armed Forces may have to conduct *insitu* maintenance. For dual specific-general licenses to be used within the various branches of the Armed Forces, specific licenses would be necessary for maintenance activities, and replacement of radioactive sources and source safety features.

The NRC staff believes that the current regulations addressing the accountability, tracking, and loss of control of these devices are not appropriate when the detectors are used during military exercises and maneuvers on U.S. Government-controlled property, because these areas are generally remote areas, with restricted or no access to the public or the private sector. Furthermore, the radioactive sealed sources used for the above activities are solid metallic fixed forms of radioactive material that are housed in robust structures; therefore, loss of control of these devices does not result in a release of radioactive material. The radiation dose rates

associated with these devices are very low. Comparable devices with similar designs have been authorized by the NRC as exempt devices and distributed to public end users exempt from the loss, loss of control and security requirements mentioned herein. Because of the restricted access, harsh and hazardous environments associated with the military exercises, it is difficult for the Armed Forces to effectively enforce the regulations addressing the accountability, tracking and loss of control of these devices during maneuvers and exercises. However, the radiological and security risks associated with the use of these devices during Armed Forces maneuvers and exercises were evaluated in determining whether an exemption should be granted, so as to arrive at a balanced decision, without impacting the safety of the Armed Forces personnel or the members of the public.

Currently, the Armed Forces possess approximately 65,000 of these detection and monitoring devices. The Army has reported a loss of 3 to 4 devices per year, per 10,000 devices. Because the Armed Forces use detectors in both wartime and simulated military battlefield exercises, and ordered maneuvers, in the air, on land, and at sea, it is anticipated that the loss of these devices will continue at the current rate, or increase a small amount because of the increased deployment warranted by the current world political situation, and the associated widespread deployment of the Armed Forces.

1.3 Proposed Action

Given the circumstances described above, the staff is considering granting a license amendment exempting the Armed Forces from certain control and reporting requirements during military exercises and maneuvers. During these times, the Armed Forces would be specifically exempt from requirements contained in: (1) 10 CFR 20.1801, "Security of stored material," when the Armed Forces store these authorized radioactive sealed source devices for monitoring and detecting chemical warfare agents during military exercises or maneuvers on U.S. Government-controlled property; (2) 10 CFR 20.1802, "Control of material not in storage," when the Armed Forces employ these devices during exercises or maneuvers on U.S. Government-controlled property; and (3) 10 CFR 20.2201, "Reports of theft or loss of licensed byproduct material," when these devices are lost when they are stored or used during military exercises or

maneuvers on U.S. Government-controlled property.

The exemption would not apply to: (1) Devices stored or used at other times, or lost under other conditions; (2) theft of the devices; or (3) devices lost in the U.S. public domain. Additionally, the Armed Forces licensees would continue to implement their established existing programs for tracking military assets and storage records of these devices. The Armed Forces would be required to keep records onsite of losses and loss of control of these devices and on request, make them available for review by the NRC Inspection staff.

1.4 Need for Proposed Action

NRC has closely reviewed the Armed Forces control and tracking procedures.

Although the Armed Forces have established an effective tracking and control program for these devices, losses have occurred and losses could still reasonably occur because of the unique circumstances associated with the use of such devices by the Armed Forces. The use of these detectors is critical for the safety of Armed Forces personnel, and, indirectly, critical to the safety of U.S. citizens. In addition, the use of these detectors (*i.e.*, for military exercises and maneuvers to prepare soldiers for battlefield conditions) is outside the scenarios envisioned when NRC regulations and policies on the accountability, tracking, and loss of control of radioactive sealed sources were developed.

Given the scope and nature of the U.S. military exercises, constant control and surveillance over such devices during military exercises and maneuvers may not always be possible or practical. For example, during these exercises and maneuvers, the devices are deliberately camouflaged to avoid detection by the enemy, and deployed manually or remotely from the air. To ensure constant control could be hazardous and may put some military personnel in harm's way. According to the Armed Forces reports, the majority of the losses have occurred during combat exercises and, with some exceptions, on U.S. Government-controlled property. Additionally, current requirements to report each separate loss of a device or devices may interfere with, and may even hinder, smooth military maneuvers and exercises, since the current regulations may trigger reactive or augmented team inspections by NRC after the repeated reported losses of detection and monitoring devices.

1.5 Alternatives

Available alternatives to NRC are:

1. Continue the current mode of operations to ensure compliance with referenced NRC regulations at all times (See section 1.2 for details of the current mode of operations). This is a no-action alternative.

2. Grant the exemption to the Armed Forces for the devices by issuing a license amendment (See section 1.3 for more details). This is the staff's preferred alternative.

3. Modify regulatory provisions applicable to these devices through the rulemaking process. The effect of this alternative would be to grant the same exemptions discussed for the proposed action. This type of action takes about 2 to 3 years.

2.0 Affected Environment

The affected environment for Alternatives 1, 2, and 3 is considered to be the immediate vicinity of the deployment of a device primarily on federally-controlled facilities and properties. Loss or loss of control of a device or devices would not lead to a release of radioactive material to the environment because the protective features (shielding and containment), as described in section 1.2, are robust and remain functional. Further, these devices contain small quantities of radioactive sealed sources (up to 300 microcuries of Americium-241 or up to 30 millicuries of Nickel-63).

These devices are normally tracked from central locations under the supervision of the licensee's staff and are issued on request to armed services units that may be stationed throughout the world. However, this exemption is only applicable to devices used or stored during military exercises or maneuvers on U.S. Government-controlled property, e.g., DOD installations throughout the United States of America. The Armed Forces currently inform NRC of lost devices that occur both in the U.S. and overseas, including some losses that occur in areas outside NRC's jurisdiction.

3.0 Environmental Impacts of Proposed Action and Alternatives

3.1 Public Health

Because of their portability (hand-held or capable of swift setup and dismantling in field) and potential radiological risk (if devices are taken apart), isolated lapses in control and accountability of these devices have continued to concern the Commission. However, the U.S. Armed Forces have established a safe operational record with these low-dose, robust radioactive devices, even when extensively deployed. Thus, taking into account the

military's safety record with these devices and their need for these devices, the staff is assessing the need for this license amendment and its impact on public health.

The three alternatives described in Section 1.5 represent the approaches that could be used in addressing the exemption request. The staff evaluated the three alternatives and their individual impact on public health. The impact of implementing any of these alternatives on public health will be the same because the alternatives address procedural and device loss, loss of control and accountability issues. Alternative 2 is being proposed since this alternative was found to be more efficient and practical compared to the other two alternatives. Also, this alternative reduces unnecessary regulatory burden on the licensees.

Alternative 1 (No action): The impact of this alternative would be similar to the proposed action. NRC believes that these very low-risk detection devices are currently over-regulated for the uses discussed in this EA. Based on the review of the circumstances surrounding the loss of the detectors, NRC believes that both the burden to the licensee of frequent reporting and the expenditure of NRC and MMLs resources performing reactive inspections after reports of loss of control of these devices, do not enhance the safe use of these devices. In fact, continued application of the current approach requiring reporting of loss of control events could inadvertently provide information to United States adversaries and could adversely impact the purpose or the intended outcome of a military exercise.

Alternative 2 (Proposed action): The principal users of chemical agent detectors and monitors are the Armed Forces. The devices are used to protect personnel when entering areas where the use of chemical warfare agents is likely. Other users could also include Federal, State, or local government agencies that support Emergency First Responders. These devices are portable (hand-held or able to be swiftly set up and dismantled in the field) and used by trained personnel, making them operable under dynamic or stressful situations and, at times, under very trying circumstances.

NRC performed analysis to support and verify the allowed use of exempt radioactive quantities of Americium-241 and Nickel-63 in chemical monitoring. The model, computer codes used, and assumptions made in the exemption analysis for chemical monitoring devices are presented in section 2.15.5 of NUREG-1717 (Ref. 5). The analysis

estimated maximum individual doses from chemical detectors containing 160 microcuries of Americium-241 and 10 millicuries of Nickel-63 and compared them to the regulatory limits (shown in Table 2.15.6 and Table 2.15.7 of NUREG-1717). The results of the NRC analysis indicate very small radiation doses which are an order of magnitude below the specified dose limits contained in 10 CFR sections 32.27 and 32.28.

Armed Forces licenses authorize possession and use of devices containing up to 300 microcuries of Americium-241 (Am-241) or up to 30 millicuries of Nickel-63 (Ni-63), which are two to three times higher than the radioactive source strength considered in NUREG-1717. However, the maximum doses associated with devices used by the U.S. Armed Forces would still be below the regulatory limits. Also, the radiation dose to a member of the public from a loss of control of a device would be extremely small. This is due, in part, to the fact that the U.S. Armed Forces use these chemical detection and monitoring devices on remote DOD installations and temporary job sites that are great distances from each other, and the time spent by individuals near or close to a lost device is estimated to be about one hour. It is expected that the individual dose from normal use or the potential dose from a loss of control, a temporarily displaced device, or a lost device, would not result in radiation exposure to the workers or the public significantly above the background radiation.

Although the Armed Forces have established an effective tracking and control program, losses could still reasonably occur because of the unique circumstances associated with the use of such devices. This use is critical for the safety of U.S. Armed Forces personnel, and is certainly outside the scenarios envisioned when NRC regulations and policies on the loss of sources were developed. Given the scope and nature of military activities, constant control and surveillance over such devices may not always be practical or possible. According to the Armed Forces reports, the majority of the losses have occurred during combat exercises and, with one exception, on U.S. Government-controlled property (one loss occurred when a device, which was believed to be in use on U.S. Government-controlled property, was later discovered in the U.S. public domain).

We conclude that no significant impacts on the public health under normal and accident conditions are expected as a result of granting this exemption to the Armed Forces.

Further, implementation of this alternative will reduce unnecessary burden on the Armed Forces and enable them to more efficiently use these devices when conducting exercises and maneuvers. Additionally, this license exemption should improve staff efficiency and effectiveness by reducing the work load of NRC and MMLs inspectors, who are required to conduct a reactive inspection each time a device is reported lost.

Alternative 3 (Rulemaking): It is expected that the impact from the rulemaking alternative would be similar to the impact of the proposed action; however, a lengthy time frame and large expenditures of resources are associated with the rulemaking process. A long-term reliable impact assessment that would support a rulemaking may not be available for more than five years. A rulemaking would not, in this case, provide a timely response to the current need. By the time a rule making could be completed, the Armed Forces may have shifted to using non-radioactive detection devices or other emerging technologies. NRC anticipates that, with the passage of time, the use of sealed sources in detection and monitoring devices for chemical agents is likely to diminish.

3.2 Water, Geology, Soils, Air Quality, Demography, Biota, and Cultural and Historic Resources

The NRC staff has determined that the proposed licensing exemption (Alternative 2) will not impact the quality of water resources, since the radioactive source quantities are very small and are not soluble in water. The staff has determined that the proposed exemption will not significantly impact geology, soils, air quality, demography, biota, and cultural and historic resources, under normal and accident use scenarios. NRC staff has reviewed the historical performance of this type of detection device and the potential for future deployment and concluded that no significant cumulative impacts are anticipated.

NRC staff has determined that the proposed action will not affect listed or proposed threatened or endangered species or critical habitat. NRC staff has determined that the proposed action is not the type that has the potential to cause effects on historic properties. Therefore, no further consultation with the regulatory authority responsible for overseeing section 106 of the National Historic Preservation Act was found necessary.

Impacts on water, geology, soils, air quality, demography, biota, and historic resources of implementing Alternatives

1 and 3 (described in section 1.5) are expected to be similar to those in the proposed action. As discussed in section 3.1, Alternative 2 is being proposed because it is the more efficient and practical alternative, and reduces unnecessary regulatory burden on the concerned licensees.

4.0 Conclusion

The NRC staff has determined that granting of this exemption will have no significant adverse effect on the public health and safety, or the environment. Based on its review, the NRC staff has determined that the environmental impacts associated with the proposed action do not warrant the preparation of an EIS.

5.0 Agencies and Persons Contacted

NRC contacted the U.S. Navy and U.S. Air Force MML National Radiation Program Oversight Committees and the Appropriate U.S. Army Commands. The need to contact State government officials was considered; however, it was concluded that such consultation was not necessary, since the proposed limited exemption is limited to federally-controlled facilities and properties.

6.0 References

1. U.S. Air Force Master Materials License No. 42-23539-01AF.
2. U.S. Department of Army License No. 12-00722-16.
3. U.S. Navy Master Materials License No. 45-23645-01NA.
4. U.S. Nuclear Regulatory Commission, Program-Specific Guidance About Master Materials Licenses, December 2000, NUREG-1556, Vol. 10.
5. U.S. Nuclear Regulatory Commission, Systematic Radiological Assessment of Exemptions for Source and Byproduct Materials, June 2001, NUREG-1717.

III. Finding of No Significant Impact

The action that NRC is considering is to issue an exemption to the Armed Forces in the form of a license condition that would exempt them from the requirements contained in: (1) 10 CFR 20.1801, "Security of stored material," when the Armed Forces store these authorized radioactive sealed source devices for monitoring and detecting chemical warfare agents during military exercises or maneuvers on U.S. Government-controlled property; (2) 10 CFR 20.1802, "Control of material not in storage," when the Armed Forces employs these devices during exercises or maneuvers on U.S. Government-controlled property; and (3) 10 CFR

20.2201, "Reports of theft or loss of licensed byproduct material," when these devices are lost when they are stored or used during military exercises or maneuvers on U.S. Government-controlled property.

The exemption would not apply to: (1) Devices stored or used at other times, or lost under other conditions; (2) theft of the devices; or (3) devices lost in the U.S. public domain. Additionally, under this exemption, the Armed Forces licensees would continue to implement their established existing programs for tracking and controlling these devices, and would be required to keep records of losses and loss of control available onsite for review by the NRC Inspectors.

The Commission has prepared this EA in light of the proposed action. In the assessment, the Commission has concluded that environmental impacts associated with the proposed action would not be significant and do not warrant the preparation of an EIS. Accordingly, based on the environment impacts described in section II, the Commission is issuing a FONSI for this licensing action.

IV. Further Information

Any questions about this action can be directed to Ujagar S. Bhachu at (301) 415-7894, or by e-mail at usb@nrc.gov.

Dated at Rockville, Maryland, this 8th day of April, 2004.

For the Nuclear Regulatory Commission.

Thomas H. Essig,

Chief, Materials Safety and Inspection Branch, Division of Industrial and Medical Nuclear Safety, NMSS.

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NUCLEAR WASTE TECHNICAL REVIEW BOARD

Notice of Meeting

Board Meeting: May 18-19, 2004—Washington, DC: The U.S. Nuclear Waste Technical Review will meet with the DOE and interested parties to discuss the potential for localized corrosion during periods of above boiling temperatures in a repository planned for Yucca Mountain in Nevada.

Pursuant to its authority under section 5051 of Public Law 100-203, Nuclear Waste Policy Amendments Act of 1987, on Tuesday and Wednesday, May 18 and 19, 2004, the U.S. Nuclear Waste Technical Review Board (Board) will hold its spring meeting in Washington, DC. The Board has invited the U.S. Department of Energy (DOE) and several other interested parties—including the Nuclear Regulatory