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September 30, 2002

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR POLICY
DIRECTOR, DEFENSE THREAT REDUCTION AGENCY

SUBJECT: Report on the Cooperative Threat Reduction Program Liquid Propellant Disposition Project (Report No. D2002-154)

We are providing this report, which the Deputy Secretary of Defense requested, for review and comment. We considered management comments on a draft of this report when preparing the final report.

DoD Directive 7650.3 requires that all recommendations be resolved promptly. We request that the Under Secretary of Defense for Policy provide additional comments on recommendation A.1. by November 29, 2002.

We appreciate the courtesies extended to the staff. Questions should be directed to Ms. Evelyn R. Klemstine at (703) 604-9172 (DSN 664-9172) (eklemstine@dodig.osd.mil) or Mr. Donney J. Bibb at (703) 604-9613 (DSN 664-9613) (dbibb@dodig.osd.mil). See Appendix F for the report distribution. The team members are listed on the inside back cover.

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Report No. D-2002-154 **September 30, 2002**
(Project No. D2002LG-0119)

Cooperative Threat Reduction Program
Liquid Propellant Disposition Project

Executive Summary

Who Should Read This Report and Why? DoD civilian and military personnel who manage international programs should read this report. This report discusses topics that international agreements should include.

Background. This audit is one in a series of audits the Deputy Secretary of Defense requested. As part of the Cooperative Threat Reduction (CTR) Program, DoD agreed to assist the Russian Federation in disposing of its liquid rocket propellant. Public Law 102-228 (section 2551 [note], title 22, United States Code), the Soviet Nuclear Threat Reduction Act of 1991 designates DoD as the executive agent for the CTR Program. Specific objectives of the act are to destroy chemical, nuclear, and other weapons; transport, store, disable, and safeguard weapons in connection with their destruction; and establish verifiable safeguards against proliferation of weapons of mass destruction. The Office of the Assistant Secretary of Defense (International Security Policy), under the Office of the Under Secretary of Defense for Policy, develops, coordinates, and oversees implementation of policy for the CTR Program. The CTR Directorate, Defense Threat Reduction Agency operates the program.

The direction of DoD assistance for disposal of liquid rocket propellant changed after the initial agreement. DoD initially agreed to provide equipment, services, and training so that Russia could incinerate 30,000 metric tons* of liquid propellant (heptyl) and 123,000 metric tons of oxidizer (amyl and mélange). However, DoD ultimately financed facilities that would convert the propellant and oxidizer into commercial products. As of July 2, 2002, DoD had obligated at least $164.5 million and disbursed $137.2 million to assist Russia in the disposal of heptyl and amyl.

Results. Although the Defense Threat Reduction Agency obligated $112.2 million and disbursed $95.5 million through July 2, 2002, to design and build facilities that would convert heptyl and amyl into commercial products, Russia informed DoD in February 2002 that Russia used the heptyl and amyl for its commercial space program. As a result, the heptyl and amyl disposition facilities that cost the United States $95.5 million will not be required for their intended purpose. In addition to those costs, the Defense Threat Reduction Agency has obligated $1.2 million for maintenance and security of the heptyl disposition facility while DoD considers the future of the facility.

The Under Secretary of Defense for Policy could reduce program risks by negotiating implementing agreements requiring a commitment from Russia to provide the weapon systems and their components, provide adequate transparency rights to DoD, and include

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* A metric ton equals 2,204.6 pounds.

remedies. By deciding on the future of the heptyl disposition facility, the Under Secretary of Defense for Policy could reduce U.S. costs by more than $197,000 a month. The Under Secretary of Defense for Policy could reduce U.S. costs and increase the cooperative nature of the CTR Program by requesting that Russia use the proceeds from the sale of heptyl for CTR Program purposes. The Director, Defense Threat Reduction Agency could have more assurance that Russia will provide weapons systems for disposal by performing more complete inspections of equipment provided to Russia and by identifying other potential uses that Russia may have for weapon systems that Russia has agreed to provide for disposal. The Director, Defense Threat Reduction Agency could help ensure that DoD officials are aware of risks involved with the CTR Program by reporting identified risks to the Under Secretary of Defense for Policy. (See the Finding section of the report for the detailed recommendations.)

Management Comments. The Under Secretary of Defense for Policy and the Defense Threat Reduction Agency concurred with the recommendations. The Under Secretary stated that executive agents for Russia have agreed to amend implementing agreements to legally commit Russia to using U.S. assistance for intended purposes. In addition, an implementing arrangement was drafted for signature between DoD and the Russian Aviation and Space Agency, providing U.S. representatives continuous access to Russian project sites. The Under Secretary agreed to investigate the inclusion of remedies in implementing agreements with Russia, but stated doing so may not be beneficial from a policy perspective. The Under Secretary also stated that DoD is reviewing Defense Threat Reduction Agency recommendations on the future of the liquid propellant disposition facility. Further, the amended implementing agreement provides for audits of proceeds from CTR assistance. Also, the Under Secretary believes that the proceeds from heptyl sales must be monitored, applied to other CTR Program projects, and be subject to future audits and examinations. The Director, Defense Threat Reduction Agency stated that pending Office of the Under Secretary of Defense for Policy approval, the audit and examination team is preparing to inspect intermodal containers and review associated shipping documents. Also, the Director will prepare a report on the risks to achieving program objectives for the Under Secretary of Defense for Policy.

Audit Response. The planned actions are positive steps in the right direction. However, the Under Secretary needs to clarify four planned actions or planned alternative actions. For the recommendations to include remedies in agreements, to use the proceeds from the sale of heptyl for program purposes, and to mitigate program risks associated with achieving program objectives, the Under Secretary should more clearly describe the planned actions that will be taken. For the recommendation to expedite the determination of the future of the heptyl disposition facility, the Under Secretary should identify the planned use of the facility. We request that the Under Secretary provide comments that clarify the planned actions or alternative actions by November 29, 2002. See the Finding section of the report for a discussion of management comments and the Management Comments section of the report for the complete comments.

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Background

On March 18, 2002, the Deputy Secretary of Defense requested that the Office of Inspector General of the Department of Defense (IG DoD) review the Cooperative Threat Reduction (CTR) Program project to convert liquid rocket fuel removed from intercontinental ballistic missiles in the Russian Federation (Russia) into a more benign substance, to provide advice on protecting DoD from similar pitfalls on other U.S.-funded projects that rely on Russian assurances, and to review the organizational arrangements between the CTR Policy office within the Office of the Under Secretary of Defense for Policy and the CTR Directorate at the Defense Threat Reduction Agency (DTRA). This report presents our conclusions on the rocket fuel project. The Office of Intelligence Review, IG DoD will provide advice in a separate report on how the intelligence community can improve DoD oversight on other CTR projects. We will also conduct a separate review to identify and evaluate other CTR projects that rely on Russian assurances, and evaluate organizational arrangements within DoD.

To reduce the threat posed by the weapons of mass destruction that remain in the territory of the former Soviet Union, Congress enacted Public Law 102-228 (section 2551 [note], title 22, United States Code), the Soviet Nuclear Threat Reduction Act of 1991. Public Law 102-228 designates DoD as the executive agent for the CTR Program. Public Law 102-228, and subsequent laws that continue the CTR Program, are commonly referred to as Nunn-Lugar legislation. Objectives of the act are to destroy chemical, nuclear, and other weapons; transport, store, disable, and safeguard weapons in connection with their destruction; and establish verifiable safeguards against proliferation of weapons of mass destruction. From FY 1992 through FY 2002, Congress appropriated $4.7 billion for the CTR Program. With those funds, DoD provided assistance to Belarus, Georgia, Kazakhstan, Moldova, Russia, Ukraine, and Uzbekistan.

Framework for Assistance. DoD provides assistance to countries of the former Soviet Union through umbrella agreements and implementing agreements. The umbrella agreement with Russia, signed on June 17, 1992, establishes the overall framework under which the United States provides assistance to Russia. The umbrella agreement, which was to expire in June 1999, was extended by a protocol in June 1999 for an additional 7 years. The implementing agreements signed between DoD and designated executive agents of countries of the former Soviet Union outline the assistance and amounts the United States will provide. Generally, implementing agreements have been amended each year to increase the amount of assistance. The liquid propellant disposition project is managed under an implementing agreement commonly referred to as the Strategic Offensive Arms Elimination-Russia (SOAE-Russia) implementing agreement.

Russian Executive Agents. Although the umbrella agreement states that Russia and the United States shall enter into implementing agreements through executive agents and identifies the Ministry of Atomic Energy as Russia's executive agent, DoD entered into an implementing agreement with Russia's Committee for Defense Industries on August 26, 1993. On February 11, 1998, the implementing agreement was amended to transfer executive agent responsibility to the Ministry of Economics. Russia eliminated the Ministry of Economics in 2000 and moved

executive agent responsibility to the Russian Aviation and Space Agency (RASA). On August 30, 2002, DoD negotiated an implementing agreement identifying RASA as the Russian executive agent.

DoD Program Management. The Office of the Assistant Secretary of Defense (International Security Policy), under the Office of the Under Secretary of Defense for Policy, develops, coordinates, and oversees implementation of policy for the CTR Program. Since September 30, 1998, the CTR Directorate, DTRA has managed the day-to-day operations of the CTR Program. Prior to then, the Office of Under Secretary of Defense for Acquisition and Technology (now Acquisition, Technology, and Logistics) directed the CTR Program while the Defense Nuclear Agency, which became the Defense Special Weapons Agency in June 1995, managed projects.

Disposal of Liquid Propellant. Russia requested U.S. assistance to dispose of 30,000 metric tons[1] of liquid fuel (unsymmetrical dimethyl hydrazine) as well as 123,000 metric tons of oxidizer (dinitrogen tetroxide and mélange[2]). In Russia, unsymmetrical dimethyl hydrazine and dinitrogen tetroxide are known as heptyl and amyl, respectively. Russia needed assistance with the disposal of liquid propellant to facilitate the disposal of intercontinental ballistic missiles and submarine-launched ballistic missiles. The liquid propellant disposition project includes removing the heptyl and amyl from missile sites, transporting the material to storage sites, and converting the material into commercial products. A more complete description of the liquid propellant disposition project is in Appendix C.

In the SOAE-Russia implementing agreement, DoD agreed to provide equipment, services, and training to Russia so they could incinerate the heptyl and amyl. The equipment included 8 transportable incinerators and 220 tanker railcars. In a March 1994 meeting with Russian officials, however, the Special Coordinator for Cooperative Threat Reduction, under the Assistant Secretary of Defense (International Security Policy), stated that DoD would develop a contract solicitation for heptyl disposal. Also, the Special Coordinator stated that instead of tanker railcars DoD would provide intermodal containers, flatbed railcars, and cranes for handling the intermodal containers. As of July 2, 2002, DoD had obligated at least $164.5 million and disbursed $137.2 million to assist Russia in the disposal of heptyl and amyl.

Heptyl Disposition System. The heptyl disposition project would provide Russia with two disposition systems,[3] located in Krasnoyarsk, Russia, and capable of converting 30,000 metric tons of heptyl into a commercial product. After a contract competition, the Defense Nuclear Agency awarded contract

[1] A metric ton equals 2,204.6 pounds.

[2] Mélange is a mixture of dinitrogen tetroxide, nitric acid, and corrosion inhibitors used in tactical missiles.

[3] Initially, DoD was to provide three propellant disposition systems. However, because Strategic Arms Reduction Treaty II completion times were moved from 2003 to 2007, the third system was no longer needed. DoD is storing as replacement parts the parts for the third system at Krasnoyarsk.

DNA001-95-C-0066 to Thiokol Corporation in April 1995. Later, DoD modified that contract to include required equipment and infrastructure that Russia initially agreed to finance. DoD also awarded two other contracts to support the heptyl disposition system. One contract was for shipping required equipment to the facility and the other was for logistical support. As of July 2, 2002, DTRA had obligated $94.4 million and disbursed at least $85.4 million for the heptyl disposition facility and associated shipping and logistical support. In addition, DoD has obligated $1.2 million to maintain and secure the heptyl disposition facility, while DoD considers the future of the facility. Photographs of the heptyl disposition facility are in Appendix D.

Amyl Disposition System. The amyl disposition system would provide Russia with up to two systems that would convert amyl into nitric acid. After a contract competition, DTRA awarded contract DTRA01-99-C-0057 to Bechtel National, Incorporated in June 1999. Initially, Bechtel National, Incorporated was contracted to design, fabricate, and test up to two mobile systems that would convert 43,000 metric tons of amyl and 80,000 metric tons of mélange into nitric acid. Later, DoD agreed with a Russian request that the systems be permanent and located at the Russian cities of Aleksin and Krasnoyarsk. In February 2002, DoD removed the mélange-processing requirement because mélange was not considered a strategic missile oxidizer. As of July 2, 2002, DTRA had obligated $17.8 million and disbursed $10.1 million for designing and building the amyl disposition systems.

Other Assistance Associated With Propellant Disposal. DoD also provided equipment and transportation services to Russia that assisted with propellant disposal, and DoD was to operate and maintain the disposition facilities. DoD provided equipment, including 125 flatbed railcars, 670 intermodal tank containers, and 7 cranes to transport and temporarily store the propellant, as well as logistic support and shipping of the equipment, through 7 contracts. For those contracts, DTRA had obligated $47.8 million and disbursed $39.7 million as of July 2, 2002. DoD provided transportation services through several contracts for rail services to move the propellant from missile sites to storage sites in Russia. As of July 2, 2002, DTRA had obligated and disbursed $2 million to transport propellant. Operation and maintenance of the disposition facilities was included in an August 2000 contract awarded to Kellogg, Brown, and Root, Incorporated. That contract also required the contractor to dismantle intercontinental ballistic missiles and their launchers and plan for and transport propellant from storage sites to the disposition facilities. As of July 2002, DTRA had obligated $1.3 million to plan for and transition to disposition system operations, but did not have disbursement amounts readily available for that obligation.

Objectives

The overall objective of this audit was to review the CTR project to convert liquid rocket fuel from intercontinental ballistic missiles into a more benign substance. Specifically, we evaluated the viability of the liquid rocket propellant disposition facilities built for Russia and controls over liquid rocket propellant. See Appendix A for a discussion of the audit scope and methodology.

Facilities That Dispose of Rocket Propellant and Oxidizer

Although the CTR Program obligated $112.2 million and disbursed $95.5 million to design and build facilities that would convert heptyl and amyl into commercial products, Russian officials informed DoD in February 2002 that Russia used the heptyl and amyl for its commercial space program. That condition occurred because the SOAE-Russia implementing agreement did not require Russia to provide the heptyl and amyl for disposal and because neither the umbrella agreement nor the SOAE-Russia implementing agreement provided adequate access rights to DoD or remedies for non-performance. In addition, DTRA has not inspected the equipment the United States provided to Russia for transporting and storing the heptyl and amyl since June 1999, nor did DTRA identify other uses of the heptyl and amyl as a program risk. As a result, the heptyl and amyl disposition facilities that cost the United States $95.5 million through July 2, 2002, will not be required for their intended purpose. In addition to those costs, DTRA has obligated $1.2 million for maintenance and security of the heptyl disposition facility while DoD considers the future of the facility.

National Defense Authorization Act for Fiscal Year 2002

Section 1304 of the Public Law 107-107, National Defense Authorization Act for Fiscal Year 2002, requires the Secretary of Defense to consider the use of revenue generated by activities carried out under CTR programs in negotiating and executing contracts with Russia.

Management Control Guidance

Office of Management and Budget Circular No. A-123, "Management Accountability and Control," June 21, 1995, provides guidance to Federal managers for improving the accountability and effectiveness of Federal programs and operations by establishing, assessing, correcting, and reporting management controls. The circular states that management accountability is an expectation that managers are responsible for the quality and timeliness of program performance, increasing productivity, controlling costs, and mitigating adverse aspects of agency operations. The circular also states that management controls, including the organization, policies, and procedures, are tools used to reasonably ensure that programs achieve results and safeguard the integrity of programs. The circular requires managers to incorporate basic management controls in strategies, plans, guidance, and procedures that govern their programs and operations. It states that the controls shall be consistent with specific standards drawn from the "Standards for Internal Control in the Federal Government," issued by the General

Accounting Office. One specific standard cited in the guidance is that the management controls must provide reasonable assurance assets are safeguarded against waste, loss, unauthorized use, and misappropriation.

"Standards for Internal Control in the Federal Government," November 1999, provides the framework for establishing and maintaining internal control within the Federal Government. The guidance states that internal controls, which it identifies as synonymous with management controls, serve as the first line of defense in safeguarding assets. The guidance also states that management needs to identify risks and should consider all significant interactions with other parties as well as internal factors. In addition, the standards require that control activities, which are an integral part of an entity's planning, implementing, reviewing, and accountability for stewardship of Government resources, help ensure that actions are taken to address risks.

Commercial Space Launch Agreement

During the time that DoD and the Russian executive agent were planning to dispose of the heptyl and amyl from Russian missiles, the United States and Russia were negotiating Russia's entry into the commercial space launch business. In September 1993, the United States and Russia signed the "Agreement Between the Government of the United States of America and the Government of the Russian Federation Regarding International Trade in Commercial Space Launch Services." That agreement, amended in January 1996, sets forth the principles for Russia to contract with international customers to provide space launch services. The agreement allowed Russia to launch as many as 20 principal payloads through December 2000, when the agreement expired. The agreement requires Russia to ensure that market principles are applied to international competition; not to distort competition among providers of commercial space launch services; and not to engage in unfair business practices that secure contracts for commercial space launch services. Russia also agreed that its space launch service providers would charge prices comparable to prices that commercial space launch service providers from market economy countries offered. Russia has continued to provide commercial space launch services since the agreement expired.

State of the Liquid Propellant Disposition Project

Although the CTR Program obligated $112.2 million and disbursed $95.5 million to design and build facilities that would convert heptyl and amyl into commercial products, RASA officials failed to inform DoD that Russia used the heptyl and amyl for its space program until confronted by DoD officials in February 2002. According to the DTRA project manager, the heptyl disposition systems were virtually complete as of April 2002, and the contractor was expected to start operating the disposition facility in July 2002. The amyl disposition facility was still in the design phase when DTRA terminated the contract in July 2002.

Unavailable Liquid Propellant. According to DTRA officials, the initial indication that heptyl would not be available for disposal was in January 2002 during informal discussions with RASA officials. Following those discussions, on February 13, 2002, the Director, CTR Directorate telephoned the Director of the Missile Technologies Division, RASA to obtain an explanation and request a formal response. According to the DTRA record on the telephone discussion, the RASA official confirmed "the reprocessed heptyl was made available to the commercial Proton[4] program and for missile development tests." He also stated that although heptyl tank farms were almost dry, the Ministry of Defense (MOD) saw a continuing need for the heptyl disposition facility because of uncertainties surrounding the number of future space launches.

Russia's Official Response. In a letter dated May 24, 2002, the Director of the Missile Technologies Division provided the official response for Russia. The Director stated that although the heptyl disposition units were supposed to have started functioning by the end of 1997, the disposition units were still not tested or certified for operation. The Director projected that testing and certification could take another year to complete. In explaining the situation in Russia, the Director stated that by the mid-1990s, heptyl storage facilities at MOD sites were full and Russia had stopped manufacturing new heptyl. He also stated that Russia had stopped producing land-based and sea-based ballistic missiles and that Russia had very few commercial launches of the Proton rocket. Because Russia lacked the capacity to produce and store heptyl, the Director explained that in 1996, when the number of Proton launches started to increase, officials decided to regenerate heptyl at its Salavat plant[5] to fuel commercial launches. In explaining why DoD was not informed, he stated

> However, practically speaking, given the extreme uncertainty of the constantly changing situation, it was very difficult for Russia to inform you properly without harming Russia's plans associated with strategic offensive arms elimination under START [Strategic Arms Reduction Treaty] I and II, since these plans made it possible to fairly fully load the two units being built in Krasnoyarsk with work.

Meetings With RASA Officials. The DTRA project manager and IG DoD representatives met with RASA officials in June 2002. The Director of the Missile Technologies Division indicated that untimely completion of the project had little impact on the Russian decision to use the heptyl for space launches. Regarding the delays, the Director explained that neither Russia nor the United States fully understood the complexities involved with the heptyl disposition project, which was new technology, until after the project started. The RASA project manager for the heptyl disposition facility stated that he first learned that Russia was using heptyl for the Russian space program in late December 2001. The RASA project manager stated that prior to December 2001, officials of the

[4] A Proton is a Russian space launch vehicle that uses heptyl and amyl.

[5] In a followup meeting, the Director stated that in 1995 Russia converted the Salavat plant to a facility that could regenerate the heptyl removed from missiles. However, the Director stated that Russia is reconfiguring the plant so that it will produce new heptyl and that regenerating heptyl was not cost effective.

Fuels Directorate, MOD, which owned and controlled the heptyl, made frequent inquiries about when the disposition facility would be completed. The inquiries led the RASA project manager to believe a continuing need existed for a disposition facility. The RASA project manager acknowledged, however, that prior to December 2001, he had difficulties obtaining heptyl from MOD. Organizationally, the RASA project manager stated no coordination between his office and RASA offices responsible for space launches took place, which contributed to not knowing sooner that MOD was selling heptyl for space launches to the Khrunichev State Research and Production Space Center. Within the Russian government, the RASA project manager estimated that MOD deserved 75 percent of the blame for not informing DTRA sooner while RASA deserved 25 percent of the blame.[6] In that regard, the RASA project manager stated that DoD should have had an agreement with MOD requiring delivery of heptyl to the disposition facility.

Launches of Heptyl-Fueled Vehicles

During 1992 when DoD and Russian officials were initially making decisions on the disposal of heptyl and amyl, Russia was experiencing a decrease in the number of heptyl-fueled space launches. (In 1990, Russia launched 34 heptyl-fueled rockets. In both 1992 and 1993, the number decreased to 20 each year.) Since 1995, however, when the Defense Nuclear Agency contracted to build the heptyl disposition facility and RASA officials stated that Russia stopped producing new heptyl, Russia has launched 102 heptyl-fueled rockets through June 2002, using 12,500 metric tons of heptyl. In addition, Russia could have used significantly more heptyl to test rocket engines. According to a trip report prepared by a DTRA contractor, RASA officials stated Russia test fires each rocket engine using 100 percent of the fuel capacity.[7] Details on Russian space launches and heptyl use from 1990 through June 2002 are in Appendix E.

Disposal Requirements, Equipment Inspections, and Risks

Russia used the heptyl and amyl without DoD knowledge because the agreements with Russia did not require Russia to provide the heptyl and amyl for disposal, including remedies for non-performance, and did not provide DoD with any access rights over heptyl and amyl storage. Also, DoD has not performed inspections of the equipment the United States provided to Russia for transporting and storing the heptyl and amyl since June 1999, nor did DoD identify other uses of the heptyl and amyl as a risk to the program. Including requirements and better

[6] We did not contact MOD to obtain its position.

[7] According to an official at the National Aeronautics and Space Administration, each rocket engine undergoes acceptance testing using procedures agreed to between the manufacturer and user. That testing may or may not include a flight-duration test to evaluate flight worthiness. In addition, he stated that the engines would also undergo development, qualification, and certification testing, all of which would consume fuel.

access rights in agreements, along with conducting more frequent and comprehensive inspections, would have helped ensure better stewardship of Government resources used for the liquid propellant disposition project. Identifying other uses of heptyl and amyl as a risk would have helped ensure that actions were taken to address that risk.

Disposal Requirements and Access Rights. The SOAE-Russia implementing agreement did not require Russia to provide the heptyl and amyl for disposal, and neither the umbrella agreement nor the SOAE-Russia implementing agreement provides adequate access rights to DoD. Also, those agreements did not include any remedies in case Russia failed to provide the heptyl and amyl for disposal. In addition, when DoD and Russia agreed to dispose of heptyl and amyl through a competitive contract, the informal arrangements used did not require Russia to provide the heptyl or amyl for disposal. Those informal arrangements included an exchange of letters and the issuance of a joint statement between the United States and Russia.

Heptyl and Amyl Disposal Requirements. The initial arrangements for DoD to assist Russia in disposing of the heptyl and amyl are included in Annex A and Annex B to the SOAE-Russia implementing agreement. However, the SOAE-Russia implementing agreement did not require Russia to provide the heptyl and amyl for disposal. Annex A states that DoD may provide transportable incinerators, capable of incinerating heptyl or amyl, along with other services and maintenance. Annex B states that DoD may provide railcars for transportation and temporary storage of heptyl and amyl. However, the SOAE-Russia implementing agreement did not include provisions that require Russia to provide the heptyl and amyl for disposal, and provided no remedies in case Russia failed to do so. Instead, the SOAE-Russia implementing agreement limits Russia's responsibilities to providing DoD with documents that contain recommended performance specifications and requirements for material, services, and training the DoD provides.

Changes to the assistance agreed to in Annex A and Annex B were outlined in a letter from the Special Coordinator for Cooperative Threat Reduction to Russia's Director of the Committee for Defense Industry, dated April 19, 1994. The changes did not require Russia to provide heptyl and amyl for disposal. In that letter, the Special Coordinator stated that instead of providing incinerators and railcars, DoD would solicit private industry for proposals to eliminate heptyl in an environmentally sound manner. The Special Coordinator also agreed that DoD would provide intermodal containers, flatbed railcars, and cranes. As in the SOAE-Russia implementing agreement, DoD did not require Russia to provide the heptyl for disposal or provide any remedies if Russia did not use the assistance provided. The United States and Russia met from April 19, 1994, through May 6, 1994, to review the performance specifications for the heptyl disposition project. The results of that meeting were summarized in a joint statement. The joint statement states that Russia agreed to accept the most cost-effective disposal method. However, the joint statement does not require Russia to provide the heptyl for disposal.

Access Rights. Neither the umbrella agreement nor the SOAE-Russia implementing agreement provides adequate access rights for DoD. The umbrella

agreement provides DoD with the right to examine Russia's use of material, services, and training provided by the United States upon request and according to procedures to which both countries agree. The SOAE-Russia implementing agreement provides procedures for conducting audits and examinations. That agreement requires that DoD provide a 30-day written notice prior to performing an audit and examination as well as specifying that audits and examinations are limited to no more than three each calendar year, and concurrently at no more than two sites. The agreements did not allow DoD access to conduct inventory inspections of heptyl and amyl at MOD tank farms. Also, officials from the Office of the Under Secretary of Defense for Policy stated that they never sought the right to inventory the heptyl; however, not inventorying the heptyl limited their knowledge of the amount of heptyl available for conversion.

On June 15 and June 16, 1999, the United States and Russia signed a protocol that extended the umbrella agreement for an additional 7 years and amended several terms. The amended terms state that each country's executive agent should negotiate procedures for conducting audits and examinations. Until July 2002, the Office of the Under Secretary of Defense for Policy had not arranged to discuss DoD rights for conducting audits and examinations with Russia. According to DTRA officials, DTRA had not inspected any equipment provided under the SOAE-Russia implementing agreement, including intermodal containers, since June 1999 because new arrangements had not been finalized. If reinstituted, audits and examinations would complement project oversight DTRA project managers provide.

Remedies. Neither the umbrella agreement nor the SOAE-Russia implementing agreement provides for remedies should Russia fail to use the equipment, services, and training DoD supplies to assist Russia in disposing of the heptyl and amyl. Remedies included in the agreements would have provided DoD and Russia's executive agents with an understanding of the consequences and procedures to follow if products are not delivered, making facilities unusable for their intended purpose.

Equipment Inspections. Although DTRA has not performed an audit and examination on equipment provided to Russia for transporting and storing the heptyl and amyl since June 1999, the three inspections performed prior to that date were not fully effective. Those inspections included audits and examinations performed from March 27 through April 3, 1999, September 23 through September 29, 1998, and June 9 through June 20, 1996. Although two inspections identified that Russia improperly used some intermodal containers for mélange, the audits and examinations performed during 1998 and 1999 were not complete enough to identify the extent of improper use of the equipment. According to a former member of the audit and examination team, the audits and examinations were limited to comparing the serial numbers on intermodal containers against the list of serial numbers the project manager provided, identifying the location, and noting the condition of each container. The former team member stated that the audit and examination team did not verify the contents of the intermodal containers or examine rail transportation records. Instead, Russian officials accompanying the team identified the contents of the intermodal containers because team members did not have the equipment needed to safely examine the intermodal containers. DTRA officials stated that the audit

and examination team also lacked the necessary training to safely inspect the intermodal containers and ascertain whether they actually held heptyl. Examining rail transportation records could have identified whether Russia was using the intermodal containers to ship the heptyl and amyl to space launch sites or other locations. However, DTRA officials stated that the audit and examination team did not have the right to examine the rail transportation records, or the Russian heptyl fuel tank farms, where the approximately 30,000 metric tons of heptyl was stored.

Risks. As early as December 1992, Russian officials had informed DoD officials of plans to use some of the heptyl removed from ballistic missiles for space launches. However, Russian officials estimated that only 3,000 metric tons would be consumed. In 2000, DTRA started to include general and specific risks in its project plans for the heptyl disposition facility. General risks for that project included cost; project access, including the number of yearly visits by the project manager; time since the last audit and examination; site access restrictions; and project status. The specific risks for the heptyl disposition project were finding and training qualified Russian operators, and operational performance that followed long-term outside storage of the disposition facility. However, the project plans, which are updated annually, did not identify as a risk that Russia might use heptyl for other purposes. Other possible uses of heptyl should have been identified as a risk for three reasons. First, Russian officials informed DoD officials in 1992 of their plans to use for space launches some of the heptyl removed from ballistic missiles. Second, Russia's executive agent did not control the heptyl. Third, DTRA did not have the authority to inventory heptyl Russia was storing at MOD sites. By identifying other possible uses of heptyl as a risk and informing the CTR Policy Office of that risk, DoD management could have taken action to mitigate the risk. DTRA officials stated that they would send reports regarding the risks to achieving program objectives to the Under Secretary of Defense for Policy through its chain of command, the Under Secretary of Defense for Acquisition, Technology and Logistics.

Fund Use and Options For the Heptyl Disposition Facility

Because RASA officials stated that Russia has used most of the heptyl removed from ballistic missiles, the heptyl and amyl disposition facilities that cost the United States $95.5 million through July 2, 2002, will not be used for their intended purpose. In addition, the United States obligated $1.2 million to maintain the heptyl disposition facility from March 29 to September 30, 2002, while DoD considers the future of the facility. DoD also supplied assistance totaling at least $41.7 million to transport and store the heptyl and amyl.

Fund Use. Because RASA officials stated that Russia has used most of the heptyl removed from ballistic missiles, the heptyl and amyl disposition facilities will not be used for their intended purpose. Had Russian officials informed DoD that Russia was using more heptyl for space launches than initially anticipated, DoD could have re-evaluated the disposition project sooner. A re-evaluation would have provided DoD with an opportunity to fund other important CTR projects that dismantled weapons of mass destruction.

Options for the Fuel Disposition Project. After DTRA was notified about Russia's heptyl use, DTRA initially placed a stop-work order on the heptyl and amyl disposition facilities while DoD developed and considered its options. In February 2002, the Office of the Under Secretary of Defense for Policy drafted a list of options and associated costs for the heptyl and amyl disposition facilities. Although the options were provided on an interim basis until the Office of the Under Secretary of Defense for Policy and DTRA could develop a more comprehensive list, the options developed did not include alternatives for assistance provided to Russia for de-fueling missiles and transporting heptyl and amyl. In March 2002, DTRA requested that RASA provide options for the heptyl and amyl facilities. RASA responded on May 24, 2002, stating that it would consider options to convert the heptyl disposition units so the units could eliminate chemical weapons or explosives, sell the units on the world market, or mothball the units. As of July 23, 2002, DoD was considering the future of the disposition facility, but did not make a decision.

Heptyl Disposition Facility Options. The preliminary options for the heptyl disposition facility included readying the systems for operation ($4 million), preparing the facility for storage "mothballing" ($600,000), converting the facility for other CTR projects (costs unknown), and scrapping the facility to sell high-value components ($5 million revenue).[8] In its May 24, 2002, response, RASA stated that although Russia could provide for disposal of about 12,000 metric tons of heptyl in the future, using the heptyl for pre-launch testing of the Proton rockets made better financial sense. As of July 2002, the United States continued to pay more than $197,000 a month to maintain and secure the heptyl disposition facility, while DoD officials were deciding on a course of action.

Amyl Disposition Facility Options. The preliminary options for the amyl disposition facility included completing the project ($30 million), providing one unit ($18 million), terminating the project in its current state ($2.7 million), and terminating the project after completing the design ($3.4 million). In its May 24, 2002, response, RASA indicated that because Russia planned to combine the disposal of amyl and mélange and the United States decided not to participate in mélange disposal, Russia would finance oxidizer disposal alone. In addition, RASA requested that the United States transfer the technical documents for the disposition facility that were developed with U.S. funds to RASA. After considering the options, DTRA terminated the contract for the amyl disposition facility in July 2002, and according to DTRA officials they expect to deobligate $3.5 million of unused contract costs. In addition, DTRA officials stated that they plan to transfer in November 2002 the technical documents for the amyl disposition facility to RASA.

De-Fueling and Transportation. Although the preliminary options do not include information on the future use of equipment and services to de-fuel missiles and transport and store heptyl and amyl, as Public Law 107-107 requires, DoD should consider that Russia was generating revenue from selling the fuel for use in commercial space launches and that there are additional missiles to de-fuel.

[8]DTRA officials informed us on September 25, 2002 that the revenue from the sale of high-value components is estimated at about $3 million.

The breakdown of costs for de-fueling was not readily available, however, DoD assistance related to transporting and storing heptyl and amyl totaled at least $41.7 million through July 2, 2002. Those costs include $39.7 million for railcars and intermodal containers and $2 million for transporting heptyl and amyl from Russia's northern naval facilities and from intercontinental ballistic missiles to MOD sites. DoD also paid to de-fuel missiles and transport heptyl and amyl from Russia's Pacific naval facilities and to administer the projects.

Management Actions Taken

After RASA officials notified DoD that Russia was using heptyl for commercial space launches, the Office of the Under Secretary of Defense for Policy established an Executive Review program and amended the SOAE-Russia implementing agreement.

The Executive Review program was designed to increase communication between DoD and the Russian executive agents. The Executive Review program offers opportunities for DoD and Russian executive agents to identify and implement changes to project assumptions and objectives, obtain legally binding commitments, and avoid expenditure of funds if Russia cannot meet its commitments. The program requires officials from DoD and Russian executive agencies to review CTR projects that rely on unwritten, good faith obligations from Russia. The first Executive Review meeting took place the last week of July 2002. According to the Office of the Under Secretary of Defense for Policy, the DoD team reviewed all CTR projects that rely on good faith obligations and Russian executive agents stated that they were prepared to hold semi-annual reviews, amend implementing agreements to include binding legal commitments to use U.S. assistance for intended purposes, and sign documents that describe assumptions, requirements, and responsibilities for each project.

The Office of the Under Secretary of Defense for Policy also stated that the SOAE-Russia implementing agreement was amended on August 30, 2002. The amended implementing agreement authorizes DoD to audit the proceeds of CTR assistance and extends the agreement until June 17, 2006.

Conclusions

Although the CTR Program obligated $112.2 million and disbursed $95.5 million to design and build facilities to convert heptyl and amyl into commercial products, RASA officials informed DoD that Russia used the heptyl and amyl for its commercial space program. RASA officials agreed that Russia should have notified DoD of that use sooner. Citing communication problems within RASA, the RASA project manager for the heptyl disposition facility stated that he was not aware until December 2001 that Russia was using the heptyl from dismantled ballistic missiles for the space program.

Although Russia should have informed DoD, DoD could have provided better stewardship to protect the U.S. investment in the heptyl and amyl disposition facilities. Agreements should have required that Russia provide the heptyl and amyl for disposal and provide DoD with access to heptyl and amyl inventories. To ensure enforceability of any agreement, the proper instrument would be an implementing agreement, with remedies for non-performance.

DoD now faces decisions on what to do with the heptyl disposition facility. Options include mothballing the facility, converting the facility for other CTR projects, or selling the high-value components of the facility. While DoD has considered all of those options, the United States has obligated $1.2 million to maintain the facility, more than $197,000 a month. According to RASA officials, heptyl tank farms are almost empty. Therefore, limited storage capacity for heptyl and amyl is no longer a hindrance to the destruction of ballistic missiles. As such, no reason appears to exist for DoD to unnecessarily spend additional funds on the heptyl disposition facility. If the MOD wants the disposition facilities as a contingency, DoD should consider turning the heptyl disposition facility over to the Russian government, and allow the MOD to finance any additional work on the facility. Should it decide to maintain the facility, DoD should limit additional obligations and disbursements to assistance that facilitates elimination of weapons of mass destruction.

DoD should also consider options for the removal, transportation, and storage of the heptyl and amyl that remains in ballistic missiles, as that assistance benefits commercial space launches for Russia. The proceeds from the sale of heptyl and amyl could be used for CTR Program purposes.

Management Comments on the Finding and Audit Response

Deputy Under Secretary of Defense, Technology Security Policy and Counterproliferation. The Deputy Under Secretary of Defense (Technology Security Policy and Counterproliferation) stated that in addition to those management actions taken already outlined in the report, the Deputy Under Secretary drafted an SOAE Joint Requirements and Implementing Plan; commenced an SOAE audit and examination on August 24, 2002; and drafted a Transparency Protocol for the Fissile Material Storage Facility at Mayak, Russia.

The Deputy Under Secretary estimated that 15,000 metric tons of heptyl remain in Russian ballistic missiles that were identified for dismantlement in the future. Because the Russian MOD indicated that the heptyl would not be available for conversion and would be used instead in the commercial space program, the Deputy Under Secretary agreed that the proceeds from the sale of that heptyl should be monitored, applied to other CTR projects, and become the subject of future audits and examinations.

Audit Response. We commend the Deputy Under Secretary's office for its efforts to acquire greater Russian commitments, further DoD access and audits

and examinations rights, and commit to the view that proceeds from the sale of heptyl for the commercial space launch program be monitored, applied to other CTR projects, and become the subject of future audits and examinations.

Defense Threat Reduction Agency. The Deputy Director, DTRA stated that DTRA assesses the potential risk to a project after the requirement has been identified and when a plan for implementation is being developed. The Deputy Director also stated that based on its annual evaluation, consisting of several steps to assess the project plan's overall risk of succeeding, and the possible misuse of the assistance, DTRA would develop strategies to mitigate the risk in each of these areas. However, the Deputy Director stated that the steps occur after the United States anticipates making a significant investment in facilities to destroy or convert the materials. The Deputy Director also stated that DTRA informally provides the possible alternative uses of the item to the Office of the Under Secretary of Defense for Policy.

Audit Response. We recognize factors exist that are beyond the control of DTRA, such as knowing a foreign country's possible intentions. However, identifying possible alternative uses of the involved material and sharing that information with the Office of the Under Secretary of Defense for Policy would assist DoD management in taking actions to mitigate the risks.

Recommendations, Management Comments, and Audit Response

A.1. We recommend that the Under Secretary of Defense for Policy:

a. Negotiate amendments to Cooperative Threat Reduction Program implementing agreements with Russia that:

(1) Require a commitment from Russia to provide the weapon systems and their components when the United States anticipates that it will make a significant investment in facilities.

Management Comments. The Deputy Under Secretary of Defense (Technology Security Policy and Counterproliferation) concurred, stating that executive agents for Russia have agreed to amend implementing agreements to include binding, legal commitments to use U.S. assistance for intended purposes. The Deputy Under Secretary also stated that Russian officials agreed to complete and sign documents that describe assumptions, requirements, and responsibilities for each project.

(2) Provide adequate access rights to DoD, including audits and examinations and access to materials identified for destruction or conversion in facilities for which the United States pays.

Management Comments. The Deputy Under Secretary of Defense (Technology Security Policy and Counterproliferation) concurred, stating that an implementing

arrangement was drafted for signature between DoD and RASA, providing U.S. representatives continuous access to Russian project sites when contracted services are ongoing.

(3) Provide for remedies when Russia fails to use the equipment, services, and training DoD supplies.

Management Comments. The Deputy Under Secretary of Defense (Technology Security Policy and Counterproliferation) concurred but stated that although remedies can be included in agreements, doing so may not be beneficial from a policy perspective. The Deputy Under Secretary agreed to investigate the matter further.

Audit Response. Although the Deputy Under Secretary concurred with the recommendation, additional comments are requested. After the investigation of remedies is completed, we request that the comments explain the planned course of action.

b. Expedite the determination of the future of the heptyl disposition facility.

Management Comments. The Deputy Under Secretary of Defense (Technology Security Policy and Counterproliferation) concurred stating that DoD is reviewing recommendations DTRA provided on September 4, 2002.

Audit Response. In response to this report, we request that the Deputy Under Secretary state the planned use of the heptyl disposition facility and any completion dates.

c. Request that Russia use the proceeds from the sale of heptyl for Cooperative Threat Reduction Program purposes.

Management Comments. The Deputy Under Secretary of Defense (Technology Security Policy and Counterproliferation) concurred, stating that the amended SOAE implementing agreement provides for audits of proceeds from CTR assistance. The Deputy Under Secretary also believes that the proceeds from heptyl transferred or sold for Russia's commercial space launch program must be monitored, applied to other projects, and become subject to future audits and examinations.

Audit Response. The Deputy Under Secretary concurred with the recommendation, however, in response to this report, we request clarification on the planned actions that will ensure proceeds from the sale of heptyl are used for CTR Program purposes.

d. Mitigate the risks to achieving program objectives after receiving the program risks from the Director, Defense Threat Reduction Agency.

Management Comments. The Deputy Under Secretary of Defense (Technology Security Policy and Counterproliferation) concurred.

Audit Response. Although the Deputy Under Secretary concurred with the recommendation, the Deputy Under Secretary did not provide planned actions and the completion date of the planned actions. In responding to this report, we request that the Deputy Under Secretary provide the actions planned to meet the intent of the recommendation.

A.2. We recommend that the Director, Defense Threat Reduction Agency:

a. After the Under Secretary of Defense for Policy negotiates improved access, perform more complete inspections of equipment provided to Russia that will ensure proper usage.

Management Comments. The Director, DTRA concurred, stating that pending Office of the Under Secretary of Defense for Policy approval of agreements on audits and examinations, the audit and examination team is preparing to inspect intermodal containers to determine the container contents and review associated shipping documents.

b. Identify potential alternative uses of the involved material as a risk to achieving program objectives when the United States anticipates making a significant investment in facilities to destroy or convert those materials.

Management Comments. The Director, DTRA concurred, stating that when the United States anticipates making a significant investment in facilities to destroy or convert those materials, DTRA will formally provide alternative uses of materials to the Office of the Under Secretary of Defense for Policy.

c. Report annually, and as needed, to the Under Secretary of Defense for Policy risks to achieving program objectives.

Management Comments. The Director, DTRA concurred, stating that they will send a report that notes the risks in achieving program objectives to the Office of the Under Secretary of Defense for Acquisition, Technology and Logistics for signature and transmittal to the Under Secretary of Defense for Policy.

Appendix A. Scope and Methodology

We reviewed DoD methods and policies used to administer the CTR Program, which included program, project, and financial management. The review included provisions of Nunn-Lugar legislation, international agreements, DoD directives, and OMB circulars. The documentation reviewed covered July 1991 through July 2002.

We conducted interviews with officials from the Office of the Under Secretary of Defense for Policy; General Counsel, DoD; DTRA; the National Aeronautics and Space Administration; the Harvard-Smithsonian Center for Astrophysics; and International Launch Services, Incorporated. We also visited project sites in Russia to interview Russian officials and U.S. contractor representatives. In addition, we observed CTR Directorate personnel while they reviewed the heptyl and amyl projects at sites within Russia.

We evaluated the ability of DoD to efficiently and effectively manage the CTR Program. Specifically, we identified and analyzed requirements, policy, and guidance DoD and DTRA officials established and implemented to provide assistance to Russia. The review included an examination of the Strategic Arms Reduction Treaty I and Strategic Arms Reduction Treaty II and an evaluation of the umbrella agreement and the SOAE-Russia implementing agreement between DoD and Russia. Also, we examined the audit and examination process of the CTR Program, compared the controls over the liquid rocket propellant disposal with management control requirements published by the Office of Management and Budget and the General Accounting Office. In addition, we evaluated the viability of the liquid propellant disposition facility.

We performed this audit from April through August 2002 in accordance with generally accepted government auditing standards. The DTRA project manager arranged meetings with Russian officials. Staff of the IG DoD accompanied the DTRA team on its review of the project. However, given that Russia is a sovereign nation, we were limited in the types of questions we could ask Russian officials and access to internal Russian records. We did not review the management control program in this audit.

Use of Computer-Processed Data. We did not evaluate the general and application controls of the Centralized Accounting and Financial Resource Management System, which accounts for DTRA funds because that was outside the scope of our review. To support the obligations and disbursements for the liquid propellant disposition facilities and other assistance related to transporting and storing heptyl and amyl, we relied on data that system produces. Inadequate controls in the Centralized Accounting and Financial Resource Management System could affect the obligations and disbursements included in this report.

Appendix B. Prior Coverage

During the last 5 years, the General Accounting Office and the IG DoD have issued seven reports that discuss the CTR Program. General Accounting Office reports can be accessed on the Internet at http://www.gao.gov. IG DoD reports can be accessed on the Internet at http://www.dodig.osd.mil/audit/report.

General Accounting Office

GAO Report No. 01-694, "Cooperative Threat Reduction: DoD Has Adequate Oversight of Assistance, but Procedural Limitations Remain," June 19, 2001

GAO Report No. NSIAD-0040 (OSD Case No. 1942), "Cooperative Threat Reduction: DoD's 1997-98 Reports on Accounting for Assistance Were Late and Incomplete," March 15, 2000

GAO Report No. RCED/NSIAD-00-82, "Nuclear Nonproliferation: Limited Progress in Improving Nuclear Material Security in Russia and the Newly Independent States," March 6, 2000

GAO Report No. NSIAD-99-76 (OSD Case No. 1756), "Weapons of Mass Destruction: Effort to Reduce Russian Arsenals May Cost More, Achieve Less Than Planned," April 13, 1999

IG DoD

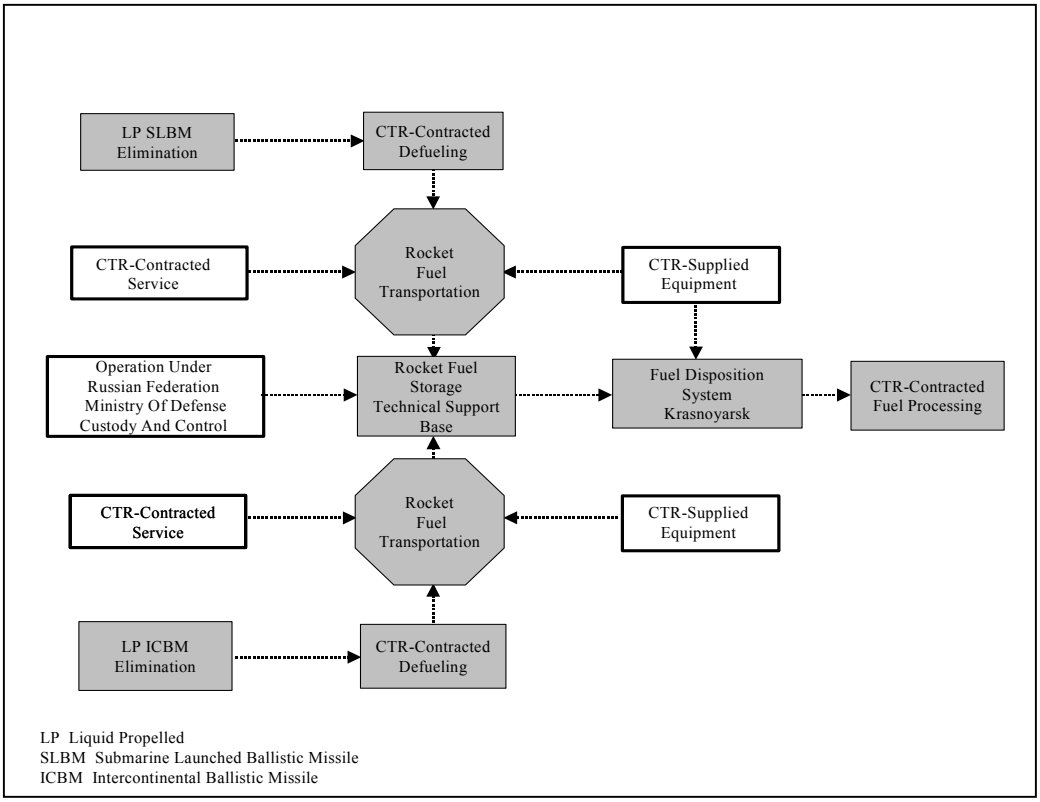
IG DoD Report No. D-2002-033, "Management Costs Associated With the Defense Enterprise Fund," December 31, 2001

IG DoD Report No. D-2001-074, "Cooperative Threat Reduction Program," March 9, 2001

IG DoD Report No. D-2000-176, "Defense Enterprise Fund," August 15, 2000

Appendix C. Liquid Propellant Disposition Process

The liquid propellant disposition project includes removing heptyl and amyl from missile elimination sites, transporting heptyl and amyl to storage sites, and processing heptyl and amyl with disposition systems. The project was to be conducted in three phases. Heptyl and amyl was first removed from Russian liquid propelled intercontinental ballistic missiles and liquid propelled submarine-launched ballistic missiles. That heptyl and amyl was then transported to storage bases owned and operated by the Russian MOD. Those locations include Ilyino, Moshkovo, Mulyanka, Rada, Turinskaya, and Vanino, Russia. Transportation of the heptyl and amyl was provided through CTR-contracted services using CTR-supplied equipment. Disposal of heptyl and amyl would occur upon delivery of the fuel from the MOD storage bases. The figure below outlines the liquid propellant disposition process.



Source: Defense Threat Reduction Agency

Liquid Propellant Disposition Process

Appendix D. Pictures of the Heptyl Disposition Facility, Krasnoyarsk, Russia

Figure D-1. Aerial view of the Heptyl Disposition Systems and Infrastructure

Figure D-2. Ground View of the Heptyl Fuel Disposition System

Figure D-3. Exterior of One of the Two Heptyl Disposition Units

Figure D-4. Interior of One of the Two Heptyl Disposition Units

Figure D-5. Hydrogen Generator Buildings (One for Each Disposition Unit)

Figure D-6. Steam Generator Rooms (One for Each Disposition Unit)

Figure D-7. Exterior of the Computer Process Control and Water Treatment System Building

Figure D-8. Interior of the Computer Process Control Room

Appendix E. Heptyl-Fueled Launches and Heptyl Use Since 1990

According to available data,[1] compared to 1990 and 1991 levels, the number of Russia's heptyl-fueled space launches has fallen since 1992. Also, generally the amount of heptyl used after 1991 decreased, but not as much as launches because the average number of launches that use Proton launch vehicles has decreased at a lesser rate. Since 1995, when the Defense Nuclear Agency contracted to build the heptyl disposition facility and RASA officials stated that Russia stopped producing new heptyl, Russia could have used more than 25,000 metric tons of heptyl.

Heptyl-Fueled Launches. Heptyl-fueled space launches decreased significantly after 1991. Heptyl-fueled launch vehicles include the Dnepr (a converted SS-18 ballistic missile), Kosmos-3, Proton, Rokot (a converted SS-19 ballistic missile), and Tsyklons. In 1990 and 1991, Russia had 34 launches and 31 launches, respectively. Between 1992 and 2001, however, Russia averaged 16.3 launches a year, a 47-percent decrease from 1991. In 1992 and 1993, the number of launches decreased each year to 20 launches. After heptyl-fueled launches increased to 27 in 1994, from 1995 through 1999 the number of launches decreased to 15 or less. In 2000, heptyl-fueled launches increased to 20, but decreased in 2001 to 10. For 2002, Russia had six heptyl-fueled launches through June. (See Figure E-1)

Proton Launch Vehicles. Heptyl use did not decrease as significantly as the number of launches because the number of launches using the Proton launch vehicle did not decrease as much as launches using other launch vehicles. When compared to Russia's other heptyl-fueled launch vehicles, the Proton uses considerably more fuel. Depending on the configuration, fuel use for each Proton launch ranges from between 172 and 178 metric tons of heptyl. In comparison, fuel use for other heptyl-fueled launch vehicles ranges from 25.2 metric tons to 53 metric tons of heptyl. In 1990 and 1991, Russia had 11 and 9 Proton launches, respectively. Between 1992 and 2001, however, Russia averaged 8.7 Proton launches per year, a 3-percent decrease from 1991. In 1992 and 1993, the number decreased to eight launches and six launches, respectively. After increasing in 1994 to 13, Proton launches decreased to 9 or less from 1995 through 1999. In 2000, Proton launches increased to 14, but decreased to 6 in 2001. For 2002, Russia has had three Proton launches through June. (See Figure E-1)

[1] We were not able to locate official launch and fuel use data published by the Russian Federation. Instead, the number of launches was provided on the Internet at Gunter's Space Page, http://www.skyrocket.de/space/space.html. As National Aeronautical and Space Administration officials suggested, we compared launches for 1990 through 1997 on Gunter's Space Page against data an astrophysicist for Harvard-Smithsonian Center for Astrophysics provided. For 1998 through June 2002 launches, we compared the data used against data maintained by the National Aeronautical and Space Administration. The launch data agreed, except Gunter's Space Page included two sub-orbital launches that the astrophysicist and officials from the National Aeronautical and Space Administration stated they excluded. The Office of Under Secretary of Defense for Policy provided data for fuel use on each launch vehicle.

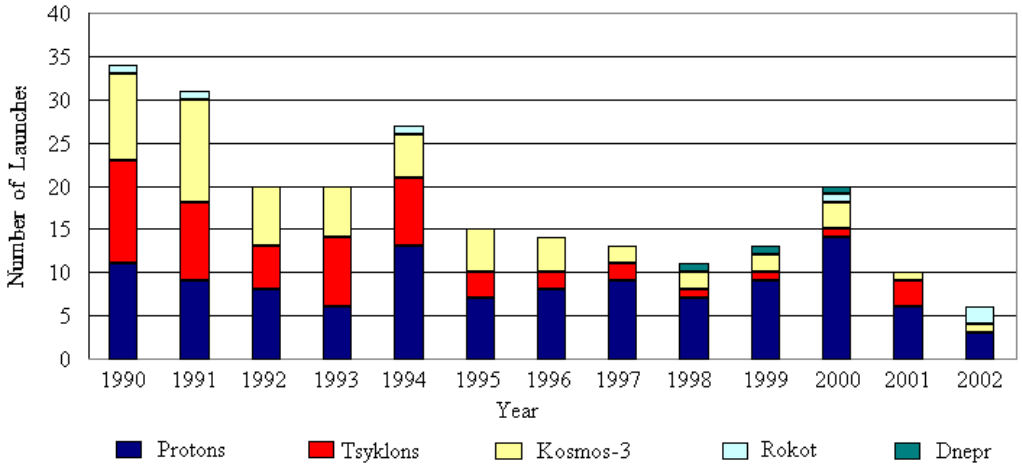


Figure E-1. Heptyl-Fueled Launches 1990 Through June 2002

Heptyl Use. Although the number of heptyl-fueled launches decreased after 1990, heptyl use did not decrease as significantly as the launches decreased. In 1990 and 1991, Russia used about 2,800 metric tons of heptyl and about 2,350 metric tons of heptyl during space launches, respectively. Between 1992 and 2001, however, Russia used an annual average of more than 1,800 metric tons, a 23-percent decrease from 1991. In 1992 and 1993, the use of heptyl decreased to more than 1,800 metric tons and almost 1,600 metric tons of heptyl. After its use increased to more than 2,800 metric tons in 1994, heptyl use decreased from 1995 through 1999 to between about 1,400 metric tons and almost 1,800 metric tons. In 2000, heptyl use increased to about 2,700 metric tons, but decreased to more than 1,200 metric tons in 2001. For 2002, Russia has used more than 600 metric tons of heptyl through June. (See Figure E-2)

Heptyl Use Since 1995. Since 1995, when the Defense Nuclear Agency contracted to build the heptyl disposition facility and RASA officials stated RASA stopped producing new heptyl, Russia could have used more than 25,000 metric tons of heptyl. From 1995 through June 2002, Russia had 102 heptyl-fueled launches using more than 12,500 metric tons of heptyl. The amount of heptyl Russia used could be significantly higher because, according to

RASA officials, Russia test fires each rocket using 100 percent of the fuel capacity. Therefore, Russia could have used in its space program more than 25,000 metric tons of heptyl since 1995.[2] (See Figure E-2)

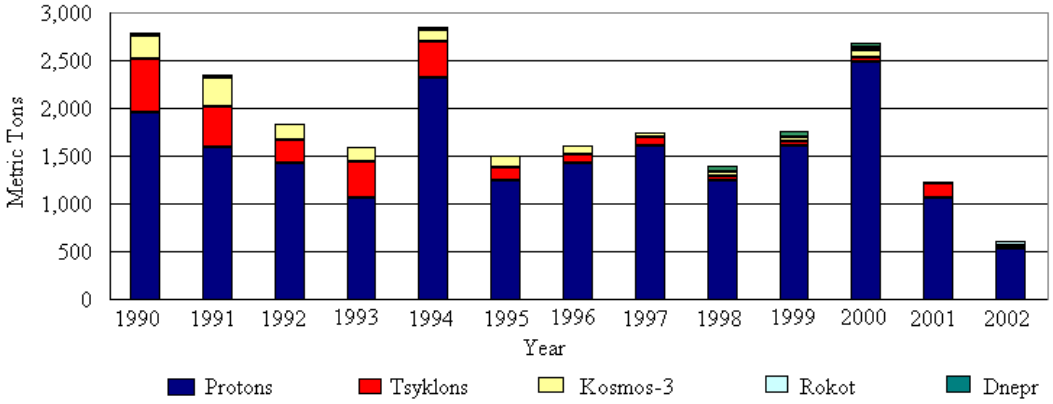


Figure E-2. Heptyl Use 1990 Through June 2002

[2] According to an official at the National Aeronautics and Space Administration, each rocket engine undergoes acceptance testing using procedures agreed to between the manufacturer and user. That testing may or may not include a flight-duration test to evaluate flight worthiness. In addition, he stated that the engines would also undergo development, qualification, and certification testing, all of which would consume fuel.

Appendix F. Report Distribution

Office of the Secretary of Defense

Deputy Secretary of Defense
Under Secretary of Defense (Comptroller)/Chief Financial Officer
    Deputy Chief Financial Officer
    Deputy Comptroller (Program/Budget)
Under Secretary of Defense for Policy
    Assistant Secretary of Defense (International Security Policy)
        Deputy Under Secretary of Defense (Technology Security Policy and Counter-Proliferation)
General Counsel of the Department of Defense

Department of the Army

Auditor General, Department of the Army

Department of the Navy

Naval Inspector General

Department of the Air Force

Assistant Secretary of the Air Force (Financial Management and Comptroller)

Unified Command

Commander in Chief, U.S. European Command

Other Defense Organizations

Director, Defense Threat Reduction Agency

Non-Defense Federal Organization

Office of Management and Budget

Congressional Committees and Subcommittees, Chairman and Ranking Minority Member

Senate Committee on Appropriations
Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Subcommittee on Emerging Threats and Capabilities, Committee on Armed Services
Senate Committee on Foreign Relations
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on Defense, Committee on Appropriations
House Committee on Armed Services
House Committee on Government Reform
House Subcommittee on National Security, Veterans Affairs, and International Relations, Committee on Government Reform
House Committee on International Relations
House Subcommittee on International Economic Policy and Trade, Committee on International Relations

Office of the Under Secretary of Defense for Policy

OFFICE OF THE UNDER SECRETARY OF DEFENSE
2000 DEFENSE PENTAGON
WASHINGTON, DC 20301-2000

POLICY

SEP 18 2002

MEMORANDUM FOR DIRECTOR, READINESS AND LOGISTICS SUPPORT DIRECTORATE, OFFICE OF THE INSPECTOR GENERAL, DEPARTMENT OF DEFENSE

SUBJECT: Report on the Cooperative Threat Reduction (CTR) Liquid Propellant Disposition Project (Project No. D-2002LG-0119)

Thank you for the opportunity to review and comment on the draft report regarding the CTR liquid propellant disposition project in Russia. We concur with the report's recommendations for OSD Policy and already have begun taking actions in line with them. Attached are our specific comments on the draft report for your consideration.

We appreciate the work your staff has put into this effort. We look forward to working with the Office of the Inspector General on the next phase of the project.

Ken Ebuhlen, for
Lisa Bronson
Deputy Under Secretary of Defense,
Technology Security Policy and
Counterproliferation

Attachments:
As stated

Final Report Reference

Comments on Draft Report on the
Cooperative Threat Reduction Liquid Propellant Disposition Project
(Project No. D-2002LG-0119)

- Page i, Executive Summary, Results:

  OSD staff Comment: Change:

Modified

  First paragraph, sixth line: ". . . will not be ~~used~~ *required* for their intended purpose."

Modified

  Second paragraph, third line ". . . provide adequate ~~access~~ *transparency* rights to DoD . . ."

Modified

- Top page 2, "as of July 25, 2002, DoD had not yet negotiated an implementing agreement with RASA [Russian Aviation and Space Agency]."

  OSD staff Comment: We interpret this to refer to formal designation of RASA as the Russian Federation (RF) executive agent. On August 30, 2002, DoD and RASA officials signed an amendment to the Strategic Offensive Arms Elimination (SOAE) Agreement formally identifying RASA as the Russian Federation executive agent.

Modified

- Top of page 4, Facilities That Dispose of Rocket Propellant and Oxidizer.

  OSD staff Comment: Change fourteenth line to read as follows:

  . . . will not be ~~used~~ *required* for their intended purpose.

Modified

- Bottom of page 5, State of the Liquid Propellant Disposition Project.

  OSD staff Comment: Recommend the text in the third and fourth lines be changed as follows:

  RASA officials *failed to* inform~~ed~~ DoD that Russia used the heptyl and amyl for its space program *until confronted by DoD officials in February 2002*.

- Bottom page 8, Access Rights. First line: "Neither the umbrella agreement nor the SOAE-Russia implementing agreement provides adequate access rights to DoD."

  OSD staff Comment:

  1. In the DoD response to RASA letter 291/460 dated July 9, 2002, we proposed to General Baluyevsky, Acting Chief, General Staff, Russian Armed Forces and Dr. Koptev, Director, RASA that the U.S. draft access arrangements and guidelines.

1

Final Report Reference

2. Subsequently, we have drafted an Implementing Arrangement for review within DoD and coordination in the interagency. When approved, we will discuss the Arrangement with RASA and sign when both executive agents reach an agreement.

- Middle page 9, Access Rights. Second paragraph, fourth line: "As of July 2002, the Office of the Under Secretary of Defense for Policy had not arranged to discuss DoD rights for conducting audits and examinations with Russia." Modified

  OSD staff Comment:

  1. In anticipation of formal designation as executive agent, on July 19, 2002 (RASA letter 294/477) RASA officials approved a visit by a DoD audit and examination team.
  2. DoD has drafted a Supplement to the Administrative Arrangements for the Conduct of Audits and Examinations of Assistance Provided Under the Strategic Offensive Arms Elimination Agreement to supplement the Administrative Arrangements for the Conduct of Audits and Examinations of Assistance, dated 25 October 1995. We are reviewing the Supplement within DoD, will coordinate within the interagency, and will then schedule to negotiate and sign the Supplement with RASA.

- Top page 10, Risks:

  OSD staff Comment: OSD staff estimates 15,000 metric tons of heptyl remain in intercontinental ballistic missiles and submarine launched ballistic missiles that have been identified for dismantlement in the future. During spring 2002, the Ministry of Defense indicated that the heptyl would not be available for conversion but would be used in the Russian commercial space launch program. The OSD staff feels that if the heptyl is transferred or sold for the commercial space launch program, the proceeds must be monitored, applied to other CTR projects, and become the subject of future audits and examinations.

- Top page 12, "Management Actions Taken." Modified

  OSD staff Comment: In addition to the Management Actions Taken discussed in the report, we have also implemented the following management actions:

  1. First Executive Review conducted in Moscow, July 2002. Russian executive agents were well prepared, Russian experts were available during each session, and all US questions were answered. The DoD team reviewed all projects of assistance that rely on good faith obligations. Executive agents stated they are prepared to:

2

a. Hold semi-annual reviews;
b. Sign amendments to appropriate implementing agreements to replace the current good faith obligations with written, binding legal commitments to use the U.S. assistance for its intended purpose; and
c. Complete and sign documents that describe assumptions, requirements, and responsibilities for each project.

2. SOAE amendment was signed on August 30, 2002. This document formally recognizes RASA as the Russian executive agent, authorizes audits of proceeds from CTR assistance, and extends the agreement until June 17, 2006.
3. Drafted SOAE Joint Requirements and Implementing Plan (JRIP). The SOAE JRIP defines DoD and RASA requirements and responsibilities during program execution.
4. Drafted Supplement to the Administrative Arrangements for the Conduct of Audits and Examinations of Assistance Provided Under the Strategic Offensive Arms Elimination Agreement. It is intended to facilitate effective conduct of audits and examinations of SOAE assistance, including revenue from CTR assistance.
5. Drafted Implementing Arrangements which will provide adequate access rights to DoD for the purpose of assessing, evaluating, contracting and completing projects requested by the Russian Federation under terms of the SOAE agreement and establishes the terms for access.
6. RASA approved and DoD commenced an SOAE audit and examination on August 24, 2002.
7. Drafted Mayak Transparency Protocol. Ongoing negotiations with the Russian Federation focus on establishing transparency measures necessary to provide confidence that material at the Fissile Material Storage Facility is from dismantled nuclear weapons, that it is maintained in a safe and secure environment, and that it will not be used for weapons again. DoD will discuss the revised and simplified transparency protocol and annexes in future meetings with Russian Federation officials.

- DoD IG report, pages i, 3, 10, and 12 identifies DoD maintenance and security obligations $197K/month ($1.2M obligated so far).

  OSD staff Comment: These expenses are necessary until DoD determines the disposition of the facility.

- DoD IG report page 13, top of page.

  OSD staff Comment: DoD reiterates its comment on page 10 of the DoD IG report. DoD estimates 15,000 metric tons of heptyl remains in intercontinental ballistic

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missiles and submarine launched ballistic missiles that have been identified for dismantlement but not yet dismantled. During Spring 2002, the Ministry of Defense indicated that the heptyl would not be available for conversion but would be used in the Russian commercial space launch program. It is the DoD view that if the heptyl is transferred or sold for the commercial space launch program, the proceeds must be monitored, applied to other CTR projects, and become the subject of future audits and examinations.

- DoD IG report page 13, A.1, a(2), "Recommendations." — Page 14

  OSD staff Comment: As stated above, the SOAE amendment was signed on August 30, 2002. This document formally recognizes RASA as the Russian executive agent, authorizes audits of proceeds from CTR assistance, and extends the agreement until June 17, 2006. DoD has also drafted an Implementing Arrangement to provide continuous access to U.S. representatives when contracted services are ongoing. When signed, this agreement will recognize that ongoing access to Russian sites is necessary for the purpose of assessing, evaluating, contracting and completing projects requested by the Russian Federation under terms of the SOAE agreement and establishes the terms for access.

- DoD IG report page 13, A.1.a(3), "Recommendations." — Page 15

  OSD staff Comment: Legally, we can include remedies in agreements and will investigate the DoD IG recommendation further. From a policy perspective, however, we may find it is not in our best interest to include legal remedies in the agreements.

- DoD IG report page 13, A.1.b, "Recommendations." — Page 15

  OSD staff Comment: DTRA provided its recommendations concerning disposition of the heptyl facility on September 4, 2002. The DTRA recommendations are under review.

- DoD IG report page 14, Appendix A. Scope and Methodology. Work Performed. — Page 17 Modified

  OSD staff Comment: Change paragraph 2, first line, to read as follows:

  . . . officials from the *Office of the* Under Secretary of Defense for Policy.

Defense Threat Reduction Agency Comments

Defense Threat Reduction Agency
8725 John J. Kingman Road MSC 6201
Ft Belvoir, VA 22060-6201

SEP 18 2002

MEMORANDUM FOR DEPARTMENT OF DEFENSE INSPECTOR GENERAL

SUBJECT: Draft Audit Report on the Cooperative Threat Reduction (CTR) Program Liquid Propellant Disposition Project (Project No. D2002LG-0119)

Thank you for the opportunity to review and comment on the draft audit of the CTR program.

Your recommendations are directed at both the Under Secretary of Defense for Policy (USDP) and the Director, Defense Threat Reduction Agency (DTRA). We defer to USDP for the recommendations covered under A.1. Turning to the recommendations addressed to DTRA:

DoD IG Recommendation A.2.a: We recommend that the Director, DTRA, after the USDP negotiates improved access, perform more complete inspections of equipment provided to Russia that will ensure proper usage. DTRA Response: DTRA concurs. The DoD IG recommendation faults DTRA for not thoroughly inspecting the contents of the intermodal containers during the Audit and Examinations (A&E) conducted prior to June 1999. These containers were provided by CTR to the Russians to transport heptyl from the Intercontinental Ballistic Missiles to Russian controlled and operated heptyl fuel tank farms. At the time, the A&E team lacked the necessary equipment and training to safely inspect the intermodal containers and ascertain whether they actually held heptyl. Heptyl can be lethal if inhaled, and collecting samples requires special hazardous material suits and analysis equipment which must be agreed to by the Russians. At the time, the team did not have the right to inspect shipping documents for intermodal containers. Nor did it have the right to inspect the Russian heptyl fuel tank farms, which were not part of the CTR program. These tank farms were the location of the approximately 30,000 metric tons of heptyl that were eventually used for space launches.

In June 1999, CTR lost the right to conduct A&Es in the Strategic Offensive Arms Elimination program. In November 2001, DTRA recertified the intermodal containers for operational use. The recertification process allowed DTRA to learn what was in the intermodal containers, but did not grant us access to the Russian shipment documents, nor to the tank farms. DTRA intends to conduct an A&E this Fall of the intermodal containers, pending OSDP approval of the A&E and US/Russian agreement on the A&E rights. DTRA is preparing its A&E team to both safely inspect the intermodal containers to learn their contents, and to translate any shipping documents it is granted access to.

DoD IG Recommendation A.2.b: We recommend that the Director, DTRA, identify potential alternative uses of the involved material as a risk to achieving program objectives when the United States anticipates making a significant investment in facilities to destroy or convert those materials. DTRA Response: DTRA concurs. DTRA currently assesses the potential risk to a project after the requirement has been identified and a plan for implementation is being developed. DTRA assesses the project plan's overall risk of succeeding according to cost, schedule, contractor performance, and the reliability of our foreign partner in assisting in implementation. DTRA develops strategies to mitigate this risk. DTRA also assesses the possible misuse of assistance after it is provided to the foreign partner. This assessment looks at the value of the equipment; the frequency of project manager visits to the site; the frequency of American contractor visits to the site; the time since the last A&E at the site; how far advanced the project is; the relative accuracy of equipment records; the possibility of the equipment serving some alternative military application; any prior misuse of the equipment; any site access restrictions; and the remoteness of the location. Based on this annual evaluation, DTRA develops strategies to reduce the risk of misuse.

However, all of these steps occur after the United States anticipates making a significant investment in facilities to destroy or convert those materials. Currently, DTRA informally provides OSDP possible alternative uses of the item (e.g., that heptyl can be incinerated, chemically converted, or used as rocket propellant as it was designed). Henceforth, DTRA will formally provide OSDP with technical alternatives as the United States anticipates making a significant investment in facilities to destroy or convert those materials. However, DTRA's charter does not permit it to perform Intelligence Community functions. DTRA cannot substitute for the Intelligence Community's role in assessing the foreign country's possible intentions. DTRA can only point out that heptyl could be used for commercial space launches, not that Russia intends to use, or is using, heptyl from ballistic missiles for space launches.

DoD IG Recommendation A.2.c: We recommend that the Director, DTRA, report annually, and as needed, to the USDP risks to achieving program objectives. DTRA Response: DTRA concurs. However, DTRA will send this report up its command chain for signature by the Under Secretary of Defense for Acquisition, Technology and Logistics for transmittal to the USDP.

Thank you again for the opportunity to comment on this draft report.

Robert P. Bongiovi
Major General, USAF
Deputy Director

Attachment:
As stated

Team Members

The Readiness and Logistics Support Directorate, Office of the Assistant Inspector General for Auditing of the Department of Defense prepared this report. Personnel of the Office of the Inspector General of the Department of Defense who contributed to the report are listed below.

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