
ML113430779

Safety Evaluation Report for the
Special Nuclear Material License Application
Passport Systems, Inc.
North Billerica, Massachusetts

Docket No. 70-7022

Manuscript Completed: December 2011

Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001



Enclosure 4

TABLE OF CONTENTS

I. INTRODUCTION.....	3
II. DISCUSSION.....	4
1.0 GENERAL INFORMATION.....	4
2.0 ORGANIZATION AND ADMINISTRATION.....	5
3.0 INTEGRATED SAFETY ANALYSIS.....	5
4.0 RADIATION PROTECTION.....	6
5.0 NUCLEAR CRITICALITY SAFETY.....	9
6.0 FIRE SAFETY.....	13
7.0 EMERGENCY MANAGEMENT.....	14
8.0 DECOMMISSIONING.....	14
9.0 ENVIRONMENTAL PROTECTION.....	14
10.0 PHYSICAL PROTECTION AND PHYSICAL SECURITY.....	16
11.0 MATERIAL CONTROL AND ACCOUNTING.....	16
III. CONCLUSION.....	17
IV. PRINCIPAL CONTRIBUTORS.....	17
V. REFERENCES.....	17

I. INTRODUCTION

By letter dated November 5, 2010 (Agencywide Documents Access and Management System [ADAMS] Accession No. ML110110694), Passport Systems, Inc. (Passport) submitted an application (ADAMS Accession No. ML110117310) to the U.S. Nuclear Regulatory Commission (NRC) requesting a Special Nuclear Material (SNM) License. The NRC staff accepted the application for review by letter dated March 1, 2011 (ML110600726). Passport's request was made pursuant to the requirements in Title 10 of the *Code of Federal Regulations* (10 CFR), Part 70, "Domestic Licensing of Special Nuclear Material." Passport requests that it be licensed to possess and use SNM to conduct a research program to develop new technologies to detect SNM in cargo containers as described in its license application. Passport supplemented its application with a Request for Exemption from a Criticality Monitoring System dated February 8, 2011 (ADAMS Accession No. ML11131A010). Passport also responded to NRC's Requests for Additional Information in letters dated May 18, 2011 (ADAMS Accession Nos. ML11159A185 and ML11159A186), August 4, 2011 (ADAMS Accession No. ML112270282), and September 23, 2011 (ADAMS Accession No. ML112790472). In accordance with Part 70, the term of Passport's license, if granted, would be 10 years.

The NRC staff conducted its safety and safeguards review in accordance with Title 10 of the Code of Federal Regulations as follows:

- Part 2, Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders,
- Part 19, Notices, Instructions and Reports to Workers: inspection and Investigations,
- Part 20, "Standards for Protection against Radiation,"
- Part 21, Reporting of Defects and Noncompliance,
- Part 50, Domestic Licensing of Production and Utilization Facilities,
- Part 51, Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions,
- Part 70, "Domestic Licensing of Special Nuclear Material,"
- Part 73, "Physical Protection of Plants and Materials;" and
- Part 74, "Material Control and Accounting of Special Nuclear Material".

The NRC staff used various guidance documents listed in Section 15, REFERENCES, herein, to conduct its safety review.

Passport has a Massachusetts Radioactive Materials License No. 55-0585 for source and byproduct materials. Activities associated with this State Agreement License are independent of the SNM license requested by Passport in November 2010 and are not discussed in this Safety Evaluation Report. Passport's Massachusetts license was reviewed by NRC staff to determine if it included quantities of SNM that would impact this application's review. The NRC staff determined that Passport's license with the Commonwealth of Massachusetts did not authorize the possession or use of any SNM. Passport has no other license with the NRC or the Commonwealth of Massachusetts.

A notice of opportunity to request a hearing on the license application was published in the *Federal Register* on October 13 2011 (76 FR 63672).

II. DISCUSSION

This safety evaluation report documents NRC's review and findings with regard to Passport's Part 70 license application (LA).

1.0 General Information

Passport has been contracted by the Department of Homeland Security (DHS) to conduct a research program for the development of new technologies that are capable of detecting SNM in cargo containers. DHS's development program includes testing that utilizes SNM placed inside of fully loaded cargo containers during testing of the equipment built by Passport. During testing the contents of the cargo containers will include a variety of typical cargo materials seen in U.S. ports of entry. DHS will test Passport's equipment to determine if it can locate SNM sources placed inside the containers when they are surrounded by the cargo.

The SNM sources shall be authorized for use at Passport's facilities located in N. Billerica, Massachusetts (MA). Passport stated that the sources licensed for use by Passport will be delivered to their facility by the Department of Energy (DOE) who will retain ownership. Passport will store the licensed sources at their facilities. DOE will be responsible for removing and shipping the sources from Passport's facilities.

The LA described the characteristics and composition of the SNM to be used in the testing program. It also included drawings illustrating source containers, the facility location and floor plan where the proposed activities would take place, and where the sources would be stored.

Passport is requesting approval to use the SNM listed in the table below for its research and development programs. The quantity of SNM is greater than a critical mass as defined in 10 CFR 70.4, and the quantity of SNM is within the limits of special nuclear material of low strategic significance as defined in 10 CFR 73.2.

MATERIAL	FORM	QUANTITY	MAXIMUM QUANTITY	AUTHORIZED USE(S)
Uranium oxide enriched to [REDACTED] U-235	U ₃ O ₈ in sealed stainless steel canisters	[REDACTED] U-235 per disc	[REDACTED] grams U-235 total	Research and development programs at Passport
Uranium enriched to [REDACTED] U-235	Nickel plated enriched uranium	[REDACTED] U-235 per disc	[REDACTED] grams U-235 total	Research and development programs at Passport
Uranium enriched to [REDACTED] U-235	Enriched uranium in sealed titanium containers	[REDACTED] U-235 per disc	[REDACTED] grams U-235 total	Research and development programs at Passport

In accordance with the requirements of 10 CFR 70.22, which describes the information that must be included in a Part 70 license application, the NRC staff determined that Passport's LA is complete. With this information provided in the LA, NRC staff conducted a detailed technical evaluation and documented its findings in this safety evaluation report.

2.0 APPLICANT QUALIFICATIONS

2.1 Regulatory Requirements

The regulatory basis for the review of Passport's qualifications is contained in 10 CFR 70.23(a)(2), which requires the applicant to be qualified by reason of training and experience to use the SNM.

2.2 Staff Review and Analysis

The Radiation Safety Officer (RSO) oversees the radiation protection (RP) program at Passport. An Assistant RSO (ARSO) is also part of the radiation safety team. The LA describes the responsibilities and qualifications of the individuals in these positions, including educational background and professional experience. The LA also provided a description of the responsibilities of the radiation safety personnel at Passport.

The RSO is appointed by the President of the company. The RSO is responsible for managing the radiation safety program and for defining policies and practices regarding the safe use of radioisotopes and radiation sources at Passport's facilities. The RSO has expertise in the principles and practices of the control of hazards from the use of radioisotopes and radiation detection equipment. Passport stated that the RSO will administer the SNM license and is responsible for licensing and regulatory compliance, including liaison with the NRC.

Passport provided a description of the RP program used at the facility, including personnel monitoring and training practices, commitments for leak-testing sources, commitments for maintaining doses as low as is reasonably achievable (ALARA), and waste disposal. The license application also discussed the roles and responsibilities of the different individuals implementing the RP program.

The administration of the RP program in support of activities at Passport is the responsibility of the RSO. The RSO has the primary responsibility for implementing the RP program on a daily basis. The technical qualifications of the RSO and ARSO at Passport with responsibilities under the RP program are defined in the LA. According to Passport, these individuals work together to ensure a complete RP program that complies with internal procedures and regulatory requirements.

2.3 Evaluation Findings

After reviewing the application, the NRC staff concludes that those using the SNM at Passport are trained and experienced in using the SNM based on the description of the RSO and the implementation and procedures of Passport's RP program. Therefore, the NRC staff concludes that the information provided by Passport meets the requirements in 10 CFR 70.23(a)(2) and is, therefore, acceptable.

3.0 INTEGRATED SAFETY ANALYSIS

The NRC staff reviewed the LA to determine whether Passport was required to provide Integrated Safety Analysis (ISA) Summary information, pursuant to the provisions in 10 CFR Part 70, Subpart H, "Additional Requirements for Certain Licensees Authorized to Possess a Critical Mass of Special Nuclear Material." The proposed activities for which the SNM would be

used do not meet the criteria in 10 CFR 70.60. Passport will be authorized to possess SNM in an amount greater than critical mass, but an ISA summary is not necessary under 70.60 because Passport will not be engaged in enriched uranium processing, fabrication of uranium fuel or fuel assemblies, uranium enrichment, enriched uranium hexafluoride conversion, plutonium processing, fabrication of mixed-oxide fuel or fuel assemblies, scrap recovery of SNM or any other activity that the Commission determines could significantly affect public health and safety. Additionally, Passport's proposed action will not significantly affect public health and safety as discussed more thoroughly herein. Therefore, 10 CFR Part 70, Subpart, H is not applicable to the LA. As a result, the NRC staff concludes that Passport is not required to submit an ISA Summary in support of its license application.

4.0 RADIATION PROTECTION

4.1 Regulatory Requirements

The regulatory basis for this review of radiation protection (RP) is contained in 10 CFR 70.23(a)(1)-(4); 10 CFR 19.12, "Instruction to Workers;" 10 CFR 19.13, "Notifications and reports to individuals;" and 10 CFR 20, "Standards for Protection Against Radiation."

4.2 Staff Review and Analysis

4.2.1 Radiation Protection Program Overview

Passport is requesting a license to possess seventeen encapsulated SNM test objects of various forms of uranium materials. The high-enriched uranium containers were fabricated at Y-12 out of titanium discs and continuously welded to seal them. The U_3O_8 containers will be continuously welded stainless steel meeting ANSI/HPS N43.6-2007, "Sealed Radioactive Sources—Classification," testing requirements for Class 2 sealed sources. The low-enriched uranium plates are blocks of uranium metal with 3 to 5 mils nickel plating. The sources are encapsulated and pose little airborne or external hazard to workers. The radiological hazards are minimal as long as the encapsulation isn't compromised.

The primary radiological concern is loss of encapsulation and subsequent contamination and internal exposures to workers. To address this concern, Passport stated that it will perform swipe tests of the sources every 6 months and any time prior to being returned to DOE's possession, to identify a possible loss of encapsulation. If there is evidence of dispersible material from the swipes or a suspected uptake, Passport stated that it will perform and evaluate bioassays taken from exposed workers to determine the uptake and dose. Passport stated that the external dose rates to workers are not expected to exceed the monitoring requirements of 10 CFR 20.1502, external monitoring—if performed—will utilize thermo luminescent detectors or whole body monitors that are processed by a National Voluntary Laboratory Accreditation Program (NVLAP) accredited contract service. Passport does not anticipate waste or effluents from these operations. Passport stated that it will return the materials to DOE when testing at the Passport facility has been completed.

Section 20.1101(a) requires a licensee to develop, document, and implement a radiation protection program commensurate with the scope and extent of licensed activities and sufficient to ensure compliance with NRC's radiation protection requirements. Passport has established an RP Program under its Massachusetts Radioactive Material License (#55-0585). Passport's "Radiation Safety Procedures, Rev. 5," was reviewed by NRC staff and found to be applicable

for the operations proposed under this license as it provides direction for: General Rules for Safe Use of Radioactive Materials; Radiation Safety Training Program; External Exposure Monitoring Program; Emergency Procedures; Duties of the RSO; and Procedure for Leak Testing Sealed Sources.

Dr. Stephen Korbly is Passport's RSO and Curtis Hicks is the ARSO. Passport stated that both will have received training to be aware of their responsibilities in these positions before the licensed materials are obtained. Passport's LA states that Dr. Korbly has previous experience using sealed sources at other institutions including the Massachusetts Institute of Technology and the University of California Santa Barbara, and has experience with source handling requirements.

Passport's LA states that the test objects containing SNM will be stored in a secured room built with two foot concrete walls and a reinforced door to which only authorized users will have access. In addition, the sources shall be either in a locked 55-gallon drum or in a safe. Passport also stated that the storage area is free from combustible materials and that the handling of the test objects containing SNM will be consistent with the Radiation Safety Procedures.

4.2.2 As Low As Reasonably Achievable

Passport stated that it has an established a program to minimize radiation doses ALARA in accordance with 10 CFR 20.1101(b) and (d), which require procedures and engineering controls to achieve doses that are as low as reasonably achievable by constraining air emissions of radioactive material to the environment. Passport stated that reviews of radiation doses of employees are performed quarterly. Passport also states that its radiation protection program is consistent with the ALARA principle because it establishes procedures and policies designated to mitigate any exposures well below ALARA limits. Passport must review the content and implementation of their radiation protection programs at least once per year to ensure compliance with the requirements in 10 CFR 20.1101(c), and the terms and conditions of the license; occupational doses and doses to members of the public are ALARA; and records of audits and other reviews of program content are maintained.

Based on the NRC staff's review of Passport's LA, the staff concludes that Passport's ALARA program meets the applicable requirements in 10 CFR 20.1101(b) and (d) and is, therefore, acceptable.

4.2.3 Written Procedures

10 CFR 70.23(a)(4) requires the applicant to establish adequate procedures to protect health and to minimize danger to life or property. Passport stated that it maintains written procedures that are used to establish safe conduct of activities while working with radiation sources. Procedures are reviewed by employees during initial training as part of their radiation safety indoctrination.

Passport's LA states that written procedures are used for monitoring and operating the radioactive sources and for emergency response activities. Passport stated that its Radiation Safety Procedures include procedures for the safe receipt and inspection of sources and for radiation surveys of the sources prior to returning the sources to DOE for shipment from Passport's facility. Passport stated that written procedures provide for radiation postings in both permanent and temporary areas of source use and storage. Passport's written procedures also

require that procedures for the control of the sources and operating procedures for use of the sources are available in the areas of source use and storage. Additionally, Passport's written procedures limit access to restricted areas and require personal dosimetry. Passport's internal procedures provide that sources must be leak tested on a 6-month cycle in accordance with internal procedures. In addition, operation of the testing facility will only be done by personnel specifically trained to operate the facility in accordance with specific, written procedures.

Passport's written procedures with respect to radiation safety are adequate to protect health and minimize danger to life and property because its procedures establish safe conduct of activities dealing with radioactive sources, provide procedures for monitoring and handling sources and for emergency response. As such, Passport's written procedures meet the requirements of 10 CFR 70.23(a)(4) and are therefore acceptable.

4.2.4 Radiation Safety Training

As required by 10 CFR 19.12(a), the applicant must establish a radiation safety training program that requires all individuals who in the course of employment are likely to receive in a year an occupational dose in excess of 100 mrem to be instructed in radiological protection, reporting requirements and incident response. Passport's LA states that all individuals who work in or frequent restricted areas will be trained in radiation safety training courses provided by the RSO or ARSO. This training program is specifically focused on the radioactive materials used at the facility. Passport stated that the radiation orientation program is mandatory for all personnel involved in the testing program prior to using any radioactive material. Refresher training is provided annually. This training is provided for personnel who require access to radiation areas or areas that contain radioactive materials in accordance with 10 CFR 19.12(a). This program consists of training material on personnel radiation exposures, radiation hazards, dose measurements, and safety procedures.

Based on Passport's LA, the NRC staff concludes that the program to train staff, maintain the training content, and employ qualified staff described in the LA meets the requirements of 10 CFR 19.12(a), and is therefore acceptable.

4.2.5 Radiation Surveys and Monitoring Programs

The regulations in 10 CFR 20 Subpart F, "Surveys and Monitoring" require the applicant to survey the magnitude and extent of radiation levels at a facility, the concentrations or quantities of radioactive material, and the potential radiological hazards to individuals. Passport stated in its LA that use of the SNM will be limited to non-destructive testing and analysis of the cargo inspection system developed under this program.

Passport maintains portable radiation monitoring equipment capable of detecting any radiation that may result from the testing program. This equipment is calibrated in accordance with procedures maintained by the RSO.

NRC staff concludes that the limited use of the licensed sources combined with the survey and monitoring programs and the radiation detection equipment described in Passport's LA meet the requirements of 10 CFR Part 20, Subpart F, and is therefore acceptable..

4.2.6 Contamination Control and Waste Handling

10 CFR 20.1406(a) requires that certain applicants for licenses, including applicants for a Part 70 license, describe in the application how facility design and procedures for operation will minimize contamination of the facility and the environment, facilitate decommissioning, and minimize the generation of radioactive waste. Since the sources Passport proposes to use are sealed, there is minimal risk of airborne or external contamination. Passport has written procedures to collect and dispose of low-level waste material if such waste were created.

Based on its review of Passport's LA, the NRC staff concludes Passport's operational use of sealed sources will minimize contamination, facilitate decommissioning, and minimize the generation of radioactive waste. Additionally, the procedures Passport described to collect and dispose of low-level material in the unlikely event that some were to be released into the environment meets the regulatory requirements in 10 CFR Part 20.1406(a) and is therefore acceptable.

4.3 Evaluation Findings

As discussed above, the staff finds that the minimal radiological risk posed by the contained SNM will be adequately addressed by the RP Program described in the license application, and that Passport's procedures will be sufficient to assure compliance with the radiological protection requirements in 10 CFR 19, 20, and 70. The staff finds that the applicant satisfies the requirements of 10 CFR 70.23(a)(2), (3), and (4) with respect to radiological controls and that the health and safety of the public and the environment are protected by Passport's radiation protection program.

While the procedures and license application are considered acceptable, the NRC staff noted that reporting requirements and guidelines for contamination levels were not stated in the Radiation Safety Procedures—even though this is potentially the largest radiological concern. Because of this, the staff recommends the following license conditions:

- Contamination guidelines shall be established for unrestricted release of contaminated material and equipment that are no greater than the those identified in the Branch Technical Position, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," April 1993.
- Leak tests of SNM sources will be performed consistent with applicable NRC branch technical positions issued in April 1993: "License Condition for Leak-Testing Sealed Uranium Sources," or "License Condition for Leak-Testing Sealed Plutonium Sources."

5.0 NUCLEAR CRITICALITY SAFETY

5.1 Regulatory Requirements

The regulatory basis for this review of nuclear criticality safety (NCS) is contained in 10 CFR 70.23(a)(3-4). This section also contains a discussion of the applicant's requested exemption from the criticality monitoring requirements of 10 CFR 70.24(a).

5.2 Staff Review and Analysis

Passport has submitted a license application to possess [REDACTED] encompassing various forms and enrichment of uranium. Passport's LA identified [REDACTED] containing SNM in the form of uranium and plutonium for evaluation of nuclear criticality safety even though the license will not include the plutonium source and will therefore only include the remaining [REDACTED] listed in Table 1 below.

By using all [REDACTED] in the criticality analysis, the analysis is more conservative and bounding. However, Passport shall not have all 18 sources at the facility at one time as 18 sources would cause them to exceed the upper limit of the quantity allowed under the definition of a quantity of SNM of low strategic significance in 10 CFR 73.2. Passport states that it will use a different composition of sources listed in Table 1 below in future testing to determine their equipment's capability of identifying various kinds of SNM.

In total, the mass of U-235 in all [REDACTED] is approximately [REDACTED], and in addition there may be [REDACTED] of plutonium used in the testing program following an amendment to the possession limits in the license. The uranium is primarily [REDACTED] although almost [REDACTED] [REDACTED] enriched. The material will be used as test objects for the evaluation of Non-Intrusive Inspection Systems being evaluated by the Transformational and Applied Research Directorate division of the Domestic Nuclear Detection Office, which is part of DHS. Passport stated that the SNM will either be encapsulated or plated in 3 to 5 millimeters of nickel, and is not dispersible or soluble. Passport stated it will only use the material consistent with their written procedures for handling and storage of sealed sources and no processes are anticipated which could result in the material being in a form or geometry other than presented as test objects. Because of this, the applicant has identified no credible criticality accidents that could occur with the materials.

The applicant bounded the NCS assessment for the material requested under this license, and identified in the criticality monitoring exemption request, by previously evaluating the k_{eff} of an even greater quantity of these objects in air as well as various accident configurations of the objects surrounded by water using MCNP 5.12 and library ENDF/B-VI as presented in Table 1. Passport used "worst-case" accident sphere containing the total of the SNM materials and surrounded by Beryllium and water and it was calculated to have a k_{eff} of 0.67166. Beryllium was added to the evaluation because it has a slightly greater moderation/reflection effect than water and will also be present in the vicinity of the SNM as another test object. This "worst-case" accident configuration was independently verified by NRC staff using the SCALE 6 code, basic compositions integral to the code, and "nesting" of the plutonium in a sphere with spherical layers of the remaining SNM surrounding it; then surrounded by a layer of Beryllium and a 1 meter radius water sphere. This essentially put the most reactive material in a sphere surrounded by the remaining reactive material in layers from the most to the least reactive and fully reflected by the Beryllium and water. The k_{eff} calculated by NRC staff using a different analytical model for that configuration was slightly less than calculated by the applicant for a homogenous sphere surrounded by Beryllium and water. The difference in k_{eff} between the two analytical models used by the applicant and NRC staff is not significant and demonstrates the validity of Passport's analysis. The k_{eff} determined from the two separate analyses are both sufficiently below unity that staff considers the analysis adequate to offset any bias in the calculations that may be present and to assure that the test objects remain subcritical.

Table 1. K_{eff} for all Test Objects and Configurations of Test Objects.

Condition	Accident Results			
	Storage Results (in air)		(Flooded)	
	$K_{eff} (Air)$	$Std Dev$	$K_{eff} (water)$	$Std Dev$
Sphere [Worst-case w/Be]	0.48097	0.00025	0.67166	0.00043
Stackable Objects	0.29237	0.00016	0.60678	0.00042
1 DTRA Plate	0.13906	0.0001	0.47027	0.00043
2 DTRA Plates	0.1935	0.00011	0.51399	0.00041
3 DTRA Plates	0.22977	0.00013	0.54245	0.00041
4 DTRA Plates	0.25455	0.00013	0.56256	0.00043
5 DTRA Plates	0.27217	0.00014	0.57721	0.00041
Pu Puck	0.13036	0.00012	0.34226	0.00039
1 HeU Disk	0.05856	0.00006	0.49688	0.00046
2 HeU Disks	0.08518	0.00007	0.51676	0.00047
3 HeU Disks	0.10721	0.00008	0.53216	0.00047
1 Canister Uranium Oxide	0.01106	0.00001	0.31221	0.00036
2 Canister Uranium Oxide	0.016	0.00001	0.3229	0.00036
3 Canister Uranium Oxide	0.0191	0.00001	0.32811	0.00037
4 Canister Uranium Oxide	0.02112	0.00001	0.33269	0.00034
5 Canister Uranium Oxide	0.02253	0.00001	0.33556	0.00035
6 Canister Uranium Oxide	0.02346	0.00002	0.33807	0.00036
7 Canister Uranium Oxide	0.02416	0.00001	0.33919	0.00036

Condition	Accident Results			
	Storage Results (in air)		(Flooded)	
8 Canister Uranium Oxide	0.02471	0.00002	0.34103	0.00036
9 Canister Uranium Oxide	0.02512	0.00002	0.34145	0.00036
10 Canister Uranium Oxide	0.02541	0.00002	0.34315	0.00035

The information submitted in the application was sufficient for staff to evaluate the NCS concerns consistent with 10 CFR 70.23(a)(3) and (4), which require that an applicant's proposed equipment, facilities and procedures are adequate to protect health and minimize danger to life or property.

Because the form and use of the material assure there will be no credible upsets resulting in a criticality, the applicant has requested an exemption from the monitoring requirements of 10 CFR 70.24(a). Given that the applicant will not alter the physical form of the material and that all criticality evaluations show $k_{eff} < 0.7$ at the 95 percent confidence interval, the staff concluded that a criticality accident is not a credible scenario and a criticality monitoring system would serve no purpose. The NRC staff further concludes that the handling, storage, and use of the test objects do not pose a credible nuclear criticality concern.

5.3 Evaluation Findings

As discussed above, the information submitted by the applicant and reviewed by the staff assures the applicant's equipment, facilities, and procedures will be adequate to assure subcriticality of the SNM test objects consistent with 10 CFR 70.23(a)(3) and (4), thus adequately protecting health and minimizing danger to life or property.

The applicant requested an exemption from the criticality monitoring requirements of 10 CFR 70.24(a) for the handling, use, and storage of the test objects containing SNM. Under 10 CFR 70.17, the Commission may grant exemptions from the requirements of the regulations as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest. The staff also determined that the installation of a criticality accident alarm system at the applicant's facilities would not significantly reduce the risk to the workers or the public because there is no credible criticality accident associated with the SNM test objects. Therefore, the lack of a criticality alarm system will not endanger life or property or the common defense and security. Because the proposed approach will reduce both the applicant's expenses by not installing the system and regulatory costs for the time evaluating and inspecting the installation, the staff has determined that the proposed approach will be in the public's interest by reducing unnecessary costs. Therefore, the staff recommends that the requested exemption be granted as provided in Attachment A of the license application. The following license condition will be imposed in the license to address the exemption from the criticality monitoring regulatory requirements:

- The applicant is granted an exemption to the requirements of 10 CFR 70.24 to maintain a criticality accident alarm system.

6.0 FIRE PROTECTION

6.1 Regulatory Requirements

The regulatory basis for the fire safety review can be found in 10 CFR 70.23(a)(3) and 10 CFR 70.23(a)(4).

6.2 Staff Review and Analysis

Passport's facility complied with the applicable building code regulations at the time of construction (State of MA Building Code) in the early 2000s. The portion of the facility where the licensed material is used and stored is fabricated of non-combustible construction materials, such as steel and concrete. Passport stated that the walls surrounding the storage room for the licensed material have an equivalent fire resistance rating of 2 hours. The walls surrounding the usage room for the material at risk are designed to have a fire resistance rating of 1 hour. Passport stated that a lightning arrestor system is not installed; however, the building is wired and grounded in accordance with the applicable edition(s) of the MA Electrical Code, which references NFPA 70, "National Electrical Code." Building renovations and operations are reviewed by the RSO to ensure adequate safety of the building.

The fire protection systems installed at Passport's facility include a sprinkler system, smoke/heat detection, and an offsite-monitored fire alarm system with manual pull stations available. Fire loading in Passport's facility is minimal. The fire protection systems interface through an offsite central monitoring station which notifies the local fire department.

Portable fire extinguishers are deployed within the building in accordance with industry standards. Fire hydrants are located throughout the area in accordance with industry standards.

Passport's facility is inspected by the building landlord biannually and Passport coordinates with the City of Billerica Fire Department (BFD) for compliance with applicable building and fire codes concerns. The BFD also performs periodic emergency drills with Passport, and the BFD responders periodically tour the facility for familiarization training. Procedures are in place to allow the fire department efficient access to process areas during fire emergencies. Worker egress is designed and maintained consistent with the National Fire Protection Association (NFPA) 101, "Life Safety Code."

Fire prevention, inspection, testing, and maintenance of fire protection systems and the qualification, drills, and training of facility personnel are consistent with applicable NFPA codes and standards.

The NRC staff's review determined that the applicant has met the guidance provided in NFPA 801, "Standard for Fire Protection for Facilities Handling Radioactive Material." The NRC staff notes that a complete release of the licensed material at Passport Systems would be highly unlikely, since the material at risk is contained in a hard metal alloy that is unlikely to volatilize or otherwise readily disperse as a result of a fire. Staff has further determined that, given the low risk to public health and safety of the materials covered by the proposed license, a formal fire hazards analysis is not required.

The NRC staff reviewed Passport's fire protection program and determined that the facility maintains an adequate level of fire protection to protect public health and safety. The NRC staff

concludes that the applicant's equipment, facilities, and procedures provide a reasonable level of assurance that adequate fire protection will be provided.

7.0 EMERGENCY MANAGEMENT

The regulatory basis for emergency management is found in 10 CFR 70.22(i)(1) which states that "Each application to possess enriched uranium or plutonium for which a criticality accident alarm system is required, uranium hexafluoride in excess of 50 kilograms in a single container or 1000 kilograms total, or in excess of 2 curies of plutonium in unsealed form or on foils or plated sources, must contain either ... (ii) An emergency plan for responding to the radiological hazards of an accidental release of special nuclear material and to any associated chemical hazards directly incident thereto." Passport does not possess any uranium hexafluoride in any quantity, will be exempted from the requirement to possess a criticality alarm, and does not possess in excess of 2 curies of plutonium in unsealed form or on foils or plated sources. Therefore, Passport is not required to have an Emergency Plan.

8.0 DECOMMISSIONING FINANCIAL ASSURANCE

The regulatory basis for financial assurance and decommissioning funding requirements are found in 10 CFR 70.22(a)(9) and 70.25. Passport is requesting authorization to possess and use SNM in the form of sealed sources, which poses less risk to the health and safety of the workers and the environment than unsealed SNM. Sections 70.22(a)(9) and 70.25 require an applicant for a specific license for a uranium enrichment facility or authorizing possession and use of unsealed SNM in certain quantities to submit a decommissioning funding plan or certification of financial assurance for decommissioning. As previously indicated, Passport will only possess and use sealed SNM. Thus, the NRC staff concludes that the requirements in 10 CFR 70.22(a)(9) and 70.25 do not apply to the proposed activities, and that Passport is not required to provide decommissioning financial assurance in support of its license application.

9.0 ENVIRONMENTAL PROTECTION

9.1 Environmental Assessment – Categorical Exclusion

9.1.1 Categorical Exclusion for the Facility

Passport's licensed activities are categorically excluded from the requirement to prepare a site-specific Environmental Assessment (EA) under 10 CFR 51.22(c)(14)(v), which exempts from the requirement to prepare an EA a materials license issued under 10 CFR Part 70 that authorizes the "[u]se of radioactive materials for research and development and for educational purposes."

Passport proposes to use sealed sources of SNM for research and development of new technologies that can detect SNM in cargo containers. Passport's application states that it does not propose to release to the environment radioactive materials that originated onsite, and Passport states that it will be conducting only non-destructive experiments while utilizing the SNM. Therefore, consistent with 10 CFR 51.22(c)(14)(v) and the criteria in NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs,"

Section 2.2.7.5, pp. 2-9 and 2-10, this licensing action is categorically excluded from the need to prepare an Environmental Assessment or an Environmental Impact Statement.

9.1.2 Categorical Exclusion for Exemptions

As noted above in Section 5.0, Nuclear Criticality Safety, the staff conducted a NCS review of the research activities to be performed on the SNM sources. As a result of that review, the staff found that there was no accident scenario, even a worse-case accident scenario, under which a criticality would occur. Because the proposed activities under this license cannot result in a criticality event or include gamma or neutron radiation associated with such an event, Passport also requested an exemption from 10 CFR 70.24 criticality monitoring, surveillance, and associated recordkeeping and reporting requirements.

For an exemption to qualify for a categorical exclusion, the exempted regulatory activity must meet one of the criteria identified in 10 CFR 51.22(c). An exemption that involves inspection or surveillance requirements, as well as any related recordkeeping and reporting requirements, are categorically excluded under 10 CFR 51.22(c)(25)(vi)(A)-(C) provided that (i) there are no significant hazards consideration; (ii) there is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite; (iii) there is no significant increase in individual or cumulative public or occupational radiation exposure; (iv) there is no significant construction impact; and (v) there is no significant increase in the potential for or consequences from radiological accidents; and (vi) the requirements from which an exemption is sought involve inspection or surveillance requirements. As discussed in more detail above in Section 4.0- Nuclear Criticality Safety Review, an exemption from 10 CFR 70.24 under this proposed license would not significantly change or increase the types or amounts of effluents released offsite; the individual, cumulative public or occupational radiation exposure; construction impacts; or the potential for or consequences from radiological accidents; nor would it introduce a significant hazards consideration because there will be no criticality or criticality-related gamma or neutron radiation to detect resulting from the research activities using SNM sources as described above. These research activities will not individually or cumulatively have a significant effect on the human environment.

A criticality accident alarm system (CAAS) provides continuous monitoring and surveillance for criticality events. The CAAS provides an alarm in case of a criticality event, and also provides continuous record keeping as output from the CAAS. 10 CFR 51.22(c)(25)(iv)(A-C) states that the requirements from which an exemption is sought involve: (A) record keeping; (B) Reporting requirements; (C) Inspection or surveillance requirements. The exemption sought by the applicant from the requirement to have a CAAS satisfies each of these criteria when performing its function.

Therefore, because the requirements under 10 CFR 51.22(c)(14)(v) have been met, the staff finds that Passport's licensed activities are categorically excluded from the requirement to prepare a site-specific Environmental Assessment. In addition, because an exemption from the regulatory requirements of 10 CFR 70.24(a) meets the provisions identified in 10 CFR 50.22(c)(25), the staff also finds that the exemption from those regulatory requirements are categorically excluded from the requirement to prepare a site-specific Environmental Assessment.

10.0 PHYSICAL PROTECTION AND PHYSICAL SECURITY

The regulatory basis for the review of Passport's physical protection and security management is in 10 CFR 73.67(a)(1) and (2). As provided above in Section 1.1, the quantity of SNM Passport would possess is of low strategic significance as defined in 10 CFR 73.2.

The general performance objectives in 10 CFR 73.67(a) specify that facilities with special nuclear material of low strategic significance must minimize the possibilities for unauthorized removal of SNM and facilitate the location and recovery of missing SNM. To achieve these objectives, Passport's physical protection and security management program shall provide for: (1) early detection and assessment of unauthorized access or activities by an external adversary within the controlled access area containing SNM, (2) early detection of removal of SNM by an external adversary from a controlled access area, (3) assure proper placement and transfer of custody of SNM, and (4) Respond to indications of an unauthorized removal of SNM and then notify the appropriate response forces of its removal in order to facilitate its recovery.

Passport stated in its LA that its physical security management program provides for ongoing security for early detection of missing material and assessment of unauthorized access through management controls of the storage and usage areas and security guards monitoring the facilities. Passport also stated that its program provides for early reporting of missing materials under their material control and accounting procedures and that it provides for proper handling and transfer through management controlled access.

Based on this information, the NRC staff concludes that Passport's physical security procedures meet the general performance objectives of 10 CFR 73.67(a) because Passport's procedures will allow it to detect unauthorized access and activities within a controlled area, detect, respond to, and report the removal of SNM from a controlled area and assure proper placement and transfer of custody of SNM. Passport's procedures are therefore acceptable.

11.0 MATERIAL CONTROL AND ACCOUNTING

10 CFR 70.22(b) does not require Passport to submit a Fundamental Nuclear Material Control Plan because 70.22(b) exempts applications for use of SNM in the form of sealed sources from submitting the document. Since the licensed material for Passport is in the form of sealed sources, the NRC staff concludes that the requirements in 10 CFR 70.22(b) do not apply to Passport's proposed operations. As a result, Passport is not required to submit a Fundamental Nuclear Material Control Plan in support of its license application.

Passport is required, however, to maintain SNM inventory and reporting requirements in accordance with 10 CFR 74.11, 10 CFR 74.13, 74.15 and 74.19. Section 74.11 requires the licensee to notify the NRC Operations Center in the event of any lost, stolen, or unlawfully diverted SNM, including attempts, within one hour of discovery. Section 74.13 requires licensees to prepare Material Balance Reports concerning SNM that the licensee has received, produced, possessed, transferred, consumed, disposed or lost. Section 74.15 requires a licensee who transfers or receives SNM in certain quantities or who adjusts its inventory of SNM to submit a Nuclear Material Transaction Report. Section 74.19 requires a licensee to maintain records of the receipt, inventory, acquisition, transfer and disposal of all SNM. This section details the procedures the licensee must implement in order to maintain records.

In its LA, Passport commits to notifying the NRC in the event of any lost, stolen, or improperly diverted SNM. Passport also commits to maintaining an SNM inventory and reporting program consistent with the requirements in 74.13. Passport also commits to conducting physical inventories of its SNM and maintaining the required records in accordance with the requirements of 74.19. Finally, Passport will report the transfer and receipt of SNM consistent with the requirements in 74.15.

The NRC staff reviewed the information and commitments provided by Passport in the license application. Based on Passport's commitments, the staff concludes that Passport will maintain SNM inventory and reporting requirements in accordance with 10 CFR 74.11, 10 CFR 74.13, 74.15 and 74.19 and that its procedures are therefore acceptable.

III. CONCLUSION

The NRC staff concludes that the information and regulatory commitments provided by Passport in their license application provide reasonable assurance of adequate safety of the proposed operations. The staff concludes that the proposed operations at Passport will not have an adverse impact on the public health and safety, the common defense and security, or the environment; and meet the applicable requirements in 10 CFR Parts 19, 20, 51, 70, 73, and 74.

Therefore the staff recommends granting the special nuclear materials license for a 10 year period in accordance with the license application and subject to the recommended license conditions herein and incorporated in the license. It is also recommended that the exemption requested by Passport from the requirements for a criticality accident alarm system be granted.

IV. PRINCIPAL CONTRIBUTORS

Richard Thompson
James Downs
Greg Chapman
Linda Allen

V. REFERENCES

1. (NRC, 1983) U.S. Nuclear Regulatory Commission, Regulatory Guide 5.59, "Standard Format and Content for a Licensee Physical Security Plan for the Protection of Special Nuclear Material of Moderate or Low Strategic Significance," February 1983.
2. (ANSI/ANS, 1997) ANSI/ANS 8.3, "Criticality Accident Alarm System (CAAS)," 1997 (Reaffirmed in 2003).
3. (NRC, 2010) U.S. Nuclear Regulatory Commission, NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility," May 2010.
4. (NFPA, 2003) NFPA 801, "Standard for Fire Protection for Facilities Handling Radioactive Material," 2003.
5. NFPA 101, "Life Safety Code."

6. (NFPA) 70, "National Electrical Code."
7. (ANSI/ANS, 2007) ANSI/ANS 8.23, "Nuclear Criticality Accident Emergency Planning and Response," 2007.