Passport
Systems Inc.

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February 8, 2011

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

Attention: Document Control Desk

Subject: Request for Exemption from a Criticality Monitory System

Reference: Passport Systems, Inc. Request for SNM License for DHS testing dated November 5, 2010

Attachment: (A) Passport Systems, Inc. Request for Exemption from a Criticality Monitory System

Dear Sir or Madam:

As a follow up to our discussions with representatives from The United States Nuclear Regulatory Commission (NRC) and The Department of Homeland Security, Passport Systems, Inc. hereby submits for your review the attached additional information (original + one copy) in connection with our reference November 5, 2010 license request.

Please do not hesitate to contact our Radiation Safety Officer, Dr. Steve Korbly at (978) 263-9900, ext. 2206 or Radiation Safety Consultant, F.X. Massé Associates, at (978) 283-4888 if further information is required.

Yours truly,

Paul H. Johnson
Vice President
Contracts and Administration
Passport Systems, Inc.

Cc: S. Korbly, Radiation Safety Officer
Passport Systems, Inc.

Attachment A
Re: Passport Systems, Inc. Letter,
dated February 8, 2011

Passport Systems, Inc. (Passport) Request for Exemption from a Criticality Monitory System

Per the process described in 10 CFR 70.17, Passport hereby requests a specific exemption. We respectfully request that we be granted an exemption from the requirements of 10 CFR 70.24(a) which requires a criticality monitoring system when a licensee possesses a specified amount of SNM. While it is clear that we are asking for a possession limit higher than that which requires a criticality monitoring system, we feel that the form and use of the material does not necessitate such a system. Furthermore, not having such a system will not endanger life or property or the common defense and security of the United States and are otherwise in the public interest. Passport does not possess nor have a license to possess any additional SNM.

As stated in the license application, the SNM we seek to possess (Table 1) are to be used as Test Objects for systems that are capable of locating SNM hidden in cargo containers. The SNM will not be in a soluble or readily dispersible form.

Table 1 SNM Form

SNM	**Description**	**Maximum Quantity**
UO_2	[redacted] grams of UO_2 will be compressed to a density of [redacted] g/cc and encapsulated in a stainless steel canister [redacted] cm diameter and [redacted] cm thick. There will be [redacted] grams of contained U235 ([redacted]% enrichment). This item will be fabricated by Y-12.	7
U_3O_8	[redacted] grams of U_3O_8 will be compressed to a density of [redacted] g/cc and encapsulated in a stainless steel canister [redacted] cm diameter and [redacted] cm thick. There will be [redacted] grams of contained U235 ([redacted]5% enrichment). This item will be fabricated by Y-12.	10
LEU	DTRA designed uranium plate in a [redacted] cm by [redacted] cm by [redacted] cm nickel plated (3 to 5 mils). There will be [redacted] grams of contained U235 ([redacted]% enrichment). This item was fabricated by Y-12.	4
HEU	A [redacted] cm diameter and [redacted] cm HEU disc encapsulated in a titanium case that is [redacted] cm diameter by [redacted] cm thick. There will be no more than [redacted] grams of contained U235 ([redacted]% enrichment). This item was fabricated by Y-12.	3
Pu	A [redacted] cm diameter and [redacted] cm Pu disc encapsulated in a tantalum /stainless steel housing that is [redacted] cm in diameter and [redacted] cm thick. There will be [redacted] grams of Pu. This item was designed and fabricated by PNNL as a sealed source for the Department of Homeland Security.	1

The items listed above are to be used in testing a nuclear material detection system for Department of Homeland Security. Criticality calculations were performed by Sensor Concepts Applications, Inc. for these items. The results of these calculations are provided below.

An analysis of the K_{eff} for all the SNM listed in Table 1 was conducted using MCNP simulations. Based on K_{eff} results from the individual Test Objects, the worst case arrangement appears to be two vertical stacks side by side. For this storage arrangement a simulation was run with all Test Objects in two vertical stacks. The first stack, from top to bottom, is composed of 3

HEU discs, 7 UO2 discs, and 4 LEU plates. The second stack is composed of 10 U_3O_8 discs topped by a single Pu puck. The criticality calculations for this configuration resulted in a K_{eff} of 0.39338 ± 0.00053 in air.

For a flooding scenario a simulation was run assuming the two vertical stacks are surrounded by 1.5 meter sphere of water resulting in a K_{eff} of 0.76000 ± 0.00103. For the Test Objects individually in the sphere of water the K_{eff} is significantly lower.

For a worst case accident scenario a simulation was run assuming the two vertical stacks are involved in a fire and subsequently completely melted, forming a sphere without oxygen and the cladding material. In this simulation, the K_{eff} was estimated to be 0.40609 ± 0.00041. Placing this sphere into a 1.5 meter sphere of water the K_{eff} becomes 0.80245 ± 0.00086.

Given that we can't alter the physical form of the material and that all criticality calculations show that $K_{eff} < 0.9$ at the 95% confidence interval, we feel that a criticality accident is not a credible scenario. Therefore, we believe that a criticality monitoring system should not be required.