U.S. Department of Homeland Security
Washington, DC 20528

Homeland Security

February 15, 2007

The Honorable John D. Dingell
Chairman
Committee on Energy and Commerce
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

Thank you for January 19, 2007 letter from the Committee on Energy and Commerce to the Domestic Nuclear Detection Office (DNDO).

The Committee asked five questions of DNDO. The questions and responses follow.

Q1: It is our understanding that additional tests involving portal technology are scheduled to occur at the Nevada Test Site. If so, please indicate what types of equipment will be tested and what these additional tests are designed to accomplish with respect to the selection and purchasing of nuclear portal technology.

A1. The Committee is correct in its understanding. The DNDO plans to conduct a test campaign at the Nevada Test Site during the Winter of 2007. This test campaign is an integral part of the ongoing program to characterize the performance of the Advanced Spectroscopic Portal (ASP) systems. The FY 2007 Department of Homeland Security Appropriation[1] states: "that none of the funds appropriated under this heading shall be obligated for full scale procurement of Advanced Spectroscopic Portal Monitors until the Secretary of Homeland Security has certified through a report to the Committees on Appropriations of the Senate and the House of Representatives that a significant increase in operational effectiveness will be achieved." This certification is referred to in the context of DHS Management Directive 1400 as a Key Decision Point Three (KDP-3) decision.

DNDO intends to request KDP-3 approval based upon completed and documented test results from test campaigns to be conducted at the Nevada Test Site (NTS), the New York Container Terminal (NYCT) and contractor facilities (system qualification testing), as well as interim results from deployment integration testing to be conducted at the Pacific Northwest National Laboratory (PNNL) Integration

[1] House Report 109-699, Making Appropriations for The Department Of Homeland Security for the Fiscal Year Ending September 30, 2007, and For Other Purposes, September 28, 2006

Laboratory (frequently referred to as the 331G facility), and field validation efforts in which ASP units are installed in "secondary screening" at eight operational Ports of Entry (POE) in tandem with existing approved interdiction systems.

The NTS Test Campaign will characterize the performance of the following systems:

1. Raytheon ASP Portal (employing Sodium Iodide gamma detection technology)
2. Thermo Fisher ASP Portal (employing Sodium Iodide gamma detection technology)
3. Canberra ASP Portal (employing Germanium gamma detection technology)
4. SAIC Polyvnyl Toluene (PVT) Portal (set at DOE Highly Enriched Uranium (HEU) Guidance – Energy Windowing Enabled)
5. SAIC PVT Portal (set at Operational Thresholds – Energy Windowing Enabled)
6. Ludlum PVT Portal (set at Operational Thresholds – Energy Ratio Enabled)
7. TSA PVT Portal used by DOE Megaports (Thresholds set by DOE Megaports)
8. SAIC GR-135 Radioisotope Identifier Device (RIID)

An operationally effective interdiction system must have the capability to detect and identify Special Nuclear Materials (SNM), Radiological Dispersal Device (RDD) materials, and Naturally Occurring Radioactive Materials (NORM) that is routinely found in the stream of commerce. Therefore, combinations of the above listed pieces of equipment will be characterized in terms of their probability to detect and probability to identify the following:

A. Category 1[2] quantities of SNM
    a. HEU
    b. Weapons Grade Plutonium
    c. Neptunium
B. RDD materials
    a. Cesium-137
C. Simulated threat-like objects
D. Naturally Occurring Radioactive Materials
E. Masking Materials

Q2: A primary reason for the Nevada Test Site tests was to determine the validity of "Energy Windowing," that could be applied to certain technology. Please indicate why the previous tests at the Nevada Test Site did not formally assess this technology and whether any new testing is designed to do so.

A2. The primary purpose of the "Winter 2005 ASP Test Campaign" at NTS was to characterize the relative performance of 10 "early development ASP systems." The results of the characterization test were used in the context of a best-value competitive source selection to choose three vendors to develop

[2] Quantities set by security and safeguard limitations

units suitable for a future comparative test. This subsequent round of testing was planned to measure the relative performance of ASP and PVT portals and to inform the decision to proceed with full rate production. The test plan from the "Winter 2005 ASP Test Campaign" (Advanced Spectroscopic Portal (ASP) Monitors Test #3 Plan) states: The Draft American National Standard Performance Criteria for Spectroscopy-Based Portal Monitors used for Homeland Security, ANSI 42.38-WD-F1, details the base performance requirements for radionuclide identifying portal monitors, based on monitors used in support of DHS efforts. Additional details concerning sensitivity, design requirements, testing requirements, and documentation are in the ASP Performance Specification dated January 3, 2005. The specific objectives for Test #3 are:

- Examine the ability of the monitors to detect radioactive materials.
- Assess the portal monitors' ability to discriminate amongst different classes of radioactive materials.
- Evaluate monitor performance against the draft ANSI standard: N42.38-WD-F1.
- Challenge the monitors beyond ANSI performance specifications.
- Assess the ability of the monitor assembly to communicate alarm and identification information to the user and check the human interface – how non -vendor personnel operate the assemblies based on manufacturer's training and documentation.
- Capture reliability, availability and maintainability data.

Although PVT systems were operated during the test for data collection, they were not set-up in a manner consistent with CBP operations, and validating energy windowing algorithms was not a stated purpose of the tests.

The test campaign scheduled to begin during the Winter of 2007 at NTS will compare the performance of the PVT portal detection systems to the next generation ASP portals to provide the technical basis for the Secretarial certification of ASP required by the
FY 2007 Appropriations Act. As stated in the response to question 1, the SAIC and Ludlum portals at NTS have energy windowing algorithms enabled. The upcoming tests **will** characterize the performance of energy windowing enabled PVT portals.

Q3. Please indicate whether DNDO has definitive data which can determine whether existing "plastic scintillators (PVTs)" are more or less capable of detecting radiological or nuclear materials than the proposed "advanced spectroscopic portal monitors (ASPs)." If DNDO does have such data, please include this data in your response.

A3. DNDO does not yet have a definitive data set that allows a determination whether PVT is more or less capable than ASP. As stated above, the primary purpose of the upcoming test series at the NTS is to provide a data set suitable for such a comparison and will include both PVT models currently deployed with energy windowing enabled. The test series will not just evaluate detection capability of PVT and ASP, but also the identification ability of ASP and hand-held RIID and therefore the impact on current

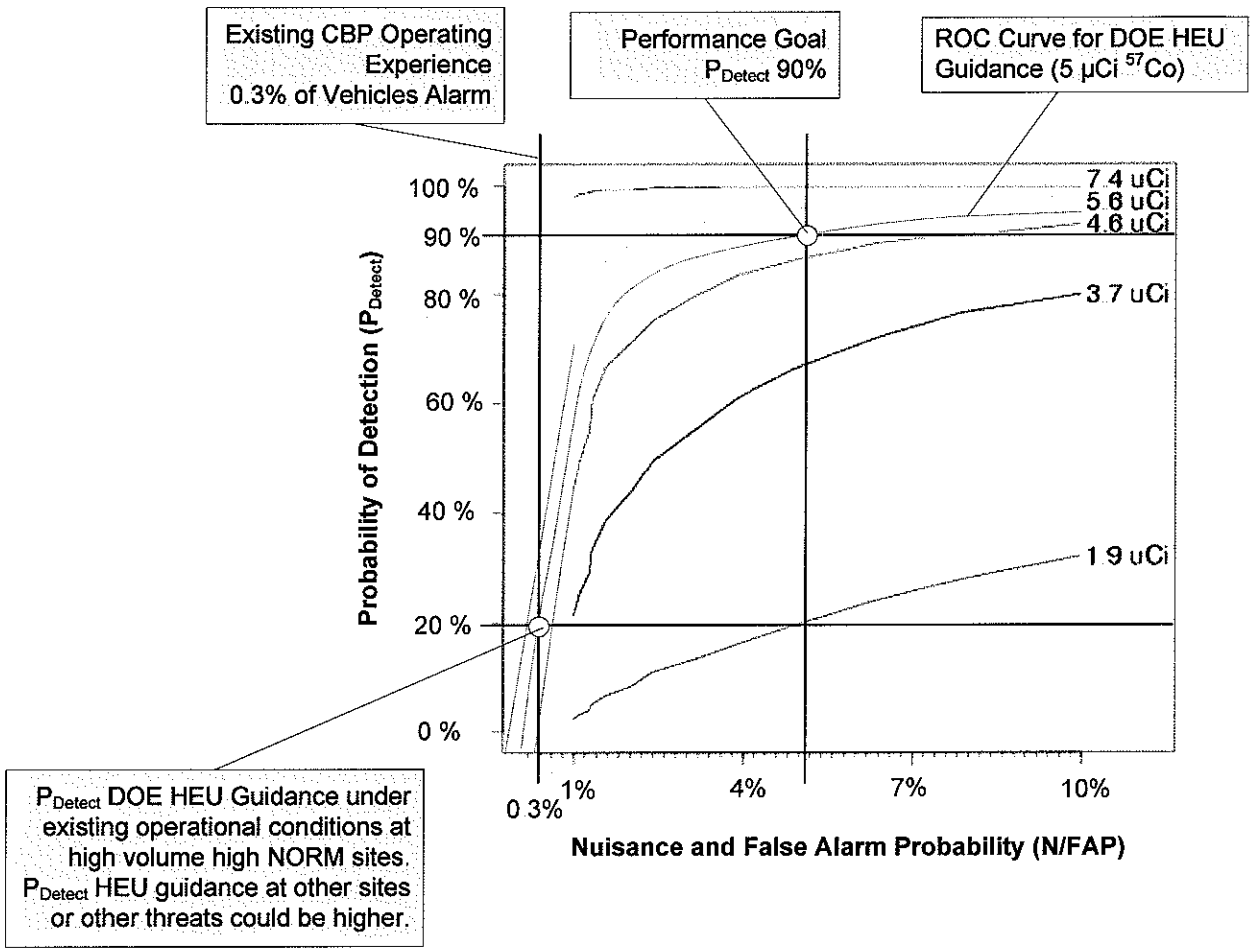
PVT-oriented site operational processes. This comparison of operational effectiveness of the next generation ASP systems to the current generation PVT systems (with energy windowing enabled) will form the technical basis for the required Secretarial certification. As required by the FY 2007 DHS Appropriations Law, the certification will be reported by the Secretary to Congress.

Q4. The audit by the Government Accountability Office (GAO) revealed that although DNDO tested the performance of PVTs, along with ASPs, it did not use the results of these tests in its cost-benefit analysis used to select the next generation of portals. Please explain why DNDO did not use the results of these tests in its selection process for choosing new technology.

A4. As stated in response to Question 2, the focus of the earlier NTS tests was not on characterizing the performance of the PVT systems. The PVT systems were not set up in accordance with procedures and settings reflective of operationally deployed systems used by CBP. Rather, the PVT data collected at the Winter 2005 test series were used in the development of advanced algorithms for PVT-based systems. Thus, the measured performance from these tests is not indicative of the currently deployed systems and not suitable for use in the cost-benefit analysis.

For the purpose of the cost-benefit analysis (CBA), DNDO derived the probability to detect HEU with existing PVT systems at existing operational thresholds at high volume POE's from the receiver-operator characteristic (ROC) curve shown in Figure 1. A ROC curve compares the nuisance and false alarm probability (N/FAP) to the probability of detection (P_{Detect}). This ROC curve was developed using a representative stream of commerce population database of approximately 2,100 cargo vehicles collected at the Champlain POE. This Champlain dataset has been extensively evaluated by CBP and multiple national laboratories, and was available for use in unclassified settings. At the time the CBA was conducted, this data set was considered the best understood and most relevant data for the intended purposes.

Figure 1. ROC for various activities of unshielded ^{57}Co point sources for the PVT/Energy Ratio in a representative stream of commerce.[3]



DNDO understood the limitations of this dataset. The Champlain data was based on a two window energy windowing algorithm used by the PVT systems deployed on the northern border. These data do not take into account the eight window algorithm available on the newest models currently being deployed. Therefore, DNDO always planned on validating its assumptions through a defensible characterization effort once the ASP systems were mature enough for a definitive characterization. The upcoming test campaigns at NTS and NYCT will provide a comprehensive dataset with an extensive stream of commerce (800 to 1200 vehicles per day per portal at NYCT). The results from these test events shall be used to update the cost-benefit analysis and revisit the preferred alternative.

[3] DOE HEU Guidance is 5 µCi 57Co.

Q5. It is our understanding that ASPs will be placed in "secondary" inspection locations at certain U.S. seaports, including ports designated under the Department of Energy's "Megaports Initiative." If so, please provide the full methodology both DHS and DOE will use to not only gather data, but also assess the capability of such equipment while deployed in such settings. Please indicate how certain ports will be selected to receive new ASP technology for testing.

A5. The Committee is correct in its understanding. As indicated in the response to question 1, the KDP-3 will be based on a series of integrated test campaigns. In addition to NTS and NYCT, there will be field validation of eight low rate initial production (LRIP) ASP units in secondary inspection environments. These units will be deployed for secondary inspection to eight POEs where existing operational secondary PVT systems already provide interdiction capability. The ASP LRIP field validation systems will be set up in a series with the existing operational PVT systems such that all conveyances sent for secondary radiation inspection will pass through both systems. This will allow ASP testing at operational venues while limiting impacts to commerce. This arrangement will also allow direct comparisons of ASP performance in secondary to the combined performance of PVT and handheld RIIDs for secondary inspection in operational streams of commerce. The criteria for choosing the sites were as follows:

- Choose sites with a differing commerce to expose the ASP systems to as wide a range of commerce as possible.
- Choose sites with large volumes of cargo to expose ASP systems to as many and different conveyances as possible.
- Choose sites with footprints that can accommodate multiple systems in secondary.
- Choose sites with a range of operational conditions to verify they meet the operational needs of the end user.

The plan is to deploy at two POEs each at northern and southern land borders and two seaports each on the east and west coasts. The list of sites to be included in the field validation effort is:

- Land Borders
    - Fort Street, Detroit, Michigan
    - Blue Water Bridge, Port Huron, Michigan
    - Colombia, Laredo, Texas
    - World Trade Bridge, Laredo, Texas
- Seaports
    - Pier J South, Long Beach, California
    - Pier A, Long Beach, California
    - A. P. Moeller, Port of New York & New Jersey
    - Port Newark Container Terminal, Port of New York and New Jersey

The DOE Megaports Initiative is purchasing 12 production ASP portals in FY 2007 and will be deploying them in FY 2007 through FY 2009 at foreign seaports to enhance secondary inspection capabilities. DOE has provided technical input to the NTS Test Plan and will observe some of the testing. DOE will evaluate the DNDO performance testing and field validation in conjunction with additional venue specific operational and interoperability testing to validate the ASP interface with the megaports communication system. DOE expects these additional tests to support its deployments in varying operational environments at the broad range of foreign seaports in which it works.

DOE anticipates deploying its first ASPs at the following ports:

- Southampton, United Kingdom
- Laem Chabang, Thailand
- Algeciras, Spain
- Antwerp, Belgium

We hope this information meets the Committee's requirements. I look forward to a continued dialogue regarding the efforts by DNDO to protect our Nation against potential nuclear threats in sea cargo containers bound to the United States from foreign ports.

If you have any additional questions, please contact the Office of Legislative and Intergovernmental Affairs at (202) 447-5890.

Sincerely,

Vayl S. Oxford
Director
Domestic Nuclear Detection Office