EA-507; Environmental Assessment and FONSI For The FAA Explosive Detection System Independent Validation And Verification Program INEL

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1. NEED FOR PROPOSED ACTION

The urgent development, fabrication, and operation of advanced explosive detection systems are needed by the Federal Aviation Agency (FAA) to counteract potential terrorist threats. The Department of Energy (DOE) proposes to provide independent testing of such devices at the Idaho National Engineering Laboratory (INEL) to evaluate their effectiveness. The INEL has not been involved in the development of the explosive detection systems and can provide the necessary independent testing expertise. Explosive handling experts and chemical vapor experts are employed at the INEL for emergency action teams and are available with necessary explosive expertise. The information gained from the Explosive Vapor Detection System Independent Validation and Verification Program would then be used anywhere explosive detection devices need to be deployed, e.g., commercial airports, DOE sites, and other sites having national security interests.

2. DESCRIPTION OF PROPOSED ACTION

The proposed Explosive Vapor Detection System Independent Validation and Verification Program would determine the true performance of recently developed, commercially available explosive vapor detection systems. The data obtained from this program will be Confidential Secret National Security

Information. The test program would consist of three independent phases, including:

1. Sensitivity and calibration,
2. Detector performance,
3. Operational characterization.

The Class A explosives that would be tested are Water Gels, C-4, Flex-x Deta Sheet, TNT, and Semtex. These explosives have very low vapor pressures, i.e., a preference to remain in the solid state. Consequently, very few molecules are available, in the gas phase, for the instrument to detect. To be useful, the detection system must be capable of detecting quantities in the parts per trillion range.

The sensitivity and calibration test would consist of establishing the sensitivity and defining the Limit of Detection (LOD) of each system tested. To accomplish this objective very small amounts of explosive would be tested in a vapor generator.

Detector performance tests would consist of characterizing detector performance at different environmental conditions, e.g., ambient temperatures, pressures, and relative humidity. The detector would be tested for response to contaminants as directed by the FAA and an explosive vapor expert inside an environmental chamber.

Operational characterization would consist of simulating the actual airport monitoring conditions, e.g., portal monitors and conveyor systems. These tests would use one pound, or less, of explosive hidden in baggage or on personnel.

The project would be located at the Water Reactor Research Test Facility (WRRTF) at the north end of the INEL, primarily in building TAN-646. (See Appendix I.) The facility is presently underutilized and, due to its isolated location, is considered an appropriate location for explosive testing, storage, and handling. No more than 5 lbs of explosive would be allowed in the building at one time. There would be 5 containers with 5 lbs/container stored in the magazines in the storage area. Building renovations that would

be required for operation of the tests in TAN-646 consist of replacing electrical fittings with explosion proof hardware, installing a quick response fire detection system, evacuation alarm buttons and pressure relief panels (where required), repairing the existing steam heating system and other similar minor modifications to bring the building into code. A trench is required to supply electricity for an alarm system at the explosive storage area, which would be built per regulations the required distance from the nearest building at WRRTF. The storage area also requires clearing of a minimal amount of sagebrush and construction of a gravel pad and chain link fence.

3. ALTERNATIVES TO PROPOSED ACTION

The No Action alternative is the only alternative considered for the INEL in this environmental assessment. Other sites at the INEL were considered and eliminated due to safety or administrative reasons. WRRTF is the preferred location due to availability, isolated location, and chemical cleanliness of âthe facility. The No Action alternative would eliminate the need for a trench âand explosive storage area and the risks associated with explosive handling and transportation; eliminating any potential environmental impacts associated with implementation of the proposed action. If the proposed testing of explosive detection systems is not performed, deployment and operation of the âsystems at critical national security locations may be delayed or not be implemented.

4. ENVIRONMENTAL IMPACTS OF PROPOSED ACTION

4.1 Location

The proposed action would take place at the Water Reactor Research Test Facility (WRRTF), primarily using the TAN-646 building. An alarmed fenced storage area for the explosives would be constructed 1250 ft. from the nearest building.

4.2 Environmental Impacts

Tâhe majority of the activities related to the proposed action would take place âwithin the existing facility, TAN-646. No effluents or emissions are âanticipated. Existing facility utilities are adequate to accommodate the ârelocated 0O to 20 personnel associated with the proposed action. Excavation and clearing would be required for placement of the security cable trench and the gravel storage pad. Disturbance to undisturbed ecosystems will be

minimized by locating the trench in previously disturbed areas. An archaeological survey was performed in the WRRTF area in 1985. (See Reference 1 & 2) No cultural resources were located and the area has been given archaeological clearance. The only potential environmental concern is the storage, handling, transport, and disposal of the explosives.

4.3 Explosive Storage, Handling,â and Transport

Explosive storage, handling, and transportation would be in accordance with DOE 6055.9-STD, D. O. D. "Ammunition and Explosives Safety Standards; DOE-ID Appendix 0550, Standard Operational Safety Requirements, Part 3, Subpart I, "Explosives"; DOE/EV/06194, "DOE Explosives Safety Manual"; and all other applicable requirements. Responsibilities, safety controls, training requirements, explosive delivery, transportation, storage, access and control, and handling procedures are outlined in a Safety Plan written for the project which would be strictly followed.

Explosive storage would require the construction of a gravel pad, fence, and alarm system. A trench would be dug from the nearest building 1250 feet west to allow the placement of an alarm system on the fenced magazine storage area. The access roads would be improved as necessary for compliance with transportation needs. Applicable Department of Transportation regulations for explosives would be followed during transportation.

4.4 Explosive Disposal

Upon completion of the project, or when the explosives are no longer needed, they would be shipped to the ARA-IV Dynamic Processing Area for storage until use in experiments carried out by the Materials Technology Dynamic Research and Development Program. DOE anticipates that all of the explosives would be used resulting in no waste generation. However, some of the explosives near the end of their shelf life would be disposed either by detonation at the designated INEL explosives detonation area or incinerated at a RCRA regulated disposal facility.

4.5 Safety

A hazard analysis was performed on possible accident scenarios. Summarized here are the explosives hazards: 1) A fire generated from another source involving the explosives. The probability of this occurring was considered improbable and the mitigation would include the control of the ignition sources and presence of a fire suppression system. 2) Initiation of

explosives by friction, heat, static discharge, or impact is another scenario assessed. The probability of this occurring was also considered improbable. Safety and administrative controls would be used to further mitigate the likelihood of occurence. The type of explosives used in the test are in plastic or gel form and are not sensitive to electrostatic discharge. 3) Detonation of explosives during transport due to an accident was considered as a remote possibility. Protective measures used to reduce the probability of a traffic accident involving explosives include Class A placards, safe driving procedures, and regulation storage containers. (See Appendix II.)

5. CONCLUSIONS/SUMMARY

Testing of explosive detection devices at the INEL would provide data from which explosive detection devices may be chosen for deployment by the FAA. The potential ârisks posed by the explosive handling and storage can be managed by safe administrative controls and proper training of personnel. The facility proposed for the action is in an isolated location and requires âminimum renovations. Environmental impacts resulting from the proposed validation and verification tests would be minimal.

6. LIST OF PREPARERS

This document was prepared by Kathy Bitton, Environmental Programs, EG&G Idaho, Inc. with information provided by Grant W. Homer, Engineering, EG&G Idaho, Inc. during February 1991.

7. REFERENCES

1. W. G. Reed, J. W. Ross, B. L. Ringe, and R. N. Homer, 1987, Archaeological Investigations on the Idaho National Engineering Laboratory; 1984-1985, Revised Edition, Swanson/Crabtree Anthropological Research Laboratory Reports of Investigations 87-1, Pocatello, Idaho.

2. Letter from D. L. Lowrey, EG&G Idaho to G. W. Homer, EG&G Idaho, Subject: "Archival Search Action Request for Proposed Magazine Storage Pad/FAA Project - Water Reactor Research Test Facility (WRRTF)", February 6, 1991.

APPENDICES

APPENDIX I

Figure (Page XXX WATER REACTOR RESEARCH TEST FACT)

APPENDIX II

ACCIDENT SAFETY ANALYSIS

Hazards analysis and protective measures for the FAA Explosive Vapor Detection System program are detailed below. This study assesses the hazards risk involved with the WRRTF operation in TAN 645/646, emphasizing the handling and transportation of the high explosives to be used by this program. The cutting and final disposition of the explosive samples are covered by EG&G Explosive Engineering Specialist procedures and are not within the scope of this study.

A hazard risk evaluation will be applied to each hazard area involved in the FAA program. This approach quantifies the safety analysis by breaking each potential hazard are into severity level and probability level. The two are then correlated by a Hazard Risk Index Matrix with a one through four numerical code assigned to each hazard; number one being unacceptable risk and number four being acceptable as a non-risk (see Table 8)

The consequences of any accident involving severe damage or injury during these explosive detection studies could lead to postponement or cancellation of the program, so it is vital that every needed safeguard be designed into the project.

8.1 Fire Hazards

The following categorizes potential fire hazards, summarizes protective measures, and assigns a level of risk to each.

1. Fire Hazard 1: Fire spread from unused areas of TAN 645/646 or from TAN 640/641 to the area used by FAA Program.

Protective Measures: Building 645/646 is of non combustible

cinder block construction, has an active fire sprinkler system in

HAZARD RISK ASSESSMENT MATRIX

	I	II	III	IV	---------- SEVERITY LEVEL
A	1	1	2	3	
B	1	2	3	4	
C	2	3	3	4	
D	3	3	4	4	

PROBABILITY LEVEL

I Catastrophic - Permanent death or injuries. Irreplaceable or irreparable damageâ to product, facility, tooling, or other equipment. System loss.

II Critical - Severe injury or illness (non-permanent). Major system damage (repairable but program impact)

A. Frequently - Likely in the short term/ frequent occurrence

III Materials - Minor injury or illness. Minor system damage (no program impact).

B. Probable - Remote chance in the short term. Very likely in time/occurs several times.

IV Negligible - Less than minor injury, illness or system damage.

C. Remote - Unlikely. Possible to occur in the life of an item.

CORRECTIVE ACTIONS

D. Improbable - Small chance of

Level of Control for Hazard

ever occurring.

HAZARD RISK INDEX	CRITERIA
1	Unacceptable
2	Undesirable (management decision required)
3	Acceptable (with review by management)
4	Acceptable (without review)

Risk Index Level	
1	Engineering controls required.
2	Engineering controls and/or safety devices appropriate.
3	Engineering controls, safety devices, warnings and/or procedures and training acceptable
4	No corrective action required but all of the above are appropriate

all areas but the High Bay, an active fire evacuation alarm with sirens and speakers, and a fire alert phone. All unnecessary combustibles will be removed from 645/646.

Building 640/641 is cinder block construction and located 80 feet from 645/646, far enough to avoid normal fire propagation.

Risk Analysis: The potential severity level of any fire involving personnel in the proximity of high explosives is level I, Catastrophic. The corrective measures make the probability level to level D, Improbable.

The Risk Index Criteria for fire spread from other areas is 3, acceptable, subject to management approval.

2. Fire Hazard 2: Fire initiating in the area of the testing.

The possible source of such a fire could be electrical faults in

the equipment or electrical systems, ignition sources brought in by workers, and chemical reactions.

Protective Measures: All electrical fixtures in any room in which significant quantities of explosives are handled will be "explosion proof". Switches, lights, panels, signs, testing equipment and machinery will be NEMA 7 or the equivalent. Telephones, speakers, and evacuation alarm systems in processing rooms will be explosion proof. Electric wallboard heaters will be replaced with safety approved heating systems, such as steam heat. Explosives will be enclosed in designated fire resistant containers wherever transported between testing rooms.

Employees will not be allowed to bring lighters, matches, radios, or other spark producing devices into any operating areas. Smoking will be allowed only in the approved area of the adjacent 640/641 building. Fire extinguishers will be provided in each room to fight incipient stage fires.

No chemicals will be allowed within operating areas. All cleaning will be done with water.

Risk Analysis: Any fire involving personnel in the proximity of explosives is severity level I, catastrophic. The above corrective measures lower the probability level to "D", improbable.

The Risk Index for fire originating in testing areas is 3, acceptable by management review.

3. Fire Hazard 3: Fire initiation from lightning strike.

Protective Measures: TAN 645/646 is equipped with lightning arrestors. An engineering survey will be conducted to verify that the lightning protection system complies with NFPA 78. Upgrades will be done as needed.

The magazine storage pad is located 1250 feet from buildings to protect people. Vegetation is cleared away 25 feet to prevent fire in the unlikely event that lightning strikes it.

Risk Analysis: A lightning initiated fire involving personnel and explosives is classified severity level I, catastrophic. The probability level is D, Improbable.

The Risk Index for a lightning initiated fire is 3, acceptable by management review.

8.2 Explosives Hazard

The explosives used by this study are five types of NATO Class 1.1 plastic sheets or gels: Simtex-H, TNT, Flex-X, C-4, and water gels. As Class 1.1, the materials are capable of detonation or producing a supersonic shock wave, but in the plastic or gel form, these high explosives are relatively stable.

The following analyzes potential explosive hazards and assigns a level of risk to each:

1. Protective Hazard l: A fire spreading from another source propagating and involving the explosives.

   Protective Measures: The explosive material will be kept in fire resistant storage magazines. It will be stored in a secured pad 1250 feet from any building. There will be no combustibles inside the secured area and vegetation will be kept clear 25 feet back from the storage area. No radioactive material will be permitted within the explosive quantity-distance zone.

   Quantities of explosives required for daily work only will be transported to TAN 645/646. They will be stored in a bare concrete room with explosion proofed electricals with a minimum

of eight feet between boxes. A fast reacting fire detector will be tied into the fire alarm system in the storage room and fire extinguishers available in all areas involved with explosives.

The explosive materials will be removed from the magazines only in rooms having fire sprinklers and an explosion proof electrical system. They will be returned to the magazines when not immediately in use.

Flammable/combustible materials will be kept out of the area. Closed lid metal trash cans only will be used.

Risk Analysis: A fire capable of propagating into explosives is severity level I, catastrophic. The probability level of such an occurrence is D, improbable.

The Risk Index is Level 3, acceptable by management review.

2. Explosive Hazard 2: Initiation of explosives by friction, heat, static discharge, or impact.

Protective Measures: The explosive sheets will be kept packaged and in protective magazines except when samples are used in the studies. The samples will be enclosed and protected in suitcases when used around the moving conveyor equipment to avoid friction. Suitcases will not be thrown or stacked on one another. Personnel will be stationed by the conveyor to prevent suitcases from falling or getting caught. Personnel handling and packaging the explosive samples will be trained to not bend, drop, inpinge, or scrape the material.

All electrical and heating systems in the operating rooms will be upgraded to eliminate heat ignition sources. Any container used to raise the temperature of samples will be explosion proofed with a safety approved heating system.

The types of explosives used are in plastic or gel form and are not sensitive to electrostatic discharge.

Risk Analysis: Initiation of Class 1.1 explosive materials in an inhabited building rates a severity level I, catastrophic. The

probability level of such an event is D, improbable.

The Risk Index in Level 3, acceptable by management review.

3. Explosive Hazard 3: Explosives initiated by a traffic accident during transportation. A working quantity of explosives will be transported daily between TAN 645/646 and the magazine pad.

Protective Measures: Class A placards will identify any vehicle carrying the explosives. Vehicles will not drive faster than 45 mph and will not drive during hazardous road conditions. The vehicle will be fully lighted and will avoid main roads and night driving.

Two fire extinguishers and two personnel will be located on every vehicle moving explosives. Doors to the explosives storage areas will be closed when the vehicle is within 25 feet with the motor running. The vehicle will be shut off when loading or unloading explosives. The area will be lighted if loading or unloading in the dark.

Only Class II or equivalent containers will be used to transport the explosives between the storage area and working area. These magazines are designed to safeguard materials from damage or fire in an accident. They will be tied down and covered while in transit.

Risk Analysis: Explosives initiated by a vehicle accident is identified severity level I, catastrophic. The probability level is C, remote.

The Hazard Risk Index is 2, undesirable, a management decision required.

United States Government memorandum

Department of Energy

DATE: May 21, 1991

REPLY TO
ATTN OF: EH-25

SUBJECT: Environmental Assessment for the Federal Aviation Administration (FAA) Explosive Detection System - Independent Validation and Verification Program at Idaho National Engineering Laboratory, Idaho Falls, Idaho

TO: A. A. Pitrolo
Manager
Idaho Operations Office

This is in response to your request for approval of the subject environmental assessment (EA) and issuance of a finding of no significant impact (FONSI) for the proposed independent validation and verification program for the FAA's explosive detection system at Idaho National Engineering Laboratory, by your memorandum of March 7, 1990.

The Office of Environment, Safety and Health has reviewed the EA in accordance with our responsibilities under DOE 5440. ID regarding compliance with the National Environmental Policy Act (NEPA). The EA incorporates comments provided by the Office of NEPA Oversight on a preliminary version of the EA. Your NEPA Compliance Officer has informed us (by memorandum of May 9, 1991) that the State of Idaho was provided an opportunity to review and comment on the pre-approval EA and provided no comments.

Based upon my staff's review and recommendations, and after consultation with the Office of General Counsel, I have determined that the EA is adequate for publication and that the proposed action is not a major Federal action significantly affecting the quality of the human environment, within the meaning of NEPA. Therefore, the preparation of an environmental impact statement is not required. The basis for the determination is explained in the attached FONSI.

Please note that the Idaho Operations Office is responsible for providing public notice of the availability of the EA and FONSI as required in Section 1506.6(b) of the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the NEPA. Please send five copies of the document and a copy of the distribution list to the Office of NEPA Oversight for our files.

Paul L. Ziemer, Ph.D.
Assistant Secretary
Environment, Safety and Health

Attachment

cc: T. Perkins, IDO
NEPA Compliance Officer

DEPARTMENT OF ENERGY
FINDING OF NO SIGNIFICANT IMPACT
FEDERAL AVIATION ADMINISTRATION EXPLOSIVE DETECTION SYSTEM - INDEPENDENT VALIDATION AND VERIFICATION PROGRAM
IDAHO NATIONAL ENGINEERING LABORATORY
IDAHO FALLS, IDAHO

AGENCY: Department of Energy

ACTION: Finding of No Significant Impact

SUMMARY: The Department of Energy (DOE) has prepared an environmental assessment (EA), DOE/EA-0507, on the program to independently test explosive detection systems for the Federal Aviation Administration (FAA) at the Idaho National Engineering Laboratory (INEL) near Idaho Falls, Idaho. Based on the analyses in the EA, DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment, within the meaning of the National Environmental Policy Act (NEPA) of 1969. Therefore, the preparation of an environmental impact statement (EIS) is not required, and DOE is issuing this finding of no significant impact (FONSI).

ADDRESS AND FURTHER INFORMATION: For additional information regarding the proposed project, contact:

Director, Office of External Affairs
Idaho Operations Office

U.S. Department of Energy
785 DOE Place
Idaho Falls, ID 83402-1118
(208) 526-1317

For general information on the NEPA process for the proposed project, contact:

Carol M. Borgstrom, Director
Office of NEPA Oversight
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585
(202) 586-4600

PROPOSED ACTION: The proposed action would test the performance of recently developed, commercially available explosive vapor detection systems at an isolated location on the INEL.

The test program would consist of three independent phases, including:

1. Sensitivity and calibration,

2. Detector performance, and

3. Operational characterization.

The Class A explosives that would be tested are Water Gels, C-4, Flex-x Deta Sheet, TNT, and Semtex. These explosives have very low vapor pressures and the detection system must be capable of detecting quantities in the parts per trillion range.

ENVIRONMENTAL IMPACT: Activities related to the proposed action would take place within an existing facility, the Water Reactor Research Test Facility (WRRTF), building TAN-646. No effluents or emissions are anticipated. Existing facility utilities are adequate to accommodate the relocation of 1O to 2O personnel associated with the proposed action. Excavation and clearing would be required for placement of a security cable trench and gravel storage pad. The trench would be located in a previously disturbed area. An archeological survey was

performed in the WRRTF area in 1985. No impacts to cultural or biological resources are anticipated.

Explosive storage, handling, and transportation would be in accordance with (1) DOE 6055.9-STD, D.O.D. "Ammunition and Explosives Safety Standards; (2) DOE-ID Appendix 0550, Standard Operational Safety Requirements, Part 3, Subpart I, "Explosives"; (3) DOE/EV/06194, "DOE Explosives Safety Manual"; and (4) all other applicable requirements. Responsibilities, safety controls, training requirements, explosive delivery, transportation, storage, access and control, disposal, and handling procedures are outlined in a "Safety Plan" written for the project which would be strictly followed.

ALTERNATIVES CONSIDERED: The No Action alternative is the only alternative considered for the INEL in this environmental assessment. Other sites at the INEL were considered and eliminated for safety or administrative reasons. WRRTF is the preferred location due to availability, isolated location, and chemical cleanliness of the facility.

DETERMINATION: The proposed action to independently test explosive detection systems for the FAA at the INEL does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of the NEPA. This finding is based on the analyses in the environmental assessment. Therefore, the preparation of an EIS is not required for this proposed action.

Issued at Washington, D.C., this 21st day of May, 1991.

Paul L. Ziemer, Ph.D.
Assistant Secretary
Environment, Safety and Health