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Environmental Assessment

for

Pulsed Fast Neutron Analysis Cargo Inspection System Test Facility

at

Ysleta Port of Entry Commercial Cargo Facility, El Paso, Texas

Department of Defense
Counterdrug Technology Development Program Office

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XXX 2003

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Proposed Action:

Operational Test of a Pulsed Fast Neutron Analysis Cargo Inspection System at the Ysleta Port of Entry Commercial Cargo Facility, El Paso, Texas.

Designation:

Environmental Assessment

Abstract:

The Department of Defense proposes to construct a Pulsed Fast Neutron Analysis (PFNA) Test Facility and conduct an operational test for a period of 6 months. The purpose of the proposed action is to comply with the legislative directives found in Senate Report 1087-109.

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Executive Summary

Executive Summary

In the post 9/11 World, American citizens recognize, more than ever, that protection of national borders is the foremost responsibility of government. In the age of global terrorism, the biggest defensive challenge is identifying security threats before damage can be done.

Threats can be of many forms, but most agree that the materials needed for terrorism and drug dealing will likely enter the country hidden in the cargo that routinely crosses the border every business day. Non-Intrusive Inspection Systems allow those who guard the border to examine cargoes without having to physically unload the cargo containers.

A large number of Non-Intrusive Inspection Systems are deployed at ports of entry around the United States. While helping to make the inspection process more effective, current technology has shortcomings. Many of the current systems pass x-rays or gamma rays through the inspected vehicles and their cargoes. To discover potential contraband, the system operator must recognize it by its density or unique shape. All of today's systems require a high degree of operator interaction looking at visual images to determine whether more detailed investigation of a particular load is warranted.

Pulsed Fast Neutron Analysis (PFNA) is a radiation-based method that has been developed into a Non-Intrusive Inspection Technology. This technology was designed to determine the presence of contraband and indicate its precise location with no operator input. By automatically detecting the proportions of specific chemical elements within the cargo container, the system alerts enforcement personnel when a match is made with target compound "fingerprints." PFNA has been successfully demonstrated in a laboratory setting using a limited range of cargo. Yet, to be useful in the war against terrorism and drugs, the technology must perform well in real life conditions. Simulating the variety of cargo, vehicles and operating conditions encountered at a port of entry in a laboratory is of limited value. The only way to definitively determine the utility of the technology (detection capability, throughput, "false alarm" rate, etc.) is to subject it to the actual field conditions.

Members of the US Congress recognized that moving a promising technology from the laboratory to the field could only happen after successful operational testing. Hence, Congress appropriated funds and provided specific direction to the Department of Defense to conduct a real-life test of the technology.

Based on a review of candidate locations having a high volume of incoming commercial traffic, the Ysleta Commercial Cargo Facility in El Paso, Texas was identified as the best test site. Under the proposed action, the government will construct a test facility (approximately 9 months) and operate it with the commercial stream-of-commerce (for a maximum period of 6 months).

In accordance with Section 102 [42 USC § 4332(2)(C)] of the National Environmental Policy Act (NEPA), the Department of Defense has prepared this Environmental Assessment for the proposed action. An Environmental Assessment was required to provide information on any potential impacts to the human and natural environment that may result from the proposed action.

A four-step methodology was employed to identify and assess potential impacts. Each component of the environment was evaluated for potential effect and consequences. The results of this assessment process are summarized in Table ES-I.

All consequences were negligible or minor. With the exception of radiation, the effects and consequences of the proposed action are not unlike constructing and operating a drive-through tollbooth plaza. With regard to radiation, a very small amount (a fraction of 1 percent of EPA's allowable threshold) is released to the atmosphere. A small amount of solid radioactive waste will be disposed of using licensed contractors who typically handle hospital waste. Analyses have shown that the system is safe to operators, cargo and the general public. A stowaway in the cargo vehicle will be subjected to a maximum radiation dose the same as OSHA allows for general public over the course of a year. Weapons of mass destruction will not be initiated by the system. Analysis of possible accidents shows that worst-case radiation doses are below acceptable standards.

Based on this Environmental Assessment, a Finding of No Significant Impact is warranted for the proposed action.

Table ES-1. Consequences of the Proposed Action

Document Section	Resource Area	Consequences
3.1	Earth	
3.1.1	Climate	N
3.1.2	Geology	N
3.1.3	Soils	N
3.2	Water	
3.2.1	Surface Water	N
3.2.2	Storm Water	M
3.2.3	Floodplains	M
3.2.4	Wetlands	N
3.3	Air	M
3.4	Vegetation and Wildlife	
3.4.1	Vegetation	N
3.4.2	Wildlife	N
3.4.3	Threatened and Endangered Species	N
3.5	Noise	M
3.6	Land Use	N
3.7	Infrastructure/Utilities	N
3.8	Housing	N
3.9	Recreational Areas	N
3.10	Transportation	N
3.11	Historical and Cultural Resources	N
3.12	Hazardous Waste	N
3.13	Environmental Justice	M
3.14	Ionizing Radiation	
3.14.2.1	Normal Operations	M
3.14.2.2	Abnormal Events	N
3.14.2.3	Dismantlement	N
3.15	Non-Ionizing Radiation	N
3.16	Cumulative Impacts	M

Key: PS = Potentially significant impact
M = Minor impact
N = Negligible impact
NA = Not Applicable

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ACRONYMS AND ABBREVIATIONS

~	Approximately
°	Degree
"	Inch
--	Negligible impact
§	Section
^{57}Co	Cobalt-57
^{60}Co	Cobalt-60
^{54}Mn	Manganese-54
AAQS	Ambient Air Quality Standard
ACGIS	American Conference of Industrial Hygienists
ALARA	As Low As is Reasonably Achievable
ALI	Annual Limit on Intake
BCD	Texas Biological Conservation Data System
c/s	Cycles per second
CAA	Clean Air Act
CAAA	Clean Air Act Amendment
CDE	Committed Dose Equivalent
CEDE	Committed Effective Dose Equivalent
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
Ci	Curie
Ci/kg	Curies per kilogram
Ci/m^3	Curies per cubic meter
Ci/yr	Curies per year
cm	Centimeter
cm/s	Centimeter per second
CO	Carbon Monoxide
DAC	Derived Air Concentration
dB	Decibel
dBA	A-weighted decibel
DBA	Design Basis Accident
DDE	Deep Dose Equivalent
DEA	Drug Enforcement Administration
DOD	Department of Defense
DOT	Department of Transportation
dpm	Disintegrations per Minute
E-Field	Electric Field
E	Endangered
E/SA	Endangered by Similarity of Appearance
EA	Environmental Assessment
EDE	Effective Dose Equivalent
EIS	Environmental Impact Statement
EMF	Electromagnetic Field

EO	Executive Order
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
G	Gauss
g/cm^3	Gram per cubic centimeter
H-Field	Magnetic Field
IBWC	International Boundary and Water Commission
ICRP	International Commission on Radiological Protection
IRPA	International Radiological Protection Association
kg	Kilogram
kVA	Kilo Volt Ampere
lb	Pound
LDE	Eye Dose Equivalent to Lens of the Eye
L_{eq}	Average sound pressure levels
LLRW	Low-level radioactive waste
LOS	Level of Service
M	Minor impact
mCi	Millicurie
MCNP	Monte Carlo N-Particle
MeV	Mega electron volt
mG	Milligauss
mg/cm^2	Milligram per square centimeter
mg/m^3	Milligram per cubic meter
mrem	Millirem
mrem/h	Millirem per hour
mrem/s	Millirem per second
MSL	Mean Sea Level
mSv	Millisievert
mT	Millitesla
NAAQS	National Ambient Air Quality Standards
NAMS	National Air Monitoring Station
NCRP	National Council on Radiation Protection and Measurements
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NII	Non-intrusive inspection
NO_2	Nitrogen Dioxide
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
O_3	Ozone
ONDCP	Office of National Drug Control Policy
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety and Health Administration
OSL	Optically stimulated luminescence

Pb	Lead
pCi/g	Picocuries per gram
PEL	Permissible exposure limit
PFNA	Pulsed Fast Neutron Analysis
$PM_{2.5}$	Particles with diameter less than or equal to 2.5 micrometers
PM_{10}	Particles with diameter less than or equal to 10 micrometers
PS	Potentially significant impact
Q.F.	Quality Factor
rad	Radiation absorbed dose
RCRA	Resource Conservation and Recovery Act
rem	Roentgen equivalent man
s	Second
s/h	Seconds per hour
SDE	Shallow Dose Equivalent
SEC	Safety and Ecology Corporation
SHOP	State Historic Preservation Officer
SLAM	State and Local Monitoring Station
SLM	Sound level meter
SO_2	Sulfer Dioxide
SOC	Species of Concern
Sv	Sievert
T	Threatened
T.A.C.	Texas Administrative Code
TEDE	Total Effective Dose Equivalent
TODE	Total Organ Dose Equivalent
TPW	Texas Parks and Wildlife
tpy	Tons per year
TSA	Transportation Security Administration
TWA	Time weighted average
TWC	Texas Water Code
$\mu g/m^3$	Microgram per cubic meter
µrem	Microrem
µrem/h	Microrem per hour
µSv	MicroSievert
US	United States
U.S.C.	United States Code
USCS	United States Customs Service
USFWS	US Fish and Wildlife Service
USIBWC	United States Section, International Boundary and Water Commission
UST	Underground storage tank
VOC	Volatile organic compound
WHO	World Health Organization
Yr	Year

Purpose and Need for the Action 1.0

1 PURPOSE AND NEED FOR THE ACTION

1.1 Purpose of this Document

This Environmental Assessment (EA) has been prepared pursuant to the National Environmental Policy Act (NEPA) and the Council on Environmental Quality regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508). The assessment has been conducted to determine whether the proposed action is a major federal action having significant effects on the environment, which would require preparation of an Environmental Impact Statement (EIS), or whether the impacts of the proposed action (after mitigation) are less than significant, which would result in preparation of a Finding of No Significant Impact (FONSI).

1.2 Purpose of the Action

The purpose of the proposed action is to comply with the legislative direction provided by the US Senate Committee on Appropriations in connection with the Fiscal Year 2002 Appropriations Bill for the Department of Defense. In its December 2001 report,[1] the Committee directed the Department of Defense, in concert with the United States Customs Service, to conduct a field test of Pulsed Fast Neutron Analysis (PFNA) technology:

> "The Committee has included $10,000,000 to fund the operational field testing of a Pulsed Fast Neutron Analysis (PFNA) NII [Non-Intrusive Inspection] system at the Ysleta border crossing in El Paso, Texas. The technology, developed through years of support through various government agencies, is designed to provide non-invasive, non-harmful detection of illegal substances including narcotics, explosives, currency, nuclear devices, and chemical weapons, regardless of the shape or density of the subject material. The Committee directs the Department of Defense to work with the United States Customs Service to complete this test by July 31, 2002, and jointly report the results to the defense oversight committees within 30 days of completion of the test."

1.3 Need for the Action

In the post 9/11 World, American citizens recognize, more than ever, that protection of national borders is the foremost responsibility of government. Protection of the border encompasses many dimensions, but the main mission is to repel the people and the things that could do harm to the population and the nation's infrastructure. In an age of global terrorism, identifying the threats before damage can be done is the biggest defensive challenge.

Threats can be of many forms, but most agree that the materials needed for terrorism and drug dealing will likely enter the country hidden in the cargo that routinely crosses the border every business day. Statistics reflecting the staggering volume of imports are summarized in Table I.

Table I. Many millions of cargo containers must be evaluated as potential threats.

	Trailer-Size Cargo Containers arriving through:	
Fiscal Year	Southwest Border	Entire United States
2000	4.3 million	17.4 million
2001	4.5 million	16.9 million

Source: US Customs Service, website at http://www.customs.ustreas.gov/enforcem/enforcem.htm

Many parts of government contribute to border protection. The United States Customs Service is the primary law enforcement agency charged with preventing contraband from crossing the nation's borders. The Transportation Security Administration protects the nation's transportation systems. The Department of Defense has a military role as well as an extensive research and development infrastructure that enhances the capability of military and civilian forces. As the government moves toward reorganization to form a Department of Homeland Security, it is today's agencies that must deal with the threat.

Until September 2001, the primary contraband sought by the Customs Service was illegal drugs. At once, the operational tempo greatly increased as noted in a Customs Service press release:[2]

> "Immediately following the September 11 attacks, U.S. Customs went to level one alert status, meaning more thorough inspections of all arriving cars, trucks, and individuals at all southern and northern border locations. As a result of the increased U.S. Customs Service scrutiny, seizure and enforcement activity has increased substantially …"

When it started operations in 1789, Customs Agents' best method of verifying the nature of cargo was hand inspection. Although, hand inspection is still an important tool for the Customs Service, it is clearly impractical in dealing with the volumes of imports shown in Table I. Increasingly, the Customs Service has come to rely on Non-Intrusive Inspection technologies. In principle, Non-Intrusive Inspection allows agents to determine if contraband is present in a cargo container without the need to physically open the container.

A large number of Non-Intrusive Inspection systems are deployed at ports of entry around the United States. While helping to make the inspection process more effective, current technology has shortcomings. Many of the current systems pass x-rays or gamma rays through the inspected vehicles and their cargoes. To discover potential contraband, the system operator must identify it by its density or unique shape. All of today's systems require a high degree of operator interaction looking at visual images to determine whether more detailed investigation of a particular load is warranted.

Pulsed Fast Neutron Analysis (PFNA) is a radiation-based method that has been developed into a Non-Intrusive Inspection Technology. This technology was designed to determine the presence of contraband and indicate its precise location with no operator input. By automatically detecting the proportions of specific chemical elements within the cargo container, the system alerts enforcement personnel when a match is made with target compound "fingerprints." PFNA has been successfully demonstrated in a laboratory setting using a limited range of cargo. Yet, to be useful in the war against terrorism and drugs, the technology must perform well in real life conditions. Simulating the variety of cargo, vehicles and operating conditions encountered at a port of entry in a laboratory is of limited value. The only way to definitively determine the utility of the technology (detection capability, throughput, "false alarm" rate, etc.) is to subject it to the actual field conditions.

Congress recognized that moving a promising technology from the laboratory to the field could only happen after an operational test. Hence, Congress appropriated the funds to perform the test and provided specific direction to conduct the test.

1.4 Participating Agencies

The Department of Defense is the lead agency for the proposed action. Under a Memorandum of Understanding, the United States Customs Service and the Transportation Security Administration are cooperating agencies. The General Services Administration is participating under a separate Memorandum of Agreement.

1.5 Application of NEPA

As described in Section 1.2 herein, the operational field test of PFNA technology is an action mandated by legislative requirement. Therefore, the field test is not a DoD decision or an action that is proposed by the DoD. As a result, DoD is not required to consider alternatives to the mandated action – the field test of PFNA. However, NEPA still requires that alternative ways to structure the test be assessed for their impact.

The Proposed Action and Alternatives 2.0

2 THE PROPOSED ACTION AND ALTERNATIVES

2.1 Description of the Proposed Action

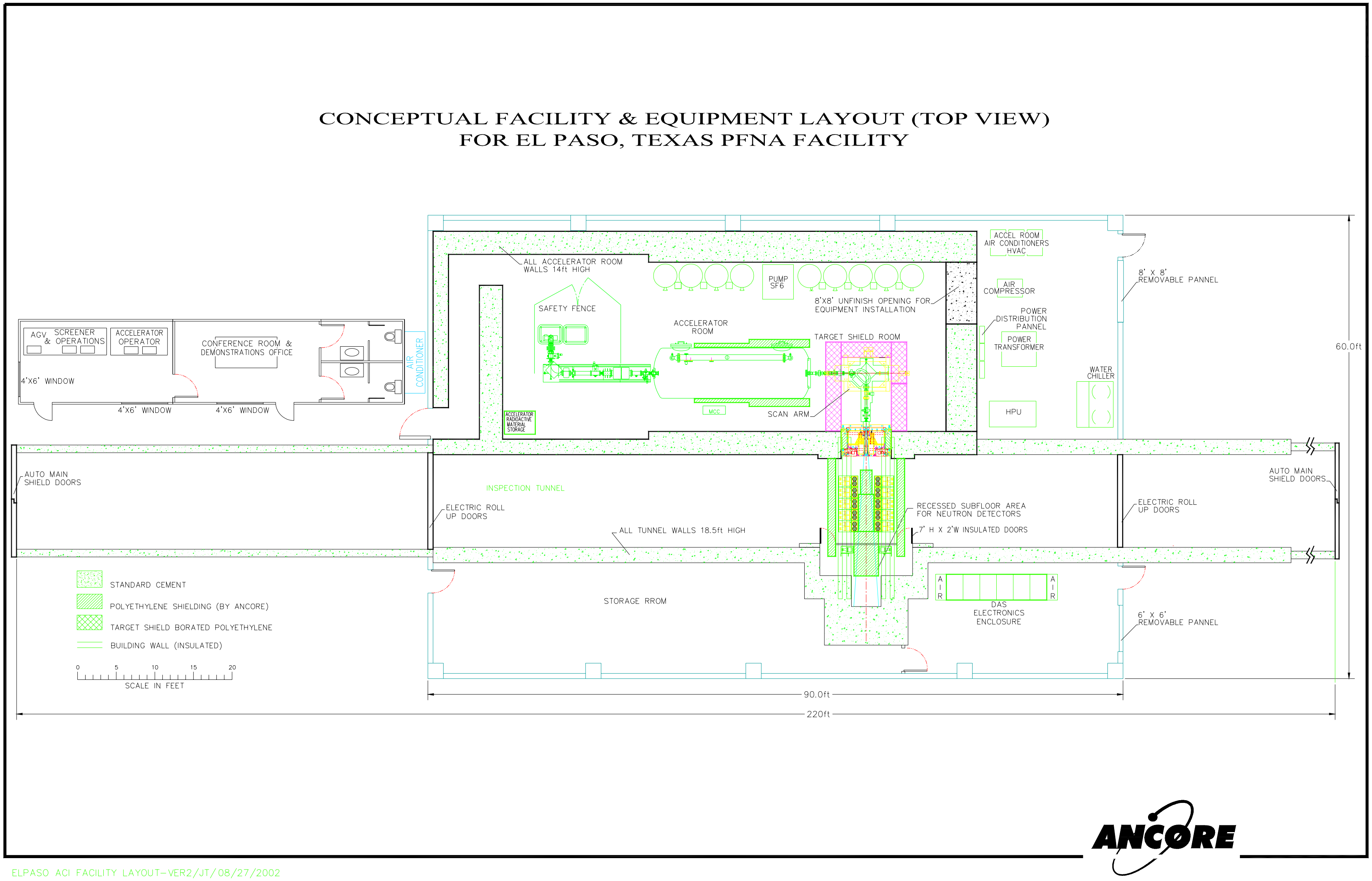
The proposed action is to conduct an operational test of a Non-Intrusive Inspection Technology using stream-of-commerce at a port of entry operated by the United States Customs Service. The specific technology undergoing evaluation is the PFNA Cargo Inspection System and the test site is the Ysleta Port of Entry Commercial Cargo Facility located at El Paso, Texas. A six-month operational test period is planned after construction of buildings to house the equipment is completed. At the conclusion of the test period, the PFNA inspection equipment may be turned over to the Customs Service or it may be removed and the site returned to its original state.

To meet the operational requirements of the PFNA Cargo Inspection System, a total land area approximately 250 feet by 650 feet is required (approximately 3.7 acres) for the following facilities:

- **Cargo Inspection Building**, measuring approximately 60 feet x 220 feet, to conduct the inspection of trucks and cargo containers. The building will house the PFNA equipment and incorporates an inspection tunnel where trucks and cargo will be inspected. The PFNA Cargo Inspection Building will have shielding material of sufficient thickness to ensure radiation levels are essentially equal to the “background levels” external to the building. Personnel are excluded from this building while the PFNA equipment is running as a safety precaution from radiation.
- **Operations Center**, approximately 800 square feet, containing restrooms, work, office, and conference spaces. This building will accommodate personnel and equipment that is part of the PFNA Cargo Inspection System. This building will be adjacent to, but separate from, the Cargo Inspection Building.
- **Driver Waiting Area** composed of a covered area and seating where vehicle drivers will wait while trucks and cargo containers are being inspected.
- **Supporting Infrastructure** including access roadways to provide controlled entry into the PFNA Cargo Inspection Building and return of vehicles to normal port traffic routes, connections to utility service lines, a storm water control system and final landscaping of the site.

These facilities will be designed to provide protection to the general public and workers in accordance with applicable laws and regulations. Activities in support of the proposed action will be conducted in compliance with federal, state, and local environmental regulations and in strict accordance with all conditions specified in environmental permits. Required permits are identified in Section 3.0

Layout of the buildings making up the PFNA Cargo Inspection System is shown in Figure 1



Source: Ancore Corporation, “Deliverable No. 13: PFNA Facility Requirements and Specifications for Installation in El Paso, Texas,” 28 August 2002.

Figure 1. Conceptual Layout of Test Facility. (Get drawing w/o Ancore logo and w/ less detail.)

2.2 Scope of Project

The operational field test will include:

- Preparing a test site with appropriate roadways;
- Constructing buildings;
- Erecting fences for perimeter security
- Landscaping the site
- Fabricating, shipping and assembling equipment at the test site;
- Conducting a field test for approximately six months;
- Analyzing test data and preparing a final report
- Turning the system over to the Customs Service
- Or, deconstruction of the test facility.

For the purposes of this EA, the scope of the project is composed of three phases as shown in Figure 2. The Construction Phase covers construction of facilities, installation of the PFNA equipment and preparation of roadways. This, the first phase, will take six months.

The Operational Test Phase will consist of a 2-month period for checkout and calibration followed by a 4-month operation test period. During the 4-month test period, the system is envisioned to operate 12 hours per day, 6 days per week. For the test, the estimated throughput is 4 trucks per hour. (Ten vehicles per hour is the system's designed throughput for routine operation.) In order to obtain the broadest range of types of cargoes and vehicles, testing will be conducted continuously while the Commercial Cargo facility is normally open.

In the final phase, the Disposition Phase, test data will be analyzed and a final report will be written. If the system proves successful, it will be left in place for Customs Service use. In that case, this EA will have to be updated to reflect a longer time of operation. Additionally, some permits may have to extended or rewritten.

If the PFNA Cargo Inspection System fails the test, it will be removed through a deconstruction process and the project plans provide for this eventuality.

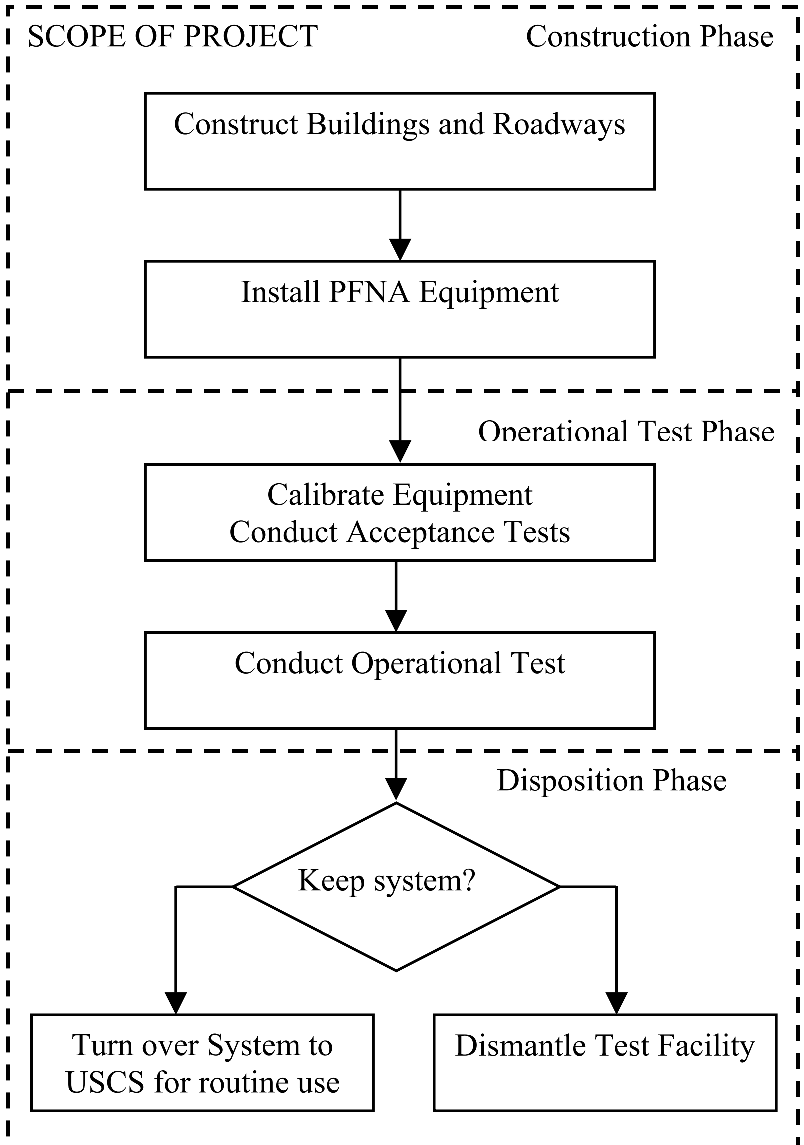


Figure 2. The scope of the project is divided into three phases.

2.3 Alternatives

Environmental assessments for major federal actions require investigation of alternatives to the proposed action as part of the assessment process. DOD, in concert with supporting agencies USCS and TSA, has evaluated several alternatives for the proposed action. Results of evaluations of alternatives are summarized in this section of the EA.

2.3.1 No Action Alternative

This alternative proposes that the PFNA Cargo Inspection System not be operationally tested. Naturally, not testing the PFNA Cargo Inspection System would result in no immediate change to the existing environment at the proposed Port of Entry. Over the longer term, growing trade activity or heightened security concerns can lead to long delays at border crossings into the United States. Besides the obvious traffic problems, delays will lead to degraded air quality, noise and other unwanted environmental consequences. If the PFNA concept proves successful, it may well speed up the processing of vehicles through inspection at ports of entry and alleviate some of the traffic problems. Foremost, if the system can reliably detect contraband, significant national security benefits will accrue with deployment at points of entry into the United States.

From the perspective of this EA, the environmental impacts associated with the No Action alternative would be the same as those resulting from current operations at Ports of Entry. However, as discussed in Section 1.2 (Purpose and Need for The Action), Congress has provided funding and direction to DOD to conduct a test of the PFNA technology. Therefore, the no action alternative is infeasible and is not further evaluated in the EA.

2.3.2 Use of Facilities without Stream-of-Commerce

One alternative is to construct the test facility at a location other than a port of entry. The PFNA Cargo Inspection System would only inspect vehicles that had been specifically prepared as test samples. This approach has the advantage of causing no possible disruption to daily port of entry operations. Additionally, locating the facility could be accomplished without having to conform to the many limitations imposed by a working facility (e.g., controlled access, land area, traffic patterns, etc.).

This alternative was discarded because one of the central purposes of the test is to subject the system to the "real life" conditions encountered in an operational setting. Testing at an operating port of entry yields: varying traffic levels, a wide range of vehicle types and configurations, a broad span of cargo composition, operators performing under pressure, etc. While the conditions are not as controllable as those that would occur in a structured test outside of the stream-of-commerce, they are truly representative of the ultimate demands that would be placed on the system.

Based on the fundamental purpose of the test, this alternative was determined not to be acceptable.

2.3.3 Use of Existing Facilities at Ports of Entry

In a survey of their Ports of Entry, USCS quickly determined that there existed no buildings that could be cost-effectively modified to serve as a field test facility for the PFNA Cargo Inspection System. The buildings for the PFNA Cargo Inspection System require specialized design and construction characteristics in order to satisfy basic operational and safety requirements. Using existing facilities, even with extensive modifications, was determined not to be a viable alternative. Use of existing facilities is not discussed further in this EA.

2.3.4 Location at an Alternative Port of Entry

For another port of entry to be considered viable site for an operational test site for the technology, it first had to meet the facility and operational requirements of the PFNA Cargo

Inspection System Test Facility and its related support structures/functions. In assessing ports, the following constraints/requirements were considered:

- Port should have sufficient stream of commerce to enable PFNA to be tested on a broad array of cargo.
- Port should have sufficient land area to accommodate the Test Facility and supporting structures. (If sufficient land is not available on current property, consider purchase/ lease of adjacent land.)
- Locating PFNA Cargo Inspection System at Port should not severely disrupt current (or planned upgrades to) operations.
- Locating PFNA Cargo Inspection System should not disrupt established traffic patterns at the Port.
- Site characteristics would not demand special construction techniques.
- Site has easy access to utilities

Should the technology be a positive contributor to the USCS mission, different constraints would likely be involved in making decisions about deploy to other locations.

The USCS considered five potential high-traffic locations as candidate sites for the PFNA Cargo Inspection System field test. USCS and Ancore representatives visited each site as part of the assessment process.[3]

Results of the assessment are summarized in Table II. Most locations were severely limited in free land area that could accommodate the relatively large structure to house the PFNA Cargo Inspection System. Also, short-term placement of the test facility at most locations would disturb traffic patterns to the extent that ongoing Customs inspections would be unacceptably compromised.

As a result of the review by USCS, the Ysleta Cargo Facility emerged as the only site surveyed that could accommodate the Test Facility without compromising Customs Service operations during the test period. Ysleta was selected because it has sufficient space available to locate the PFNA Cargo Inspection System, would result in very little traffic impact, and would not adversely impact planned port construction. The El Paso (USCS) district has the second largest workload in commercial traffic along the US-Mexico border[4] and therefore, for purposes of conducting a "stream-of-commerce" field test, Ysleta offered a wider range of cargo types than the other alternatives. Conducting a field test on Federal government-owned property provided significant flexibility to site the PFNA Cargo Inspection System to meet the USCS requirement for natural background (ambient) radiation levels at the property fence line. USCS facilities at seaports are under lease or used according to standing agreements with the USCS, limiting those areas where the PFNA Cargo Inspection System could be sited and safely operated.

Since Ysleta was selected as the proposed site, it is fully assessed in the balance of this EA.

Further details about the other candidate locations are presented in the remainder of this section.

Table II. Summary of Evaluation of Candidate Ports as Test Locations

Port Requirement	Bridge of the Americas, El Paso, Texas	Port of Long Beach, California	Port of Los Angeles, California	Port of Oakland, California	Ysleta Cargo Facility, Texas
Has sufficient stream of commerce	M	M	M	M	M
Sufficient land area available (or obtainable)	F	F	M	M	M
Would not disrupt current/planned operations	F	U	F	M	M
Would not disrupt traffic patterns	F	F	F	F	M
Would not require specialized construction	U	U	F	U	M
Convenient access to utilities	M	M	M	M	M
Key: M = Meets requirement F = Fails to meet requirement U = Unknown					

2.3.4.1 Bridge of the Americas, El Paso, Texas

At the Bridge of the Americas, a suitable area for the PFNA Cargo Inspection System field test site could not be found that would not negatively impact existing operations. Building the PFNA Cargo Inspection System facility at this location would impact the movement of vehicles and severely reduce the space required to back trucks into docks at the commercial facility. There was no land available to expand the boundaries of the Port.

2.3.4.2 The Port of Long Beach, California

A spot providing sufficient space for the PFNA Cargo Inspection System test site at the Port of Long Beach could not be found.

2.3.4.3 The Port of Los Angeles, California

Investigation of the Port of Los Angeles uncovered a number of concerns:

- (1) The physical shape and industrial complexity of the port does not allow the PFNA Cargo Inspection System to be centrally located from a traffic standpoint. Any location picked for the PFNA Cargo Inspection System will require traffic to be directed to it, sometimes with normal movement and sometimes against normal traffic patterns.
- (2) Locating the PFNA Cargo Inspection System facility at the port would affect proposed upgrades to the rail and road systems.
- (3) Identified sites would require fill material prior to PFNA Cargo Inspection System construction. Construction cannot be scheduled for at least 2 years after fill placement in order to allow for settlement.
- (4) Foundations are expected to be of pile construction and will have to meet California Earthquake Zone 1 criteria. It is anticipated that compliance with earthquake standards will increase costs 15-25% for the unique site conditions.

2.3.4.4 The Port of Oakland, California

Locating the PFNA Cargo Inspection System facility at the Port of Oakland, CA would adversely affect planned upgrades to the rail and road systems at the port and would result in traffic tie-ups at major intersections. Port personnel had identified two sites that could be considered. One site at the Ninth Avenue Terminal is remote from the rest of the port. The port is spread out with multiple shipper terminals providing direct accesses to local highways. USCS personnel indicated that access to this remote site would require significant vehicle movement in a congested area and possibly require extra personnel at the remote site. Another site is in the parking lot at the USCS administrative facility. This location is near the center of the port and the road system. Traffic tie-ups at the major intersection adjacent to the site are common. If established here, the site is feasible for the test throughput of 5 vehicles per hour. The site could not be used if the throughput is increased closer to the 20 vehicles per hour that the inspection equipment can potentially accommodate. Traffic flow would have to be improved in order to accommodate 10 vehicles per hour that the inspection equipment can potentially inspect

2.4 Description of the Proposed Site

The Ysleta Cargo Facility is near El Paso, Texas in the westernmost part of Texas (Figure 3). It is approximately 10 miles (16 kilometers) southeast of El Paso, Texas in southern El Paso County, Texas. An aerial view, Figure 4, shows the relationship of the Ysleta Port of Entry to the Rio Grande and major roads. As shown in Figure 5, the Commercial Cargo Facility is a large part of the port of entry complex. The Port of Entry, which encompasses an area of approximately 90.3 acres,[5] is situated on the eastern shore of the Rio Grande River. Agricultural lands bound it from the northeast to the south. The International Boundary and Water Commission (IBWC) levee bounds it to the west. To the east, it is bounded by the access roads to Americas Avenue. Administrative and automobile inspection areas of the Port of Entry are adjacent to the north of the Commercial Cargo Facility. .

Facilities existing at the Ysleta Commercial Cargo Facility include: six (6) primary lanes, two (2) empty truck inspection bays, four (4) bulk cargo inspection bins, two (2) hazardous cargo containment bays, ten (10) export dock spaces, fifty-five (55) truck docks with 50-foot bay depth for full offload and forklift operations, a VACIS non-intrusive inspection system and a Truck X-ray non-intrusive inspection system.

Source: World Sites Atlas

Figure 3. The Ysleta Port of Entry is located in the westernmost part of Texas.

As shown in Figure 6, the site identified for the PFNA Cargo Inspection System is on government-owned land outside of the current operating area of the Commercial Cargo Facility. The site is untended land (Figure 7) and will require access roads to connect it with the current operating area of the Commercial Cargo Facility (Figure 8).

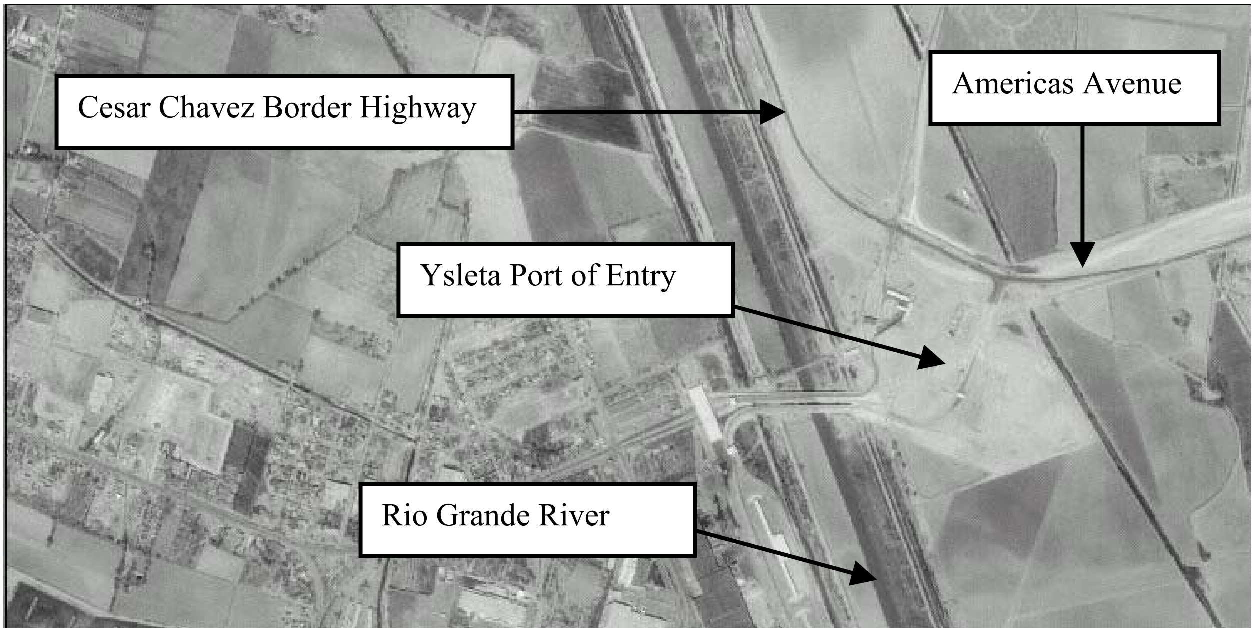


Figure 4. Aerial view of Ysleta Port of Entry showing location with respect to major features.

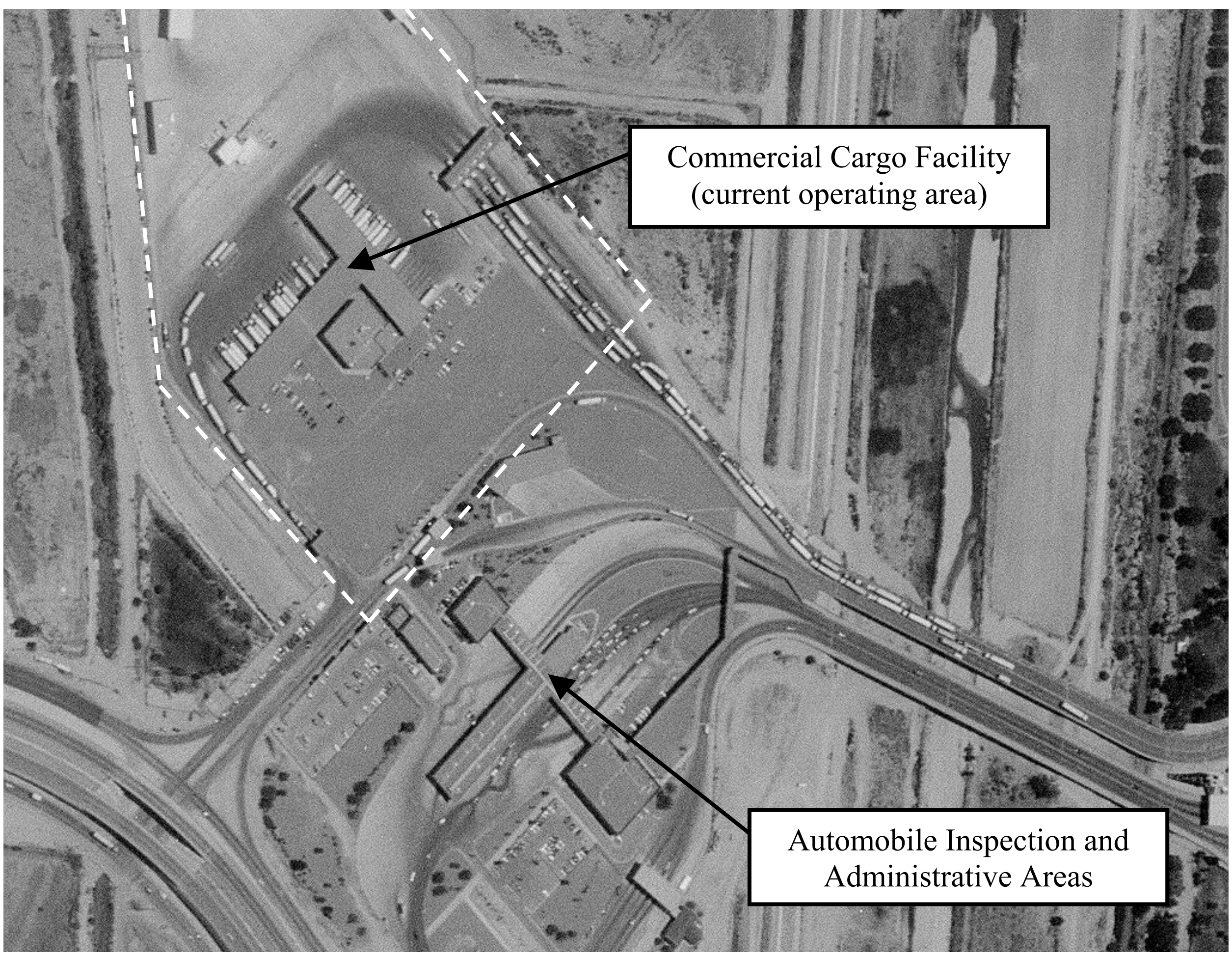


Figure 5. The Commercial Cargo Facility is a major part of the Ysleta Port of Entry.

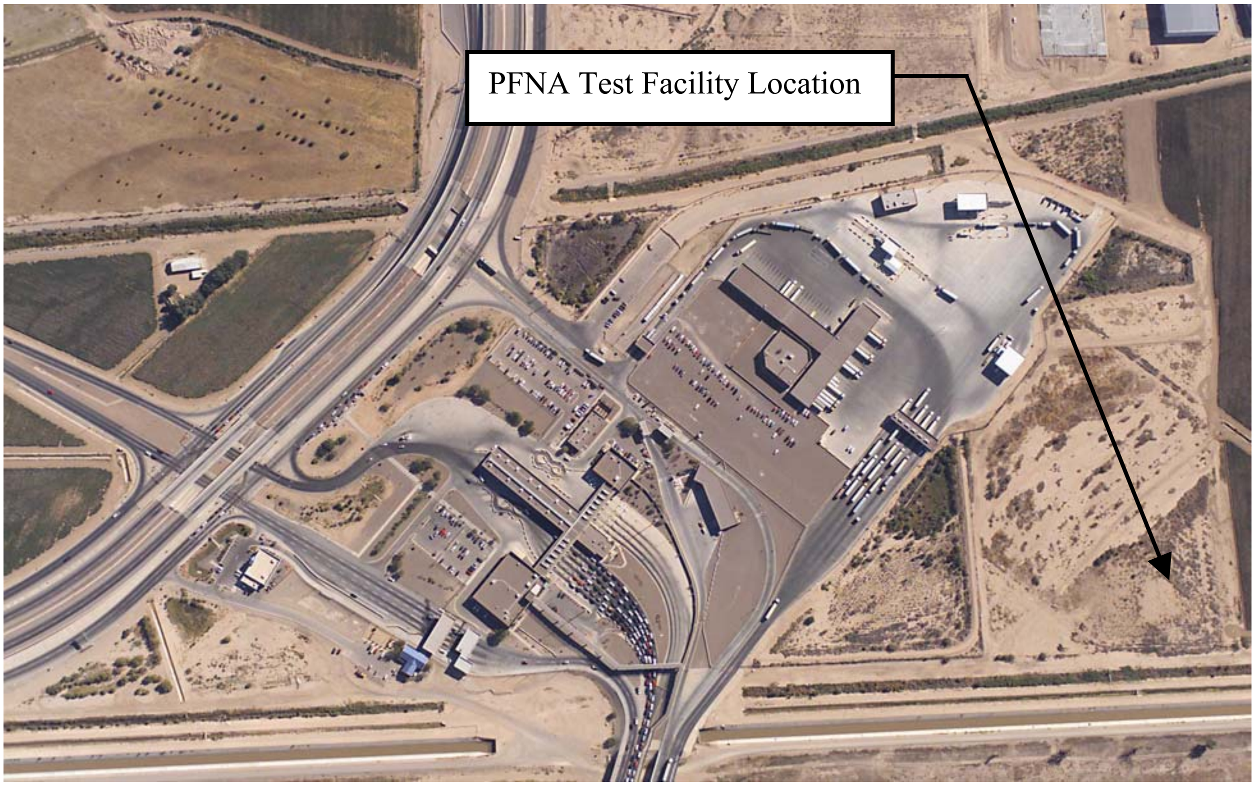


Figure 6. The proposed location of Test Facility is outside the current operating area.

Figure 7. The proposed location is an untended area that will require improvement.
(View looking southwest.)

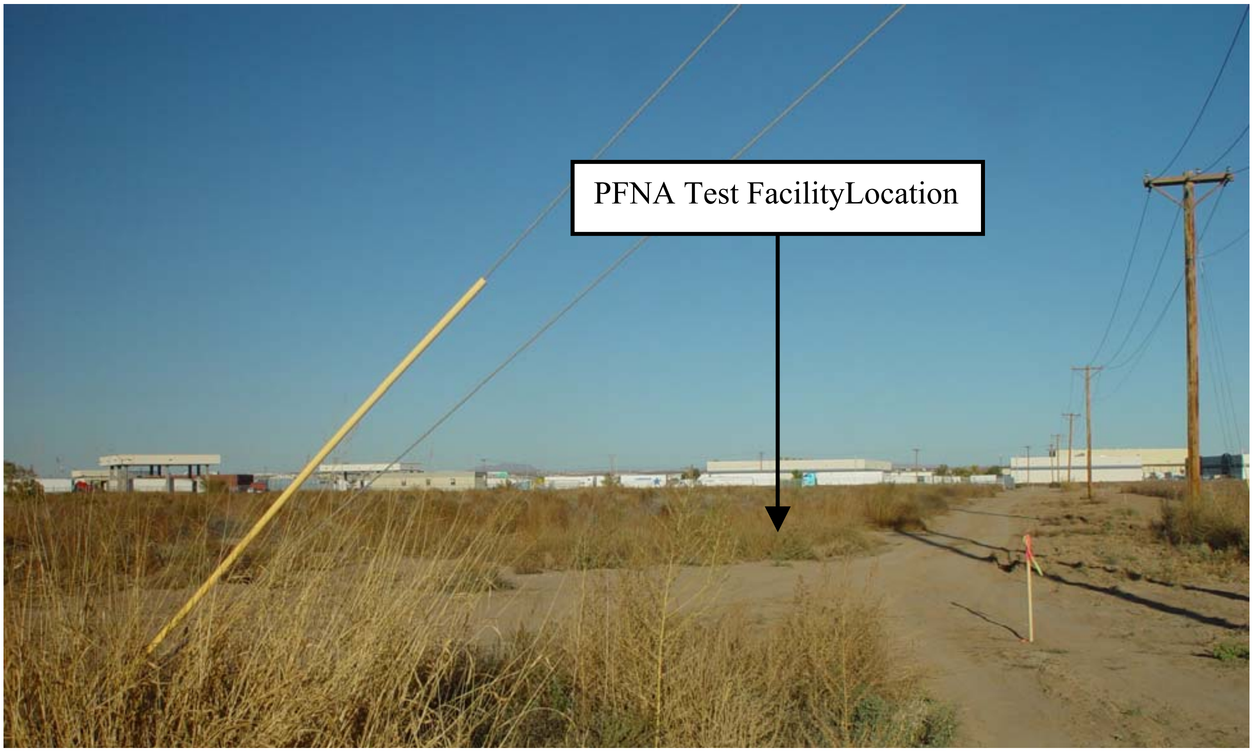


Figure 8: The proposed location requires access roadways
from the main part of the Commercial Cargo Facility.
(View looking east.)

2.5 Pulsed Fast Neutron Analysis Cargo Inspection System

2.5.1 What is PFNA?

Pulsed Fast Neutron Analysis (PFNA) is a radiation-based method that has been developed into a Non-Intrusive Inspection Technology. The PFNA technique measures the elemental contents (e.g., oxygen, nitrogen, etc.) within volume segments of a scanned object. These measurements are used to generate three-dimensional “maps” of the object’s elemental composition. The amounts and relative concentrations of key elements are used to identify specific substances of interest (e.g., explosives, narcotics, etc.).

A system has been designed to use this technique for inspecting tractor-trailer vehicles. The system, made by Ancore Corporation, is called the Pulsed Fast Neutron Analysis Cargo Inspection System. The system is housed in a large “Cargo Inspection Building” and several auxiliary structures. A simplified diagram of the PFNA Cargo Inspection System is shown in Figure 9.

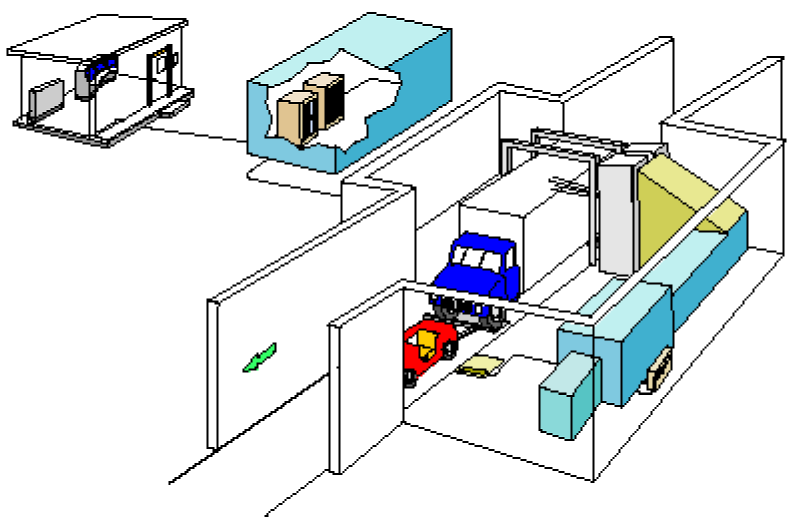


Figure 9. The PFNA Cargo Inspection System is housed in several structures.

2.5.2 Description of the Inspection Procedure

Trucks selected for inspection will be directed to the corridor-like entrance of the Inspection Building. Drivers leave their vehicles and walk to the designated waiting area (pavilion) near the exit of the corridor at the opposite end of the building. The corridor is approximately 220 feet long. The truck is towed through the corridor by an unmanned, automated ground vehicle or AGV (Figure 10 and Figure 11). Shield doors are located at each end of the corridor. Once the vehicle is fully inside the corridor, the shield doors are shut allowing the equipment to start operating. The whole process is monitored and directed by the test facility personnel located in the PFNA control center.

Figure 10. The AGV tows a truck by its front wheels.

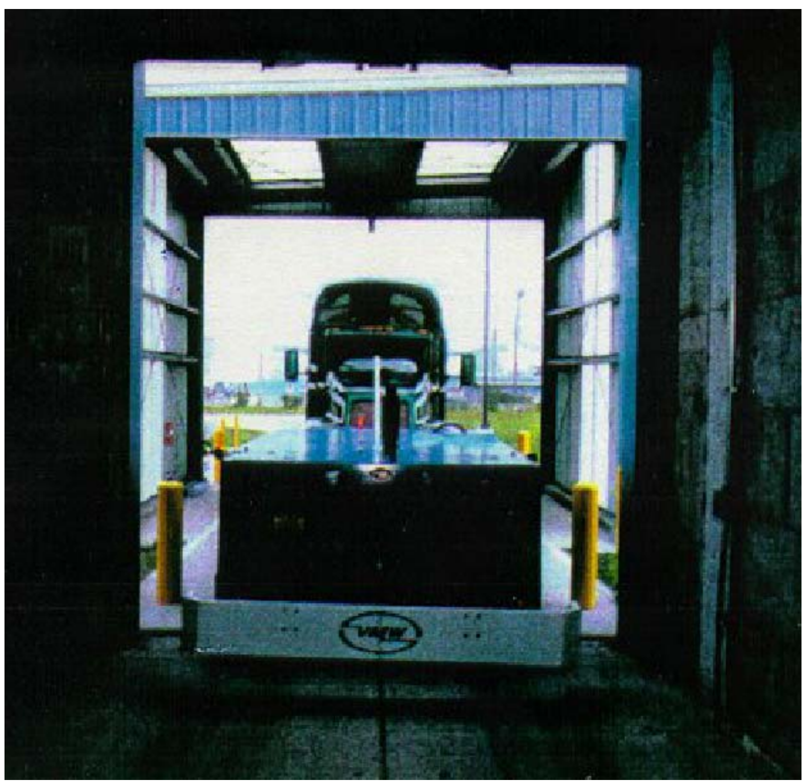


Figure 11. Via remote control, the AGV guides the tractor-trailer through the Inspection Building.

When it reaches the scanning device, the beam of neutrons scans the cargo container (See the description below). The beam is located on one side of the corridor so that the towed cargo container will pass in front of it. As the truck is towed through the corridor, it is moved through the neutron beam (Figure 12). As a result, all sections of the cargo, as well as the vehicle itself, are examined (Figure 13). Detectors on the wall, ceiling and floor sense scattered radiation and transmit data to the Control Center computers. The results of the examination show up immediately on the computer monitors of the operators in the test facility's control center. If no contraband is detected, the driver retrieves the truck at the exit of the test facility corridor.

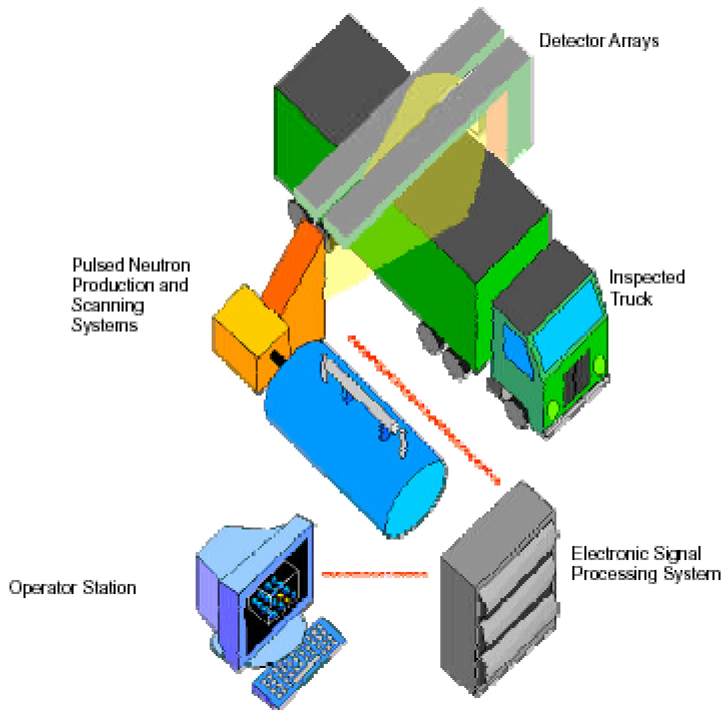


Figure 12. The heart of the PFNA Cargo Inspection System
is the pulsed neutron production and scanning systems.

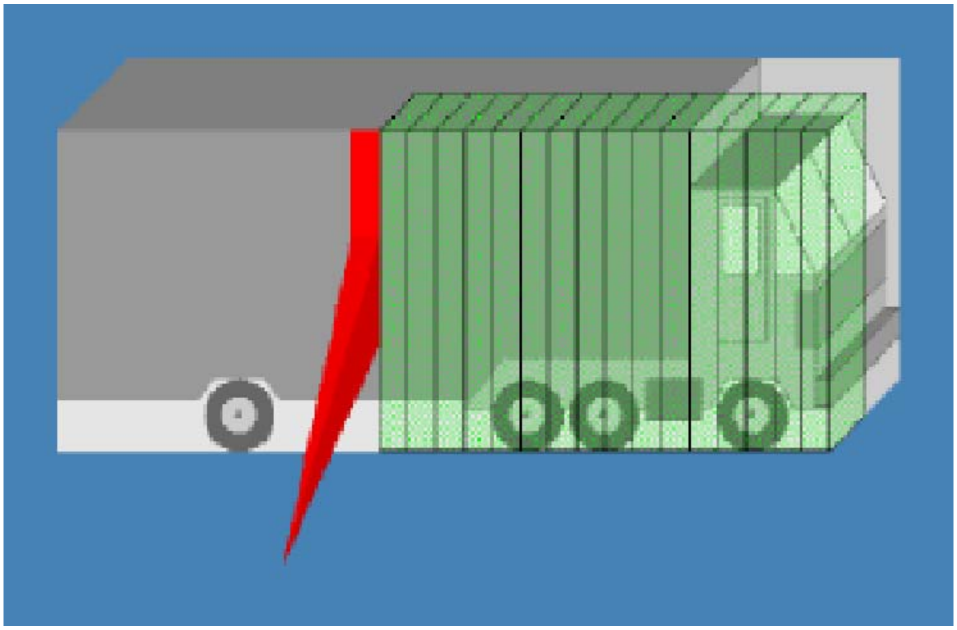


Figure 13. The scanning beam covers virtually all parts of the vehicle.

2.5.3 Description of the Scanning Beam

The PFNA device uses what are referred to as “fast neutrons”, from a pulsed source, to scan the cargo containers. Neutrons are non-charged particles found in the nucleus of all atoms except hydrogen. The nucleus oaf an atom can contain neutrons and protons. The most abundant form of hydrogen has a nucleus with one proton. A second form of hydrogen called deuterium has a nucleus with one proton and one neutron. The PFNA system uses deuterium to produce the neutron beam. Ionized deuterium can be accelerated, via an electromagnetic field, to a very high velocity. A fairly tight beam is formed and the accelerated deuterium atoms are directed to a stationary target consisting of more deuterium gas.

The accelerated deuterium nuclei impact the target deuterium nuclei. One result of these collisions is the creation of individual neutrons. Many of these neutrons travel in one direction. Using, a square tube collimator, the neutrons are focused to form the inspection beam. Neutrons are emitted from the square-shaped beam, which is approximately 45 centimeters x 45 centimeters in size. The neutrons that do not move straight down the tube will hit the tube walls and are either deflected away or absorbed.

What emerges is essentially a straight or collimated beam of neutrons. Also, since the original accelerated deuterium nuclei beam can be readily maneuvered, it is used to create a pulsed neutron scanning beam. Since we are looking at only those neutrons which have made it through the tube and are all basically moving in the same direction, they also tend to be traveling at the same velocity and have roughly the same kinetic energy, approximately eight (8) million electron-volts (MeV) per particle. Tightly controlling the energy of the neutrons in the beam is critical for determining what materials are in the cargo container, as explained below.

A by-product of the process is very small amount of another radioactive form of hydrogen called tritium. As a part of normal operations, the gaseous tritium is released periodically into the atmosphere. No other radioactive material is released into the environment by the system.

2.5.4 Detecting Specific Materials in the Cargo

The neutron beam described above is used to examine the vehicle and its contents. As the neutrons beam passes through the vehicle, some of the neutrons will interact or strike the nuclei of the atoms of the items inside. Some of the neutrons will hit the walls, on both sides, and some will pass right through the vehicle and not hit anything. When the neutrons do strike nuclei inside, one of two things will happen. Either the neutron will, like the billiard ball, bounce off the nuclei or it will be temporarily absorbed by the nuclei. It is the latter case that forms the basis for determining the contents of the vehicle.

When absorbing the neutron, each atom or molecule has more energy than it did before. The atom may now undergo one of several processes, depending on what type of atom it is, to get rid of this excess energy, and will typically do this in a very short period of time. Some of the extra energy (in some cases, all of the energy) is released as a gamma ray. A gamma ray is a form of electromagnetic energy similar to X-rays, or microwaves. Atoms of the same element will always emit a gamma ray of precisely the same energy. Cargo made up of different types of atoms or elements will emit gamma rays with a range of energies. The PFNA computers are programmed to look for specific combinations of emitted gamma rays at specific energies, which are unique “fingerprints” for contraband items.

As noted in the description of the facility, detectors are located in the corridor around the vehicle being scanned. The detectors are designed to measure gamma ray energy. Computers compile the measurements and compare them to the specific energies or fingerprints of the substances (contraband) that is being sought. Comparing the time when the gamma rays were detected to the time the neutron pulse was initiated, the computer calculates the location of the atoms that emitted the gamma radiation. The computer shows this location on the operator’s monitor. Using information from the detectors located around the vehicle, the system creates a three-dimensional picture on the operator’s monitors that highlights the location of the contraband.

Figure 14 shows a series of pictures taken of a car containing contraband. The picture at the upper left is simply the radiographic image of the car that would be obtained with medium resolution gamma rays. Although some features of the automobile are recognizable in the radiographic view, the engine compartment and rear of the car are cluttered and indistinguishable. The PFNA system can identify specific materials as shown in the other four pictures. The image labeled *Carbon* shows the components of the car with high carbon content, such as the tires, spare tire, gasoline in the fuel tank, and other miscellaneous carbon bearing parts. The image labeled *Oxygen* shows the water in both the battery and the windshield washer reservoir, along with a partial signature of the concealed explosive that has a unique oxygen fingerprint. The water bottles in the rear of the car also show a partial explosive signature. The image labeled *Explosive* show the location of the contraband. For this image, the PFNA system was commanded to show only objects that had the programmed elemental “fingerprint” of an explosive. All other components of the inspected object are rendered transparent.

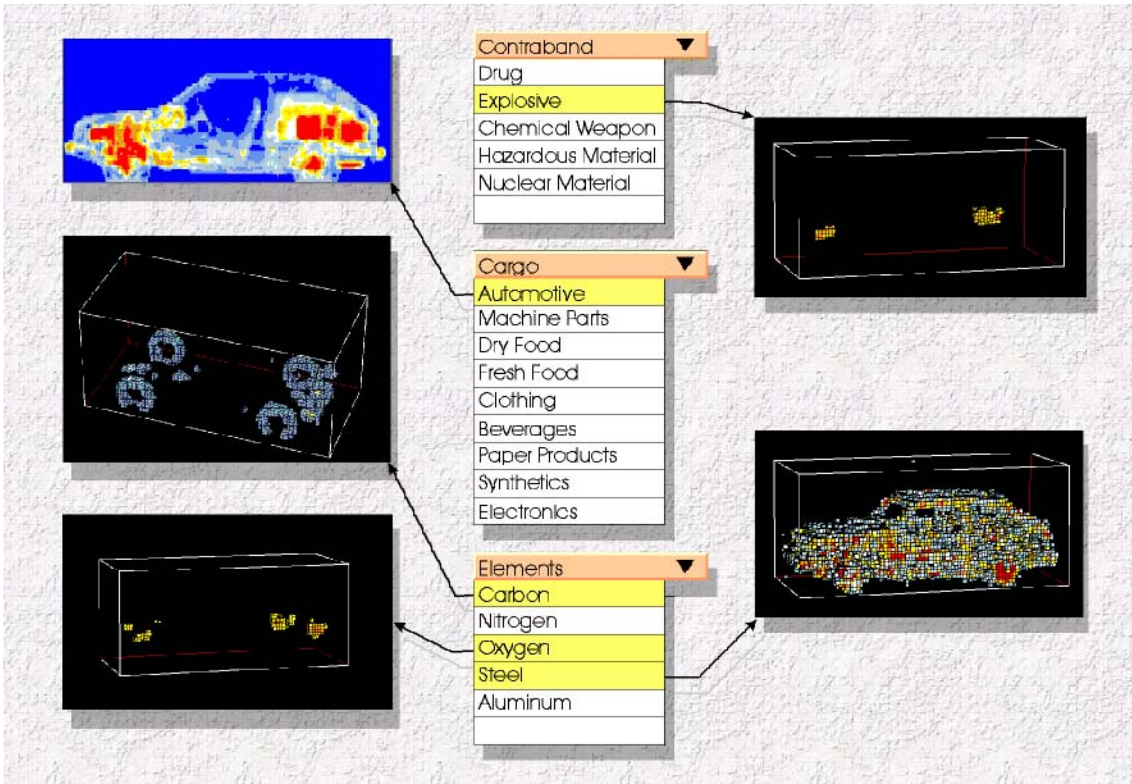


Figure 14. PFNA selectively shows the location of substances based on gamma ray "fingerprints."

The Affected Environment and Environmental Consequences 3.0

3 THE AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The purpose of this section is to describe the characteristics of the Ysleta Port of Entry Commercial Cargo Facility and to assess the potential impacts of the proposed action. If an impact is identified, it is assessed as to its magnitude.

The methodology employed to identify and assess impacts involved four steps. First, information was collected about the various resources at or near the proposed test site. Next, a determination was made whether the proposed action described in Section 2.0 would result in any impacts to those resources. In the third phase, it was determined whether these impacts were potentially significant, as defined in 40 CFR 1508.27. The action was reviewed in the context of applicable laws and regulations to determine whether the action exceeded specific thresholds (e.g., statutes, regulatory limits, etc.). Finally, for impacts that were assessed as potentially significant, it was determined in the fourth step whether mitigation measures could be implemented to reduce impacts to less-than-significant levels.

3.1 Earth

3.1.1 Climate

3.1.1.1 Affected Environment

The Chihuahuan Desert climate is semi-arid, characterized by moderately hot summers, mild winters, short temperate spring and fall seasons, low humidity and little rainfall. In the spring, dust storms and high winds are common. Wide temperature ranges occur from day to night because of the effects of nighttime cooling of the thin, dry air. Background information regarding climate is presented in Appendix C.

3.1.1.2 Consequences

No activities associated with the PFNA Test will affect the climate of the area.

3.1.2 Geology

3.1.2.1 Affected Environment

The Ysleta Cargo Facility has relatively flat terrain with a low elevation and consists of gravel, sand, silt, and clay deposits. Background information regarding geologic properties is presented in Appendix C.

3.1.2.2 Consequences

During the Construction Phase (and also potentially during the Disposition Phase), excavation will occur. Excavation activities will be restricted to typical activities associated with building foundations and activities associated with creating infrastructure such as roads and utility connections. Footings for the buildings will not be deeper than 24 inches below the surface.

XX Confirm depth of footings.

Implementing the proposed action will have no significant effect on the geology of the area.

3.1.3 Soils

3.1.3.1 Affected Environment

At one time, the soils in the project area were subject to flooding by the Rio Grande. Because most of the acreage in this part of El Paso County has been leveled for irrigation, the soils have an almost uniform surface. In El Paso County, the soils have a high content of lime, are alkaline, contain little organic material, and lose water rapidly through evaporation. Background information regarding soils is presented in Appendix C.

3.1.3.2 Consequences

Potential impacts to soil resources were assessed based on existing soil types, site conditions, and the size of the project. Primary impacts to soils would occur during the Construction Phase. Specifically, clearing, grubbing, excavation, and grading will result in the permanent alteration or loss of on-site topsoil. The entire site lies within the 100-year flood zone (see Section 3.2.3). Fill material will be required to raise the base elevation level to the same level as the rest of the Commercial Cargo Facility

Standard erosion and sedimentation measures will be incorporated as mitigation:

- Paved areas, graded areas, trenching conducted for utilities and building construction areas will be stabilized during construction using hay bales and/or filter fabric;
- The site will be revegetated as soon as possible after soils are disturbed,
- Soil matting will be employed.

In addition to the erosion mitigation measures cited above, it will be necessary to minimize sedimentation runoff into the storm water retention ponds that serve the port of entry.

By implementing standard engineering practices for erosion, no significant impacts are anticipated with the proposed action.

3.2 Water

The PFNA Cargo Inspection System does not use water and does not create any wastewater. Water resources were considered from the following perspectives:

- Surface water
- Floodplains
- Storm water
- Wetlands

Background information regarding water resources is presented in Appendix D.

3.2.1 Surface Water

3.2.1.1 Affected Environment

No surface water bodies are located on the proposed site. The Rio Grande River and manmade irrigation channels are the only major hydrologic features near the project site. The United States Section, International Boundary and Water Commission (USIBWC) levee separates the river from the Ysleta Port of Entry.

To supply irrigation water to the fields in the surrounding area, a network of channels (called "drains") exists throughout El Paso. The Playa Drain borders the Ysleta Port of on the east by and the Playa Intercepting Drain borders it on the west. Both of these are earthen. The concrete-lined Playa Lateral is immediately west of the Playa Intercepting Drain. The Playa Lateral carries water year round. The drains normally carry agricultural water from March through October, which may be a couple of feet deep, and are dry the rest of the year. Each of the drains has an associated right-of-way.

3.2.1.2 Consequences

Proceeding with the proposed action will not impact existing bodies of water.

3.2.2 Storm Water

3.2.2.1 Affected Environment

Storm Water management on the Ysleta Port of Entry is accomplished through the use of sheet flow to surface drains, which are connected to an underground collection system. Depending on the particular location at the port, runoff feeds into one of three water retention areas. These ponds allow storm water runoff to be detained in order to allow suspended material to settle. Runoff collected in the pond on the southwest corner of the facility is fed through an underground line to the pond on the southeast corner of the facility. Pumps in the two ponds on the east side of the facility provide for the controlled release of the detained water into the nearby Playa Drain.

Under Texas law, storm water discharges associated with small construction activities that result in land disturbance of equal to or greater than one acre and less than five acres do not require storm water discharge permits.

3.2.2.2 Consequences

Implementing the proposed action will increase storm water runoff and may impact nearby water resources (Playa Drain). There will be short-term impacts to water quality from construction activities (an increase in soil erosion) and potential long-term impacts to water quality from the construction of impermeable surfaces (e.g., storm water runoff from access roads), and soil compaction. However, an erosion and sedimentation control plan and storm water management plan will be prepared and implemented as part of the proposed action. By design, management of storm water runoff will be accomplished through the use of an underground collection system connected to existing storm water retention ponds and creation of additional ponding areas as necessary. Like the existing storm water retention ponds at the Ysleta Port of Entry, any new storm water retention ponds will be equipped to provide controlled release into the nearby Playa Drain. All of these measures will offset increases in impervious surfaces, allow for increased infiltration and capture sediment leaving the site through precipitation measures. Implementation of these plans will greatly reduce impacts to water quality.

If erosion control measures are implemented during construction and any additional storm water mitigation measures identified in the storm water management plan are implemented, no significant impacts to water quality are anticipated from implementing the proposed action at this site.

xxx Will a storm water management plan be written? If so, by whom?

3.2.3 Floodplains

3.2.3.1 Affected Environment

Most of the Ysleta Port of Entry is within the 100-year floodplain. Specifically, it is in the 100-year shallow flooding area (with average depths of one to three feet). This means that, in any given year, there is a 1 percent chance of flooding.

3.2.3.2 Consequences

Because the Ysleta Port of Entry is within the Rio Grande Floodplain, locating the action where it could affect a floodplain is not a feasible alternative. Building design requirements pertaining to radiation safety preclude elevating the Cargo Inspection Building above the base flood level as recommended in Section 3(b) of Executive Order 11988. XXX Is a permit required? A floodplain development permit will be obtained before any development proceeds in the designated Special Flood Hazard Area.

To minimize impacts on floodplain values, and harm to the investment at risk and to others, the proposed action will comply with state and local flood protection standards, floodplain management laws and/or ordinances. XXX Is this true? All practicable means to flood proof structures shall be taken.

XXX Send letter to El Paso City Engineers Office with precise description of site to conform that no floodplain permit is needed.

3.2.4 Wetlands

3.2.4.1 Affected Environment

There are no wetland areas or waters of the United States within the boundaries of the Ysleta Port of Entry.

3.2.4.2 Consequences

Proceeding with the proposed action will result in no impacts to wetlands because no dredged or fill material will be placed into waters of the United States, including wetlands.

3.3 Air

Air quality is subject to a range of federal and state regulations as described in Appendix E. EPA has established limits for six criteria air pollutants. A geographic area whose ambient air exceeds a threshold is designated a "nonattainment area" for that pollutant.

In addition to the criteria air pollutants, EPA also regulates the release of hazardous materials to the atmosphere. Hazardous air pollutants are regulated through the National Emission Standards for Hazardous Air Pollutants (NESHAPs). Of particular interest here is the NESHAP covering radionuclides. Details regarding these regulations are presented in Appendix E.

3.3.1 Affected Environment

The EPA classifies El Paso as a "serious" ozone nonattainment area, "moderate" carbon monoxide nonattainment area, and "moderate" particulate nonattainment area. Industrial pollutants and automobile exhaust from the densely populated El Paso-Juarez area contribute greatly to the carbon monoxide and ozone air pollution. Wind blown dust and extensive use of vehicles on unpaved roads near population centers contribute to particulate air pollution.

3.3.2 Consequences

3.3.2.1 Construction Phase

Fugitive dust emissions typically occur during ground clearing, site preparation, grading, stockpiling of materials, on-site movement of equipment, material transportation and building construction. Fugitive dust emissions are greatest during dry periods, periods of intense construction activity and during high wind conditions. Standard techniques used to limit particulate emissions during construction activities include the following:

- Use of water or chemicals for control of dust in construction operations, grading of roads or the clearing of land
- Application of asphalt, oil, water, or suitable chemicals on dirt roads, materials, stockpiles, and other surfaces that can give rise to airborne dust
- Covering open bodied trucks that transport materials likely to give rise to airborne dusts
- Prompt removal of earth or other material from paved streets that is generated from construction activities.

The potential for fugitive dust emissions from the proposed action would cease once construction is complete.

Exhaust from on-site construction equipment, worker vehicles traveling to and from the site, and construction delivery vehicles will create air pollutants. These exhaust emissions are expected to be negligible compared to those generated by the large volume of traffic passing through the port of entry as a part of its normal operations.

If the test facility is modified for another purpose and when the facility is eventually demolished, similar temporary effects are expected.

A review of the project by the Texas Natural Resource Conservation Commission concluded that:[6]

> "Although any demolition, construction, rehabilitation or repair project will produce dust and particulate emissions, these actions should pose no significant impact upon air quality standards. Any minimal dust and particulate emissions should be easily controlled by the construction contractors using standard dust mitigation techniques."

3.3.2.2 Operational Test Phase

As described in Section 2.5.2, vehicles selected for inspection will be attached to the AGV. Once the vehicle is in position to be attached to the AGV, its engine will be turned off. XXX Is this true or is it always running? The vehicle will be towed through the Cargo Inspection Building by the AGV. After inspection, the vehicle will be detached from the AGV. Once detached, the AGV will continue on a closed-circuit path to the inspection starting point for the next vehicle.

The XXX-powered AGV is expected to be operating up to 12 hours per day. Rated at XXX horsepower, the exhaust of the AGV will be approximately the same as a typical diesel-powered tractor-trailer.

In its 2002 review, the Texas Natural Resource Conservation Commission concluded that " … the emissions from the proposed project are expected to be well below the 50 tons per year significance level. Therefore a general conformity analysis will not be required."

As described in 2.5.3, the PFNA Cargo Inspection System produces and releases tritium as a process by-product. Also, a small amount of radioactive material is produced as target foils. Although federal regulations do not apply to low-energy accelerators such as that used in the PFNA Cargo Inspection System, the performance was of the system was compared to NESHAP thresholds. Details are presented in Appendix E.

Over the Operational Test Phase, the total amount of radioactivity produced would be approximately 0.2 percent of the Annual Possession Limit for all the materials involved. Not only would the system be in full conformance with EPA regulations, there would be no requirement for annual reporting to the EPA because the amount of radioactive material is less than 10 percent of EPA's limit.

Exhaust emission s from the AGV will be a small fraction of the emissions from vehicles passing through the Commercial Cargo Facility. Radionuclide exposure through gaseous effluents is well below all regulatory limits. Consequently, no significant impacts to air quality are expected during the Operational Test Phase.

3.4 Vegetation and Wildlife

3.4.1 Vegetation

3.4.1.1 Affected Environment

The vegetation communities of El Paso County are defined by the interaction of geology, soils, physical geography and climate. It should be noted that the existing vegetation in this area of Texas derives largely from land-use disturbance, and as such is heterogeneous with regard to composition. Details regarding vegetation are presented in Appendix F.

3.4.1.2 Consequences

Potential impacts to vegetation resources were evaluated based on the orientation of the proposed PFNA facility on the site and the relative abundance of the different vegetative cover types on the Ysleta Cargo Facility.

Activities resulting from construction, operation, and maintenance of the PFNA facility would total approximately 3.7 acres. It will be installed over brush land. A search of the Texas Biological and Conservation Data System (BCD) revealed no presently known occurrences of special species or natural communities in the general vicinity of the proposed project.[17] Indirect impacts resulting from increased commercial and industrial development are not anticipated as a result of the proposed action. The proposed action will not result in the loss of vegetation communities adjacent to the Port of Entry. Construction at the proposed site will not significantly impact wildlife habitat.

3.4.2 Wildlife

3.4.2.1 Affected Environment

Wildlife resources were identified based on the diversity and size of the on-site habitats, and the amount and availability of foraging areas, water, and cover provided by each vegetative cover type(s). Details are presented in Appendix F.

3.4.2.2 Consequences

Potential impacts to wildlife resources were assessed based on the type, size, and quality of existing habitats within the proposed site, and the relative abundance of the habitat types on lands adjacent to the Ysleta Cargo Facility. Impacts were considered negligible if little or poor wildlife habitat was present on the site.

The construction of the PFNA Cargo Inspection System facility on the proposed site will have negligible impacts on wildlife resources. The grass and shrub habitat is of marginal value for most wildlife due to the sparse cover it provides. Habitat providing better forage and cover is present throughout the areas immediately adjacent to the proposed site. Displaced wildlife could easily relocate to these areas. The agricultural crop habitat adjoining the site will not be impacted and the wildlife utilizing these habitats will not be impacted through the loss of habitat. Placement of the PFNA Cargo Inspection System facility adjacent to these habitats will degrade them through the introduction of new sources of human activities (e.g., noise, lighting, etc.). Over time, most species will acclimate to the new site conditions, especially since many of species present have already adapted to the improved conditions on the Ysleta Commercial Cargo Facility.

3.4.3 Threatened and Endangered Species

3.4.3.1 Affected Environment

The potential presence of federal and state-listed threatened and endangered species was evaluated based on the type and extent of the existing habitat at the site. Special status plant and animal species that may be found within El Paso County are listed in Appendix F. The sparse vegetation present on the proposed site does not provide critical habitat for any known plant or animal species of special status. With the exception of the transient occurrence of protected bird species, no special status species are anticipated to occur on the proposed site.

3.4.3.2 Consequences

The USFWS and Texas Department of Parks and Recreation have determined that the proposed action "will not affect any species listed or proposed to be listed as endangered or threatened." Associated developments resulting from the PFNA Cargo Inspection System test that could have indirect impacts to vegetation and wildlife are not expected.

3.5 Noise

3.5.1 Affected Environment

Noise around the proposed site presently originates from mix of agricultural, transportation, and light industrial activities with the primary source of noise being traffic on roadways. The dominant source of noise at the Commercial Cargo Facility is traffic noise from commercial tractor-trailers passing through the port of entry. There are no sensitive receptors since there is no residential or institutional development in the immediate area of the Port of Entry. Background information on noise is presented in Appendix G.

3.5.2 Consequences

Noise impacts were considered from three perspectives:

- Noise during construction
- Noise during operation of the PFNA Cargo Inspection System equipment
- Traffic noise.

The effects of noise were considered for both humans and wildlife. An impact was judged significant if the noise level exceed EPA or OSHA standards.

3.5.2.1 Noise Impacts during Construction Phase

Construction vehicles will typically operate 8-hours per day during normal working hours on weekdays. Construction noise will come from the diesel-powered earth moving equipment needed for digging and building foundations, for assembly of modular buildings and construction of roadways. Diesel trucks and cranes will be needed for transporting building materials and PFNA machinery. These diesel vehicles will emit noise levels that are comparable to the tractor-trailers that pass through the Commercial Cargo Facility. As shown in Appendix G, construction equipment is expected to produce between 80 to 90 dBA fifty feet from the source.

3.5.2.1.1 Impacts on Humans

With respect to construction at the proposed site, assuming bulldozer and dump truck delivery activity only, noise levels would be approximately 85 dBA at 50 feet. The noise levels would fade to approximately 67 dBA at 400 feet. These noise levels do not exceed the EPA limits for construction. Therefore, no significant impacts from construction noise are anticipated to the human environment. If noise levels exceeding 85 dBA are determined through monitoring at facilities adjacent to the construction area, steps will be taken to attenuate those levels.

Some construction personnel may require hearing protection. The impacts resulting from construction activities are temporary and are anticipated to have no adverse effects on surrounding land use because noise levels from such sources attenuate quickly with distance. Consequently, construction noise is expected to have no impact on Customs Service personnel and members of the general public in the surrounding areas.

3.5.2.1.2 Impacts on Wildlife

Noise associated with the construction of the proposed facility will have a negligible affect on wildlife since the noise source will be both temporary and similar to other existing background sounds. Disturbance to wildlife is anticipated to be greatest as construction activities are initiated, and to lessen as wildlife become acclimated to these temporary noises.

3.5.2.2 Noise Impacts during Operational Test Phase

The PFNA Cargo Inspection System facility is expected to operate between 8-10 hours per day during normal Port of Entry operating hours. Facility Operations noise includes those noise levels generated during operation of the PFNA Cargo Inspection System equipment. Measurements of noise generated by similar equipment at the vendor’s facility (Appendix G) were within regulatory limits. Impact or impulse noise is not anticipated nor is it anticipated that the proposed action will expose anyone to noise levels that require the use of hearing protection devices.

3.5.2.2.1 Impacts on Humans

Due to the low noise pressure levels and the fact that employees will not work in the measured areas during normal operation of the PFNA Cargo Inspection System, the additional noise sources should not significantly add to overall noise exposure. Employee exposures should be well below the occupational limits. Noise levels associated with vehicles undergoing inspection would not exceed those currently present during normal Port of Entry operations.

3.5.2.2.2 Impacts on Wildlife

Noise associated with the operation of the proposed facility will have a negligible affect on wildlife since the noise sources will significantly smaller than those currently present during normal Port of Entry operations.

3.5.2.3 Noise Impacts from Traffic

No significant impacts are anticipated from traffic noise associated with the test. The existing traffic noise would increase slightly with the addition of 8 trucks (loaded with simulated target materials) and passenger vehicles used by 25 new personnel participating in the test. However, these 25 private vehicles and 8 trucks represent a small portion of a projected loading of approximately 1,300 vehicles that are inspected per day at the Ysleta Cargo Facility. Assuming private vehicle per person, the maximum increase in total number of vehicles to the Ysleta Cargo Facility would be approximately 2.5 percent.

3.6 Land Use

3.6.1 Affected Environment

The Ysleta Port of Entry's land is in two El Paso land use zones. The operating portion of the Port of Entry is zoned "Ranch-Farm," which is described as:

> "Single-family detached dwellings fallow, agricultural or open uses; raising & harvesting of field crops; nursery hatching; raising and marketing of poultry; pasturage of horses, cattle, goats & sheep; veterinary hospital or clinics; raising of small animals; greenhouses"

Government-owned land to the south of the developed portion of the port where the PFNA Test Facility will be sited is zoned "M-1 (Light Manufacturing)." Permitted uses of land zoned M-1 are:

> "Light manufacturing, fabricating, processing, wholesale distributing and warehousing uses"

Land to the east and north is zoned "C-4" Commercial. Immediately to the east of the port is Americas Industrial Park.

The proposed site (approximately 3.7 acres) is located within the undeveloped area set aside for the Commercial Cargo Facility. Past uses of the property were primarily agricultural. The site consists of a flat, grassy field bordered by agricultural fields from the northeast to the south, the Playa Intercepting Drain to the west, and the current Commercial Cargo Facility to the north. Along its southern border, electrical transmission lines traverse the boundary of the site in an east-west direction. A storm water retention pond to the north of the lot will not be affected or altered by project construction.

3.6.2 Consequences

Implementing the proposed action would be consistent with current and proposed land use at the Port of Entry and the surrounding area. The proposed action would not result in significant impacts to land use.

3.7 Infrastructure/Utilities

Infrastructure/utilities include electric, water, sewer and solid waste disposal services.

3.7.1 Affected Environment

El Paso Electric Company provides electric power to the area. Water and sewer services are provided by the El Paso Water Utilities as managed by the Public Service Board. Solid waste is disposed of in city-owned landfills that are licensed and regulated by the Texas Department of Health.

Connection lines for electricity, water, and sewer will have to be constructed for the proposed site. The distance from the center of the proposed site to where the current fenceline around the Commercial Cargo Facility would be breached is approximately 750 feet..

3.7.2 Consequences

Peak electric demand for the PFNA Cargo Inspection System is estimated to be approximately 185 kVA and average demand is estimated to be 140 kVA. Existing electrical service at the port is adequate to meet this demand.[7]

XXX Infrastructure/utility connections are available in the vicinity of the proposed site. New utility lines are proposed to be buried underground at the facility. New overhead transmission lines will connect to the existing electrical transmission lines currently on the proposed site. Buildings associated with the PFNA Cargo Inspection System Facility will be connected to the existing sanitary sewer system. All solid waste materials generated during construction and site preparation will be removed from the Commercial Cargo Facility at the completion of construction.

During operation, the PFNA Cargo Inspection System generates no solid waste or wastewater.

Implementing the proposed action is not anticipated to have significant impacts on infrastructure/utilities.

3.8 Housing

There is no housing within close proximity of the site.

3.9 Recreational Areas

There are no recreational facilities in the immediate area of the proposed facility.

3.10 Transportation

3.10.1 Affected Environment

The Ysleta Port of Entry is at the eastern end of the Zaragosa Bridge, which spans the Rio Grande River. Although that is its official name, on the American side, it is popularly known as the Ysleta Bridge. Consisting of two 4-lane spans, the bridge complex handles private vehicles, commercial vehicles and pedestrian traffic. However, commercial traffic is kept physically separate on the bridge and within the port of entry.

Most vehicles exiting the port immediately go onto Loop 375 (also called Americas Avenue), a four-lane divided road. Loop 375, a controlled access highway, has exit and entrance ramps from both directions that serve the port of entry. In the area of the interchange for the port of entry, the road makes nearly a 90-degree turn from an east-west road to a north-south road. To the north of the port, Loop 375 is called the Cesar Chavez Border Highway. Average daily traffic on Loop 375 near the port of entry is:[8]

- 32,000 vehicles eastbound
- 29,000 vehicles northbound

Approximately 60 government and contract personnel work within the Ysleta Commercial Cargo Facility. Most port employees commute less than 20 miles, from the city of El Paso. Peak commuting hours are from 6:00 to 8:00 and 15:00 to 17:00. Levels of traffic congestion on Loop 375 during peak commuting hours are moderate outside the Port of Entry.

Commercial vehicles inbound to the United States, which would be potentially selected for inspection by the PFNA Cargo Inspection System, number approximately 30,000 per month.[9] Details regarding traffic through the port are presented in Appendix XXX. Upon exiting the port, a significant number of commercial vehicles travel short distances to warehouses in the immediate vicinity.

Outside of the port of entry itself, no road improvements are planned as part of the proposed action.

The Texas Department of Transportation is conducting parallel environmental assessments for a temporary commercial vehicle inspection station and a permanent commercial vehicle inspection station. Both would be located in the immediate are of the Ysleta Port of Entry. While these facilities may be nearby, they will not be on federal property.

3.10.2 Consequences

Traffic will temporarily increase during the Construction Phase due to worker vehicles and construction equipment. During the Construction Phase, an estimated additional XXX private vehicles and an additional XXX commercial vehicles will enter the port each day. At the maximum, XXX pieces of heavy construction equipment will be operating in the Commercial Cargo Facility. Delivery of construction materials will average three vehicles per day over the construction period.

XXX Confirm number of vehicles during construction

During the Operational Test Phase, facility traffic will increase by an estimated XXX private vehicles per day. This is an increase of approximately XX % over the current load of approximately 1,300 cargo vehicles per day that enter the Commercial Cargo Facility each day. Commuting to the port will add less than X.XXX% of the approximate 30,000 vehicles that use Loop 375 daily. Once per week, there will be a fuel delivery for the automated ground vehicle.

The proposed action will increase the Commercial Cargo Facility loading by approximately 25 personnel and 8 trucks over a six-month period. The influx of approximately 25 additional employees, 8 trucks and delivery vehicles for the PFNA Cargo Inspection Facility and support structures is negligible to the overall traffic volume at the Ysleta Commercial Cargo Facility.

Since it is wholly contained within the port, the proposed action will not negatively impact accessibility to adjoining properties.

The proposed project site contains no sidewalks or designated bike paths that would be impacted by this project.

The proposed action will have minor effects to transportation within and nearby the port. XXX Need to address movement of vehicles to and from PFNA.

3.11 Historical and Cultural Resources

3.11.1 Affected Environment

Background on the history of the area is presented in Appendix I.

3.11.2 Consequences

The proposed site has been severely disturbed, has limited research potential and does not appear to demonstrate archaeological values or cultural associations that would justify a finding of eligibility for the National Register of Historic Places. The site does not appear to have the potential to contribute to the understanding of Texas's cultural development.

Consultation with the Office of the State Historic Preservation Officer (SHPO), Texas Historical Commission revealed the possibility that buried archeological deposits might be present in the project area. If artifacts are encountered during construction, work will cease in the immediate area. Work can continue in the project areas where no archeological deposits are present. The discovery of archeological deposits will require the notification of both the Advisory Council on Historic Preservation in accordance with 36 CFR 800.13.b.2 and the SHPO.

No prior archaeological investigations or surveys have been conducted within the proposed site or adjacent areas. Consultation with the SHPO indicated there are no properties listed or eligible for listing on the National Register of Historic Places within the proposed site or adjacent areas. With regard to the proposed action, the overall finding by the SHPO was "No Effect on National Register Eligible/Listed Properties or State Archeological Landmarks."[10]

XXX Confirm previous findings by sending electronic images of new Ysleta site to state office.

No impacts to cultural resources are anticipated from implementing the proposed action.

3.12 Hazardous Waste

Regulations governing hazardous waste are discussed in Appendix J.

3.12.1 Affected Environment

No hazardous or non-hazardous waste sites have been identified on the proposed site. The proposed site was previously used for agricultural purposes. Therefore, potential soil contamination from agricultural pesticides is possible.

Operations at the Ysleta Port of Entry do not generate any hazardous waste.[11] For instance, contractors come to the port to perform vehicle maintenance. The contractors take used oil, lubricants, etc. with them when they depart the port.

Maintenance of the PFNA equipment by the vendor will lead to the generation of small amounts of spent solvents (such as acetone, kerosene, and alcohol). Estimated quantities of hazardous waste associated with operating the PFNA Cargo Inspection System are identified in Appendix J.

Neutron production target foils will become radioactive as a result of PFNA Cargo Inspection System operations. The foil is an operating consumable. Each foil is expected to last a few weeks in normal use of the inspection system. During the test period, the total inventory of waste foils is projected to be no more than 6 millicuries.

3.12.2 Consequences

To confirm that no residual pesticides or other hazardous materials are present in the soil, core samples will be taken prior to disturbing the ground for construction activities. An independent, licensed laboratory will evaluate the core samples for chemicals and radioactivity. If hazardous materials are discovered, they will be removed and disposed in accordance with all applicable federal, state, and local regulations

Having total responsibility for equipment maintenance, the vendor will be handling all spent solvents and used oils. He will turn them over to a hazardous waste disposal service licensed in the local area. Used neutron production target foils will be placed in a locked, shielded box for disposal as low-level radioactive waste. Disposal will be contracted with a disposal service licensed to handle radioactive wastes.

No significant hazardous waste issues will result from implementing the proposed action.

3.13 Environmental Justice

By Executive Order, Federal agencies must ensure that their actions do not result in “disproportionately high and adverse” effects on minority and low-income populations. Background information on environmental justice is presented in Appendix XX.

3.13.1 Affected Environment

In Table III, characteristics of the the "potentially affected population" in the immediate vicinty of the Ysleta Port of Entry are compared to the populations of the El Paso Countyand the city of El Paso. Compared to the populations of the El Paso County and the city of El Paso, the potentially affected population has more minotrities, is overwhelmingly Hispanic or Latino and has a significantly greater proportion of familes below the poverty level.

Table III. The potentially affected population is distinctly different than the city or the county as a whole.

Characteristic	Percent for:		
	County of El Paso	City of El Paso	Potentially Affected Population
Non-white proportion of poulation	26.1	26.7	30.4
Hiapanic or Latino Proportion of the Population	76.6	78.2	94.7
Proportion of Familes Below the Poverty Level	20.5	19.0	30.9

3.13.2 Consequences

An evaluation of consequences as they pertain to environmental justice has two components: 1) the presence of a minority or low-income population and 2) adverse impacts. For normal operations, no identified impact extends beyond the boundaries of the port of entry. While it is true that the population living in the immediate vicinity does consists of minorities and low income families, there are no adverse impacts identified for the populations in the immediate area.

3.14 Ionizing Radiation

Radiation is the most complex of all the considerations pertaining to the operational test of the PFNA Cargo Inspection System. To ensure that the topic is wholly covered, the discussion concerning radiation presented in this section is more comprehensive than the discussions in the other sections.

The subject of this section is "ionizing radiation." See Appendix L for background information on ionizing radiation. A discussion of "non-ionizing radiation" follows in Section 3.15.

Under federal regulations, release of radioactive substances to the atmosphere is classified as an air quality concern. Radioactive release to the atmosphere is addressed in Section 3.3.

The neutron-generating accelerator used in the PFNA Cargo Inspection System is a relatively small electrostatic type, similar to many used for small-scale nuclear physics research and, more recently, for analytical measurements in the semiconductor industry. As a radiation-producing machine, it is subject to regulation by radiation protection authorities and its use may require a license or registration and a structured radiation safety program.

3.14.1 Affected Environment

It is useful to consider the affected environment in three situations:

1. Operating under Normal Conditions
2. Abnormal Events
3. During Dismantlement

During normal operations, the affected environment includes the vehicles passing through the Cargo Inspection Building. People in the area around the Cargo Inspection Building are of course the key component of the affected environment. For purposes of discussion, people are classified into three categories:

1. Maintenance personnel
2. System operators
3. General public

Truck drivers passing through the Cargo Inspection Facility are considered members of the general public.

Stream-of-commerce cargo can encompass a wide variety of materials including food and pharmaceuticals that are meant to be ingested or otherwise enter the human body (e.g., surgical implants, etc.).

During operation, the PFNA Cargo Inspection Facility will produce a small amount of low-level radioactive waste. This waste will need to be managed and disposed of.

Abnormal events include:

1. Stowaways in the vehicle
2. Weapons materials in the cargo
3. Accidents

Over time, the shielding and the structure of the Cargo Inspection Building will absorb radiation. At the conclusion of its useful life, the shielding will be removed and disposed of. The structure would also be disposed of at a later time. Radioactivity within the shielding and structural materials is a concern during the dismantlement process.

3.14.2 Consequences

The PFNA Cargo Inspection System will be built, tested and accepted in accordance with a

System Safety Specification.[12] The Radiation Safety Plan describes how the system will be operated. These documents established acceptable levels of radiation based on prevailing federal regulations for radiation safety and the "As Low As is Reasonably Achievable" philosophy.

XXX Do we want to simply reference the safety spec or include it as an appendix? What about the safety procedures?

3.14.2.1 Normal Operations

3.14.2.1.1 Human Exposure during Normal Operations

3.14.2.1.1.1 Inside the Restricted Area

The Restricted Area is the inside of the Cargo Inspection Building. The only people allowed in the Restricted Area while the PFNA equipment is operating are maintenance personnel. All maintenance personnel are employees of the equipment manufacturer. Vendor personnel have had specialized radiation safety training and are classified as “Radiation Workers.” By the nature of their jobs, they are exposed to a higher level of radiation than people outside the Restricted Area. The PFNA Cargo Inspection System will have to comply with OSHA’s strict dose standards for Radiation Workers (Appendix L).

Since the radiation levels in the Restricted Area are confined to that limited area, there is no significant impact to the surrounding area. Consequences outside the Restricted Area are addressed in the next section.

3.14.2.1.1.2 Outside the Restricted Area

For its workers, the US Customs Service has adopted the same effective radiation dose standard that OSHA prescribes for members of the general public (i.e., 100 mrem/year). This means that, as far as radiation dose standards are concerned, PFNA Cargo Inspection System operators are the same as members of the general public. For a more detailed discussion of dose standards, see Appendix L.

In the extreme, a system operator (or a member of the general public) could be situated immediately outside the Cargo Inspection Building 8 hours a day, every workday of the year (that is to say, 2,000 hours per year). To meet the threshold radiation dose limit under this conservative assumption, the radiation level outside the building cannot exceed 0.05 mrem/hour.

The safety specification for the PFNA Cargo Inspection System includes the requirement that within 5 centimeters of the Cargo Inspection Building, the radiation level (above background radiation) can not exceed 0.05 mrem/hour. Testing at the very beginning of the Operational Test Phase will verify that the radiation levels meet the System Safety Specification. Given that the combination of engineering design features specified in the System Safety Specification are implemented and that the procedures identified in the Radiation Safety Plan are followed, the impact of radiation to the system operators and the general public would not be significant.

3.14.2.1.2 Cargo Exposure during Normal Operations

Use of the PFNA Cargo Inspection System to inspect cargo will unavoidably lead to conversion of some atoms to radioactive nuclides. (A radioactive nuclide is an unstable atom that spontaneously emits radiation.) The consequences of creating radioactive nuclides are examined in this section. Typical stream-of-commerce materials are considered first followed by special cases of food and medical materials (pharmaceuticals and medical devices).

At Ysleta, cargo made up of live animals is not currently scanned using radiation-based inspection equipment. Under that policy, there are no plans to use the PFNA Cargo Inspection System with live animals.

3.14.2.1.2.1 Typical Stream-of-Commerce Materials

In an analysis of the PFNA Cargo Inspection System prepared for the General Services Administration, radiation doses were calculated for handling, using or consuming irradiated stream of commerce materials.[13] Five different materials were selected to represent potentially exposed stream-of-commerce materials. The findings were that "in all cases, the doses to workers and the public were inconsequential."

3.14.2.1.2.2 Food

Based on its evaluation of the PFNA Cargo Inspection System, the Food and Drug Administration found no "basis for safety concerns under the [planned] conditions of use."[14] As a consequence, the Food and Drug Administration had no objection to using the PFNA Cargo Inspection System "to inspect vehicles that may contain food for a period up to 6 months at the Ysleta (El Paso) Texas port of entry."

3.14.2.1.2.3 Pharmaceuticals and Medical Devices

Pharmaceuticals and medical devices pose a special concern because people ingest pharmaceuticals and some medical are implanted in humans. In this regard, the National Council on Radiation Protection and Measurements (NCRP) studied the implications of the PFNA Cargo Inspection System for public health. Using the energy characteristics of the PFNA beam, NCRP examined a broad range of possible elements in pharmaceuticals and medical devices. NCRP concluded that the radiation levels produced in pharmaceuticals and medical devices would be far below the accepted limits for the general public.[15] Consequently, no significant impacts are anticipated from PFNA Cargo Inspection System use with the pharmaceuticals and medical devices present in the stream-of-commerce.

3.14.2.1.3 Radioactive Waste

Within the PFNA Cargo Inspection System, there is a thin metal foil (havar alloy) window on the deuterium gas cell target. Target foils will become radioactive as a result of operating the system. The foil is an operating consumable and will be replaced approximately every two weeks during the Operational Test Phase. Used foils will be placed in a locked, shielded box for disposal as low-level radioactive waste. Over the entire 6-month test period, the total amount of radioactive target foils will be no more than 6 millicuries. Disposal of the used target foils will be handled by a licensed disposal service under the direction of the PFNA equipment manufacturer.

Since this small amount of radioactive material will be controlled and handled using standard procedures, no impact is expected from radioactive waste.

3.14.2.2 Abnormal Events

3.14.2.2.1 Stowaway

It is possible that people will hide themselves in cargo containers in order to surreptitiously enter the United States. A stowaway concealed in a vehicle that passes through the Cargo Inspection Building will be exposed to radiation as a direct consequence of the inspection process.

In considering the proper standard for this situation, the National Council on Radiation Protection and Measurements (NCRP) recommended that the PFNA Cargo Inspection System "be designed and operated in a manner that ensures that an inadvertently exposed person will receive an effective dose of less than" 100 millirem (reference XXX). Furthermore, NCRP recommended that this limit be raised fivefold "if necessary, to achieve national security objectives." The NCRP recommendation was incorporated into the safety specification for the system (reference XXX, maybe also an appendix).

NCRP will conduct computer simulations to project the level of exposure that a person would receive as a function of location and cargo type. During the first part of the Operational Test Phase, phantoms that simulate human beings will be hidden among an array of cargoes. Radiation measurements from the phantoms during the scanning process will be used to validate the computer predictions. More importantly, the measurements will verify that the exposure to stowaways does not exceed the NCRP-recommended threshold. Testing with typical stream-of-commerce vehicles will not begin until the system demonstrates that the inadvertent exposure standard is met.

Since stowaways will be exposed to a level of radiation acceptable for infrequent annual exposures to the general public, no impacts are expected for this abnormal event.

3.14.2.2.2 Weapons of Mass Destruction

Exposure of weapons of mass destruction (explosives, chemical agents, biological agents, etc.) to the PFNA Cargo Inspection System will not, under any circumstances, cause the weapon to initiate. XXX Is there an authoritative source that can be cited that says weapons will not initiate?

Because they are initiated by radiation, nuclear weapons represent a different situation. It is extremely improbable that weapons grade nuclear materials under the control of a national government would cross the Mexico-United States international border. Conceivably, terrorists could attempt to smuggle nuclear materials into the United States in commercial cargo.

XXX How do we address the issue of irradiation of weapons grade material?

3.14.2.2.3 Accident

In any industrial facility, the potential always exists for the occurrence of abnormal events that may have harmful consequences on or off site. The PFNA Cargo Inspection System uses high voltages and electrical currents to produce radiation. Consequently, fire, lethal electric shock, or a radiation release could conceivably occur.

The PFNA Cargo Inspection System Facility has been designed to be in compliance with all applicable codes and standards in order to minimize the risk of accidents. The great majority of these accidents are industrial accidents that would pose a risk of personal injury but would have no environmental impact. The only accidents with the potential for environmental impact are those involving a release of radioactivity.

Standard fire protection systems would be provided for the PFNA Cargo Inspection System Facility in accordance with local, state, and federal standards. XXX True? Special fire protection means would be provided for transformers and devices filled with flammable oils. XXX True? The small amounts of deuterium gas used will also be subject to fire protection standards. These features bring the proposed facility within the compliance and ensure that all reasonable efforts have been made to reduce loss. No accident sequences involving fires have been identified that lead to a release of radioactivity.

An act of sabotage at the PFNA Cargo Inspection facility is considered an extremely unlikely event. Physical barriers as well as an armed security force control access to the area. Since the neutron beam is wholly enclosed within the shielded Cargo Inspection Building, it can not be directed to an outside location where it could cause harm. Purposeful destruction of the PFNA equipment is the equivalent of the design-basis accident, which is discussed next.

The Nuclear Regulatory Commission defines a design-basis accident as:[16]

> "A postulated accident that a nuclear facility must be designed and built to withstand without loss to the systems, structures, and components necessary to assure public health and safety."

Applying this concept to the PFNA Cargo Inspection System means identifying the worst-case scenario that still affords protection to the public. The logical design-basis accident for the PFNA Cargo Inspection System is the instantaneous releases all the on-site radioactive materials into the air of the Accelerator Room.

XXX The DBA promises to be a lengthy and complex series of calculations. Putting them in an appendix is less preferable than having an authoritative report to cite.

3.14.2.3 Dismantlement

If it is decided to dismantle the system after the Operational Test Phase, measurements will be taken of shielding components to confirm that low levels of radioactivity are indeed present. Shielding will be disposed of as low-level radioactive waste. The system manufacturer will remove activated or contaminated accelerator components will reuse them elsewhere or dispose of them as low-level radioactive waste.

Dismantlement of conventional facilities (if required) would follow after all activated components are identified and removed. No parts of the building structure or ancillary equipment are expected to be activated. Therefore, they would be immediately available for reuse.

3.15 Non-Ionizing Radiation

The word "radiation" is most often used to mean ionizing radiation. Ionizing radiation has enough energy to remove an electron from an atom. This creates an ion. Examples of ionizing radiation include gamma rays, alpha particles, and neutrons. The impacts of ionizing radiation were discussed in the previous section. Non-ionizing radiation (Electromagnetic radiation) does not have enough energy to create ions. Familiar examples of non-ionizing radiation include visible light, radar and radio waves.

3.15.1 Affected Environment

The PFNA equipment generates radiation using high voltages. As a result, electric and magnetic fields are present in the immediate area.

3.15.2 Consequences

As detailed in Appendix XX, electromagnetic field measurements taken around prototype equipment at the manufacturer's site were well below currently accepted guidelines and recommendations of national and international agencies. Based on those results, there is no reason to expect that non-ionizing radiation produced by the PFNA Cargo Inspection System at the Ysleta Commercial Cargo Facility will have significant impact.

3.16 Cumulative Impacts

Cumulative impact is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR Part 1508.7).

3.16.1 Affected Environment

The United States Customs Service operates various Non-Intrusive Inspection (NII) devices at the Ysleta Port of Entry that generate x-ray and gamma radiation. Each area with NII equipment, is separated from adjacent structures, work areas and traffic flows to protect workers, the general public and contents of adjacent buildings. The amount and type of radioactive material used and radiation generated defines the Radiation Safety Exclusion Zone around each NII device or area. These zones impose certain restrictions on the types of activities that may be conducted within these zones.

XXX What is Customs Service current method for defining "restricted areas? "Radiation Safety Exclusion Zones are divided into various types depending on the level of protection required for a given activity:

- Zone 1 – Occupied buildings allowed. Zone 1 establishes distances between a potential radiation site and any structure, except an NII operations building, where persons live, work, or assemble.
- Zone 2 – Vehicle parking allowed. Zone 2 established distances separating a radiation site and those areas where vehicles may be parked.
- Zone 3 – Exclusion Area (No one allowed during operations). Denotes an area where access shall be controlled during operation. No one except workers with dosimeters will be allowed in this area when radiation is being produced.

Each NII device or building is specifically located to ensure that Radiation Safety Exclusion Zones do not overlap making certain that workers and members of the public are not exposed to potentially hazardous levels of radiation.

As noted in Section XX, the Texas Department of Transportation plans to construct two commercial vehicle inspection stations (one temporary and one permanent) in the area of the Ysleta Port of Entry.

3.16.2 Consequences

As shown in Figure XXX, no Radiation Safety Exclusion Zones associated with existing NII equipment encroach on the proposed site.

Implementing the proposed action is anticipated to result in direct impacts to several specific environmental resource areas, including wildlife, air quality, noise, water quality/storm water, vegetation, hazardous materials and radiation safety.

All cumulative effects constituted an insignificant effect on the human environment.

3.17 Probable Adverse Impacts Which Cannot be Avoided and Measures to Mitigate Adverse Impacts

If the proposed action is implemented, there will be a loss of developable space at the Ysleta Cargo Facility. This represents a loss of approximately 3.7 acres, which is a significant amount of land compared to the amount of land currently comprising the Port of Entry (approximately 63.5 acres).

During the construction process, a number of temporary short-term impacts can be expected to occur. These impacts will be limited to the construction phase and will cease shortly after construction is completed. The following is a list of short-term impacts that may occur during the construction phase.

- Removing vegetation will allow for increased soil erosion
- Construction traffic in the area
- Noise from construction vehicles and site activity
- Vibration from compaction and heavy equipment

The facility contractor will be required to take mitigation measures to lessen these short-term adverse environmental impacts. Use of control measures contained in federal, state, and local regulations adopted for the protection of the environment will be required.

3.18 Irreversible and Irretrievable Commitment of Resources

The only irreversible and irretrievable commitment of resources associated with the proposed action will be the materials, utilities, labor, and time expended in both design and construction of the additional facilities, as well as the future maintenance and operations of the facilities themselves.

3.19 Mitigation Measures

The following mitigation measures are included in the EA to reduce potential impacts to less than significant levels:

> Preparation and implementation of storm water management plans and sedimentation and erosion control plans for the proposed site. Implementation of soil disturbance mitigation measures at the proposed site through proper design, installation, and maintenance of standard erosion and sedimentation measures (BMP), such as stabilizing paved roads, graded areas, areas trenched for utilities, and building construction areas during construction using hay bales and/or filter fabric. Revegetate the selected site as soon as possible after soils are disturbed. Staging of construction at the proposed site to limit the total area disturbed at any one time.
>
> Standard engineering measures to limit particulate emissions during construction activities, such as use of water or chemicals for control of dust during the grading of roads or the clearing of land; the application of asphalt, water, or suitable chemicals on dirt roads, materials, stockpiles, and other surfaces that can cause airborne dusts; covering open bodied trucks that transport materials likely to cause airborne dusts; and the prompt removal of earth or other material from paved streets that is generated from construction activities.
>
> Standard engineering and safety measures to limit radiation exposures to that received by the general public, such as adequate bulk shielding materials in the walls and ceiling of the facility, implementation of a radiation monitoring plan, and sufficient protocols to ensure that any unintended effects to stowaways do not exceed those radiation exposure limits set for the general public.

List of Preparers

Appendix A

Appendix A

List of Preparers

US Customs Service

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M.S., Environmental Management, 1995

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M.S. Environmental Management, 2000

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Environmental Analyst
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Environmental Analyst/GIS Analyst

Informing Public Officials and Citizens

Appendix B

Appendix B

Informing Public Officials and Citizens

Stakeholder Letter

On 24 September 2002, letters were sent to public officials informing them of the project. A sample letter and its attachment are presented at the end of this appendix. Officials in Mexico received the identical letter written in Spanish. Letters were sent to the officials listed in Table XX-I.

Table XX-I. Addresses for Stakeholder Letter

XXX Remember to adjust for final formatting once pages are set.

The Honorable Phil Gramm
370 Russell Senate Office Building
Washington, DC 20510-4302

The Honorable Kay Bailey Hutchison
284 Russell Senate Office Building
Washington, DC 20510-4302

The Honorable Silvestre Reyes
Texas – 16th, Democrat
1527 Longworth HOB
Washington, DC 20515-4316

The Honorable Ben Nighthorse Campbell
Chairman, Subcommittee on Treasury, Postal Service, and General Government, Committee on Appropriations
380 Russell Senate Office Building
Washington, DC 20510

The Honorable Byron Dorgan
Ranking Minority Member, Subcommittee on Treasury, Postal Service, and General Government, Committee on Appropriations
713 Hart Senate Office Building
Washington, DC 20510

The Honorable Ernest J. Istook Jr.
Oklahoma – 5th, Republican
B307 Rayburn HOB
Washington, DC 20515-6028

The Honorable Steny Hoyer
Maryland – 5th, Democrat
1705 Longworth House Office Building
Washington, DC 20515-2005

The Honorable Paul H. O'Neill
U.S. Secretary of the Treasury
1500 Pennsylvania Avenue, NW
Washington, DC 20220

The Honorable Norman Y. Mineta
U.S. Secretary of Transportation
400 7th Street, SW
Washington, DC 20590

The Honorable Donald H. Rumsfeld
US Secretary of Defense
1000 Defense Pentagon
Washington, DC 20301-1000

FDA Commissioner
U.S. Food and Drug Administration
5600 Fishers Lane
Rockville, MD 20857-0001

The Honorable Jane F. Garvey
Administrator, Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591

The Honorable John Magaw
Undersecretary
Transportation Security Administration
400 Seventh Street SW
Washington, DC 20590

The Honorable John P. Walters, Director
Office of National Drug Control Policy
750 11th Street, NW
Washington, DC 20503

Dr. Richard A. Meserve
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24 September 2002

«Address1»

Attachments: (1) Project Summary for Test of Pulsed Fast Neutron Analysis Cargo Inspection System at the Ysleta, Texas Border Station

Dear «Title» «LastName»:

In its counter-terrorism and counter-drug efforts, the Federal government is investing considerable resources into developing technologies for detecting explosives, narcotics or other contraband hidden among the freight imported into the United States. In order to validate a new technology, it has to be tested in an operational environment.

The Department of Defense (DoD) in cooperation with the United States Customs Service and the Transportation Security Administration plans to conduct a six-month, operational test of a Pulsed Fast Neutron Analysis (PFNA) Cargo Inspection System at a border station near El Paso, Texas. An overview of the project is contained in the attached summary. You may have previously been contacted about a planned test of this system. Funding issues had caused some delay within the program.

PFNA is a non-intrusive, radiation-based interrogation technology that images the contents of various sizes and types of unoccupied vehicles by using a neutron beam. Gamma rays are produced that are specific to the elements in the vehicle. Using the known "gamma ray fingerprints" of contraband materials, the system can indicate their presence and location within the vehicle.

The Department of Defense, in accordance with Section 102 [42 USC § 4332(2)(C)] of the National Environmental Policy Act (NEPA) will prepare an Environmental Assessment for the construction of the test facility (approximately 9 months) and its operation during the test period (a maximum of 6 months). An Environmental Assessment is required to provide information on any potential impacts to the human and natural environment that may result from the test.

As with other projects, the Department of Defense solicits the views and comments of federal, state and local agencies, and the general public concerning the social, economic, environmental, historical, and other impacts of the proposed action. Your views and comments will assist DoD in the early identification of possible adverse affects that should be given consideration during the development of the project. As part of the environmental assessment, DoD will evaluate the "no action" alternative as well as alternatives that may satisfy the project requirements.

Veridian is under contract to collect information and prepare an Environmental Assessment. Please review the attached summary of the proposed project and provide any comments or questions you may have to Mr. William Snow, Veridian Information Solutions, 6066 Leesburg Pike, Suite 400, Falls Church, Virginia 22041, telephone (703) 845-7334.

We would appreciate your views and comments within 30 days from the date of this letter. Also a public meeting, which will be announced in local newspapers, will be held in the El Paso area in the coming months.

Sincerely,

W. F. Snow
Veridian Information Solutions, Inc.

Attachment (1)
2nd Draft of 12 September 2002

Project Summary for
Test of Pulsed Fast Neutron Analysis Cargo Inspection System
at the Ysleta, Texas Border Station

Introduction

In its counter-terrorism and counter-drug efforts, the Federal government has invested considerable resources into developing technologies for detecting explosives, narcotics or other contraband hidden among the freight imported into the United States. Radiation-based, non-intrusive inspection systems, such as X-ray and gamma ray, have been in use for several years by Federal Government agencies. A related technology, called Pulsed Fast Neutron Analysis (PFNA), was developed several years ago for cargo inspection. PFNA is designed to directly and automatically detect and measure the presence of specific materials, such as cocaine or explosives, which may have been hidden within the vehicle. PFNA technology uses pulses of neutrons as the radiation source to non-intrusively examine packages and containers for suspect materials. While PFNA has been successfully demonstrated in a laboratory setting, it has yet to be tested in an operational environment.

The Department of Defense (DoD) in cooperation with the United States Customs Service and the Transportation Security Administration plans to conduct a six-month operational test of a PFNA system at the Ysleta/Zaragoza Border Station in Ysleta, Texas. Ysleta is next to the Rio Grande River just southeast of the city of El Paso. Ysleta was selected as the test location principally because it had space available (no additional land purchase was required) and sufficient commercial traffic.

The test facility will consist of a building (approximately 220 feet by 60 feet) housing the PFNA equipment and several smaller structures for electronic equipment and operators.

Inspection Process

Vehicles will be selected for inspection from the routine stream of commerce and will be directed to the corridor-like entrance of the test facility. The driver will leave the vehicle and walk to a designated waiting area located at the other side of the PFNA building. A self-powered towing machine will slowly pull the unoccupied vehicle through the facility and past the scanning device. Once all safety checks are verified, the vehicle is scanned with the neutrons. The pulsed beam moves up and down while the vehicle slowly passes by to ensure that all of the contents are inspected.

Many of the neutrons pass through the vehicle unaffected and are stopped by the shield walls of the corridor. Some of the neutrons hit individual atoms, subsequently giving off a gamma ray of a specific frequency that is characteristic of a chemical element. Sensors located along the walls of the corridor detect the quantities for each of the specific frequencies of gamma rays for the short period of time of each pulse of neutrons. The system's electronics and computers compile the gamma ray information to determine the properties of individual material locations within the vehicle. For the chemical makeup of specific explosives and narcotics, the computers automatically alert operators of the presence of these substances. The PFNA system generates three-dimensional images of the target materials on computer monitors to help pinpoint the location of suspect materials for U.S. Customs operators.

Radiation Properties

While the neutron generator used in PFNA systems does not contain radioactive material, the neutron production process does produce a trace amount of radioactive material. Specifically, a small amount (less than 1/100th of the levels allowed by the EPA regulations) of the radioisotope tritium (radioactive hydrogen) is a byproduct of the process, which is vented to the atmosphere.

The neutrons produce radioactive isotopes of some of the atoms within the vehicle. This may increase the level of radioactivity of scanned cargo materials. Computer modeling has shown that the level of induced radioactivity is of little consequence to human health. Residual radioactivity measurements will be made during the test to confirm the absence of significant levels of radioactivity.

For safety, personnel are shielded from radiation by staying out of the equipment area during operations. The facility's walls are designed to prevent all but minute amounts of radiation from leaving the area. X-rays and gamma rays are produced both by the fast moving neutrons themselves as they collide with atoms, and the neutron producing equipment. X-rays and gamma rays are both forms of ionizing radiation, which by virtue of their high energy, can convert molecules into charged ions, and poses an increased risk of cancer with excessive exposure. Visible light, infrared light, microwaves, and radio waves are non-ionizing forms of electromagnetic radiation because of their relatively lower energies.

It is believed that the PFNA inspection system is safe, with exposures to radioactive materials and ionizing radiation to the general public and US Customs Service personnel well below Federal and State Standards. The facility design, including radiation shielding, will be designed to ensure that levels of exposure will be statistically indistinguishable from local area background.

B.0 Agencies and Persons Contacted

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Paul Nicholas – PFNA Program Manager
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Background Information on Earth Resources
Appendix C

Appendix C

Background Information on Earth Resources

Climate

The City of El Paso is located within the northern portion of the Chihuahuan Desert. The area is arid with average annual rainfall of 8 inches, most of which falls from July through September during thunderstorms. Historically, rainfall has ranged from a recorded low of 2.22 inches in 1891 to a high of 18.29 inches in 1884. Average high temperatures range from 95 degrees in June to 55 degrees in January. Small amounts of snow fall nearly every winter, though snow cover rarely amounts to more than an inch and seldom remains for more than a few hours.

In the summer the daytime temperature frequently rises above 90 degrees and occasionally above 100 degrees, but most summer nights are comfortable because temperature usually falls to the 60's. The average number of days in which the temperature reaches 100 degrees or higher is 10 per year.

Winter days are usually mild, for the temperature on an average day in winter rises to 55 degrees to 60 degrees. The temperature drops below freezing on about half the nights in December and January. A temperature below 10 degrees is rare.

Sunshine is abundant with an average of 293 days of sunshine per year. Spring and Fall bring brief but sometimes very strong winds which occasionally stir up a considerable amount of dust and sand. The wind has both positive and negative aspects. It clears the air of man-made pollutants, but creates a form of air pollution itself (dust storms). Wind direction is predominantly North in the winter and South in the summer. On average, wind speed is 9 mph with a peak gust recorded at 84 mph in 1977.[1]

Geology

The Ysleta Cargo Facility lies within the Trans-Pecos geologic region of Texas on two geologic formations, the Hueco Bolson and the Rio Grande Valley. The geology of the Port of Entry consists of gravel, sand, silt, and clay deposits chiefly of the Cretaceous, Tertiary, and Quaternary age.

The Hueco Bolson deposits consist of gravel, sand, and clay, derived from the disintegration of the rocks of the highlands. Coarse material abounds near the mountains, and finer textured deposits compose the surface of the lowlands. The Hueco Bolson is a deep structure – more than 9,000 feet of sediment underlies the El Paso International Airport. (Brief Geological History: El Paso-Juarez Region).

The floor of the Rio Grande Valley is covered with river alluvium. A few feet of silt is commonly encountered at the surface, below which sand and gravel are reported to occur down to a depth of about 60 feet, where the gravel is underlain by clay.[13]

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[1] United States Department of Agriculture, Soil Conservation Service, *Soil Survey of El Paso County Texas* November 1971. p. 54

The Ysleta Cargo Facility has relatively flat terrain with a low elevation profile. The highest elevation is 3667.5 feet above sea level at the Import Dock Office.[14]

Soils

Because all of the acreage in this part of El Paso County has been leveled for irrigation, the soils are nearly level and have an almost uniform surface. At one time, the soils were subject to flooding by the Rio Grande, but now are protected by dams and levees. Soil resources were characterized by using the Soil Survey of El Paso County, Texas 1971. The soils in the area were mapped by the Soil Conservation Service (SCS) and recorded in the Soil Survey of El Paso County, Texas (1971).

Project area soils are part of the Harkey-Glendale Association. These soils consist of deep, nearly level soils that have loamy, very fine sand to silty clay loam underlying material on the Rio Grande flood plain. Major soil series are Glendale, Harkey, Saneli, and Vinton.

Glendale Series - The Glendale series consists of deep, brown soils that developed in stratified, loamy, friable sediments having a high content of lime. They are well drained or moderately well drained, have medium internal drainage, and are moderately to very slowly permeable. Fertility and the available moisture capacity are high. Glendale silty clay loam soil profile is found at the Ysleta site.

Harkey Series - The Harkey series consists of deep, pale-brown to pink soils that developed in friable, loamy sediments having a high content of lime. Harkey soils are moderately well drained. Their internal drainage is medium, and their permeability is moderately slow. Fertility and the available moisture capacity are high. Harkey loam and Harkey silty clay loam soils are the predominate soil profiles found on the Ysleta site.

Saneli Series - The Saneli series consists of deep, brown to pinkish-gray soils that developed in stratified, very firm material recently deposited on the Rio Grande floodplain. The material consists of silty clay over sandy sediments. The soils are moderately well drained and have slow surface runoff. Although water enters these soils rapidly when they are dry and cracked, it enters very slowly when they are wet and the cracks are sealed. Internal drainage is slow. Fertility and the available moisture capacity are high. Saneli silty clay loam soil profile is found at the Ysleta site.

Vinton Series - The Vinton series consists of deep, pale-brown soils. These soils developed in friable, stratified fine sandy loam and sandy sediments that have a high content of lime. They are well drained, have very slow surface runoff, and have rapid internal drainage. Their fertility and available moisture capacity are moderately low. Vinton loam soil profile is found at the Ysleta site.

Soils Limitations

In El Paso County the soils have a high content of lime, are alkaline, contain little organic material, and lose water rapidly through evaporation. Table II list the soil limitations that affect foundations of buildings of three stories or less and trafficways.

Foundations for buildings of three stories or less – These foundations are for buildings used as stores, offices, schools churches and small industrial plants. None of these buildings requires a presumptive bearing value of more than 6,000 pounds. The soil features that affect this use include slope, depth to bedrock or hard caliche, height of the water table, hazard of flooding, and shrink-swell potential.

Trafficways – These are low-cost roads and streets. The construction involves limited cuts and fills and limited preparation of subgrade. Properties important in evaluating the soils for this use are slope, depth to bedrock or hard caliche, height of the water table, hazard of flooding, risk of erosion, traffic-supporting capacity, and shrink-swell potential.

Table C-I. Soil Limitations

Soil Type	Soil Features Affecting	
	Foundations for buildings of three stories or less	Trafficways
Glendale silty clay loam	Moderate shrink-swell potential	Soil features favorable; Moderate shrink-swell potential
Harkey loam	Low to moderate shrink-swell potential	Soil features favorable
Harkey silty clay loam	Low to moderate shrink-swell potential	Moderate shrink-swell potential in surface layer
Saneli silty clay loam	High shrink-swell potential	High shrink-swell potential
Vinton loam	Soil features favorable	Soil features favorable

Source: *Soil Survey of El Paso County Texas* November 1971

Background Information on Water Resources
Appendix D

Appendix D

Background Information on Water Resources

Surface Water Quality

Public concern for controlling water pollution led to enactment of the Federal Water Pollution Control Act Amendments of 1972. As amended in 1977, this law became commonly known as the Clean Water Act. The Act established the basic structure for regulating discharges of pollutants into the waters of the United States. It gave Environmental Protection Agency the authority to implement pollution control programs such as setting wastewater standards for industry. The Clean Water Act also continued requirements to set water quality standards for all contaminants in surface waters. The Act made it unlawful for any person to discharge any pollutant from a point source into navigable waters, unless a permit was obtained under its provisions.

Storm Water

Storm Water runoff is regulated by the Texas Water Development Board and the Texas Natural Resources Conservation Commission. The state of Texas has incorporated, by rule, the provisions of the US Environmental Protection Agency (EPA) regulations 40 CFR 122.26(b)(14) and Federal Register Notice Volume 63, Number 31 concerning National Pollutant Discharge Elimination System (NPDES) General Permits for Storm Water Discharges from Construction Activities. Under Texas law (Texas Water Code (TWC), §26.040; Texas Administrative Code Title 30, Part 1, Chapter 205 Subchapter A Rule 205.1), storm water discharges associated with small construction activities that result in land disturbance of equal to or greater than one acre and less than five acres do not require storm water discharge permits.

Floodplains

Executive Order (EO) 11988, Floodplain Management, directs each federal agency to avoid undertaking or providing assistance for new construction located in floodplains unless the head of the agency finds that: (1) there is no practicable alternative to such construction; and (2) the proposed action includes all practicable measures to minimize harm to floodplains which may result from such use. EO 11988 does not prevent all development of floodplain areas. It recognizes that certain projects must be located in floodplains, and describes the process that must be followed in order for floodplain actions to be in compliance with regulations. To demonstrate compliance with the Executive Order, the federal agency must address the two provisions discussed herein, provide opportunity for early public review by those who may be affected, and include its findings in its environmental or other appropriate decision documents. An eight-step decision-making process has been outlined in the FEMA guidance document "Further advice on EO 11988 Floodplain Management". These actions do not constitute a waiver from compliance with EO 11988, but are a step-by-step process to be followed by the federal agency. Adherence the eight-step decision-making process ensures opportunity for early public review of any plans or proposals for actions in floodplains in accordance with Section 2(b) of EO 11514 “Protection and Enhancement of Environmental Quality”.

To determine the location of the Ysleta Cargo Facility with respect to floodplains, the applicable Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for that part of El Paso County was reviewed.[1] The map showed that the project site is in Zone AH, which is subject to 100-year shallow flooding with average depths between one and three feet. For those areas designated as Zone AH, the minimum elevation required for all new construction in developed areas is 3 feet above the highest adjacent grade or the Zone AH base flood elevation, whichever is lower. At the Ysleta Cargo Facility, the Zone AH area flood level averages 3662 feet above mean sea level.

Wetlands

The presence of wetlands at the proposed site was investigated through a review of US Fish and Wildlife Service (USFWS) wetland mapping, soil survey information, and evaluations conducted by the Corps of Engineers El Paso Regulatory Office. It was determined that there are no wetland areas or waters of the U.S. within the boundaries of the Ysleta Cargo Facility.

The Corps of Engineers determined that because no dredged or fill material will be placed into waters of the United States (including wetlands), the project was not regulated under the provisions of Section 404 of the Clean Water Act, and a Department of the Army permit was not required.[2]

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[1] Flood Insurance Rate Map for City of El Paso, Texas; El Paso County; Panel 50 of 52; Community Panel Number 4802140050.B; Effective Date: 15 October 1982.

[2] Daniel Malanchuk, Chief, El Paso Regulatory Office, Albuquerque District, Corps of Engineers, Department of the Army; letter of 15 March 2000.

Background Information on Air

Appendix E

Appendix E

Background Information on Air

General Air Quality Regulations

The Environmental Protection Agency (EPA) defines ambient air in 40 CFR Part 50, as "that portion of the atmosphere, external to buildings, to which the general public has access." In accordance with the 1970 Clean Air Act (CAA) and the 1977 and 1990 Amendments (CAAA), the EPA has promulgated ambient air quality standards and regulations for air pollutants. As explained in EPA's "The Plain English Guide to the Clean Air Act":[1]

> "A few common air pollutants are found all over the United States. These pollutants can injure health, harm the environment and cause property damage.
>
> "EPA calls these pollutants **criteria air pollutants** because the agency has regulated them by first developing health-based **criteria** (science-based guidelines) as the basis for setting permissible levels. One set of limits **(primary standard)** protects health; another set of limits **(secondary standard)** is intended to prevent environmental and property damage. A geographic area that meets or does better than the primary standard is called an **attainment area**; areas that don't meet the primary standard are called **nonattainment** areas."

To date, the EPA has issued National Ambient Air Quality Standards (NAAQS) for six criteria pollutants; carbon monoxide (CO), sulfur dioxide (SO_2), particles with a diameter less than or equal to 10 micrometers (PM_{10}), ozone (O_3), nitrogen dioxide (NO_2), and lead (Pb). Under the CAA and CAAA, state and local air pollution control agencies have the authority to adopt and enforce ambient air quality standards (AAQS) more stringent than the NAAQS. The State of Texas has adopted all the NAAQS. The National and Texas AAQS are presented in Table E-I.

[1] Environmental Protection Agency; The Plain English Guide to the Clean Air Act; EPA-400-K-93-001 of April 1993

Table E-I. National and Texas Ambient Air Quality Standards (AAQS)

Pollutant	Standard Value*	Standard Type
Carbon Monoxide (CO)		
8-hour Average[a]	9 ppm (10 mg/m^3)	Primary
1-hour Average[a]	35 ppm (40 mg/m^3)	Primary
Nitrogen Dioxide (NO_2)		
Annual Arithmetic Mean	0.053 ppm (100 µg/m^3)	Primary & Secondary
Ozone (O_3)		
1-hour Average[b]	0.12 ppm (235 µg/m^3)	Primary & Secondary
8-hour Average **	0.08 ppm (157 µg/m^3)	Primary & Secondary
Lead (Pb)		
Quarterly Average	1.5 µg/m^3	Primary & Secondary
Particulate (PM 10)	Particles with diameters of 10 micrometers or less	
Annual Arithmetic Mean	50 µg/m^3	Primary & Secondary
24-hour Average[c]	150 µg/m^3	Primary & Secondary
Particulate (PM 2.5)	Particles with diameters of 2.5 micrometers or less	
Annual Arithmetic Mean **	15 µg/m^3	Primary & Secondary
24-hour Average **	65 µg/m^3	Primary & Secondary
Sulfur Dioxide (SO_2)		
Annual Arithmetic Mean	0.03 ppm (80 µg/m^3)	Primary
24-hour Average[a]	0.14 ppm (365 µg/m^3)	Primary
3-hour Average[a]	0.50 ppm (1300 µg/m^3)	Secondary

* Parenthetical value is an approximately equivalent concentration.

** The ozone 8-hour standard and the PM 2.5 standards are included for information only. A 1999 federal court ruling blocked implementation of these standards, which EPA proposed in 1997. EPA has asked the U.S. Supreme Court to reconsider that decision

[a] Maximum Concentration not to exceed more than once per year

[b] Expected number of exceedance days shall not be more than one per year (3 year average) as determined by Appendix H of 40 CFR Part 50.

[c] Expected number of exceedance days shall not be more than one per year (3 year average) as determined by Appendix H of 40 CFR Part 50.

Source: 40 CFR Part 50, July, 2000

Site-Specific Data

The Ysleta Port of Entry is located in Texas Natural Resource Conservation Commission Region 6 (Brewster, Culberson, El Paso, Hudspeth, Jeff Davis and Presidio Counties) and in EPA Region 6 (Arkansas, Louisiana, New Mexico, Oklahoma and Texas).

Using EPA's on-line AirData system, one can extract data from the Aerometric Information Retrieval System (AIRS) Database. Among the data available are annual air quality measurements at the county level. Air quality data for El Paso County for the years 1996 through 2001 are presented in Table E-II.

Table E-II. Summary data for El Paso County show fluctuations over with regard to meeting ambient air quality standards.

	CO (ppm)		NO_2 (ppm)	SO_2		O_3	PM_{10} ($\mu g/m^3$)		Pb ($\mu g/m^3$)
Year	2nd Max 1-hr value	2nd Max 8-hr value	Annual Mean value	2nd Max 24-hr value	Annual Mean value	2nd Max 1-hr value	2nd Max 24-hr	Annual Mean value	Quarterly Mean value
1996	17.5	10.3	0.035	0.046	0.009	0.123	122	42.9	0.40
1997	17.5	7.9	0.034	0.030	0.007	0.115	209	61.4	0.12
1998	16.7	8.3	0.031	0.027	0.006	0.125	174	55.5	0.14
1999	14.4	8.2	0.028	0.016	0.002	0.108	170	69.0	0.15
2000	17.0	9.2	0.029	0.006	0.002	0.122	124	61.2	0.10
2001	14.2	6.7	0.021	0.008	0.002	0.116	182	42.3	0.07

Source: US EPA - AirData Summary Report, downloaded from web page 15 October 2002.

The EPA has classified El Paso as a nonattainment area for three of the six criteria air pollutants.[2] Specifically, the EPA classifies El Paso as a "serious" ozone nonattainment area, "moderate" carbon monoxide nonattainment area, and "moderate" particulate nonattainment area.

Hazardous Air Pollutant Regulations

A hazardous air pollutant is any air pollutant known to cause or may reasonably be anticipated to cause death, injury, or serious adverse effects to human health or the environment. Section 112 of the Clean Air Act gave EPA the authority regulate releases of these materials through the National Emission Standards for Hazardous Air Pollutants (NESHAP). NESHAP limits have been established for asbestos, benzene, beryllium, inorganic arsenic, mercury, radionuclides, and vinyl chloride. Of relevance here is 40 CFR Part 61, Subpart I, which is the NESHAP for radionuclides.

[2] Data as of 29 July 2002 per EPA Green Book, www.epa.gov/oaqps/greenbk/ancl3.html.

Analysis of PFNA Cargo Inspection System

Although 40 CFR Part 61, Subpart I does not apply to low-energy accelerators such as that used in the PFNA Cargo Inspection System, the system was studied for its performance with respect to the radionuclide NESHAP.

"*A Guide for Determining Compliance with the Clean Air Act Standards for Radionuclide Emissions from NRC-Licensed and Non-DOE Federal Facilities*" (EPA 520/1-89-002 of October 1989) provides a tiered set of methods for determining compliance. As explained in the guidance document:

> "This approach begins with simple-to-use methods that are very conservative in terms of determining compliance. The methods become progressively less conservative but more complicated at succeeding levels."

The most conservative method is the "Possession Table" method. This method applies to facilities that handle small quantities of radioactive materials. In the case of the PFNA Cargo Inspection System, the only radionuclides produced are tritium and the target foils.

Tritium is produced in the neutron production target at essentially the same rate as neutrons, i.e., 5.5×10^{10} atoms per second. Assuming 12 hours of operation per day, 6 days a week and 52 weeks per year (even though the test period is shorter, a maximum of six months), the total amount of tritium produced annually would be:

5.5×10^{10} atoms/ second x 3600 sec/hr x 12 hr/day x 6 day/wk x 52 wk/yr

= 7.41×10^{16} atoms/yr

Based on tritium's half-life of 12.26 years, 5.5 percent of any amount of tritium will disintegrate in a year. Conservatively assuming that all the tritium produced in a year is produced instantaneously at the very beginning of the year, the number of disintegrations during the year will be:

7.41×10^{16} atoms/yr x 0.055 disintegrations/atom

= 4.08×10^{16} disintegrations /yr

Expressing the definition of a curie in terms of a year yields:

1 Ci = 3.7×10^{10} disintegrations/sec x 3600 sec/hr x 24 hr/day x 365 day/yr

= 1.17×10^{18} disintegrations/yr

Then the annual tritium disintegrations may be expressed as:

4.08×10^{16} disintegrations /yr x 1 Ci/ (1.17×10^{18} disintegrations/yr)

= 0.0348 Ci

The 6 millicuries of radioactivity associated with the target foils are assumed to be evenly divided among three solid radionuclides: Cobalt-57 (^{57}Co), Cobalt-60 (^{60}Co) and Manganese-54, (^{54}Mn).

Table E-III was constructed in accordance with the guidelines of EPA 520/1-89-002 of October 1989. The "Possession Table" compares amounts of radionuclides on hand to EPA-prescribed thresholds. For these calculations, it was assumed that all radioactive material produced during the Operational Test Phase was kept on hand until the end of the test. As shown in Table E-III, the amount of curies produced per year by the PFNA Cargo Inspection System is approximately 0.2 percent of the Annual Possession Quantity for all of the materials involved. Hence, using EPA's most conservative method, the facility would be in full compliance with the NESHAP and would have no annual reporting requirement.

Table E-III. Possession Table

Facility Name: PFNA Cargo Inspection System
Assessment Period (dates): Six-Month Operational Test

	Total	Nuclide			
1. Enter the name of each nuclide (i.e., I-131, Co-60, etc.). If a nuclide is in more than one physical form, enter its name once for each physical form		H-3	Co-57	Co-60	Mn-54
2. Enter the curies on hand at the beginning of the period.		0	0	0	0
3. Enter the curies produced or received during the period.		0.0348	0.002	0.002	0.002
4. Add lines 2 and 3.		0.0348	0.002	0.002	0.002
5. Enter the physical form of the nuclide - gas, liquid or powder, or solid or capsule (G, L or S). If any nuclide is exposed to temperatures of 100° C or more, or boils at 100° C or less, treat it as a gas.		G	S	S	S
6. Enter the value shown in Table 3-1 for the appropriate form of the nuclide.		15	1600	16	250
7. Divide line 4 by line 6.		0.0023200	0.0000013	0.0001250	0.0000080
8. Sum the fractions on line 7.	0.00245				
9. Sum the fractions on line 7 due to radioiodines.	0.00000				

Source: Table format taken from: "A Guide for Determining Compliance with the Clean Air Act Standards for Radionuclide Emissions from NRC-Licensed and Non-DOE Federal Facilities;" EPA 520/1-89-002 of October 1989.

Background Information on Wildlife and Vegetation
Appendix F

Appendix F

Background Information on Wildlife and Vegetation

Vegetation

The 1984 Texas Parks and Wildlife Department El Paso Vegetation Map identifies the area in the vicinity of the port of entry as having urban vegetation.[1]

Three vegetation communities occur in El Paso County.[2]

- Tobosa-Black Grama Grassland – Commonly associated plants include blue gamma, sideoates grama, hairy grama, burrograss, bush muhly, Arizona cottontop, javelina bush, creosotebush, pamella, whitehorn acacia, cholla, broom snakeweed, and rough menodora.
- Mesquite-Sandsage Shrub **–** Commonly associated plants include fourwing saltbush, palmella, mormon tea, sotol, sand dropseed, meas dropseed, spike dropseed, blue grama, chino grama, broom snakeweed, and devil's claw.
- Crops – Commonly associated plants include cultivated cover crops or row crops providing food and/or fiber for either man or domestic animals.

Agricultural crops are abundant along the Rio Grande floodplain in the vicinity of the Ysleta Commercial Cargo Facility. The inland area of El Paso County is dominated by a mesquite-sandsage vegetation community. Tobosa-black grama grassland plant association forms the remainder of the county along most of the El Paso-Hudspeth county line and a small area north of El Paso to the New Mexico state line.

Wildlife

With approximately 70 percent of the Port of Entry property having been developed, there is very little habitat capable of supporting wildlife species. All of the remaining undeveloped property has been previously disturbed and affords little cover suitable for wildlife habitat.

Although gray foxes, bobcats, prairie falcons, golden eagles, lizards, and other predators can be found in this portion of El Paso County, the habitat provided by the grasses and shrubs on the proposed site is generally poor for most forms of wildlife, due to the sparse amount of cover provided. While several bird species will utilize the site for foraging, the low density of grasses and forbs affords little cover for ground nesting birds such as sparrows. The grassland would support a low number of smaller mammals such as rodents. Much of the surrounding land is being used for agricultural purposes. Wildlife can easily migrate from the areas of direct or indirect impact to other similar habitats that are in abundance to the east and south of the proposed site.

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[1] Texas Parks and Wildlife website at http://www.tpwd.state.tx.us/gis/veg/pdf/veg_08.pdf.

[2] McMahan, C.A., R.G. Frye, and K.L. Brown; *The Vegetation Types of Texas Including Cropland*; Texas Parks and Wildlife Department, Austin, Texas; 1984; p. 40

Threatened and Endangered Species

Any developments that may affect threatened or endangered species are subject to the coordination process with the US Fish and Wildlife Service as related to the Endangered Species Act of 1973, as amended. Texas laws and regulations pertaining to endangered or threatened plant species are contained in Chapter 88 of the Texas Parks and Wildlife (TPW) Code and Sections 69.01 - 69.14, Title 31 of the Texas Administrative Code (T.A.C.) (TPWD 2000). Texas laws and regulations pertaining to endangered or threatened animal species are contained in Chapters 67 and 68 of the TPW Code and Sections 65.171 - 65.184, Title 31 of the T.A.C.

Special status (Federal or State of Texas) plants and animals for El Paso County were identified by Texas Parks and Wildlife Department and are listed in Table F-I.

Table F-I. Special Status Plants and Animals in El Paso County, Texas

Common Name	Scientific Name	Federal Status	State Status
Birds			
American peregrine falcon	Falco peregrinus anatum	E	E
Artic peregrine falcon	Falco peregrinus tundrius	E/SA	T
Common black hawk	Buteogallus anthracinus		T
Ferruginous hawk	Buteo regalis	SOC	
Least tern	Strena antillarum	E	E
Mexican spotted owl	Strix occidentalis lucida	T	T
Mountain plover	Charadrius montanus	PT	
Northern aplomado falcon	Falco femoralis septentrinalis	E	E
Northern goshawk	Accipiter gentiles	SOC	
Northern gray hawk	Buteo nitidus maximus	SOC	
Peregrine falcon	Falco peregrinus	E/SA	
Southwestern willow flycatcher	Empidonax traillii extimus	E	E
Western burrowing owl	Athene cunicularia hypugea	SOC	
White-faced ibis	Pleadis chihi	SOC	
Zone-tailed hawk	Buteo albonotatus		T
Fishes			
Bluntnose Shiner	Notropis simus		T
Mammals			
Black-footed ferret	Mustela nigripes		E
Black bear	Ursus americanus		T
Gray wolf	Canis lupus		E
Mollusks			
Franklin mountain talus snail	Sonorella metcalfi	SOC	
Franklin mountain wood snail	Ashmunella pasonis	SOC	
Reptiles			
Big bend blackhead snake	Tantilla cucullata		T
Mountain short-horned lizard	Phrynosoma hernandesi		T
Texas horned lizard	Phrynosoma cornutum	SOC	T
Texas lyre snake	Trimorphodon biscutatus		T

Table F-I (continued). Special Status Plants and Animals in El Paso County, Texas

Common Name	Scientific Name	Federal Status	State Status
Vascular Plants			
Alamo beardtongue	Penstemon alamosensis	SOC	
Comal snakewood	Colubrina stricta	SOC	
Dense cory cactus	Coryphantha dasyacantha dasyacantha	SOC	
Desert night-blooming cereus	Cereus greggii var greggii	SOC	
Hueco rock-daisy	Perityle huecoensis	SOC	
Sand prickly-pear	Opuntia arenaria	SOC	
Sand sacahuista	Nolina arenicola	SOC	
Sandhill goosefoot	Chenopodium cycloids	SOC	
Sneed pincushion cactus	Coryphantha sneedii var sneedii	E	E
Texas false saltgrass	Allolepis texana	SOC	

Key: E = Endangered, E/SA = Endangered by Similarity of Appearance, T = Threatened, SOC = Species of Concern

Source: Nancy Gillespie, Texas Parks & Wildlife, email communication of 24 October 2002.

Background Information on Noise

Appendix G

Appendix G

Background Information on Noise

Measuring Noise

The standard measurement unit of noise is the decibel (dB), which represents the acoustical energy present. Noise levels are measured in A-weighted decibels (dBA), a logarithmic measurement, which approaches the sensitivity of the human ear across the frequency spectrum. A 3 dBA increase is equivalent to doubling the sound pressure level, but is barely perceptible to the human ear. For reference, typical noise levels are presented in Table G-I.

Table G-I. Typical noise levels produced by different activities span many orders of magnitude.

Noise level (dbA)	Activity
0	theoretical threshold of human hearing
15	average threshold of human hearing
18	rustle of leaves
25	whisper at 5 feet
50	average office environment
60	normal conversation
75	average factory
85	OSHA threshold for hearing conservation program
87	heavy street traffic
90	OSHA threshold for mandatory protection
103	punch press
115	OSHA maximum noise level allowed
120	auto horn
125	airplane motor at 25 feet
140	OSHA maximum impulse or impact sound allowed

Source: Hearing Conservation web page, http://www.state.ia.us/government/idop/rtfs/MSManual/15-40.htm

Noise Regulations

The Noise Control Act of 1972 was enacted to establish noise control standards, and to regulate noise emissions from commercial products such as transportation and construction equipment.

Work place noise standards are set by the Occupational Safety and Health Administration (OSHA) and are measured in two ways: 1) a standard of 90 dBA for a duration of 8 hours is the limit for constant noise, and 2) a maximum sound level for impulse noise of 140 dBA. The OSHA standard for occupational noise exposure is found at 29 CFR 1910.95. This standard requires personal dosimeter testing and the establishment of an effective hearing conservation program and additional testing if exposure levels to noise are at or above the "action level" of 85 dBA as an 8-hour time weighted average (TWA) exposure or if personnel are exposed to a maximum sound level for impulse noise of 140 dBA. 85 dBA is 50% of the OSHA permissible exposure limit (PEL) of 90 dBA as an 8-hour TWA while impulse noise is any sort of short blast less than 1-second in duration. The State of Texas does not have an equivalent noise protection statue or regulation.[1]

Under OSHA's hearing protection standard for general industry, employers must provide a hearing conservation program, hearing tests, training and hearing protection devices if the average noise exposure over an eight-hour day is 85 dBA. The standard for construction differs somewhat. Construction employers must provide protection against the effects of noise when sound levels exceed 90 dBA averaged over eight hours or 95 dBA over four hours (29 CFR 1926.52).

Construction Equipment Noise Measurements

[1] Personnel communication with Paula McKinney, Branch Chief, Industrial Hygiene, Texas Department of Health, 10 May 2001.

Table G-II presents typical noise levels from construction equipment 50 feet from the source. Each doubling of distance from the source will reduce the noise level by about 6 dBA.

PFNA Equipment Noise Measurements

A noise survey was conducted at Ancore Corporation in Santa Clara, California, during operation of the PFNA equipment. A Metrosonics db-307 noise dosimeter was used to measure noise levels from all high-noise sources associated with the PFNA equipment. A summary of the noise survey data is shown in Table G-III. All measurements were well below the 85 dBA OSHA action level.

Table G-II. Typical Noise Produced by Construction Equipment

Equipment	Typical Noise Level (dBA) 50 feet from source
Air Compressor	81
Backhoe	80
Concrete mixer	85
Mobile Crane	83
Generator	81
Loader	85
Pneumatic tool	85
Pump	76
Roller	74
Saw	76
Shovel	82
Truck	88

Source: Federal Transit Administration Guidance Manual, Chapter 12 - Noise and Vibration During Construction, Table 12-1, April 1995

Table G-III. PFNA Noise Measurements

Location #	Description	Noise Reading (dBA)
1	Calibration of the Meter (SLM) in Conference Room #1	102.0 - OK
2	Background in Conference Room #2	61-62
3	Sulfur Hexafluoride Vacuum Pump, 3 feet in front	71-74
4	Sulfur Hexafuoride Compressor, 3 feet in front	72-73
5	Inside Southeast Corner of Bldg., Fork Lift running	71
6	Inside Southeast Corner of Bldg., Fork Lift not running	68
7	Background at Southeast Corner of Bldg., Near SF6 Recovery Tanks	63-64
8	Target Gas Calibration Pump	76-78
9	Inside Electronics Trailer	69-70
10	Near Compressor at the Back of the Electronics Trailer	80
11	Inside Target Hut, Near Beam Bending Magnet	76-78
12	Near Hydraulic Compressor/Hydraulic Power Unit	79-81
13	SLM Post-Calibration in Conference Room #1	102.0 - OK

Source: Brent Bolton Noise Assessment for the Ancore Pulsed Fast Neutron Analysis (PFNA) Generator Facility – Santa Clara, California, U.S. Customs Service Safety and Occupational Health Branch, 23 February 2000

Background Information on Transportation

Appendix H

Appendix H

Background Information on Transportation

Port of Entry Traffic

Recent (2000 and 2001) measurements of inbound traffic to the United States through the Ysleta Port of Entry are summarized in Table H-I.

Table H-I. Traffic Inbound to the United States through the Ysleta Port of Entry

Month	Pedestrians	Freight Carriers	Passenger Carriers	Total Carriers	Total Persons
2000					
JAN	13,502	29,828	291,436	321,264	903,408
FEB	19,545	29,718	296,166	325,884	923,003
MAR	23,433	33,611	318,026	351,637	996,125
APR	66,353	29,158	299,032	328,190	977,283
MAY	32,065	34,309	312,549	346,858	989,921
JUN	27,539	32,051	341,288	373,339	1,065,351
JUL	36,482	28,396	295,131	323,517	934,941
AUG	32,997	34,661	330,042	364,703	1,042,110
SEP	29,408	32,528	324,466	356,994	1,019,151
OCT	29,696	33,739	345,579	379,318	1,082,484
NOV	32,853	22,885	392,726	415,611	1,206,086
DEC	32,853	24,618	310,019	334,637	968,835
2001					
JAN	29,583	26,873	308,515	335,388	964,587
FEB	30,437	27,360	391,009	418,369	1,205,403
MAR	33,609	31,539	333,804	365,343	1,048,949
APR	30,437	52,851	316,798	369,649	1,028,428
MAY	30,318	30,269	335,986	366,255	848,497
JUN	31,776	28,718	325,509	354,227	711,512
JUL	36,579	19,275	331,915	351,190	786,067
AUG	31,519	25,335	337,896	363,231	834,014
SEP	52,209	25,617	275,302	300,919	628,430
OCT	60,067	28,573	321,740	350,313	732,120

Source: El Paso Metropolitan Planning Organization website; http://www.elpasompo.org/nbzarabymonth.htm.

Background Information on History and Culture

Appendix I

Appendix I

Background Information on History and Culture

The town of Ysleta, now part of the city of El Paso, is perhaps the oldest town in Texas. It was one of several agricultural communities started on the Rio Grande by Spaniards and Indians after the Pueblo Revolt in New Mexico in 1680. The Tigua Indians, who were brought from their pueblo at Isleta, New Mexico, in 1680-82, have occupied the area continuously since. The refugees first sought protection of the Spanish fort El Paso del Norte (now Juarez, Mexico) and then moved to the present site to found Ysleta del Sur and build the Mission Nuestro Señora del Carmen (1682), the oldest mission in Texas. The mission's name has been changed several times, recently to Our Lady of Mount Carmel. A small stretch of irrigated land just east of the mission is claimed to be the oldest continuously cultivated plot in the United States; originally plowed in 1681, it first yielded corn (maize) and later grapes and a high grade of Egyptian long-staple cotton. Between 1829 and 1831 the Rio Grande cut a new channel, which placed Ysleta on an island formed by the old and new channels. When the deepest channel became the international boundary in 1848, Ysleta became part of the United States. In 1873 Ysleta replaced San Elizario as the El Paso county seat. The coming of the railroads in 1881 changed the population center of the county, and made El Paso the county seat. A bridge was built across the Rio Grande in 1929 linking Ysleta with Zaragosa, Mexico. In 1955 El Paso annexed Ysleta, although residents of the smaller town had voted against the move. The Tiguas, who helped the United States military as scouts during the Indian wars, were recognized as a tribe by the state of Texas in 1967 and by the United States Congress in 1968. They have established a housing area and various business enterprises on their reservation in the oldest part of Ysleta. The Ysleta section of El Paso today is characterized by whitewashed old adobe buildings standing between modern structures.[24]

Background Information on Hazardous Waste

Appendix J

Appendix J

Background Information on Hazardous Waste

Regulations

Hazardous waste at the Ysleta Cargo Facility is regulated by the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). RCRA covers the generation, transportation, treatment, storage, and disposal of hazardous wastes. Subtitles I and C address underground storage tanks (USTs). CERCLA provides for the restoration of waste sites by the parties responsible for the waste, if possible, and by the government under a trust fund where responsible parties cannot be identified or held accountable. The law also provides for a response to emergency situations involving hazardous waste.

Waste Generation

The Ysleta Port of Entry is classified as a "Conditionally Exempt Small Quantity Generator" because its generation rates do not exceed 100 kilograms (220 pounds) of hazardous waste or 1 kilogram (2.2 pounds) of acute hazardous waste in any calendar month. Such generators are exempt from substantially all RCRA requirements. Hazardous waste is accumulated in approved containers at or near the point of generation and is disposed of by a licensed waste disposal company.[26]

Materials and chemicals used with the PFNA Cargo Inspection System are listed in Table J-I. For the consumable materials, the amounts indicated are the total amounts projected to be consumed during the six-month test period. The amount of diesel fuel is the amount on the site at any one time. Weekly deliveries of diesel fuel are planned.

Table J-I. Materials and Chemicals Incorporated into or Consumed by the System.

Material/chemical	Purpose	Amount	Integral or Consumable
Fomblin pump oil	Lubricant	100 gallons	Integral
Alumina	Drying material	100 pounds	Integral
Copper O-rings	Seal	200 grams	Integral
Rubber O-rings	Seal	200 grams	Integral
Hydraulic Fluid	Working Fluid	50 gallons	Integral
Kerosene	Coolant	1 gallon	Integral
Sulfur hexafluoride	Coolant	5000 gallons (gas)	Integral
Havar foils	Target foil	1 pound	Consumable
Cesium metal	Enhances Deuterium ion formation	20 grams	Consumable

Tungsten metal	Filament 200 grams		Consumable
Isopropyl Alcohol	Solvent	5 gallons	Consumable
Acetone	Solvent	1 gallon	Consumable
Diesel fuel	Fuel	100 gallons	Consumable

Solvents (such as acetone, kerosene, and alcohol) are used in the maintenance and cleaning of PFNA equipment. However small quantities of these chemicals (often less than 1 liter) are used for these operations.[27]

Neutron production target foils will become radioactive as a result of PFNA Cargo Inspection System operations. Most of the radioactivity is short-lived, associated with the thin, (0.001 inch) metal foil window on the deuterium gas cell target. This foil is an operating consumable, expected to last a few weeks in normal inspection use. Activated neutron production target foils will be generated at a rate of about 1 millicure/month. Over the entire test period, the total inventory is projected to be 6 millicuries or less. It is assumed that no disposal will be done until the conclusion of the test. XXX Still current information: The PFNA Cargo Inspection System vendor (Ancore Corporation) is authorized to possess 10 millicuries of activation products under sub-item I of license # 2484-43. Maintenance and handling procedures and the disposal of these foils will be done in compliance with written procedures to avoid exposure of personnel. Used foils will be placed in a locked, shielded radioactive waste storage container for later disposal in accordance with applicable federal and state regulations.[28]

Background Information on Environmental Justice

Appendix K

Appendix K

Background Information on Environmental Justice

What is Environmental Justice?

Environmental justice is a movement aimed at promoting the fair treatment of people of all races, incomes, and cultures with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment implies that group of people should shoulder a disproportionate share of the negative environmental impacts resulting from the execution of domestic and foreign policy programs.

Regulations

Executive Order 12898: *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* requires that:

> "To the greatest extent practicable and permitted by law, … each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States…"

Minority populations refer to all people of color, exclusive of white non-Hispanics. Low-Income is defined as a person whose household income is at or below the Federal poverty threshold established by the Bureau of the Census. Following the Office of Management and Budget's Statistical Policy Directive 14, the Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is poor. If a family's total income is less than that family's threshold, then that family, and every individual in it, is considered poor. The poverty thresholds do not vary geographically.

Source for Population Data

Data derived from the decennial 2000 census were obtained using the "American Factfinder" available through the U.S. Census Bureau's website located at: (factfinder.census.gov/servlet/BasicFactsServlet).

Potentially Affected Population

According to the Census Bureau website, a census tract is:

> "A small, relatively permanent statistical subdivision of a county delineated by a local committee of census data users for the purpose of presenting data. Census tract boundaries normally follow visible features, but may follow governmental unit boundaries and other non-visible features in some instances; they always nest within counties. Designed to be relatively homogeneous units with respect to population characteristics, economic status, and living conditions at the time of

establishment, census tracts average about 4,000 inhabitants. They may be split by any sub-county geographic entity.

The closest census tracts to the Ysleta Port of Entry were selected to define the "potentially affected population." As shown in Figure XX, four contiguous census tracts (39.01, 39.02, 39.03 and 40.02) covered the area east of the port of entry. These four tracts constitute a land area of approximately 10 square miles.

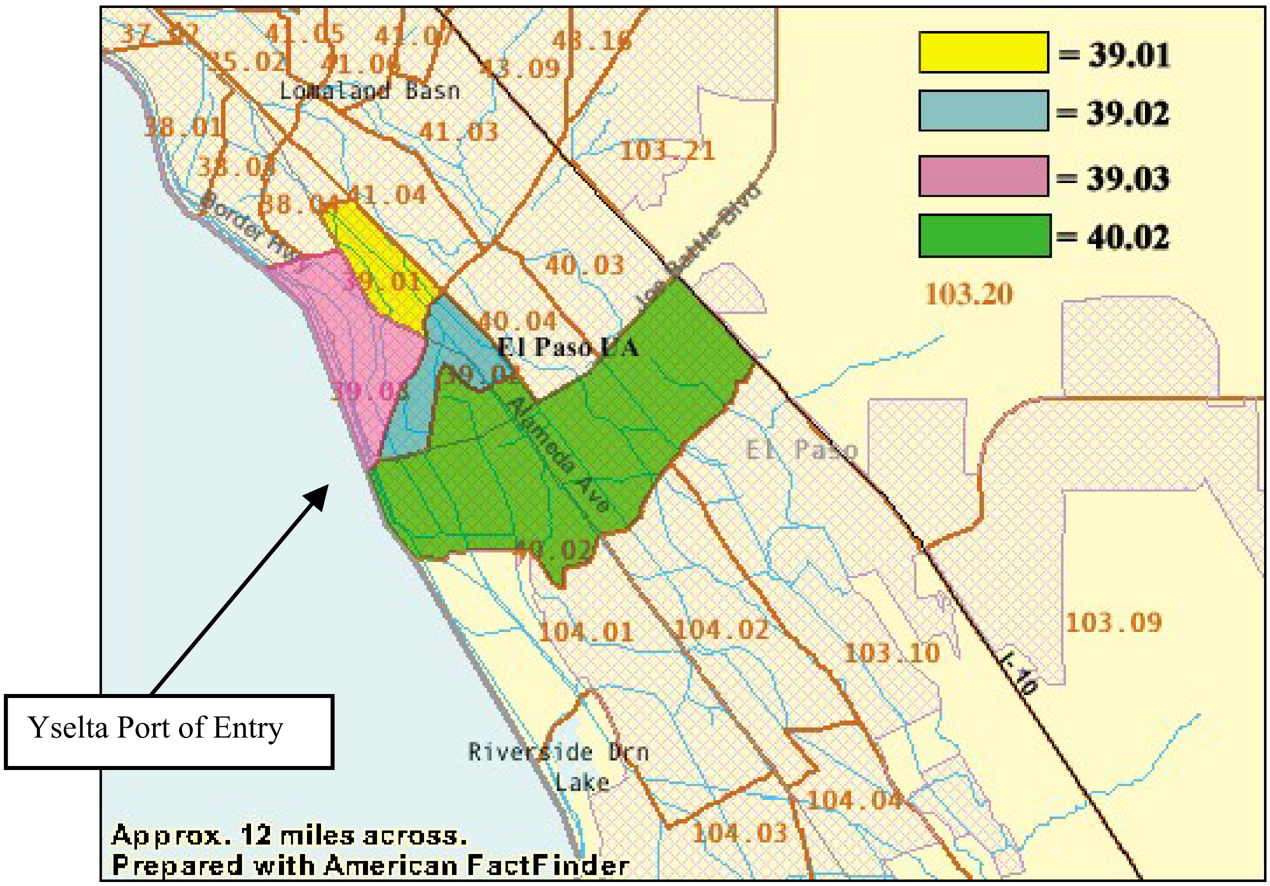

Figure K-1. Four census tracts covered the area immediately surrounding the port of entry.

Statistics pertaining to population density are compiled in Table XX-Xx. In aggregate, the four census tracts are very similar to the city of El Paso in terms of people and housing units per square mile.

Table XX-I. Comparison of Density Characteristics in 2000

Geographic Area	Population	Housing Units	Land Area (sq miles)	Density per square mile	
				Population	Housing Units
El Paso County	679.622	224,447	1,013.11	670.8	221.5
City of El Paso	563,662	193,663	249.08	2,263.0	777.5
39.01	4,160	1,294	0.80	5,191.4	1,614.8
39.02	2,400	699	0.93	2,574.2	749.7
39.03	6,085	1,697	1.51	4,034.6	1,125.2
40.02	8,294	2,168	6.08	1,363.8	356.5
Four Tracts Combined	20,939	5,858	9.32	2,246.7	628.5

Source: U.S Census Bureau, American FactFinder; available from http://factfinder.census.gov/servlet/BasicFactsServlet; Internet.

Race and Ethnicity Characteristics

Table XX presents data on the racial composition of populations at the following geographic levels: entire United States, State of Texas, El Paso County and the City of El Paso. Overall, the proportion of non-whites is approximately the same across the four groupings (approximately 25 percent of the populations). Table XX-II presents the same type of information for the four individual census tracts that make up the potentially affected population. Table XX-III combines the four census tracts and indicates that the non-white portion of the population is approximately 30 percent. Thus, the area around the Ysleta Port of Entry has a higher proportion of non-whites than the city or county as a whole.

Table XX-II. Comparison of Race Characteristics Across Geographic Areas in 2000

Race	United States		Texas		El Paso County		City of El Paso	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total Population	281,421,906	100	20,851,820	100	679,622	100	563,662	100
White	211,460,626	75.1	14,799,505	71.0	502,579	73.9	413,061	73.3
Black or African American	34,658,190	12.3	2,404,566	11.5	20,809	3.1	17,586	3.1
American Indian or Alaska Native	2,475,956	0.9	118,362	0.6	5,559	0.8	4,601	0.8
Asian	10,242,998	3.6	562,319	2.7	6,633	1.0	6,321	1.1
Native Hawaiian and Pacific Islander	398,835	0.1	14,434	0.1	669	0.1	583	0.1
Some Other Race	15,359,073	5.5	2,438,001	11.7	121,721	17.9	102,320	18.2
Two or More Races	6,826,228	2.4	514,633	2.5	21,652	3.2	19,190	3.4

Source: U.S Census Bureau, American FactFinder available on internet at factfinder.census.gov/servlet/BasicFactsServlet.

Table XX-III. Comparison of Race Characteristics Within Census Tracts in 2000

Race	39.01		39.02		39.03		40.02	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total Population	4,160	100	2,400	100	6,085	100	8,294	100
White	3,095	74.4	1,599	66.6	4,189	68.8	5,686	68.6
Black or African American	11	0.3	14	0.6	45	0.7	32	0.4
American Indian or Alaska Native	51	1.2	54	2.3	69	1.1	448	5.4
Asian	1	0.0	0	0.0	6	0.1	5	0.1
Native Hawaiian and Pacific Islander	3	0.1	0	0.0	10	0.2	1	0.0
Some Other Race	790	19.0	661	27.5	1,472	24.2	1,876	22.6
Two or More Races	209	5.0	72	3.0	294	4.8	246	3.0

Source: U.S Census Bureau, American FactFinder available on internet at factfinder.census.gov/servlet/BasicFactsServlet.

Table XX-IV. Comparison of Race Characteristics Across Combined Census Tracts in 2000

Race	Four Tracts Combined	
	Number	Percent
Total Population	20,939	100
White	14,569	69.6
Black or African American	102	0.5
American Indian or Alaska Native	622	3.0
Asian	12	0.1
Native Hawaiian and Pacific Islander	14	0.1
Some Other Race	4,799	22.9
Two or More Races	821	3.9

Table XX presents data for the division between Hispanic or Latino and non-Hispanic or non-Latino portions of the population. As expected based on the location adjacent to the Mexican border, the proportions of Hispanic or Latino people in the population of El Paso County or the city of El Paso are much larger than Texas or the United States as a whole. Approximately three quarters of the populations of El Paso County and the city of El Paso are Hispanic or Latino. Table XX-VI shows the same data for the four the four census tracts that define the potentially affected population. At approximately 95 percent, the population is the four tracts is overwhelmingly Hispanic or Latino.

Table XX-V. Comparison of Ethnicity Characteristics Across Geographic Areas in 2000

Geographic Area	Hispanic or Latino		Not Hispanic or Latino	
	Number	Percent	Number	Percent
City of El Paso	431,875	76.6	131,787	23.4
El Paso County	531,654	78.2	147,968	21.8
Texas	6,669,666	32.0	14,182,154	68.0
United States	35,305,818	12.5	246,116,088	87.5

Source: U.S Census Bureau, American FactFinder available on internet at factfinder.census.gov/servlet/BasicFactsServlet.

Table XX-VI. Comparison of Ethnicity Characteristics Across Census Tracts in 2000

Census Tract	Population	Hispanic or Latino		Not Hispanic or Latino	
		Number	Percent	Number	Percent
39.01	4,160	3,894	93.6	266	6.4
39.02	2,400	2,281	95.0	119	5.0
39.03	6,085	5,906	97.1	179	2.9
40.02	8,294	7,755	93.5	539	6.5
Four Tracts Combined	20,939	19,836	94.7	1,103	5.3

Source: U.S Census Bureau, American FactFinder available on internet at factfinder.census.gov/servlet/BasicFactsServlet.

Income Characteristics

> According to "the Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is poor. If a family's total income is less than that family's threshold, then that family, and every individual in it, is considered poor. The poverty thresholds do not vary geographically, but they are updated annually for inflation using the Consumer Price Index…"

Income data collected in 2000 census was for the previous year, 1999. As shown in Table XX-XX, the poverty threshold for households varies by the size of the family unit. Table XX-presents data for families below the poverty level in 1999. While the proportion of families below the poverty level is approximately 9 percent nationwide, in El Paso County and the city of El Paso, the level is approximately 20 percent.

Comparable data for the potentially affected population are shown in Table XX-. The proportion of families below the poverty level is approximately 30 percent, much greater than El Paso County or the city of El Paso.

Table Xx-VII. Weighted Average Poverty Thresholds for 1999

Size of Family Unit	Weighted Average Threshold
1 person (unrelated individual)	$8,501
Under 65 years	8,677
65 years and over	7,990
2 people	$10,869
Householder under 65 years	11,214
Householder 65 years and over	10,075
3 people	$13,290
4 people	$17,029
5 people	$20,127
6 people	$23,727
7 people	$25,912
8 people	$28.967
9 people or more	$34,417

Source: U.S Census Bureau, available on the internet at www.census.gov/hhes/poverty/threshld/thresh99.html.

Table XX-VIII. Comparison of Economic Characteristics Across Geographic Areas in 1999

Geographic Area	Families Below the Poverty Level	
	Number	Percent of All Families
City of El Paso	26,968	19.0
El Paso County	34,264	20.5
Texas	632,676	12.0
United States	6,620,945	9.2

Source: U.S Census Bureau, American FactFinder available on the internet at factfinder.census.gov/servlet/BasicFactsServlet.

Table XX-IX. Comparison of Economic Characteristics Across Census Tracts in 1999

Census Tract	All Families	Families Below the Poverty Level	
		Number	Percent of All Families
39.01	1,031	343	33.3
39.02	583	148	25.4
39.03	1,447	556	38.4
40.02	1,936	498	25.7
Four Tracts Combined	4,997	1,545	30.9

Source: U.S Census Bureau, American FactFinder available on the internet at factfinder.census.gov/servlet/BasicFactsServlet.

Background Information on Ionizing Radiation

Appendix L

Appendix L

Background Information on Ionizing Radiation

What is Ionizing Radiation?

This appendix deals with "ionizing radiation." The following is taken from an EPA website:[1]

> "When we hear the word 'radiation,' we generally think of nuclear power plants, nuclear weapons, or radiation treatments for cancer. We would also be correct to add 'microwaves, radar, electrical power lines, cellular phones, and sunshine' to the list. There are many different types of radiation that have a range of energy forming an electromagnetic spectrum. However, when you see the word 'radiation' [in this Appendix], we are referring to the types of radiation used in nuclear power, nuclear weapons, and medicine. These types of radiation have enough energy to break chemical bonds, and are referred to as 'ionizing radiation.'"

Measurement of Radiation Dose

Ionizing radiation is measured using units that people seldom encounter. It is important to relate the amount of radiation received by the body to its physiological effects. Two terms used to relate the amount of radiation received by the body are exposure and dose. When a person is exposed to radiation, the body absorbs a dose of radiation. The specific units of measurement are:

- rad – The term "rad" (radiation absorbed dose) is the special unit of absorbed dose of 100 ergs per gram.

  Different materials that receive the same exposure may not absorb the same amount of energy. The rad is the basic unit of the absorbed dose of radiation (i.e., alpha, beta, gamma, and neutron) to the energy they impart in materials. The dose of one rad indicates the absorption of 100 ergs (an erg is a small but measurable amount of energy) per gram of absorbed dose. To indicate the dose an individual receives in the unit rad, the word "rad" follows immediately after the magnitude, for example, "50 rad." One thousandth of a rad (millirad) is abbreviated "mrad," and one millionth of a rad (microrad) is abbreviated "µrad."

- rem – The term "rem" (Roentgen equivalent man) is the special unit of any of the quantities expressed as dose equivalent.

  Some types of nuclear radiation produce greater biological effects for the same amount of energy imparted than other types. The rem is a unit that relates the dose of any radiation to the biological effect of that dose. Therefore, to relate the absorbed dose of specific types of radiation, a

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[1] U.S. Environmental Protection Agency, website at http://www.epa.gov/radiation/understand/index.html.

"quality factor" must be multiplied by the dose in rad. To indicate the dose an individual receives in the unit rem, the word "rem" follows immediately after the magnitude, for example, "50 rem." One thousandth of a rem (millirem) is abbreviated "mrem," and one millionth of a rem (microrem) is abbreviated "µrem." The quality factor allows for the effect of higher energy deposition along particle tracks produced by various radiation types such as neutrons, x rays, or gamma rays. A quality factor of 7 is utilized for fast neutrons of 8 million electron volts (MeV) currently utilized by the PFNA Cargo Inspection Facility meaning that 1 rad of exposure results in 7 rem of effective dose.

The dose equivalent (*H*) from external exposure from sources of ionizing radiation depends on the absorbed dose (*D*), the effective quality factor (*Q*), and other modifying factors (*N*) that may be specified:

$$H = D \times Q \times N$$

where

H is units of rem (or sievert)
D is units of rad (or gray)
N is the product of any other modifying factors

For consistency, the unit of radiation dose used throughout this document is the millirem (mrem). While this can lead to large and small numbers, it does serve as a single baseline reference for the reader.

Regulations Covering Radiation Dose

Regulations pertaining to radiation exposure vary greatly and are administered by many different Federal and state agencies under a variety of legislative authorities.

- **Nuclear Regulatory Commission (NRC) (10 CFR 20)**

  NRC regulations establish standards for protection against ionizing radiation resulting from activities conducted under licenses issued by the Nuclear Regulatory Commission. NRC regulations control the receipt, possession, use, transfer, and disposal of licensed material by any licensee.

- **Occupational Safety and Health Administration (OSHA) (29 CFR 1910.1096)**

  OSHA regulations establish standards for protection against ionizing radiation that result in an occupational risk, but do not affect the safety of licensed radioactive materials. OSHA Instruction CPL 2.86 *Memorandum of Understanding between the U.S. Nuclear Regulatory Commission and the Occupational Safety and Health Administration* established OSHA standards cover employee exposures from all radiation sources not regulated by the NRC. Examples include x-ray equipment, accelerators, accelerator-produced materials, electron microscopes and betatrons, and naturally occurring radioactive materials such as radium.

- **Environmental Protection Agency (EPA) (*Radiation Protection Guidance to Federal Agencies for Occupational Exposure* FR 52 2822)**

  Federal radiation exposure protection guidance for occupational exposure is defined in *Radiation Protection Guidance to Federal Agencies for Occupational Exposure.* Administered by the EPA, the guidance was developed cooperatively by the Nuclear Regulatory Commission, the Occupational Safety and Health Administration, the Mine Safety and Health Administration, the Department of Defense, the Department of Energy, the National Aviation and Space Administration, the Department of Commerce, the Department of Transportation, the Department of Health and Human Services, and the Environmental Protection Administration. It is expected that individual Federal agencies, on the basis of their knowledge of specific worker exposure situations, will use the guidance as the basis upon which to revise or develop detailed standards and regulations to the extent that they have regulatory or administrative jurisdiction.

- **State Regulations**

  States are completely free to set their own standards for radiation protection and control for accelerator facilities. However, since the U.S. Nuclear Regulatory Commission sets radiation control standards for reactor-related matters, states generally apply similar criteria and methods to other radiation safety issues. Many states have adopted regulations modeled on the *Suggested State Regulations for Control of Radiation.*

- **State of Texas (25 Texas Administrative Code §289.202)**

  Title 25 Texas Administrative Code §289.202 establishes standards for protection against ionizing radiation resulting from activities conducted in accordance with licenses or certificates of registration issues by the Texas Bureau of Radiation Control.

- **State of Texas (25 Texas Administrative Code §289.229)**

  Title 25 Texas Administrative Code §289.229 establishes radiation safety requirements for the use of accelerators, therapeutic radiation machines, and radiation therapy simulation systems.

- **State of Texas (25 Texas Administrative Code §289.231)**

  Title 25 Texas Administrative Code §289.231 establishes standards for protection against machine-produced radiation.

Regulatory Jurisdiction

As it applies to the test of the PFNA Cargo Inspection System in Texas, OSHA is the only agency with the statutory authority to regulate the operation of radiation generating machines.

- The PFNA Cargo Inspection System does not use licensed material and is therefore exempt from NRC regulation.
- Title 25 Texas Administrative Code §289.201 specifically states that the regulations for the control of radiation and the operation of radiation generating machines, shall not apply to sources of radiation in the possession of federal agencies.
- The EPA guidance provided in FR 52 2822 *Radiation Protection Guidance to Federal Agencies for Occupational Exposure* is to be used as the basis upon which individual Federal agencies revise or develop detailed standards and regulations and does not constitute statutory authority to regulate the operation of radiation producing machines.

OSHA allows any employer who possesses or uses radiation sources other than source material, byproduct material, or special nuclear material to be governed by the laws and regulations of those states that have an agreement in effect with the NRC, pursuant to section 274(b) of the Atomic Energy Act of 1954 as amended, provided that state's program for control of these radiation sources is the subject of a currently effective determination by the Assistant Secretary of Labor that such a program is compatible with the requirements of 29 CFR 1910.1096. Such determinations are currently in affect in Texas. The Department of Defense will therefore require the vendor to comply with applicable State of Texas regulations, even though the test will be exempt from such regulation.

Dose Limits

Dose limits represent the upper bound below which risks from radiation exposure are deemed to be acceptable. Various federal and state regulations establish dose limits for occupational exposures that occur as a result of a person's employment, and limits for the total exposures received by the public in general.

In 10 CFR Part 20 and 25 TAC §289.201, the NRC and the State of Texas identify two classifications of radiation dose to people. The first classification is "Occupational Dose", as defined below:

> "*Occupational dose* means the dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to radiation or to radioactive material from licensed and unlicensed sources of radiation, whether in the possession of the licensee or other person. Occupational dose does not include dose received from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released in accordance with Section 35.75, from voluntary participation in medical research programs, or as a member of the public."

The second radiation dose classification is "Public Dose", which is defined as:

> "*Public dose* means the dose received by a member of the public from exposure to radiation or radioactive material released by a licensee, or to any other source of radiation under the control of a licensee. Public dose does not include occupational dose or doses received from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released in accordance with §35.75 (NRC), or from voluntary participation in medical research programs."

A summary of pertinent dose limits is presented in Table XX.

Table XX-XX. Summary of Regulatory Dose Limits

	Dose Limit by Agency and Regulation (mrem/year): NRC 10 CFR 20	EPA 52 FR 2822	Texas 25 TAC §289.202	OSHA 29 CFR 1910.1096
"Occupational Dose" = "Radiation Workers" in "Restricted Areas"				
Whole Body	5,000	5,000	5,000	5,000 (1,250 mrem/calendar quarter)
Lens of Eye	15,000	15,000	15,000	5,000 (1,250 mrem/calendar quarter)
Skin, Hands and Feet	50,000	50,000	50,000	
Skin of Whole Body				30,000 (7,500 mrem/calendar quarter)
Hands and forearms; feet and ankles				75,000 (18,750 mrem/calendar quarter)
Minors	10% of above limits	10% of above limits	10 % of above limits	10 % of above limits
Pregnant Women	500*	500*	500*	Not addressed
"Public Dose" = Outside of Restricted Areas				
Member of the General Public	100	Not addressed	100	Not addressed

* Applicable period is nine months rather than 1 year.

Although OSHA subscribes to dose limits set in NRC regulations, EPA guidance, and various consensus standards, they have not incorporated these limits into 29 CFR 1910.1096. Both the NRC regulations and Texas Administrative Code incorporate the most recent guidance from the International Commission on Radiological Protection (ICRP) as well as the National Council on Radiation Protection and Measurements (NCRP).

Radiation Protection Principles

In the United States and most other countries, three basic principles have governed radiation protection of workers and members of the general public:

1. Any activity involving occupational exposure should be useful enough to society to warrant the exposure of the worker. This same principle applies to virtually any human endeavor that involves some risk of injury.
2. For justified activities, exposure of the work force should be as low as reasonably achievable (ALARA).
3. To provide an upper limit on risk to individual workers, "limitation" of the maximum allowed dose is required. This is required above and beyond the protection provided by the first two principles because their primary objective is to minimize the total harm from occupational exposure in the entire work force, they do not limit the way that harm is distributed among individual workers.

As Low as Reasonably Achievable (ALARA)

"As Low As Reasonably Achievable" (ALARA) means making every reasonable effort to maintain exposures to ionizing radiation as far below the dose limits as practical, economic and social factors being taken into account. This common sense approach means that radiation doses for both workers and the general public are typically kept lower than their regulatory limits.

The principle of reduction of exposure to levels that are "as low as reasonably achievable" is typically implemented in two different ways.

1. Designing facilities to reduce the anticipated exposure.
2. Designing work practices to reduce the anticipated exposure.

Effective implementation of the ALARA principle involves most of the facets of an effective radiation protection program: education of workers concerning the health risks of exposure to radiation, training in regulatory requirements and procedures to control exposure, monitoring, assessment, and reporting of exposure levels and doses and management and supervision of radiation protection activities including the choice and implementation of radiation control measures.

A comprehensive radiation protection program will also include as appropriate properly trained and qualified radiation protection personnel adequately designed operated and maintained facilities and equipment and quality assurance and audit procedures.

US Customs Service Dose Limits

In conformance with ALARA principles, the Customs Service has adopted for its workers the same dose limit as OSHA prescribes for the general public – i.e. 100 mrem/year. In keeping with this policy, Customs inspectors are not designated as Radiation Workers.

Calculated Effects of Inspecting Stream-of-Commerce Materials

In an analysis prepared for the General Services Administration, CH2MHill analyzed five different types of materials that represented stream-of-commerce materials potentially exposed during examination by the PFNA Cargo Inspection System.[1] These materials, and their compositions, are shown in Table XX-XX.

Table XX-XX. Compositions of Representative Stream-of-Commerce Materials

Stream-of-Commerce Material (Weight Percent)					
Element	Salted Beef[1]	Ball Bearings[2]	Surgical Implants A[3]	Surgical Implant B[3]	Fertilizer[4]
H	10.11				3.81
B			0.01		
C	26.02	0.98	0.35		6.363
N	1.22		0.25		17.247
O	56.54	0.0015			30.915
F	0.0036				
Na	1.76				0.203
Mg	0.0164				
Al	0.0086	0.06	0.30		
Si	0.0273	0.25	1.0		
P	0.175	0.025	0.02		8.167
S		0.015	0.01		
Cl					12.662
K	0.2				13.619
Ca					7.014
Cr		1.5	30.0	27.0	
Mn		0.35	1.0		
Fe		96.1785	0.75		
Co			58.11	68.00	
Ni		0.25	1.0		
Cu		0.3			
Mo		0.1	7.0	5.0	
W			0.2		

[1] ANCORE data were used for this material.
[2] ASTM A295-98, "Standard Specification for High-Carbon Anti-Friction Bearing Steel", American Society for Testing and Materials, 1998.
[3] ASTM F75-98, "Standard Specification for Cobalt-28, Chromium-6, Molybdenum Casting Alloy and Cast Products for Surgical Implants (UNS R30075)', American Society for Testing and Materials, 1998.
[4] Correspondence from Johnson City Chemical Co., Inc., on Composition of Triple 19 Fertilizer (MSDS for Diammonium Phosphate, Urea, and Muriate of Potash, June 6, 1989).
Source: CH2MHill, *Report of Analysis of the Pulsed Fast Neutron Analysis Cargo Inspection System* April 2001.

These materials were subjected to simulated exposures with a beam of specific energy characteristics and at a specific scan rate provided by the equipment vendor.

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[1] CH2MHill, *Report of Analysis of the Pulsed Fast Neutron Analysis Cargo Inspection System*, April 2001.

The findings of the study were that "in all cases, the doses to workers and the public were inconsequential (less than 1.0 mrem/year)."

Design-Basis Accident

One postulated accident leading to radiation releases has been analyzed for the PFNA Cargo Inspection System Facility. This scenario assumes that all the target foil radionuclide inventory, i.e., 5 millicuries (mCi) of total inventory, is released to the atmosphere within the building. It should be noted that this postulated accident is extremely unlikely.

Assuming a total inventory of 5 millicuries (mCi) is evenly shared among the three radionuclides, Cobalt-57 (^{57}Co), Cobalt-60 (^{60}Co) and Manganese-54, (^{54}Mn) (1.7 millicuries (mCi) for each radionuclide), the maximum dose to individuals in the vicinity of the radioactive material at the time of release would be approximately 3.2 millirem per hour (mrem/h) at one meter (3.3 feet) and 0.8 mrem/h at two meters (6.6 feet) as delineated in Tables XXIV and XV[51]. This constitutes an extremely small dose and is within the regulatory limit exposure to individual members of the general public, i.e., the dose in any unrestricted area from external sources shall not exceed 0.002 rem (2.0 mrem) (0.02 millisieverts mSv) in any one hour. Radiation levels at ten meters (33 feet) would be approximately 0.032 mrem/hour (32 microrem/hour) which is approaching natural background radiation of approximately 34 microrem/hour and should have no radiological impact on individual members of the general public.

Table XXIV

Maximim Dose to Individuals at 1 Meter

Radionuclide	**Gamma Radiation Levels (Exposure Dose Rate) in milliroentgen per hour for 1.7 millicuries of specific Radionuclides in Inventory at 1 meter**
Cobalt-57 (^{57}Co)	0.153
Cobalt-60 (^{60}Co)	2.24
Manganese-54 (^{54}Mn)	0.80
TOTAL	3.2

Source: Michael Terpilak, Radiological Consequences of the Operation of the Pulsed Fast Neutron Analysis (PFNA) Interrogation System for the Department of the Treasury, United States Customs Service, May 28, 2001

Table XXV

Maximim Dose to Individuals at 2 Meters

Radionuclide	**Gamma Radiation Levels (Exposure Dose Rate) in milliroentgen per hour for 1.7 millicuries of specific Radionuclides in Inventory at 2 meters.**
Cobalt-57 (^{57}Co)	0.038
Cobalt-60 (^{60}Co)	0.56
Manganese-54 (^{54}Mn)	0.20
TOTAL	0.80

Source: Michael Terpilak, Radiological Consequences of the Operation of the Pulsed Fast Neutron Analysis (PFNA) Interrogation System for the Department of the Treasury, United States Customs Service, May 28, 2001

Assuming a total inventory of 5 mCi and assuming that the entire inventory is ^{60}Co the maximum dose to individuals in the vicinity of the radioactive material release would be approximately 6.6 mrem/h at one meter at the time of this release and 1.7 mrem/h at 2 meters (Table XXVI), which constitutes an extremely small dose and falls within the regulatory limit of exposure to individual members of the general public, i.e., the dose in any one hour. The radiation level at ten meters approaches 0.066 mrem/hour (66 microrem/hour) which is slightly above natural background radiation of approximately 34 microrem/hour and should have no radiological impact on individual members of the general public.[52]
To minimize and mitigate this exposure individuals could be instructed to leave the area.

Table XXVI
Gamma Radiation Levels (Exposure Dose Rate) in milliroentgen per hour for 5 millicuries of Cobalt-60 (^{60}Co)

Gamma Radiation Levels (Exposure Dose Rate) at 1 meter	**Gamma Radiation Levels (Exposure Dose Rate) at 2 meters**	**Gamma Radiation Levels (Exposure Dose Rate) at 10 meters**
6.6	1.7	0.0066

Source: Michael Terpilak, Radiological Consequences of the Operation of the Pulsed Fast Neutron Analysis (PFNA) Interrogation System for the Department of the Treasury, United States Customs Service, May 28, 2001

Design Basis Accident

The Nuclear Regulatory Commission defines design-basis accident as:[2]

> "A postulated accident that a nuclear facility must be designed and built to withstand without loss to the systems, structures, and components necessary to assure public health and safety."

Applying this concept to the PFNA Cargo Inspection System means identifying the worst-case scenario that still affords protection to the public. The logical design-basis accident for the PFNA Cargo Inspection System is the instantaneous releases all the on-site radioactive materials into the air of the Accelerator Room. An accidental fire or explosion could conceivably cause such a release. The purposeful release as a result of sabotage is also possible. The likelihood of sabotage is not considered high as the site is fence and regulated by a security force.

Assuming ^{60}Co is the most limiting (worst case) radionuclide, the following assumption and Radiological Assessment can be formulated.

External Dose

The total amount of inventory, i.e., 5.0 millicuries (5.0 mCi) or 5000 microcuries (5000 μCi) is instantaneously released in the accelerator building. Assuming that the entire ^{60}Co inventory, 5.0 millicuries (5.0 mCi) or 5000 microcuries (5000 μCi), is instantaneously released in the accelerator building mixes with at least 1 cubic meter of air (10^6 cubic centimeters $10^6 cm^3$) the concentration of this mixture is calculated to be 5.0×10^{-3} μCi/cm^3. With filtration and additional dilution, the discharge from the accelerator building stack would approach a value of 5.0×10^{-9} μCi/cm^3 which is an order of magnitude below the occupational Devised Air Concentration (DAC), i.e., 7.0×10^{-8} μCi/cm^3 as specified in 10 CFR 20 Appendix B Annual Limits on Intake (ALI's) and Devised Air Concentrations (DAC's) of Radionuclides for Occupational Exposure; Efficient Concentration; Concentration for Release to Sewerage.

At the site boundary, assuming an additional dilution factor of approximately of 10^3 to 10^4, the concentration would be 5.0×10^{-12} to $5.0X10^{-13}$ μCi/cm^3, which is 2 to 3 orders of magnitude below the efficient concentration discharge and well below the radiation exposure for individual members of the general public.[53]

3.15.2.3.2 Internal Dose

The instantaneous release of this radioactive material inventory is calculated to determine the ingestion and inhalation dose to individuals and to thus calculate and determine the Committed Dose Equivalent (CDE), i.e., the internal dose to these individuals. The internal dose arises from a radiation source entering the human body, whether through inhalation, ingestion, absorption through the skin, accidental injection, or introduction through a wound. Unlike external exposures, once radioactive material enters the body, it remains there for various periods of time depending on decay and biological elimination rates. The unit of measure for internal dose is the committed dose equivalent. It is the internal dose that each body organ receives from 1 "year

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[2] Nuclear Regulatory Commission; web page at www.nrc.gov/reading-rm/basic-ref/glossary/design-basis-accident.html.

intake" (ingestion plus inhalation). Normally, a 50-year or 70-year dose-commitment period is used (i.e., the 1-year intake period plus 49 or 69 years.) The dose rate increases during the year of intake. The dose rate, after the 1-year of intake, slowly declines as the radioactivity in the body continues to produce a dose. The integral of the dose rate over the 50 or 70 years gives the committed dose equivalent. In this EA, a 50-year dose-commitment period was used. The regulatory requirements for determining the internal dose are specified in 10 CFR 20.1204.[54]

Calculation of Committed Effective Dose Equivalent From Inhalation[55]
There are at least five methods acceptable to the NRC staff for calculating committed effective dose equivalent from inhaled radioactive materials:

1. Use of Federal Guidance Report No. 11
2. Use of Stochastic Inhalation ALIs from 10 CFR Part 20
3. Use of DACs from 10 CFR Part 20
4. Use of ICRP Publication 30
5. Use of Individual or Material-Specific Information

Calculation of Committed Effective Dose Equivalent Due to Ingestion[56]

If ingestion has occurred, the methods for determining the committed effective dose equivalent are similar to the methods used for estimating inhalation dose. Four acceptable methods are:

1. Use of Federal Guidance Report No. 11
2. Use of Stochastic Ingestion ALIs from 10 CFR Part 20
3. Use of ICRP Publication 30
4. Use of Individual or Material-Specific Information

Summation of External and Internal Doses (Total Effective Dose Equivalent)[57]

The "total effective dose equivalent" is defined as the sum of the "deep-dose equivalent" (for external exposures) and the "committed effective dose equivalent" (for internal exposures). The requirements in 10 CFR 20.1202 are for summing external and internal doses to demonstrate compliance with the dose limits of 10 CFR 20.1201.

Dose to Individuals for a Single Intake[58]

The following calculation from International Commission on Radiological Protection Publication- 2 (ICRP-2, 1959) was used for assessing the dose to individuals for a single intake

$$\mathbf{D = \frac{K\ A\ E\ Te\ (fw\ or\ fa)}{m}}$$

where

D = total dose (over all time) for a CDE the time frame is 50 years to any internal organ or tissue in (rads).

K = correction factor for unit conversions (73.8 rads-gram-disintegration/:Ci) (microcurie-MeV) (Million Electron Volts-day)

A = activity taken in :Ci (microcurie)

E = average energy per disintegration

Te = effective half-life

m = mass of total body

f w = fraction of the radionuclide ingested which reaches the organ of reference is 0.3.

fa = fraction of the radionuclide inhaled which reaches the organ of reference is 0.4.

Assuming the total inventory consists of ^{60}Co which represents the worst-case scenario, i.e., the most conservative calculation.

The ingestion dose is calculated to be where → fw= 0.3 (ingestion): = 22.5 Rem

The inhalation dose is calculated to be where → fa = 0.4 (inhalation): = 30.0 Rem

Total Infinite Dose Received From a "One-Shot Intake"[59]

A similar equation for a single intake, i.e., the total infinite dose received from a "one-shot intake" yields similar results.

$$D \text{ from time } 0 \rightarrow \infty = 51.1 \frac{(A_o f_w)}{\lambda_{eff}\, m} \sum EF\,(RBE)\,n$$

where

D from time 0 → ∞ = Total infinite dose received from a "one-shot intake."

51.1 = Constant.

Ao = amount of Radionuclide ingested

fw = fraction ingested that reaches organ of reference 0.3.

fa = fraction inhaled that reaches organ of reference 0.4.

λ eff = effective elimination constant

$$\lambda e = \frac{0.693}{Te}$$

where Te is the effective half-life, in this case 9.5 days for ^{60}Co.

Σ EF (RBE) n = effective energy per disintegration

For an ingestion dose the value is calculated to be 22.5 Rem.

For an inhalation dose the value is calculated to be 30.0 Rem.

Fifty-Year Dose Calculations[60]

In addition, the following calculations can also be made, assuming that Cobalt-60 (^{60}Co) is the most conservative worst-case scenario utilizing the reference document Environmental Assessment of Consumer Products Containing Radioactive Material, NUREG/CR 1775, Science Applications, Inc. prepared for the U.S. Nuclear Regulatory Commission (NRC), October, 1980.

- Fifty-year Ingestion Dose Conversion Factor as listed in Table 2.0, Rem/μCi for ^{60}Co for Total Body is 4.7×10^{-3} Rem/μCi x 5000 :Ci = 23.5 Rem

- Fifty-year Inhalation Dose Conversion Factor as listed in Table 3.0, Rem/μCi for ^{60}Co for Total Body is 1.9×10^{-3} Rem/μCi

$$1.9 \times 10^{-3} \frac{\text{Rem}}{\mu\text{Ci}}$$

$$1.9 \times 10^{-3} \frac{\text{Rem}}{\mu\text{Ci}} \times 5000\ \mu\text{Ci} = 9.5\ \text{Rem}$$

International Commission on Radiological Protection (ICRP) Publication – 30 Calculations[61]

The ICRP-2 methodology used in earlier calculations was subsequently revised in ICRP Publication Number 26 (ICRP-26, 1977) and ICRP Publication Number 30 (ICRP-30, 1979), and was incorporated into 10 CFR Part 20. A key advantage of the ICRP 30 approach is the ability to calculate and account for the dose received by all the highest exposed organs and tissues, not just a critical organ.

The ICRP Report Number 30 Dose Model is represented as follows:

$$H_{50}(T \leftarrow S) = (1.6 \times 10^{-10})U_s SEE(T \leftarrow S)$$

Where H_{50} is the 50-year dose equivalent commitment in sieverts (i.e., 1 sievert is equivalent to 100 Rem)

Where SEE is the *Specific Effective Energy* modified by a quality factor for radiation absorbed in the target organ (T) for each transformation in the source organ (S) expressed in MeV/g.

$$SEE = \sum \frac{Y \bullet E \bullet AF \bullet Q}{M_T}$$

where:

Y = yield of radiations per transformation

E = average energy of the radiation

AF = absorbed fraction of energy absorbed in the target organ (T) per emission of radiation in the source organ (S).

Q = quality factor

M_T = Mass of the target organ

and U_s is the number of nuclear transformations in the source organ (S) during the time interval for which the dose is to be calculated.

Utilizing the U.S. Environmental Protection Agency, Federal Guidance Report No. 11 entitled *Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submission, and Ingestion,* 1988. The following calculations have been performed to determine the Committed Dose Equivalent (CDE) for Inhalation and Ingestion Doses.

- Inhalation Dose – 8.2 Rem
- Ingestion Dose – 2.5 Rem

Table XXVI

Comparison of Intakes and Committed Dose Equivalent for Cobalt-60

SINGLE INTAKE CALCULATION	CDE [H_T50] (50 YEAR PERIOD)
$D = \frac{K\ A\ E\ Te\ (fa\ or\ fw)}{m}$	fa* = 30.0 Rem fw* = 22.5 Rem

<u>TOTAL INFINITE DOSE "ONE-SHOT INTAKE"</u> $D_{0 \text{ to } \infty} = 51.1 \frac{A_o \, f_a \text{ or } f_w}{\lambda_{eff} \, m}$ □ E F (RBE) n	fa* = 30.0 Rem fw* = 22.5 Rem
<u>Fifty-year Ingestion Dose Conversion Factor Calculation</u> (Table 2.0) $1.9 \times 10^{-3} \frac{\text{Rem} \times 5000 \ \mu\text{Ci}}{\mu\text{Ci}}$	9.5 Rem
<u>Fifty-year Ingestion Dose Conversion Factor Calculation</u> (Table 3.0) $4.7 \times 10^{-3} \frac{\text{Rem} \times 5000 \ \mu\text{Ci}}{\mu\text{Ci}}$	2.5 Rem
<u>Internal Commission Radiological Protection (ICRP) Report No. 30</u> Inhalation Dose Ingestion Dose	 8.3 Rem 2.5 Rem

Source: Michael Terpilak, Radiological Consequences of the Operation of the Pulsed Fast Neutron Analysis (PFNA) Interrogation System for the Department of the Treasury, United States Customs Service, May 28, 2001

*fa = Inhalation Dose
*fw = Ingestion Dose

Internal dose calculations (Committed Dose Equivalent) are primarily designated for radiation worker. Using methodology found in ICRP-2, ICRP-30, Federal Guidance Report No. 11, and NUREG/CR 1775, the analyses shows values that are well within the Dose Equivalent Annual Dose as specified by 10 CFR 20, Subpart C section 20.1201 Occupational Dose Limits for Adults by a factor of 2 to 20 below the regulatory requirements. (Refer to Table XXVIII)

Total Effective Dose Equivalent (TEDE)

The "total effective dose equivalent" is defined as the sum of the "deep-dose equivalent" (for external exposures) and the "committed effective dose equivalent" (for internal exposures). The requirements in 10 CFR 20.1202 are for summing external and internal doses to demonstrate compliance with the dose limits of 10 CFR 20.1201.

TABLE XXVII

TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE)*

Total Effective Dose Equivalent (TEDE)	=	External Dose (Deep Dose Equivalent)	+	Committed Effective Dose Equivalent (CEDE)

8303.2 2503.2	= 3.2 mrem = 3.2 mrem	8300 mrem (Inhalation Dose) 2500 mrem (Ingestion Dose)

Source: Michael Terpilak, Radiological Consequences of the Operation of the Pulsed Fast Neutron Analysis (PFNA) Interrogation System for the Department of the Treasury, United States Customs Service, May 28, 2001

* These values are below the Dose Equivalent Annual Dose as specified by 10 CFR 20, Subpart C section 20.1201 Occupational Dose Limits for Adults by a factor of 2 to 20. (Refer to Table XXVIII)

Total Effective Dose Equivalent

- External Exposure - 3.2 mrem (Deep Dose Equivalent)
- Internal Exposure -

Inhalation Dose	-	8.3 Rem	Committed Effective Dose Equivalent (CEDE)*
Ingestion Dose	-	2.5 Rem	

*Whole Body (Organ and Tissue Dose) Weighing Factor is 1.0.

Nuclear Regulatory Commission (NRC) Title 10 CFR Part 20, Standards for Protection Against Radiation

The NRC has recently published regulations and regulatory guides which provide Intake and Exposure calculations as specified in Table XXVIII

Table XXVIII

Occupational Dose Limits for Adults

Type of Exposure	10 CFR Part 20 Designation	Dose Limit
Total Whole Body Dose (Sum of External and Internal)	Total Effective Dose Equivalent (TEDE) TEDE= DDE + CEDE	5 Rem/year
External Dose	Deep Dose Equivalent (DDE)	(a)
Internal Whole Body Dose	Committed Effective Dose Equivalent (CEDE)	(a)

Total Organ Dose (Sum of External and Internal)	Total Organ Dose Equivalent (TODE) TODE = DEE + CDE	50 rem/year
Internal Organ Dose	Committed Dose Equivalent (CDE)	(a)
Skin Dose	Shallow Dose Equivalent (SDE), Skin of Whole Body	50 rem/year
Extremity Dose	Shallow Dose Equivalent (SDE), Maximum Extremity	50 rem/year
Eye Dose	Eye Dose Equivalent to Lens of the Eye (LDE)	15 rem/year

(a) Included in limits for whole body and individuals organs. In the absence of any internal exposure, external dose is limited to 5 rem per year. In the absence of any external exposure, internal exposure is limited to 2000 DAC hours per year or 1 annual limit on intake (ALI) (50 rem/year non-stochastic, 5 rem/year stochastic).

Radiation Safety

Texas Regulations for Control of Radiation Part 35 *Radiation Safety Requirements for Particle Accelerators* establishes radiation safety requirements for the use of particle accelerators. The Texas Regulations incorporate those guidelines found in Conference of Radiation Control Directors, Inc. *Suggested State Regulations for Control of Radiation Volume 1 Ionizing Radiation.*

The state regulations prohibit any person from acting as a particle accelerator operator until such person has been instructed in radiation safety; has received copies of pertinent certificates of registration conditions, and the registrant's operating and emergency procedures; and has been instructed in the use of the particle accelerator, related equipment, and survey instruments which will be employed in his assignment.[62]

The personnel assigned to operate the PFNA Cargo Inspection System will be specifically trained for PFNA Cargo Inspection System operations. These personnel will consist of the operator and other technical assistants.[63]

Training for the PFNA operators will consist of lectures and courses in basic fundamentals and principles of radiation physics, radiation safety, biological effects of radiation, instrumentation, radiation control, and operating procedures during normal and accident conditions and scenarios.[64]

Each PFNA operator will have to pass a radiation safety examination covering all of the above items.

Technical assistants and ancillary personnel such as USCS Detection System Operators will be supervised by a PFNA operator and shall receive a more basic radiation safety, training course that is commensurate with their limited and specific duties. This type of training is consistent with the training specified by Title 10 Code of Federal Regulators (CFR) Part 19, "Notices, Instructions, and Reports to Workers; Inspections." [65]

Radiation safety protocols relating to shielding and safety design requirements, particle accelerator controls and interlock systems, warning devices, operating procedures, radiation monitoring requirements, and ventilation systems will be in accordance with those Texas State requirements found in Part 35.

A radiation survey will be conducted when the accelerator is first capable of producing radiation to determine compliance with Texas Administrative Code §289.231 *General Provisions and Standards for Protection Against Machine-Produced Radiation* and 10 CFR Part 20.

The structural components of PFNA cargo Inspection System are not expected to contain significant amounts of activated radioactive (i.e., induced radioactivity) materials after a six-month test.

3.16.1 Shielding and Building Activation

The shielding is primarily concrete and hydrocarbons, e.g., polyethylene and paraffin, some of it borated, supported by a concrete floor. Hydrocarbons, borated or not, do not form any long-lived activity under neutron exposure due to the properties of the nuclei involved. Neutron activation of the current platform and adjacent areas will be virtually undetectable – i.e. at ambient natural background radiation levels. To test for activation in the concrete, two samples of concrete were taken for analysis from the floor of the Ancore Santa Clara, California facility, under the neutron production target, where the highest neutron flux on concrete in the system occurs. Two background samples were also taken of concrete from a low flux area, installed at the same time and therefore presumably having the same natural activity as the target area samples. The samples were taken July 2, 1999 and analyzed on July 6, 1999 by New World Technology, an independent analytical laboratory in Livermore, California, using a high efficiency Nal gamma ray well counter and also by liquid scintillation. The results for the four samples were not statistically different from each other or from natural background radiation.[66]

3.16.2 Accelerator Components

Activated or contaminated accelerator components shall be removed from the site by ANCORE and either used elsewhere or disposed as low-level radioactive waste (LLRW) using a qualified disposal contractor.

3.16.3 Decommissioning Process

Decommissioning of the PFNA would be:

- Similar to other accelerated facilities
- Present no unique problems
- Could be performed using current available technology.

From a radiological perspective, linear accelerators are appropriately classified as very low-level facilities and therefore do not require unusual or particularly complicated decontamination procedures. Equipment and facilities installed outside the accelerator shielding enclosures have only a negligible possibility of being activated.

Activation of accelerator components, primarily steel and copper, will contain some longer-lived radionuclides which will be fixed in the accelerator components. Components or fluids containing long half-life radionuclides would be disposed of in accordance with health, safety, and environmental protection policies and procedures.

It is anticipated that decommissioning of the accelerator facilities would proceed in three phases:

1. **Shutdown.** Physical and administrative controls for limiting access to the facilities would be maintained during and after an orderly shutdown and disconnection of operating systems, electrical power, and cooling water systems to the accelerator facilities.

2. **Survey of Residual Activities**. Every component in the accelerator vault would be surveyed by health physics personnel to identify and tag any radioactive components. Based on the documented radiation survey, an inventory of all activated materials and equipment would be made and kept under continued surveillance and maintenance. The volume of activated materials is estimated to be less than 1 m^3 (1.3 cubic yards), composed primarily of steel and copper. The level of activity would depend upon the length of operation, but dose rates are not expected to exceed a few tens of millirem per hour at contact. As a result of this phase, all excess accelerator equipment would be categorized by type and radioactivity level and would be ready for removal.

3. **Removal of Components and Dismantling.** It is anticipated that the inventory would include three general categories of components:

    - Contamination-free components would be removed to a temporary storage area, possibly on site. Experience at decommissioning of other accelerator facilities indicates that magnets, power supplies, and vacuum pumps belong to this category and are reusable at another accelerator facility.

    - Reusable items with some residual radioactivity (e.g., injector, shielding) would be removed under health physics supervision and stored in a separate radiologically controlled location for future use or shipment. Packaging and off-site shipment of these items would follow US Department of Transportation (DOT) specifications.

    - Nonreusable items with some residual radioactivity would be packaged according to local, state and federal specifications and shipped to an approved radioactive waste disposal site. For the proposed action, this might involve cutting large pieces, under health physics supervision, into sizes suitable for shipment. In all cases, radioactive and nonradioactive components would be kept segregated.

Decommissioning of conventional facilities would follow after all activated components are identified and removed. No parts of the building structures or equipment are expected to be activated; therefore, they would be available for reuse. For hardware and equipment installed outside the accelerator enclosure one would use standard procedures for disposition of excess government properties.

3.16.4 Nonradiological effects

Nonradiological effects associated with decommissioning work would be similar to installation of technical components during the construction phase (i.e., noise, dust, and exhaust emissions from carrier-transporting equipment, etc.). Environmental impacts from these activities would be temporary and would have no short- or long-term effects on the site or neighboring area. No special or hazardous liquids would be required. Nonradioactive solid materials would be salvaged or disposed of in a permitted sanitary landfill.

No significant impacts on site land commitment are expected. Interim space for temporary storage of excess materials could be allocated in the existing building and other support buildings or on PFNA open land areas. Staging areas for the preparation, packaging, and carrier-loading activities could also be accommodated within the PFNA facilities.

The work force for decommissioning would be small compared with that required for construction or operation. Similarly, traffic associated with decommissioning would be no greater than for construction.

Background Information on Non-Ionizing Radiation

Appendix M

Appendix M

Background Information on Non-Ionizing Radiation

Non-Ionizing Radiation Effects

The word "radiation" is most often used to mean ionizing radiation. Ionizing radiation has enough energy to remove an electron from an atom when it strikes an object. This creates an ion pair. Examples of ionizing radiation include gamma rays, alpha particles, and neutrons. Non-ionizing radiation (Electromagnetic radiation) does not have enough energy to create ions. Examples of non-ionizing radiation include visible light, radar, and radio waves.

Regulations

Presently, there are no formal approved standards for exposure to Electromagnetic Fields (EMF) in the United States. However, the American Conference of Industrial Hygienists (ACGIH) has adopted a Magnetic Flux Density value of 1.0 millitesla (mT) for occupational workers. The value of 1.0 mT is equal to 10 Gauss (G). Typical ambient values of exposure in an office or laboratory work environment range from 0.1 to 2 mG, although it is not unusual to routinely find fields up to 10 mG.[64]

The International Radiological Protection Association (IRPA) in cooperation with the World Health Organization (WHO) has developed guidance for exposure limits to the general public which is 0.1 millitesla (mT) for up to 24 hours per day. The value of 0.1 mT is equal to 1 Gauss (G) or 1,000 milligauss (mG). A summary of the current interim guidance for maximum magnetic field exposure is presented in Table XXX.

Table XXX. Recommended Maximum Magnetic Field Exposure

Standards Body	Situation	Maximum Magnetic Flux Density (mT)
International Radiological Protection Association	Occupational	
	Work Day	0.5
	Short Term	5.0
	General Public	
	XXX24 h d-1	0.1
	XXX Few h d-1	1.0
American Conference of Industrial Hygienists	Workers	1.0
	Workers Wearing Cardiac Pacemaker	0.1
NRPB[4]	Workers and Public	2.0

Electromagnetic Field Measurements

An Electromagnetic Field (EMF) Non-Ionizing Radiation Survey was conducted at Ancore's PFNA Cargo Inspection System Facility, Santa Clara, California on 22-24 February 2000. Results of the measurement survey were documented in XXX.

The EMF measurements were made with a VDT/VLF Radiation Survey Meter, manufactured by Holaday Industries, Eden Prairie, Minnesota. The background radiation levels were determined by taking measurements at locations on the site that were unaffected by site operations, i.e., locations within on-site buildings of similar construction. Surveys conducted with portable radiation instruments were duplicated in laboratory and/or office space similar in dimensions and construction. Ambient background radiation instrument surveys were in the range of a Electric field (E-field) of 0.03 volts/meter and a Magnetic field (H-field) of 1.40 milliamps/meter.[63]

Ten specific points within the facility were measured for Electric Fields (volts/meter) and Magnetic Fields (milliamps/meter). The latter measurements were also converted to gauss (G). A detailed EMF radiation survey is shown in Table XXIX.

Table XXIX. EMF Readings of Ancore PFNA Facility Santa Clara, California

Location	Electric Field - E (volts/meter)	Magnetic Field - H (milliamps/meter)	Magnetic Field - H milligauss (mG)
1	0.03	1.40	0.02
2	0.04	1.40	0.02
3	0.15	1.40	0.02
4	0.03	1.40	0.02
5	0.03	1.40	0.02
6	0.03	1.40	0.02
7	0.32	1.40	0.02
8	0.32	1.40	0.02
9	2.02	1.40	0.02
10	0.03	1.40	0.02
Meter Background: Electric Field (E-Field) 0.03 Volts/Meter, Magnetic Field (H-Field) 1.43 Milliamps/Meter = 0.018 milligauss			

Source: Michael Terpilak, Radiological Consequences of the Operation of the Pulsed Fast Neutron Analysis (PFNA) Interrogation System for the Department of the Treasury, United States Customs Service, Appendix H May 28, 2001

EMF measurements were also taken various operating areas of the facility. These data are presented in Table XX-XX. The results of the EMF measurements survey indicate that the EMF radiation levels at Ancore's PFNA Cargo Inspection System Facility were well below the current guidelines and recommendations of the various national and international agencies and voluntary consensus standards organizations.

Table XX-XX. EMF Measurements in Operating Areas

Location	Electric Field - E (volts/meter)	Magnetic Field - H (milliamps/meter)	Magnetic Field - H milligauss (mG)
Accelerator Control Room			
General Area	1.71	1.40	0.02
Front of Computers	4.38	30.2	0.38
Oscilloscope	0.30	14.6	0.18
Control Panel	0.12	6.36	0.08
Accelerator Complex			
General Survey of Power Supply and Amplifier Area	0.30	6.12	0.08
Detection System Operator's Room			
Sun Computer I	0.45	9.52	0.12
Sun Computer II	0.0	40.5	0.51
Sun Computer III	53.4	2.35	0.03
Distribution Box	0.13	3.66	0.05
Electronics Trailer			
Outside Trailer	0.03	1.43	0.02
Inside at Door	0.03	1.43	0.02
Front of Power Supply Equipment	0.08	12.1	0.15
Back of Power Supply Equipment	3.65	23.0	0.29

Source: Michael Terpilak, Radiological Consequences of the Operation of the Pulsed Fast Neutron Analysis (PFNA) Interrogation System for the Department of the Treasury, United States Customs Service, Appendix H May 28, 2001

EMF Radiation Survey Results

Electric Field

Based on all 23 EMF measurements taken, the results are in the ambient background readings for Electric Fields ranging from 0.03 Volts/Meter to 53.4 Volts/Meter. Given that the recommended Electric Field Maximum Exposure Limit for the worker is 25 Kilovolts/Meter and for the general public is 10 Kilovolts/Meter, the measured levels are many orders of magnitude below the recommended guidance values.

Magnetic Field

Based on all 23 EMF measurements taken, the results are in the ambient background readings for the Magnetic Field (H-gauss) ranging from 0.02 to 0.51 milligauss. As with the Electric Fields, the measured levels are many orders of magnitude below the recommended guidance values.

Conclusions

The findings and the results of the EMF measurements survey indicate that the EMF radiation levels at Ancore's PFNA Cargo Inspection System Facility, in this operating mode, are well below current federal and state guidelines and recommendations of the various national and international agencies and voluntary consensus standards organizations.

The EMF exposure at various PFNA Cargo Inspection System office space and work locations ranged on the average of 0.042 to 0.650 milligauss (mG) which is many orders of magnitude below the guidelines and recommendations of the currently accepted and recognized national and international standards.[65]

All results were within local, state and federal guidance, in addition to national and international voluntary consensus standards and recommendations.[62]

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