ENVIRONMENTAL ASSESSMENT

SUB-TENANTING BUILDING 643 BY NASA LaRC TO OLD DOMINION UNIVERSITY

Office of Environmental Engineering
NASA Langley Research Center
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I. SUMMARY AND CONCLUSIONS

This Environmental Assessment (EA) documents the results of a study of the potential environmental impacts from an action proposed by the National Aeronautics and Space Administration (NASA) Langley Research Center (LaRC). Specifically, NASA proposes to sub-tenant the operation of Building 643, a 30- by 60-foot (ft) Full Scale Tunnel, to Old Dominion University (ODU).

Under the no action alternative, operation of the facility would not continue since NASA's operations of the wind tunnel were stopped in 1995. This alternative would not permit further wind tunnel testing to occur.

Building 643 has been designated a National Historic Landmark because of the full scale wind tunnel and associated operational equipment contained in the building. The building was declared a Landmark in 1985 and is subject to a 1989 Programmatic Agreement among NASA, the National Conference of State Historic Preservation Officers (NCSHPO), and the Advisory Council on Historic Preservation (ACHP). The historical significance of the building lies in the tunnel structure and equipment (fans, fan blades, etc.) that allow the tunnel to remain operational.

The proposed action involves essentially no structural changes or changes in characteristic wind tunnel activities compared to the situation that existed when NASA operated the building. No increased workforce, no increased energy use, no new or increased noise or air emissions, no new or increased water or solid waste streams, no new or increased use of hazardous materials or procedures can be foreseen.

Given that this action is essentially of an administrative nature (change of operating organization) rather than one that involves significant physical changes, there are no foreseeable mechanisms by which any effects could arise on air, soils, surface or ground water, noise, biological communities and habitats, hazardous materials, solid waste, land use, transportation, utilities, socioeconomic conditions, aesthetics, or environmental justice.

Because no adverse impacts would occur as a result of the proposed action, a Finding of No Significant Impact is recommended.

INTRODUCTION

This Environmental Assessment (EA) documents the results of a study of the potential environmental impacts from an action proposed by the National Aeronautics and Space Administration (NASA) Langley Research Center (LaRC). Specifically, NASA LaRC proposes to sub-tenant the operation of Building 643, a 30- by 60-foot (ft) Full Scale Tunnel, to Old Dominion University (ODU).

This study was conducted in accordance with the National Environmental Policy Act (NEPA) of the 1969 [United States Code (USC) 4321 et seq.], the Council of Environmental Quality (CEQ) regulations [40 Code of Federal Regulations (CFR) 1500-1508. The purpose of this study was to determine whether or not the proposed action could potentially create significant impacts to the environment, and would warrant a more detailed study of the impacts, potential mitigation, and alternative courses of action.

II. PURPOSE AND NEED FOR THE PROPOSED ACTION

Due to the reorganization and downsizing, NASA is in the process of deactivating various facilities, including Building 643, LaRC. Operations in Building 643 have ceased since its formal closure in October, 1995. However, a need still exists for the kind of wind tunnel testing on aircraft that has historically been performed in the tunnel. As such, it is proposed that Building 643 be sub-tenanted to ODU to continue the operation of the facility.

III. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

A. No Action

Under the no action alternative, operation of the facility would not continue since NASA's operations of the wind tunnel were stopped in 1995. This alternative would not permit further wind tunnel testing to occur.

B. Proposed Action

Building 643 is owned and operated by NASA LaRC. With United States Air Force's (USAF) permission, NASA LaRC proposes to sub-tenant the operation of the facility to ODU. ODU would operate and maintain the interior of the building, and NASA LaRC would maintain only the exterior appearance of the building for structural integrity in accordance with the intent of a facility placed in an abandoned status of closure. The facility is a National Historic Landmark and, as such, the building's interior components directly related to its historic significance would be maintained and operated in its present condition.

ODU would operate the facility for the same type of research conducted by NASA LaRC, mainly tests involving aircraft models. The amount of usage would remain static or decrease slightly from past levels of usage. In addition to aircraft testing, ODU plans to open the facility to testing of full-scale road vehicles such as cars and trucks. There are also some interests for testing architectural models. (Cross, 1996).

C. Demolition of the Facility

Under this alternative, the Building would be torn down and interior equipment would be removed. The walls and roof of the Building are constructed with corrugated cement asbestos sheets, and because of this construction, building demolition would be extremely costly. It has been estimated that $10 to 12 million would be needed to complete demolition because of the presence of asbestos (Mouring, 1996a).

D. Comparison of Alternatives

Demolition of the building is not feasible because of the high costs of removing the cement asbestos sheets of the outer walls and roof. The analysis in this document focuses on the potential impacts of transfer and operation the facility versus the no action alternative of allowing the building to remain abandoned and not in operation.

IV. SITE DESCRIPTION

A. Site Location

The LaRC is located on U.S. government-owned land in the Hampton Roads area of Virginia (Appendix B). The LaRC is divided among the West and East Areas, with Building 643 located in the East Area (Appendix C). The LaRC is bounded to the south and east by Langley Air Force Base.

B. Description of Building 643 and Wind Tunnel

Building 643 is the 30- by 60-ft full scale wind tunnel (Appendix D) with associated office, shop, and storage area. The facility, constructed from 1929 to 1931, is the oldest operating wind tunnel within NASA. It was originally designed to test large and full-scale aircraft at actual flight speeds. Through the years, the tunnel's capabilities were expanded to include new tests such as sub-scale high angle of attack tests, free-flight tests, and high performance design tests. The importance of the wind tunnel was acknowledged in 1985 when it was named a National Historic Landmark (Landmark).

The tunnel is a double return flow type with an open throat. On either side of the test chamber is a return passage 50 feet (ft) wide, with a height varying from 46 ft to 72 ft. The outside walls serve as the outer walls of the return passages. The over-all length of the tunnel is 434 ft by 222 ft and the maximum height is 97 ft (Appendix D). The framework is on structural steel and the walls and roof are of corrugated cement asbestos sheets. (See attached CERCLA survey [Appendix E] for additional information concerning the cement asbestos sheets.) The entrance and exit cones are constructed of wood planking, attached to a steel frame and covered on the inside with galvanized sheet metal as protection against fire.

The tunnel is powered by two four-blade fans, each driven by 4,000 horsepower electric motors. The maximum air speed of the tunnel is about 100 mph. When the tunnel was first placed in operation in 1931, the top air speed was equal to the top speed of many airplanes then flying. The planes of today have speeds that exceed that of the tunnel. However, these planes require wing shapes and airfoil sections that sometimes result in

poor low speed characteristics. The full scale tunnel is suited to investigate means of alleviating these low speed problems because full or large scale hardware can be used with a model airplane. The tunnel is also equipped with shielded struts for six-component scale balance testing, and can also be used for free-flight testing of sub-scale models.

The tunnel was upgraded in 1973 and 1984 with the work primarily involving the electric motors that power the fans. Past research has involved the study of low speed aerodynamics, static and dynamic stability and control, and associated flow characteristics of military, general aviation, and commuter aircraft. In recent years, modern aircraft such as the Harrier fighter, the F-16, the American supersonic transport, the space shuttle, and the Lunar Landing Test Vehicle have been tested in the tunnel.

V. ENVIRONMENTAL EVALUATION

This section describes the relevant resources of the environment which potentially would be affected by the proposed action and the no action alternative, along with the potential effects on the resource. A structured technique was used to conduct the environmental evaluation and identify those resources that could be affected by the proposed action.

The possible resources include air, soils, surface and ground water, noise, biological communities and habitats (including Threatened and Endangered species, marine mammals, migratory birds, and wetlands), bio-diversity, floodplains, minerals, hazardous materials, solid waste, archeological resources, paleontological resources, historic resources, Native American cultural resources, land use, transportation, utilities, housing, education, recreation, socioeconomic conditions, aesthetics, and environmental justice.

If an environmental resource was found to have no reasonable mechanism through which the proposed activity could affect that resource, that resource was not considered in this environmental evaluation. The only resource that was found to potentially be affected by the proposed action was a historical resource, Building 643 itself.

Historic Resources

A. Affected Environment

Building 643 has been designated a National Historic Landmark (Landmark) because of the full scale wind tunnel's historically significant activities. The building was declared a Landmark in 1985 and is subject to a Programmatic Agreement among NASA, the National Conference of State Historic Preservation Officers (NCSHPO) and the Advisory Council on Historic Preservation (ACHP). The historical significance of the building lies in the tunnel structure and built-in equipment (fans, fan blades, etc.) that allow the tunnel to remain operational (Mouring, 1996b).

Under the authority of the Space Act of 1958, an interim Memorandum of Agreement (MOA) exists among NASA, LaRC, and ODU for the sub-tenanting of the building and operation of the wind tunnel by ODU. The MOA sub-tenants the operation of the

building to ODU until a permanent MOA is in place or until October 31, 1996, whichever occurs first. This MOA specifies the responsibilities of NASA and the USAF to supply support to ODU for operations, the responsibilities of ODU in the operation of the tunnel and maintenance of the building's interior, and the responsibility of NASA LaRC for the maintenance of the exterior of the building. In addition, ODU should exercise caution if it operates the low-pressure air piping system, which is contaminated with polychlorinated terphenyls (PCTs) - see Appendix E.

A separate programmatic agreement document (PAD) among the USAF, NASA LaRC, ODU, Virginia Department of Historical Resources (VDHR), and the ACHP will be put in effect along with the final MOA for ODU operations during the next ten years. The PAD will routinely allow only changes that preserve the historic function of the wind tunnel.

B. Environmental Consequences

The criteria used for evaluating the significance of impacts to historic properties are set forth in 36 CFR 800.9, Criteria of Effect and Adverse Effect.

Adverse effects on historic properties include, but are not limited to:

1. Physical destruction, damage, or alteration of all or part of the property;
2. Isolation of the property from or alteration of the character of the property's setting;
3. Neglect of a property resulting in its deterioration or destruction; and
4. Transfer, lease, or sale of the property.

C. No Action

> The abandonment and non-use of Building 643 would lead to deterioration of the property and would be a significant adverse effect on a National Historic Landmark.

Currently, NASA has ceased operations in Building 643. Under this alternative, the Building would not be maintained and the wind tunnel would not be operated. This no action alternative would lead to the degradation of Building 643 because of the lack of upkeep and operation of a Landmark. Under this scenario, further consultation with the State Historic Preservation Office (SHPO) would be required to determine the appropriate disposition of the Building.

If, instead of the proposed action, the no-action alternative were adopted, it is likely that the remediation of PCTs would still proceed. But if the building, as a whole, were allowed to deteriorate, the asbestos structural materials could deteriorate over the course of years with the potential to release airborne asbestos particles, which are a health

hazard. Such a circumstance would constitute an adverse environmental effect, but its magnitude and significance cannot be reliably predicted (see Appendix E - CERCLA assessment).

D. Proposed Action

> Sub-tenant the Building to ODU and the continued operation of the wind tunnel would not cause any significant adverse effects on the historic property.

The proposed action involves essentially no structural changes or changes in physical activities compared to the situation that existed when NASA operated the building. No increased workforce, no increased energy use, no new or increased noise or air emissions, no new or increased water or solid waste streams, no new or increased use of hazardous materials or procedures can be foreseen.

Given that this action is essentially of an administrative nature (change of operating organization) rather than one that involves significant physical changes, there are no foreseeable mechanisms by which any effects could arise on air, soils, surface or ground water, noise, biological communities and habitats, hazardous materials, solid waste, land use, transportation, utilities, socioeconomic conditions, aesthetics, or environmental justice.

Sub-tenant the building to ODU and continuing the operation of the wind tunnel would be consistent with the MOA and the future PAD between the concerned parties. Since the historical significance is due to past operation of the wind tunnel, its continued operation by ODU would constitute a positive effect for the historic property. Sub-tenant and operation of the wind tunnel would not basically change the current interior or exterior environment of the building.

VI. REFERENCES

(Benson, 1996) Benson, Jan, 1996. Office of Environmental Engineering, NASA LaRC. Personal communication.

(Bionetics, 1993-1995) Bionetics Environmental Health, 1993-1995. *Hazardous Waste Minimization Reports, 1993, 1994, and 1995.*

(Breen, 1996) Breen, Lois, 1996. Operation Support, Work Control Division, NASA LaRC. Personal communication.

(Brooks, 1996) Brooks, Dave, 1996. Facility Technician, Building 643, NASA LaRC. Personal communication.

(Cross, 1996) Cross, Jr., EJ, 1996. Dean, College of Engineering and Technology, Old Dominion University. Personal communication.

(Ebasco, 1992) Ebasco Services Incorporated, September 1992. *Final Phase I UST Assessment at the Langley Research Center, Hampton, Virginia. NASA Contract No. NASW-4598, Task Order No. 12.*

(Ebasco, 1993) Ebasco Services Incorporated, January 1993. *Final Engineering Assessment of PCB/PCT in Storm Sewers at the National Aeronautics and Space Administration, Langley Research Center, Hampton, Virginia. NASA Contract No. NASW-4598, Task Order No. 6.*

(Foster Wheeler, 1996) Foster Wheeler Environmental Corporation, April 1996. *Final Service Air System Contamination Study Report, NASA Langley Research Center, Hampton, Virginia. NASA Contract No. NASW-4598, NASA Task Order No. 61.*

(Grafton, 1996) Grafton, Sue, 1996. Facility Safety Head, Building 643, NASA LaRC. Personal communication.

(Johnston, 1992) Johnston, Roger, 1992. *Industrial Hygiene Audit, Building 643.* Bionetics Environmental Health.

(Johnston, 1996) Johnston, Roger, 1996. Bionetics Environmental Health. Personal communication.

(Mouring, 1996a) Mouring, J. 1996. Master Planner, Facilities Program Development Office (FPDO), NASA LaRC. Personal communication.

(Mouring, 1996b) Mouring, J. 1996. Master Planner, FPDO, NASA LaRC. Personal communication.

(Sullivan, 1996) Sullivan, Greg, 1996. Office of Environmental Engineering. NASA LaRC. Personal communication.

(TAI, 1995) Technology Applications, Inc., DynCorp, April 1995. *Building 643 Asbestos Configuration Management Report, Asbestos Configuration Controlled Document.*

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APPENDIX A

ACRONYMS AND ABBREVIATIONS

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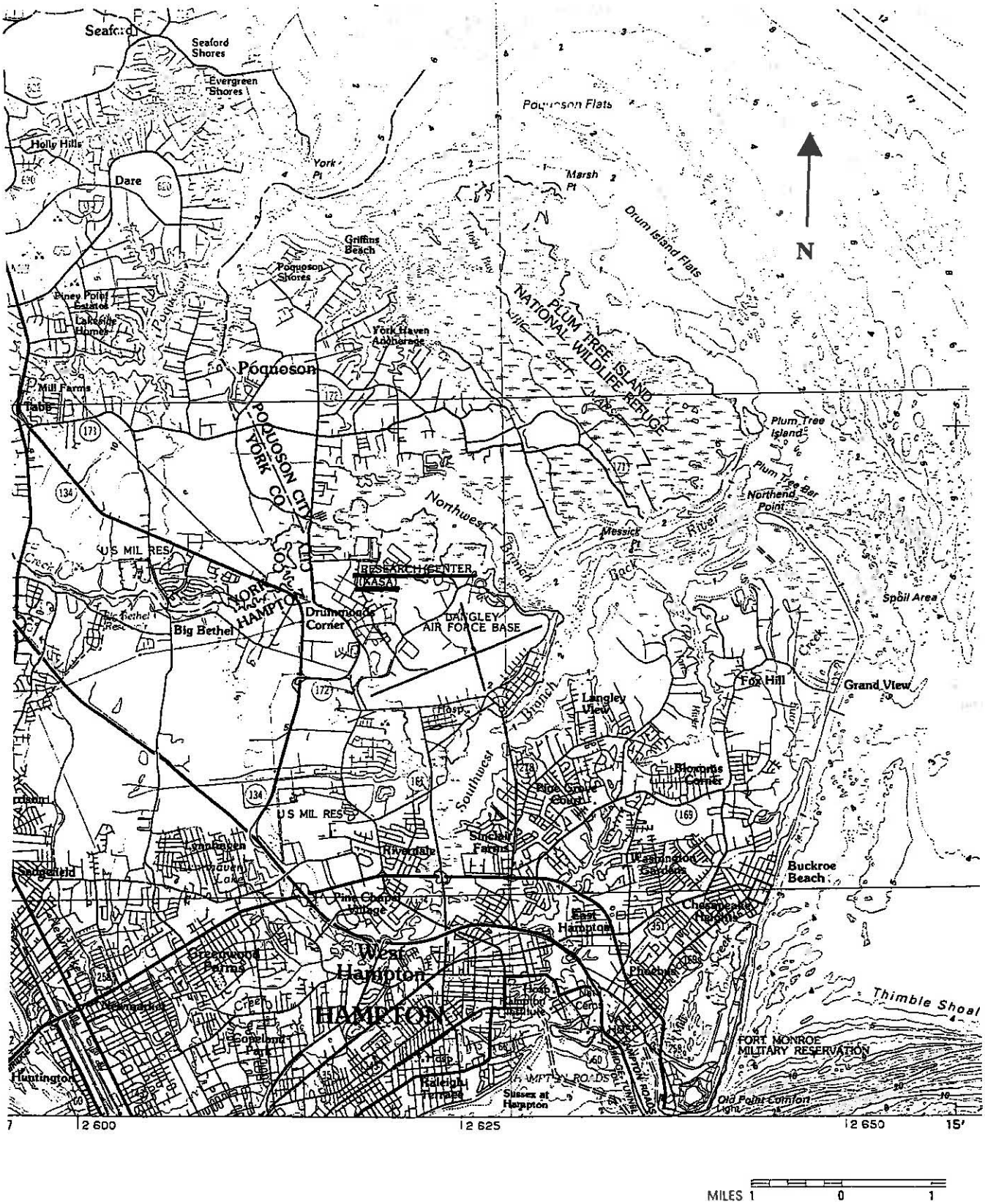
ACHP	Advisory Council on Historic Preservation
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, Liability Act
CFR	Code of Federal Regulations
EA	Environmental Assessment
EPA	Environmental Protection Agency
f/cc	fiber per cubic centimeter
FFCA	Federal Facilities Compliance Agreement
ft	feet
LaRC	Langley Research Center
MOA	Memorandum of Agreement
$\mu g/100cm^2$	microgram per 100 square centimeter
NASA	National Aeronautics and Space Administration
NCSHPO	National Conference of State Historic Preservation Officers
NEPA	National Environmental Policy Act
NPL	National Priority List
ODU	Old Dominion University
PAD	Programmatic Agreement Document
PCB	Polychlorinated biphenyl
PCT	Polychlorinated terphenyl
TCE	Trichloroethylene
USAF	United States Air Force
USC	United States Code
UST	Underground Storage Tank
VDHR	Virginia Department of Historic Resources

APPENDIX B

MAP OF HAMPTON ROADS AREA SHOWING LOCATION OF LaRC

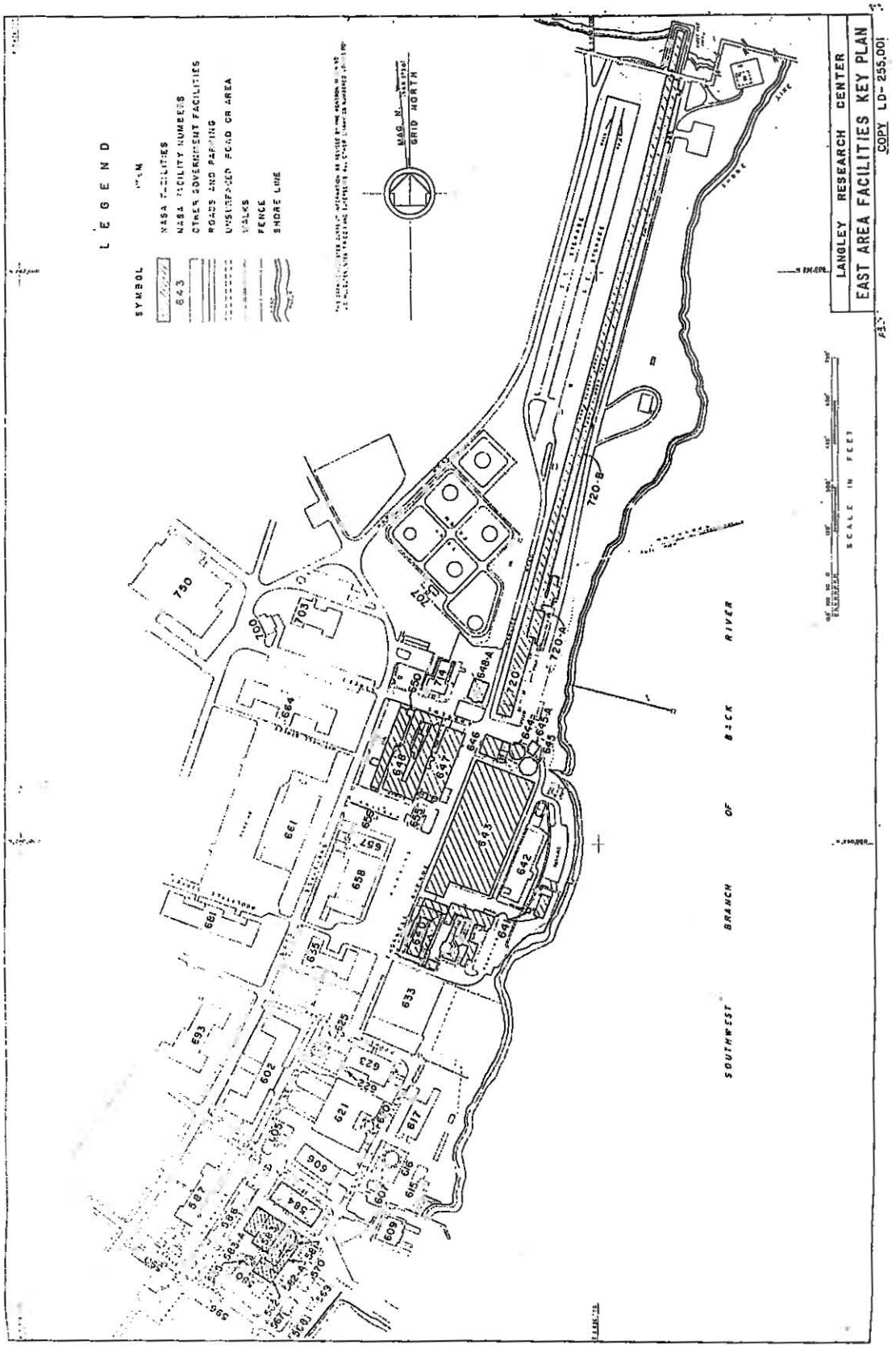
MAP SHOWING LOCATION OF LaRC



APPENDIX C

MAP SHOWING THE LOCATION OF BUILDING 643

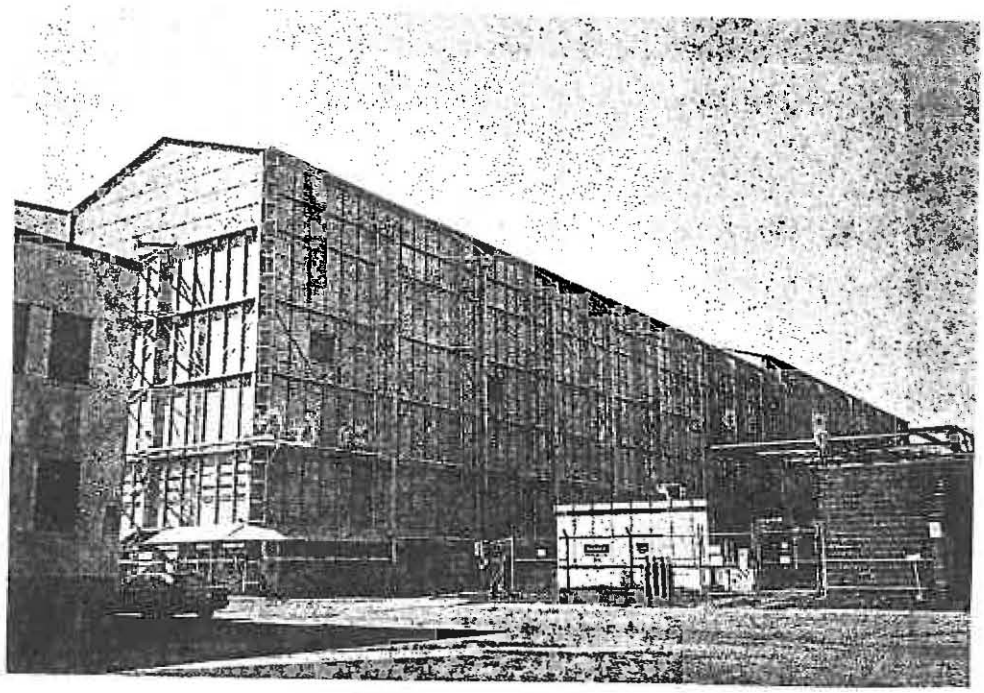
LOCATION OF BUILDING 643



APPENDIX D

PHOTOGRAPH SHOWING THE EXTERIOR OF BUILDING 643

EXTERIOR OF BUILDING 643



APPENDIX E

ASSESSMENT OF BUILDING 643 IN ACCORDANCE WITH COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA)

LIMITATIONS

Our professional service have been performed and our findings obtained in accordance with customary principles and practices in the environmental assessment field. This company is not responsible for the independent conclusions, opinions or recommendations made by others based on the records review and site observations represented in this report.

The Mangi Environmental Group conducted a visual survey for information regarding the status of hazardous substances on the site. This did not include an inspection for hidden materials, inaccessible areas, or subsurface conditions.

This report is preliminary and designed to generally identify accessible and observable materials. Under no circumstances should this document be used, in lieu of detailed survey, for such things as bidding, abatement, or project specification.

APPENDIX E

1.0 INTRODUCTION

Building 643, housing a 30- by 60-foot Full Scale Tunnel, is located at the National Aeronautics and Space Administration (NASA) Langley Research Center (LaRC). NASA is proposing to sub-permit the operation of the building to Old Dominion University (ODU). This assessment was done for Building 643 in conjunction with a NEPA Environmental Assessment.

This assessment was conducted in accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120(h) (1-4) as amended 42 U.S. Code (USC) 9620(h)(1) and applicable state or local real property disclosure requirements. In general, these laws require that when any Federal agency transfers U.S. property on which any hazardous substance was stored for one year or more, known to have been released, or disposed of, the agency shall provide a notice of the type and quantity of such hazardous substance and the time at which such storage, release, or disposal took place.

2.0 METHODOLOGY

A complete search of NASA files was done to obtain a history of the storage, release, and disposal of hazardous substances in Building 643. In addition, a site visit was conducted on May 31, 1996, to evaluate the condition of the building. The entire interior of the building was walked, locating all areas of present chemical storage. The interior and exterior of the building were surveyed to evaluate the condition of the wall panels containing asbestos. Interviews with past and present NASA personnel were conducted to supplement the record search and the site assessment.

3.0 ENVIRONMENTAL CONDITION

Based on the results of a record search, site visit, and interviews, the environmental condition of Building 643 was evaluated with respect to: 1) hazardous substances, 2) asbestos, 3) polychlorinated biphenyl (PCB) and polychlorinated terphenyl (PCT) remediation, and 4) underground storage tank (UST) removal. Both asbestos and PCBs are considered hazardous substances under CERCLA. However, they are discussed separately in this section because of the extent of their presence in Building 643.

3.1 Hazardous Substances

3.1.1 Hazardous Chemicals

NASA LaRC has agreed to remove all hazardous and non-hazardous chemicals that have been stored in Building 643 (Grafton, 1996). Historical chemical usage in the building typically consisted of infrequent use of small amounts of maintenance type chemicals, such as solvents, spray paints, adhesives, and a wide variety of oils and lubricants (Johnston, 1992).

Table 1 presents Chemical Inventory 1992 of Building 643, including the type, quantity, and time of the chemical storage. The inventory is representative of the chemical inventories from 1993 to 1995. Records prior to 1992 are not available. The identifiable chemicals that are listed as hazardous substances under CERCLA include: acetone, chlorodifluoromethane, dichlorobenzene, naphthalene, trichloroethylene (TCE), and trichloroethane. In addition, other possible hazardous substances may include: insecticide, lacquer, naphtha (aliphatic), naptha benzine VM&P, paint remover, propylene glycol, reducer (enamel 38645), resin (evercoat), silicone compound, solvents (radio TV, safe-tee, prep sol), thinner, dope & laquer, and titanium dioxide.

3.1.2 Hazardous Wastes

A history of hazardous wastes that have been generated and removed from Building 643 is presented in Table 2. Records prior to 1992 are not available.

Table 2. Hazardous wastes generated from Building 643 (Bionetics, 1993-1995)

Date	Waste	Quantity
1993	Organic Solvent	1x5 gallon container (72 lbs)
1994	None	
1995	Soil/Gravel Contaminated with Mercury	1x5 gallon container

3.2 Asbestos

Most of the exterior and the interior of Building 643 is composed of corrugated asbestos cement panels. Because of the age of the building (65 years) and the vibration and possible erosion of the panels during tunnel operation, release of asbestos fibers is a reasonable concern.

Air sampling during tunnel operation (at approximately 45 mph) has shown asbestos concentrations of <0.003 fiber per cubic centimeter (f/cc), which is below Environmental Protection Agency's (EPA) limit of 0.01 f/cc for asbestos abatement projects. However, the tunnel is capable of operating at higher speeds (up to 100 mph), at which greater erosion of the wall panels may occur. Further asbestos monitoring was recommended during tunnel operation at higher speeds (Johnston, 1992); however, no monitoring has been conducted since 1992 (Johnston, 1996).

The entire exterior of the building was painted with latex on the wall panels and with epoxy enamel on the steel frames during the mid-80's (Breen, 1996). Parts of the interior wall panels were also painted. Paint chipping off the interior and the exterior of the building was observed during site assessment. There is concern that this may result in the release of asbestos fibers (Romanowski, 1996).

TABLE 1 CHEMICAL INVENTORY 1992

BUILDING 643				
FAC. ENVIRONMENTAL COORDINATOR Frank Sutton				
DATE 2-6-92				
ITEM	MAX. AMT. ON HAND	AVG. DAILY AMT. ON HAND	NO. OF DAYS ON HAND	CUSTODIAN
BUILDING				
FAC. ENVIRONMENTAL COORDINATOR				
DATE				
ITEM	MAX. AMT. ON HAND	AVG. DAILY AMT. ON HAND	NO. OF DAYS ON HAND	CUSTODIAN
ABRASIVE CLOTH	100	50	100	MARTIN
ABRASIVE, COATED PRODUCT	100	50	100	MARTIN
ABRASIVES, COATED (SANDING DISKS)	NONE			
ACCELERATOR, HOT SHOT	NONE			
ACETONE	32 OZ.	5 OZ.	365	E. W. MARTIN
ACETONE	5 GAL	0.5 OZ.	365	E. W. MARTIN
ADHESIVE	4 OZ.	.25 OZ.	365	E. W. MARTIN
ADHESIVE--SEE ALSO CYANOCRYLATE				
AERO CONTACT CLEANER	4 X 18 OZ.	6 OZ.	365	E. W. MARTIN
AERO DUSTER	16 OZ.	.6 OZ.	365	E. W. MARTIN
AERO DUSTER			365	E. W. MARTIN
AERO DUSTER			365	E. W. MARTIN
ALCAN ALUMINUM METAL				
ALCOHOL	5 GAL.	6 OZ.	365	E. W. MARTIN
ALCOHOL 200 PROOF	1 PT.	.6 OZ	365	E. W. MARTIN
ALCOHOL, ISOPROPYL	55 GAL.	6 OZ	365	E. W. MARTIN
ALUM TAP	12 PT.	.6 OZ	365	E. W. MARTIN
BENZOYL PEROXIDE	NONE			
BIPHENYL	NONE			
BRAZING ALLOY --SEE SOLDER				
CASTOR OIL	1 GAL.	.6 OZ	365	E. W. MARTIN
CAULKING	30 OZ.	6 OZ.	365	E. W. MARTIN
CEMENT	1 PT.	.6 OZ	365	E. W. MARTIN
CHLORODIFLOUROMETHANE	24 OZ.	.5 OZ.	365	E. W. MARTIN

CHEMICAL INVENTORY 1992

BUILDING 649				
FAC. ENVIRONMENTAL COORDINATOR Frank Gordon				
DATE 2-6-92				
ITEM	MAX. AMT. ON HAND	AVG. DAILY AMT. ON HAND	NO. OF DAYS ON HAND	CUSTODIAN
CLEANING COMPOUND	5 GAL.	6 OZ.	365	E. W. MARTIN
CLEANING COMPOUND	5 GAL	6 OZ.	365	E. W. MARTIN
CLEANING COMPOUND SOLVENT	5 GAL.	6 OZ.	365	E. W. MARTIN
CORRECTION FLUID				
CORRECTION FLUID				
CORRISION RESISTANT COATING	1 PT	.6 OZ	365	E. W. MARTIN
CORROSION PREVENTATIVE	18 PT	6 OZ.	365	E. W. MARTIN
CYANOCRYLATE	6 OZ	0.6 OZ	365	MARTIN
DEBONDER	NONE			
DEODORANT	16 OZ	.6 OZ.	365	E. W. MARTIN
DEOXIDINE 624	1 GAL.	0.5 OZ	365	MARTIN
DETERGENT, GENERAL	6 X 22 OZ.	6 OZ.	365	E. W. MARTIN
DICHLOROBENZENE	2 X 6.6 LB	0.6 LB	365	E. W. MARTIN
DTE LIGHT OIL	1 GAL.	6 OZ.	365	E. W. MARTIN
DYKEM REMOVER	11 OZ.	0.6 OZ.	365	E. W. MARTIN
DYKEM REMOVER	NONE			E. W. MARTIN
ENAMEL, ALKYD, SEMI GLOSS	1 GAL.	5 OZ.	365	E. W. MARTIN
ENAMEL, ALKYD, SEMI GLOSS			365	E. W. MARTIN
ENAMEL, ALKYD, SEMI GLOSS		0.5 OZ.	365	E. W. MARTIN
ENAMEL, ALKYD, SEMI GLOSS			365	E. W. MARTIN
ENAMEL---SEE ALSO PAINT				
FIVE MINUTE EPOXY	4 X 2.5 OZ	0.6 OZ.	365	E. W. MARTIN
FLUX	3 LB.	0.6 LB.	365	E. W. MARTIN
FLUX	4 OZ.	0.4 OZ.	365	E. W. MARTIN
FLUX	2 OZ.	0.2 OZ	365	E. W. MARTIN
FUEL, MODEL	5 X 1 GAL.	6 OZ.	365	E. W. MARTIN
GASKET REMOVER	NONE			
GLYPTAL	1 QT.	0.6 OZ.	365	E. W. MARTIN
GLYPTAL			365	E. W. MARTIN
GUNK	1 QT	0.6 OZ.	365	E. W. MARTIN
HARDNER	1 TUBE	0.6 TUBE	365	E. W. MARTIN

CHEMICAL INVENTORY 1992

BUILDING 643				
FAC. ENVIRONMENTAL COORDINATOR Frank Cotton				
DATE 2-6-92				
ITEM	MAX. AMT. ON HAND	AVG. DAILY AMT. ON HAND	NO. OF DAYS ON HAND	CUSTODIAN
HARDNER	1 TUBE	0.6 TUBE	365	E. W. MARTIN
HOT STUFF---SEE ADHESIVES				
HUMI-SEAL	5 PT.	0.5 OZ.	365	E. W. MARTIN
HUMI-SEAL			365	E. W. MARTIN
HYDRAULIC FLUID H515	1 QT.	0.5 OZ.	365	E. W. MARTIN
HYDRAULIC FLUID H537	55 GAL.	6 OZ.	365	E. W. MARTIN
HYDRAULIC FLUID, AIRCRAFT	5 GAL.	0.5 OZ	365	E. W. MARTIN
INSECTICIDE	5 PT.	0.5 OZ	365	E. W. MARTIN
KICK IT --SEE ACCELERATOR				
KRYLON 1303 CLEAR	16 OZ.	0.5 OZ.	365	E. W. MARTIN
KY READ	1 PT.	0.5 OZ.	365	E. W. MARTIN
KY READ			365	E. W. MARTIN
LACQUER				
LACQUER				
LACQUER	2 GAL.	5 OZ.	365	E. W. MARTIN
LACQUER	1 GAL	0.5 OZ.	365	E. W. MARTIN
LACQUER			365	E. W. MARTIN
LACQUER	57 X 13 OZ.	5 OZ	365	E. W. MARTIN
LACQUER				
LACQUER				
LACQUER				
LACQUER				
LACQUER				
LACQUER				
LACQUER				
LACQUER				
LACQUER				
LACQUER				
LACQUER				
LACQUER, ACRYLIC	1 GAL.	5 OZ.	365	E. W. MARTIN
LACQUER, METAL PRIMER	1 GAL	0.5 OZ.	365	E. W. MARTIN

BUILDING 613				
FAC. ENVIRONMENTAL COORDINATOR Frank Sexton				
DATE 2-6-92				
ITEM	MAX. AMT. ON HAND	AVG. DAILY AMT. ON HAND	NO. OF DAYS ON HAND	CUSTODIAN
LACQUER, METAL PRIMER			365	E. W. MARTIN
LACQUER, PRIMER, UNDERCOATER	1 GAL.	0.5 OZ.	365	E. W. MARTIN
LACQUER, PRIMER, UNDERCOATER			365	E. W. MARTIN
LACQUER--SEE ALSO --PAINT				
LAPPING COMPOUND	1.25 LB.	0.5 OZ.	365	E. W. MARTIN
LAYOUT DYE	4 PT.	0.5 OZ.	365	E. W. MARTIN
LIQUID CRYSTAL	1 QT.	0.5 OZ.	365	E. W. MARTIN
LIQUID WRENCH	5 X 8 OZ.	0.5 OZ.	365	E. W. MARTIN
LPS-1	11 OZ.	0.5 OZ.	365	E. W. MARTIN
LUBE OIL 3190	16 OZ.	0.5 OZ.	365	E. W. MARTIN
LUBE OIL, INST.	1 QT	0.5 OZ.	365	E. W. MARTIN
LUBE OIL, INST.	16 OZ.	0.5 OZ.	365	E. W. MARTIN
LUBE OIL, LGT.	2 QT.	0.5 OZ.	365	E. W. MARTIN
LUBRICATING OIL	1 OZ.	0.5 OZ.	365	E. W. MARTIN
MARKER, SHARPIE, SEARCHLIGHT, ETC.	24 EA.		365	MARTIN
MINERAL, OIL, WHITE	26 X 1 GAL.	0.5 OZ.	365	E. W. MARTIN
MOBILTAC E	1 LB.	0.5 OZ.	365	E. W. MARTIN
MOBILTAC E		0.5 OZ.	365	E. W. MARTIN
NAPHTHA, ALIPHATIC	1 GAL.	0.5 OZ.	365	E. W. MARTIN
NAPHTHALENE	3 KG.	0.5 OZ.	365	E. W. MARTIN
NAPTHA BENZINE VM&P	1 GAL.	0.5 OZ.	365	E. W. MARTIN
OIL	1 GAL.	0.5 OZ.	365	E. W. MARTIN
OIL	1 PAIL	0.5 OZ.	365	E. W. MARTIN
OIL	1 X 5 GAL	5 OZ.	365	E. W. MARTIN
OIL, 522	1 GAL.	0.5 OZ.	365	E. W. MARTIN
OIL, CORVIS OIL 13	1 GAL	0.5 OZ.	365	E. W. MARTIN
OIL, DELVAC 11	5 GAL.	0.5 OZ.	365	E. W. MARTIN
OIL, DTE BB MOBILE	5 GAL.	0.5 OZ.	365	E. W. MARTIN
OIL, DUO SEAL	1 GAL.	0.5 OZ.	365	E. W. MARTIN
OIL, DUO SEAL PUMP	1 GAL.	0.5 OZ.	365	E. W. MARTIN
OIL, ESSO M350	5 GAL.	0.5 OZ.	365	E. W. MARTIN

CHEMICAL INVENTORY 1992

BUILDING 673				
FAC. ENVIRONMENTAL COORDINATOR Frank Catan				
DATE 2-6-92				
ITEM	MAX. AMT. ON HAND	AVG. DAILY AMT. ON HAND	NO. OF DAYS ON HAND	CUSTODIAN
OIL, LUBE	5 GAL.	0.5 OZ.	365	E. W. MARTIN
OIL, LUBE, 2190	55 GAL.	5 OZ.	365	E. W. MARTIN
OIL, LUBE, 660	2 GAL.	0.5 OZ.	365	E. W. MARTIN
OIL, LUBE, 890, TRIBOL	55 GAL.	5 OZ.	365	E. W. MARTIN
OIL, LUBE, DTE HEAVY-MED	2 X 5 GAL.	0.5 OZ.	365	E. W. MARTIN
OIL, MACHINE NO. 10	1 X 5 GAL.	0.5 OZ.	365	E. W. MARTIN
OIL, MEROPA 460	1 X 5 GAL.	0.5 OZ.	365	E. W. MARTIN
OIL, MOBIL 600	5 GAL	0.5 OZ.	365	E. W. MARTIN
OIL, MOBILE 600W	10 GAL.	0.5 OZ.	365	E. W. MARTIN
OIL, REFRIG.	5 GAL.	0.5 OZ.	365	E. W. MARTIN
OIL, SHELL TALFA 50	5 GAL.	0.5 OZ.	365	E. W. MARTIN
OIL, WHITE 22	1 GAL.	0.5 OZ.	365	E. W. MARTIN
OLEIC ACID	3 PT.	0.5 OZ.	365	E. W. MARTIN
PAINT REMOVER	1 GAL.	0.5 OZ.	365	E. W. MARTIN
PAINT REMOVER	1 GAL	0.5 OZ.	365	E. W. MARTIN
PAINT, INT. VINYL LATEX 38-001 1 3	2 GAL	0.5 OZ.	365	E. W. MARTIN
PAINT, INT. VINYL LATEX 38-001 1 3			365	E. W. MARTIN
PINE OIL	1 GAL.	0.5 OZ.	365	E. W. MARTIN
PLS-2 GASKET SEAL	1/4 PT.	0.5 OZ.	365	E. W. MARTIN
PLS-2 GASKET SEAL	1/4 PT.	0.5 OZ.	365	E. W. MARTIN
PREP SOL SOLVENT	2 GAL.	0.5 OZ.	365	E. W. MARTIN
PRIMER, METAL	1 GAL	0.5 OZ.	365	E. W. MARTIN
PROPYLENE GLYCOL	55 GAL.	5 OZ.	365	E. W. MARTIN
PROTECTIVE CREAM	6 OZ	.5 OZ	365	MARTIN
REDUCER, ENAMEL 38645	1 GAL.	0.5 OZ.	365	E. W. MARTIN
RESIN, EVERCOAT	1 GAL.	0.5 OZ.	365	E. W. MARTIN
RESIN, EVERCOAT	1 GAL.	0.5 OZ.	365	E. W. MARTIN
SILICON CARBIDE GRAIN	5 LB.	0.5 OZ.	365	E. W. MARTIN
SILICONE	1 TUBE	0.5 OZ.	365	E. W. MARTIN
SILICONE COMPOUND	2 TUBES	0.5 OZ.	365	E. W. MARTIN
SKIN LOTION, MEDICATED	16 OZ	1/4 OZ.	365	MARTIN

CHEMICAL INVENTORY 1992

BUILDING 643				
FAC. ENVIRONMENTAL COORDINATOR Frank Gordon				
DATE 2-4-92				
ITEM	MAX. AMT. ON HAND	AVG. DAILY AMT. ON HAND	NO. OF DAYS ON HAND	CUSTODIAN
SOLDER, PASTE ---SEE FLUX				
SOLDER, SILVER	4 OZ.	TINY	365	MARTIN
SOLVENT, RADIO TV	5 PT.	0.5 OZ.	365	E. W. MARTIN
SOLVENT, SAFE-TEE	5 GAL.	0.5 OZ.	365	E. W. MARTIN
SOLVENT-PREP SOL	4 GAL.	0.5 OZ.	365	E. W. MARTIN
SPECIAL T, ---SEE ADHESIVES				
SUPER BONDER---SEE ADHESIVES				
SUPER ELECTRO SPRAY	4 OZ.	ITTY BITTY	365	MARTIN
SUPER T----SEE ADHESIVES				
TAP FREE	6 PT.	0.5 OZ.	365	E. W. MARTIN
TAPFREE	2 PT.	0.5 OZ.	365	E. W. MARTIN
TCE & NAPTHALENE	1 GAL	0.5 OZ.	365	E. W. MARTIN
THINNER, DOPE & LAQUER	2 X 5 GAL.	0.5 OZ.	365	E. W. MARTIN
TITANIUM DIOXIDE	35 LB.	1 LB.	365	E. W. MARTIN
TRIBOL COMPRESSOR OIL	16 OZ.	0.5 OZ.	365	E. W. MARTIN
TRICHOLOROETHANE	40 X 1 GAL.	0.5 OZ.	365	E. W. MARTIN
TRICHOLORTRIFLUOROETHANE	55 GAL.	5 OZ.	365	E. W. MARTIN
TUR-CARVE	1.75 LB	0.5 OZ.	365	E. W. MARTIN
VARATHANE	1 GAL	0.5 OZ.	365	E. W. MARTIN
WHITE GLUE	5 GAL	0.5 OZ.	365	E. W. MARTIN
WHITE LIGHTNING	.8 QT.	0.5 OZ.	365	E. W. MARTIN
WHITE LIGHTNING	5 X .8 QT.	0.5 OZ.	365	E. W. MARTIN

Numerous tasks involving asbestos removal and encapsulation have been done for Building 643. The major ones include the removal of the roof panels, which were replaced with aluminum panels in 1981 and 1985 (Breen, 1996), and the removal of floor tiles in the office area and other rooms. Recent tasks involving asbestos removal and encapsulation are summarized in Table 3. A small part of an asbestos cement roof panel in Room 101 fell after the snow storms in January 1996; the area is now temporarily patched with wood boards to prevent leaks (Grafton, 1996).

Table 3. Asbestos removal and encapsulation in Building 643 (TAI, 1995)

Date	Task
March 1990	Four 9'' by 9" asbestos-containing tiles were removed from the floor in Room 121A
October 1990	600 square feet of asbestos-containing tiles were removed from Rooms 106 and 107
November 1990	Nine feet of asbestos was removed from the condensate line on the unit heater in Room 101
May 1991	720 square feet of mastic were removed from the floor of Room 106 and 107
May 1991	Loose asbestos debris was vacuumed from inside a well on the mezzanine above Room 123
September 1991	Nine feet of asbestos were removed from the steam trap lines in Room 100
February 1992	Steam lines in Room 101 were sealed with an 8 ounce canvas and 30-36 foster coating
May 1992	An asbestos-covered line above the ceiling in Room 123C was sealed with an 8 ounce canvas
July 1992	30 square feet of asbestos-containing floor tile were removed from Room 124E
April 1993	Two square feet of asbestos floor tile were removed from under the commode in the men's room located in Room 106
October 1993	48 square feet of 9" by 9" asbestos floor tile were removed from Room 300
October 1994	96 square feet of transite wallboard was removed from Room 114A

3.3 PCB/PCT Remediation

3.3.1 Service Air System (Foster Wheeler, 1996)

PCT-containing lubricants were used in Building 643's low-pressure air compressors, which is now considered a backup system. The system served nine other buildings in the area through an air distribution piping system.

Trace amount of PCBs and significant amount of PCTs were found in the service air system, including the surfaces of the compressor room, interior of the piping system, condensate traps, air dryers, volume bottles, filters, vent valves, and air tool drops, which are used to power low-pressure air for hand tools. The PCB/PCT sampling results for Building 643 are presented in Table 4. Although PCT is not a hazardous substance listed under CERCLA, the contamination study applied the regulatory contaminant levels for PCBs to PCTs because of their structural and physical similarities.

These contaminants tend to spread throughout the air systems and remain in them for extended periods of time. Personnel may be exposed to PCTs through the use of air tool drops and the maintenance activities for the air system.

NASA LaRC has completed PCB/PCT remediation of the equipment surfaces, floors, and walls inside the compressor room, as well as the air tool drop area in Room 123 (Benson, 1996). NASA LaRC is waiting for funding to begin remediation of the interior of the air piping system (Sullivan, 1996).

3.3.2 Room 114

PCB capacitors have been removed from Room 114 (Grafton, 1996). The area has been enclosed by a fence.

3.3.3 Storm Sewers/Room 125

In May 1994 Langley Air Force Base/NASA LaRC was placed on the National Priority List (NPL), which designates sites that require long-term remedial cleanup under the Superfund program. The designation was due in part to PCB/PCT contamination of the storm sewer system. NASA is under the Federal Facilities Compliance Agreement (FFCA) to clean up the contaminated areas (Sullivan, 1996).

PCB/PCT presence in the storm sewer system is due to past events and practices, not to current practices at LaRC (Ebasco, 1993). The floor drains in Building 643 have been plugged and diked to prevent PCB/PCT from entering the storm sewer (Sullivan, 1996).

Flooding in Room 125 of the building has been observed during wet weather. The room contains air reduction and air pressure systems and is also used for storage; some equipment has been ruined as a result of the flooding (Brooks, 1996). During site inspection of the room, stains on the walls and the posts were observed, indicating flooding levels of about 5 to 10 inches. The floor of the room is also covered with soil residues. The flood water and the soil in the room and their possible contaminants may be due to high tides and storms (Benson, 1996).

Table 4. Building 643 Sample Results for PCB/PCT (Foster Wheeler, 1996)

Location	PCB/PCT	Results ($\mu g/100cm^2$)*
Pipe interior, Compressor room, W wall	PCT	664
Pipe interior, Compressor room, NW	PCT	72.1
Pipe interior, Compressor room, 2nd air dryer	PCT	225
Pipe interior, Compressor room, 2nd air dryer	PCT	246
Pipe interior, Compressor room, 1st air dryer	PCT	290
Pipe interior, Compressor room, N	PCT	2,960
Pipe interior, Compressor room, at Compressor #2	PCT	10.5
Pipe interior, Compressor room, NW	PCT	135
Pipe interior, Room 101 air tool drop	PCT	147
Pipe interior, Compressor room, N	PCT	170
Pipe interior, Room 124, S. wall, air tool drop	PCT	5.23
Pipe interior, Room 124, SE wall, air tool drop	PCT	17.4
Pipe interior, Room 124, NE, air tool drop	PCT	370
Pipe interior, Room 123C, E, air tool drop	PCB	1.4
Pipe interior, NE corner (outside bldg.)	PCT	2,280
Pipe interior, between Bldgs. 643 & 645	PCT	3,950
Compressor room, under 1st receiver	PCT	3,290
Compressor room, W wall, floor	PCT	40
Compressor room, W wall, floor	PCB	22
Compressor room, oil injector case	PCB	2.52
Compressor room, floor under 2nd air dryer	PCT	56.9
Room 123C, SW, air tool drop disch. samp. pt.	PCT	12.6

Shaded areas indicate locations NASA has remediated

* EPA Spill Policy limits for PCBs are
unrestricted access : <10 $\mu g/100\ cm^2$
restricted access: >=10 and <100 $\mu g/100\ cm^2$
remediation: >=100 $\mu g/100\ cm^2$

3.4 UST Removal

The UST was located on the east side of Building 643, approximately 200 feet from the northeast corner of the building; the tank was used to store gasoline (Ebasco, 1992). The UST with a capacity of about 500 gallons was removed in early 1995 by CoF Project 93CVCZ: Replacement and Closure of Underground Storage Tanks, Various Facilities; the area has been backfilled (Sullivan, 1996).