# Project Requirements Document

# for

# Demolition Altitude Chambers

# Propulsion Systems Laboratory (PSL)

# Cells 1 & 2

# Buildings 65, 66, and Others

# FY06

# Glenn Research Center

**Project No. 630**

**Facilities Division**

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**(Revision 5)**

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# Introduction

## ***Scope & Description***

This Project at the Glenn Research Center is proposed for demolishing the Propulsion Systems Laboratory (PSL) Altitude Chambers (Test Cell Nos. 1 & 2), Building No. 65, No. 66, and minor ancillary buildings. Included in the work scope will be the demolition of the buildings, the test chambers, cooler structures, all related piping and components, pipe supports, miscellaneous above-grade utilities, and foundations down to a minimum of five feet below grade. The primary Altitude Exhaust piping is presently terminated at the existing Altitude Exhaust header northwest of Building No. 64; the bulkhead will be evaluated to determine if further isolation at the secondary cooler is required. All other utilities will be terminated at the most practical point beyond the general demolition site boundary.

Specific structures to demolish include:

No. 65 PSL Altitude Chambers Cells No. 1 and No. 2
No. 66 PSL Access Building
No. 67 PSL Primary Coolers (2 units)
No. 73 Service Support Building
No. 96 PSL Fuel Storage Building
No. 97 PSL Oxidant Storage Building

Note: No. 68 PSL Secondary Cooler (1 unit) will most likely be left in place as a support structure for a combustion air line to PSL 3 & 4 and a shop air line that need to remain in service; the structure will be prepped and painted.

## ***Customer Project Goals***

### Quality Goals:

The structures shall be removed safely according to Project Specifications, OSHA requirements, and Glenn Safety Office and Environmental Management Office requirements.

The project work site shall be reviewed to develop a comprehensive sampling and abatement plan to deal with known and suspected hazardous substances.

The project shall be designed and executed to minimize environmental damage consistent with the project scope and budget.

All hazardous material abatement shall be carried out in compliance with all Federal, State and Local environmental regulations and the GRC Environmental Programs Manual.

The Glenn Facility Preservation Officer will consult with the Ohio Historical Reservation Office to determine a plan of action to mitigate the loss of the historic PSL facility.

The project shall fund appropriate historical preservation activities.

The project shall be designed and field construction implemented in such a way as to eliminate hazards to people occupying adjacent facilities, demolition workers and casual pedestrians around the immediate work site.

The project shall also be designed and field construction implemented to minimize the potential for damaging adjacent facilities.

## Implementation Goals:

It is expected that there will be minimal impacts to adjacent facilities and occupants due to the demolition activities scheduled for the project site. The PSL site is very congested; however, the overall objective of the project amounts to a general site clearing. Therefore, congestion on site becomes the Demolition Contractor's issue to manage through work control.

Active facilities adjacent to the project site include Buildings No. 64 and its adjacent utilities. Steam trenches to the west and south of the site have load limits and shall be protected during construction.

Parking will be temporarily disrupted during on-site demolition. Some parking spaces will temporarily be lost on both the north and south sides of the site as well as in front of Building No. 66 along Walcott Road.

Pedestrian traffic around the demolition site will be temporarily disrupted during demolition. The sidewalk in front of Building No. 66 along Walcott Road and the northbound lane of Walcott Road will have to be blocked during demolition of Building No. 66.

There are numerous utilities impacted by this project and they will be terminated in ways to minimize service interruptions to adjacent system users. Some utilities may have to be rerouted.

Demolition truck traffic will impact general Glenn traffic patterns. All metal scrap and concrete rubble will have to be weighed on the heavy duty scales northeast of Building No. 21.

Fencing will be erected to define a safe zone around the project site to control pedestrian and vehicle safety as well as control site staging areas for equipment mobilization, scrap load-out, temporary material staging, and Contractors' temporary facilities.

Occupants of existing buildings scheduled for demolition will be relocated.

## Schedule Goals:

This Project as currently configured is scheduled for field demolition and construction to start during calendar year 2006 and to be done within one year. The one year duration would include all Base Bid and any or all Option work.

Schedule growth shall be limited to 5%.

The Project shall be designed to require the minimum possible abatement work on site. All abatement shall be completed to the maximum extent possible before actual demolition begins at any work site. Assuming that work is executed safely, there is relatively moderate risk to Project schedule once demolition begins. Accurately defining abatement requirements prior to the start of field work with respect to type and quantity/limits will substantially improve the possibility of meeting proposed abatement effort schedules.

## Cost Goals:

The primary objective on this Project with respect to cost shall be to limit cost growth to 5%.

Hazardous material abatement poses the greatest cost risk at this time; however, some adjustment can be made in demolition procedures on this project to decrease abatement costs.

Once abatement costs have been established, overall project cost risk will be both reduced significantly and stabilized; objectives of the final structure demolition can be well defined prior to construction Contract award.

## Justification

NASA Headquarters has concurred with and advocated the proposed demolition of PSL No. 1 and No. 2 Test Cell sites. The facility, as currently configured, has been out of service for more than 15 years. Research once done in this facility is now handled in PSL No. 3 and No. 4 Test Cells in Building No. 125. There is no projected research need in the future for PSL No. 1 and No. 2. The project is consistent with the GRC Master Plan for the site.

The PSL Access Building No. 66 has been partially occupied since termination of research testing, but the building has been judged to be beyond its useful life. The building mechanical and electrical systems are in poor repair, there are major Life Safety and ADA issues, and the roof and some foundations are in poor condition. The ancillary buildings are also generally in poor condition and are no longer efficient structures for Glenn mission requirements. Demolition of these structures will reduce GRC maintenance costs and free up real estate for future structures and/or parking lots.

## Technical Requirements

### General Requirements:

The following major disciplines will require some mix of analysis, design, development of specifications and requirements, and cost estimating.

### Civil:

Project Civil work shall include:

- Removal of concrete foundations and below-grade trenches, pits, and vaults
- Filling of excavations resulting from foundation and below-grade demolition
- Site concrete work and asphalt paving repair
- Modifications of site drainage structures and sewers as required
- Design of temporary site access control
- Development of a Site Staging Plan.
- Design boundary interface guardrails and fencing as required at Building No. 64
- Site restoration including a gravel surface and a new concrete sidewalk through the demolition area.

### Structural:

Project Structural work shall include:

- Analysis and design of supports for all utility relocation and terminations
- Analysis and design of temporary structural shoring of the termination point at the inlet to the secondary cooler, if required
- General facility demolition work

### Mechanical:

Project Mechanical work shall include:

- Termination, removal, re-support, and rerouting as required of all piping utilities impacted by the removal of other structures within this project scope
- Removal of all mechanical equipment scheduled for demolition. It is not known at this time if any equipment will be useful for salvage
- The Government will independently review and analyze as required piping systems modified as a result of proposed demolition of facilities under this project. The Government will be responsible for piping system configuration control.

## Electrical:

Project Electrical work shall include the following:

- Termination and removal of all power from all equipment scheduled for removal under this project
- Removal of all conduit, conduit components, and miscellaneous electrical equipment from all facilities scheduled for demolition. Cabling shall be removed from conduit prior to conduit removal.
- Conduits shall be sealed at termination points
- Rerouting of electrical service as required

Note: Transformers serving Bld 65 and Bld 66 loads are:

- C1G1A2 (500KVA, 2400/480volt) – also feeds Bld 73 and line side of disconnect for C1G1A2 tied to Bld 95.
- B2F1B2B3(DRY) (150KVA, 2400-208/120volt) – also tied to Bld 64
- C1G1A3 (150KVA, 2400-208/120volt)

## Safety:

All project work will be controlled by Project Specifications, a Contractor (and sub-Contractor) generated Site Specific Health and Safety Plan (HASP), a Demolition Plan consistent with and expanding on SSHASP requirements, routine project meetings, and daily on-site Government inspection.

Site Contractor demolition personnel, on-site Government inspection personnel, and site perimeter pedestrian safety will be key safety issues. Contractor use of demolition procedures inconsistent with the SSHASP and Demolition Plan will not be tolerated and will be addressed through daily project inspection and reporting.

On-site trucking congestion, staging, and routing will be addressed in the contractor's Demolition Plan. Termination or interruption of active utilities will be handled through the implementation of all required NASA and GRC safety procedures.

## Environmental:

Because of its age and past operations, the entire PSL Cell No. 1 and No. 2 complex has known or potential hazardous material contamination. All specific work sites will be investigated and sampled as required. An abatement plan will be integrated into the project design and the Contractor's SSHASP and Demolition Plan.

Sampling will be done to determine potential sources and quantities of asbestos, lead-based paint, lead, mercury, PCB's, miscellaneous hazardous organic and inorganic substances, and biological materials. Removal of asbestos or asbestos containing materials (ACM) will take into consideration

their friability grouping to reduce abatement costs. Lead-based paint removal from structural steel will normally only be required at hot-work cut lines.

Soils will be sampled for mercury, lead, PCB's, and other contaminants. It is anticipated that there will not be a significant amount of excavation required for below-grade structure removal. The project budget currently does not include total foundation removal. The handling of excavated soils will be performed as per the GRC. Environmental Programs Manual, Chapter 34 and all other mandated local, state, and Federal requirements.

All contaminated excavated soil shall be removed from the Glenn Research Center. All non-contaminated excavated soil may be used as backfill if it can be properly compacted and meets material characteristics contained in the Project Specifications; otherwise, it shall be removed from the Glenn Research Center. All off-site backfill material brought on the project site shall be tested to determine if it is "clean". Material determined to be not clean shall be rejected.

### ***Area/Space Requirements***

All personnel within the PSL Cell No. 1 and No. 2 complex impacted by this project will be relocated. All on-going functions currently located within the project site will also be relocated.

Once this project is completed, the cleared site will be available for parking or other near-term uses (which have not yet been identified). Longer range plans from the GRC Master Plan included new office building space and/or research facilities on this site. Again, no definitive designs exist for the long-range use of the site.

### ***Special Considerations***

The final design for this project will include a review of the following sub-elements that are unique to this project and will have cost impacts:

1. Recycling of materials: All materials identified for recycling will be weighed before leaving GRC.

   Scrap metal: The Project Team will attempt to estimate a scrap value for the substantial tonnage of material that will be removed which is expected to lower Contractors' Base Bid prices.

   Concrete: Clean concrete rubble shall be removed from the demolition site and GRC. There does not appear to be a need for large volume site backfill that would justify using some or all of the demolished concrete for on-site fill or, possibly, at some other GRC site.

2. Equipment Salvage: The Project Team will review the existing equipment for determining what items could be salvaged.

3. Historical Preservation: The PSL Cell No. 1 and No. 2 complex has historical significance because of the research work done to support a wide range of aeronautics and space related initiatives. NASA is responsible under the National Historic Preservation Act to mitigate the loss of this facility. The GRC Preservation Officer will consult with the State Historical Preservation Office to determine the appropriate level of historic preservation work to document the present condition of the PSL Cell No. 1 & No. 2 facility and its historical legacy of aeronautics and space related research. It is anticipated that funding for this activity will come from the project budget.

## Cost

The project requirements noted above describe, as a general overview, the work required to clear the PSL Cell No. 1 and No. 2 site and create a design package for bidding the work. An independent cost estimate done in July, 2003 showed that the Headquarters approved budget for this project is not adequate. Additional "full cost" line items that need to be accounted for obviously push the cost even higher. The independent estimate did not account for scrap value or salvage value and costs.

There will be substantial fixed and variable hazardous material abatement costs for demolition plus significant effort to develop a Site Characterization Study. Demolition procedures can be varied widely to clear this site; however, it is assumed that prospective bidders would use the most efficient methods currently available. In this case, Contractors would want to use heavy track mounted shears and hoes to minimize the need for lead-based paint abatement and maximize removal efficiency.

The current cost estimate (CCE) is $3.17M.

## Layouts

***Site/Location Plan(s)***

***Photos***