NASA LAUNCH COMPLEX 39B | JOHN F. KENNEDY SPACE CENTER, FL

A 'pick' demolition approach with long reach equipment ensured that debris did not drop from high above

- Space Shuttle Launch Pad
- June 2010 - September 2011
- $1,546,345
- NASA

- Hazardous Material Abatement
- Structural Demolition

- Zero OSHA Recordables

LVI safely completed structural demolition and hazardous material abatement at John F. Kennedy Space Center's Launch Complex 39B. The structure was first used in 1969 to launch the Saturn 5 rocket on the Apollo 10 mission as a dress rehearsal for the historic Apollo 11 lunar landing.

Over nearly four decades, launch complex 39B ferried crews to the Skylab space station, as well as the famed joint U.S./Soviet Apollo/Soyuz Saturn spacecraft in 1975. After undergoing extensive reconstruction, the launch pad facility prepared 53 space shuttle missions between 1986 and 2006, beginning with the final launch of the ill-fated space shuttle, Challenger.

NASA officially deactivated launch complex 39B on January 1, 2007, making the December 9, 2006 nighttime launch of STS-116 its last shuttle mission. It was subsequently used in April and May of 2009, when space shuttle Endeavour sat on the pad poised for a potential rescue mission that was not needed.

RE-STRUCTURING FOR COMMERCIAL USE

LVI's demolition efforts supported NASA's plans to restructure the system into a more versatile 'clean pad' design, to allow commercial vehicles to use their own launcher. LVI carefully designed a technical approach to dismantle the Fixed Service


Fixed Service Structure (left) & Rotating Service Structure (right) before demo


Nearing demolition completion

Structure (FSS) and the Rotating Service Structure (RSS) since the facility's concrete pad surface, lightning tower protection system, and water tower were to remain for future use. Both the FSS and the RSS sat on top of a concrete bunker (the 'pad') which was to be protected for reuse.

The FSS was a 40-foot-by-40-foot square, steel, 12-floor, 247-foot-tall structure that provided access to the orbiter and the RSS. Assembled from parts of the Apollo-era mobile launch towers, as the name implies, the FSS was fixed permanently to the launch pad.

Supported by the FSS, the RSS provided access to and protected the orbiter during change out and servicing of payloads at the launch pad. Capable of rotating 120°, the 102-foot-long, 50-foot-wide, and 130-foot-high RSS extended from 59 to 189 feet above the pad floor.

OVERCOMING EXTREME GROUND PRESSURE RESTRICTIONS

Because of its layout, age and planned reuse, the pad surface presented several logistical challenges. The majority of the work needed to be conducted from the crawlerway, a 27-foot-wide concrete strip adjacent to the structure. The crawlerway had a ground bearing pressure limit of 62.5 PSI, only twice that of an average passenger car. The remainder of the pad surface was limited to 3.5 PSI, less than half the pressure the average adult human exerts on the ground while standing.

In addition to defining allowable equipment weight, these parameters also dictated that no piece of the structure could be allowed to drop during demolition activities. The position of the platform mounting pedestals, which needed to be protected for later use, further added to the challenge, as they were located between the crawlerway and the FSS. In addition, work activities abutted up to a large 53-foot deep flame trench that ran down the middle of the pad.

Prior to developing a comprehensive work plan, LVI engineers performed a detailed structural analysis of the interim states of the RSS to gain an understanding of how the structure would react as pieces were removed. LVI chose the high reach excavators and a series of carefully engineered crane picks that would suit the tight working constraints while also completing the job within the allotted timeframe. Positioned 242 feet above the pad surface, the heavily-reinforced top floor of the FSS was the heaviest of the floor structures to be lowered. Due to the ground pressure restrictions and limited work theater, a 440-ton crane was chosen to conduct this work.

HAZARDOUS MATERIAL MANAGEMENT

Work was scheduled around several shuttle launches, dress rehearsals, and various other shuttle activities. Most of the abatement efforts were conducted prior to LVI's arrival; however, some hazardous materials still remained. LVI used glovebag procedures for the friable asbestos-containing material and wet procedures for the non-friable material. LVI decommissioned and destroyed the site's hypergolic tanks that previously handled hydrazine and nitrogen tetroxide, the toxic propellants used by the shuttle's maneuvering thrusters.

MAXIMUM RECYCLING

LVI removed 4,905 tons of metals, 580 tons of concrete, and 50 tons of construction debris. All metals, including copper and aluminum, stainless steel, and concrete were recycled.

Project Managed By LVI Environmental Services Inc., a Tampa, Florida-based subsidiary of LVI Services Inc. | **Client Contact** Scott Stillwell JFK Space Center, NASA, 321-867-5113, Scott.p.stillwell@nasa.gov