



2003 AFCEE Technology Transfer Workshop

San Antonio, Texas

Promoting Readiness through Environmental Stewardship

Excavation and Dewatering for Source Removal

Former Stapleton International Airport

**Douglas Downey
Parsons
25 February 2003**



Overview

- **Project Description**
- **Clean Up Criteria**
- **Challenges and Innovations**
- **Typical Site Progress Photos**
- **Accomplishments To Date**
- **When Does Excavation Make Sense**
- **Economics**



Project Team

- **City and County of Denver, Aviation Division**
- **Colorado Department of Labor and Employment, Office of Public Safety**
- **Colorado Department of Public Health and Environment**
- **Forest City Developers**
- **Parsons**





Project Description

Start date: 14 April 2000

Finish date: 1 April 2004

Scope of work:

- **Clean up over 500 acres of industrial/airfield property for immediate residential/commercial development**
- **Obtain No Further Action (NFA) letters from state regulators for 8 major sites**
- **We are currently one year ahead of schedule**



Contract Conditions

- **Key Contractual Terms and Conditions**
 - **Contract value: \$MM**
 - **Lump Sum - Turnkey**
 - **Project team: Parsons Prime using local excavators/ truckers**

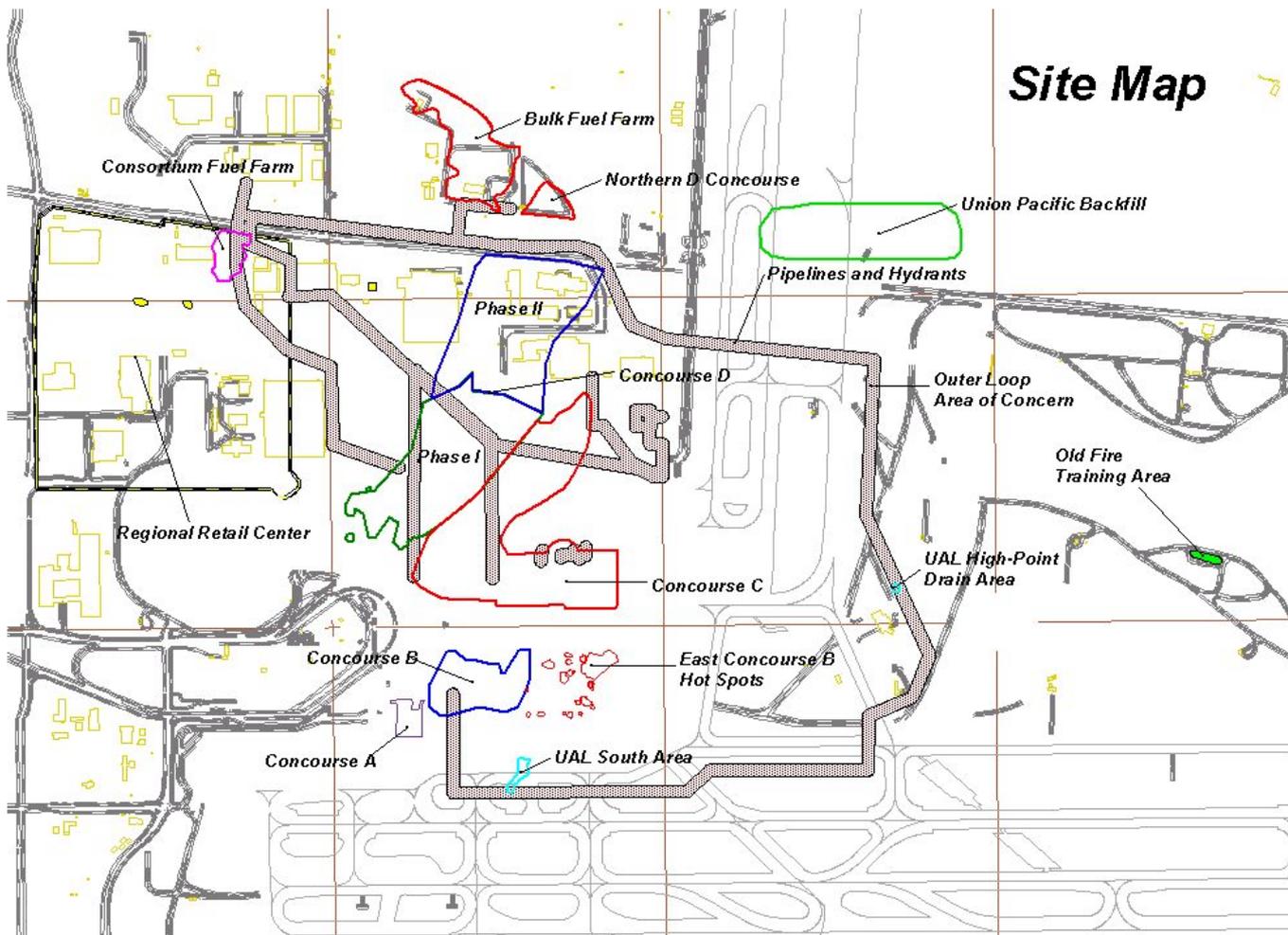


Major Sites at Stapleton

- **Consortium Fuel Farm (27 UST Tank Farm)**
- **Concourse B**
- **Concourse D**
- **Buildings and 30 USTs**
- **Pipelines and Hydrants (50,000 LF)**
- **Old Fire Training Area**
- **Concourse C**
- **Bulk Fuel Farm (18 ASTs)**



Site Map





Scope of Work (continued)

- **Scope of work:**
 - **Complete site characterization/remedy design**
 - **Relocate active utilities**
 - **Excavate and dispose of approximately one million cubic yards of contaminated soil (cover material for a local landfill).**
 - **Sample to confirm standards have been met.**
 - **POC Well Monitoring**
 - **Negotiate NFA determinations for each site.**



Contaminants of Concern

- **Jet A fuel**
- **Other petroleum products: gasoline, diesel fuel, heating oil, waste oil**
- **Deicing compounds (glycols)**
- **Mineral spirits, chlorinated solvents**
- **Asbestos**



Stapleton Numeric Criteria

- **Cleanup standards negotiated between the City, CDPHE, and OPS specifically for use at SIA**
- **Objective: Remediate contaminated soil and groundwater within the site boundaries to enable the unrestricted redevelopment and reuse of the property as expeditiously as possible.**



Stapleton Numeric Criteria

- **Standards**
 - **TPH <250 mg/kg in soils to 20 feet bpgs**
 - **No free product remaining on property, based on grain size specific free product saturation criteria**
 - **All soils, regardless of depth, meet compound-specific criteria (benzene 0.26 mg/kg)**
 - **Groundwater must meet MCLs for water at POC wells**



Challenges

- **High public awareness of new home buyers**
- **High degree of collaboration between owner, regulators, developer, and Parsons**
- **Accelerated schedules to support development plans**
- **Year round remedial operations**
- **Primary contaminant zone in the water table at 25 feet bgs**



Innovations

- **Over 2000 Geoprobe™ borings**
- **Field TPH Screening using Infra-Red Spectrophotometry (Method 418.1)**
- **Negotiated Grain-Size Specific Free Product Saturation Criteria based on TPH**
- **Combination of Well Point and Trench/Sump Dewatering**
- **Advanced Data Base and GIS Interface**
- **Enhanced Reductive Dechlorination**
- **Engineered Wetlands**



Geoprobe at Stapleton



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Stripping Clean Overburden



11 28 2000 16:53



Well Point Dewatering



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Loading Contaminated Soil



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Removal of Smear Zone Soils



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Beginning Compacted Backfill



01 11 2001 11:23



No Further Action

MAR-15-2001 16:18 FROM OIL INSPECTION TO 93038318208 P.02/03

BILL OWENS
Governor
VICKIE L. ARMSTRONG
Executive Director
JEFFREY M. WELLS
Deputy Executive Director
RICHARD O. PIPER
State Inspector of Oils



DEPARTMENT OF LABOR AND EMPLOYMENT
Oil Inspection Section
Tower 3, suite #10
1615 Arapahoe Street
Denver, Colorado 80202-2117
(303) 620-4300; Fax (303) 620-4028

March 15, 2001

Mayor Wellington E. Webb
Denver City and County Building
1437 Bannock Street, Suite 360
Denver CO 80202

Daniel Tisoncik
United Airlines
PO Box 80180
Chicago IL 60686

Re: No Further Action, Regional Retail Center, Stapleton International Airport, City and County of Denver, Colorado.

Dear Messrs Webb and Tisoncik:

The Oil Inspection Section (OIS) has reviewed the Corrective Action Plan Implementation Report (CIR) for the above referenced site dated March 8, 2001. Specifically, four Areas of Concern (AOCs): AOC #1 - Consortium Fuel Farm; AOC #2 - Building 2; AOC #3 - Pipelines and Hydrants, and AOC #5 - Building 17.

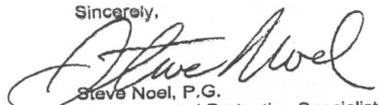
Based solely upon the information submitted, it appears you have removed the source of contamination and reduced the potential for endangerment to human health, safety, and the environment as a result of the contamination at this property. In light of the remedial action taken at this site, the OIS does not require any further investigation or remedial action at this time. If conditions change, the OIS reserves the right to determine if any additional actions are necessary. The OIS places no restrictions on residential development of the site, except for the use of groundwater. This No Further Action letter is in reference to the remediation of contamination as documented in the CIR. All other historical OIS events associated with the Regional Retail Center are hereby closed.

The OIS concurs with the position stated in the CIR that there are no outstanding issues related to AOC #4 - a 10,000-gallon gasoline UST formerly located southwest of Building 32. Accordingly, the status of that site remains as closed, per the No Further Action determination and associated letter dated December 28, 1995.

The OIS cannot release you from any liability that may be associated with any contamination at or from this site.

If you have any questions or we may be of further service to you, please contact Steve Noel at (303) 620-4014.

Sincerely,


Steve Noel, P.G.
Environmental Protection Specialist
Remediation Unit


Marilyn Hajicek, P.G.
Remediation Program Manager
Remediation Unit



Pipelines and USTs





Concourse C Excavation



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Accomplishments to Date

- **Consortium Fuel Farm (27 USTs)**
**Start of Excavation to Receipt of NFA
Determination in Less than 4 Months**

- **Concourse B**
Completed 300,000 CY Excavation April '01
Conducted Groundwater Monitoring for 9 Months
NFA Granted March '02



Accomplishments to Date

- **Pipelines and Hydrants**
 - **Removed and Characterized 50,000 LF of Fuel Pipeline April '00 to April '02**
 - **Identified and Remediated Over 150 Leak Sites**
 - **NFAs Have Been Granted for over 40,000 LF of Pipeline and Associated Hot Spots**
- **Concourse D, Phase I**
 - **Completed 800,000 CY Excavation September '01**
 - **Conducted Groundwater Monitoring 9 Months**
 - **NFA Granted June '02**



New Residences at Stapleton



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Regional Retail Center



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When Does Excavation Make Sense?

- **Non-Hazardous levels of contaminants**
- **Local landfills that need cover material**
- **Small sites with easy access (<500 cy)**
- **Closure bases with valuable property**
- **Sites planned for unrestricted residential use**
- **Known DNAPL or LNAPL hot spots**
- **Sites where in situ remediation is producing non-uniform removal and you have a deadline for cleanup**



Economics

- **Economy of Scale**
- **Local “Dirt Movers” Supply and Demand**
- **Excavation Costs \$2 - \$6 /cy**
- **Transportation Costs \$0.10 - 0.15/cy-mile**
- **Disposal Costs Free to \$30/cy for non-hazardous**
- **Sampling and Oversight \$0.75 - \$2/cy**
- **Backfill \$2 - \$4 /cy (Depends on Compaction)**
- **Profit**



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THANK YOU

**Douglas Downey
Parsons
25 February 2003**



Air Force Real Property Agency