CITY OF HOUSTON

PUBLIC WORKS AND ENGINEERING
PLANNING & DEVELOPMENT DIVISION

EXECUTIVE SUMMARY

Project Overview

InControl Technologies, Inc was retained by Lone Star Terminal LLC (the property owner), to provide environmental consulting services at the Former Lone Star Refinery property located at 8901 Manchester Street in Houston, Harris County, Texas (**Figure A1**). The subject property (Site) consists of approximately 21-acres of land located southeast of downtown Houston, Harris County, Texas along the Houston Ship Channel (**Figure B1**). The subject property is currently undeveloped. Historic operations at the former Lone Star Refinery facility have impacted shallow groundwater at the subject property.

The subject property is located on the western boundary of the San Jacinto River Watershed (**Figure B2**). According to the Flood Insurance Rate Map the site is located outside the 0.2% annual chance floodplain (**Figure B3**). Approximately 90% of the subject property is undeveloped. The remaining 10% is covered with buildings and driveways. Portions of the property are currently leased to various companies for pipe storage.

The site currently has four areas of concern with PCLE zones (**Figure B4**). PCLE Zone 1 (TPH and benzene exceedences) is centered on MW-7 along the western property boundary. PCLE Zone 2 is centered on MW-6 (arsenic exceedences). PCLE Zone 3 extends along the eastern property boundary between monitoring wells MW-4 and MW-3. This zone is an area of arsenic exceedences. PCLE Zone 4 (arsenic, benzene and TPH) is centered on MW-23 located at the far southwest corner of the property (**Figure B4**). The arsenic exceedences are believed to be naturally occurring since arsenic is not a common metal associated with either refining operations or the current and historic land uses.

Historical Environmental Condition

The subject property has had two primary historical uses. First, oil refinery operations were conducted on the property between 1918 and 1968, at which time the last refinery owner, Signal Oil Company (NAICS code 324110), shut down and dismantled the refinery. Second, Lone Star purchased the property from Allied Signal in 1968. Several additional industrial facilities occupied the site including a trucking company and the site was utilized as storage areas for the adjacent concrete plant (NAICS code 327310) from the late 1960s through the 1990s. Lone Star subsequently sold approximately 9 acres of the former Allied Signal property to Port Properties, retaining approximately 27 acres of the former Allied Signal property. Currently, two sections of the property are used as pipe lay-down yards, and the rest of the property is vacant. There are two buildings on the property: a 14,000 sq. ft. office/warehouse building

and a 5,000 sq. ft. metal building. It is anticipated that the future use of the property will remain industrial, taking advantage of the water access along the Houston Ship Channel.

Lone Star Industries, Inc. conducted a preliminary environmental assessment of the property in 1989 to develop an understanding of the environmental conditions associated with the property. The work involved the completion of eleven test trenches and two monitoring wells on the portion of the property presently owned by Lone Star. This limited assessment work identified the presence of refinery wastes in the subsoils at several locations on the property.

Lone Star conducted a second site assessment in November 1992 to further evaluate environmental conditions at the property. Twenty-three soil samples were collected from surface soils, soil borings, and excavated trenches located across the property (**Table F-1 through F-3, Figure B5-1** and **Figure B5-2**). These samples were analyzed for polynuclear aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH), chlorides, sulfates, sulfur, chromium, nickel, lead, and vanadium. Selected samples were also analyzed for polychlorinated biphenyls (PCBs); twenty shallow subsurface samples were analyzed for asbestos. This evaluation determined that weathered refinery hydrocarbon compounds and several metals, primarily chromium and lead, were present in the subsoils of the property (**Table F-1,**). Groundwater samples from monitoring wells located on the property contained trace metals and TPH (**Tables F-4 through F-6, Figures B8-1** through **B8-3**). These wells were sampled using a bailer and the results may have been influenced by sample turbidity.

Lone Star conducted a third site assessment in March 1998 to further define environmental conditions in order to evaluate property development options at the property. The objective of the 1998 site assessment activities was to verify the nature and general extent of the waste residues and impacted soils within defined areas of the property. To accomplish this task, 104 evaluation trenches were excavated between July 20 and August 24, 1998. The excavation method was selected due to the substantial quantities of concrete and debris present in the subsoils. The evaluation trenches were generally excavated to depths ranging from 3 to 8 feet below ground surface. The excavated soils were visually inspected for signs of contamination, soil type, and evidence of groundwater saturation. Based upon the visual inspection, waste residue and/or soil samples may have been collected for headspace screening and selected samples were collected for analysis of chromium, lead, nickel, and Skinner List volatiles and semivolatiles. These parameters were selected based upon the analytical results from the 1993 preliminary investigation report.

The objective of the March 2001 assessment work was to evaluate the distribution of refinery residues in three specific areas of the property. Two of these areas were the western and southwestern areas of the property that had previously been obstructed by heavy brush and large trees. These areas were the former location of the original refining operations. The third area was along the eastern boundary of the Lone Star property created by the sale of the original Lone Star property to the east of the former Allied Signal property. The 2001 assessment involved the excavation of 25 trenches to an average depth of approximately 6 feet below grade. The primary function of the trenches was to provide a visual indication of refinery residues and impacted soils and to identify the nature of the fill materials and debris overlying and underlying the residues in these specific areas. Eight refinery residue and soil samples and one

liquid sample were collected for chemical analysis of Skinner List volatiles, semivolatiles, and metals. Each of these samples was evaluated for PAH constituents using ion capture techniques to provide a lower detection limit and allow better resolution of the constituents present.

The objective of the 2007 site assessment was to define the nature and extent of the affected soils that require remedial response in order to achieve TRRP Tier 2 remedy B criteria for industrial properties. The 2007 site assessment consisted of extensive soil excavation (37 trenches, 8'-10' deep, 3'-8' wide, 30'-50' long); the soil was classified via visual observation, field testing, TPH analyses, and VOC analyses.

There was a benzene pipeline release on the Port Recycler property adjacent to the subject property. Little or no information about the release is known at this time. There was an oil spill in recent months along the Ship Channel. In response to this, in December 2009, InControl Technologies collected sediment, surface water, and soil samples in four locations along the bank and in the Ship Channel to check for possible impact to the Lone Star property. All monitoring wells on the subject property were also sampled in December 2009 (**Tables F-4 through F-6, Figure B6**).

The lateral extent of groundwater impact has been horizontally delineated in all directions to the greatest extents possible. PCLE Zone 1 extends offsite onto an active industrial facility (Rhodia Chemical). PCLE Zone 2 is delenated by monitoring wells MW-14 and MW-13 and the Houston Ship Channel to the north. PCLE Zone 3 extends offsite on to an adjacent property (Texas Port Recycling). A Municipal Setting Designation is being sought for the Texas Port Recycling Property. PCLE Zone 4 is the result of an off-site source and is delineated by monitoring wells MW-2 and MW-22 (**Figure B4**). The groundwater gradient at the site is to the north in the shallow groundwater bearing unit (**Figure B7**).

Seventeen (17) water wells were identified within a ½-mile radius of the proposed MSD boundary. Two (2) of the identified water wells are listed as "plugged" and one (1) of the identified water wells is listed as "destroyed". All three (3) wells were located on adjacent properties and are industrial use wells. No domestic use wells were identified within a ½-mile radius of the proposed MSD boundary. The nearest domestic well is located approximately 2.4-miles west (cross-gradient) from the proposed MSD boundary. According to the information contained in the water well search this well was drilled in 1940 and is completed at a depth of 590-feet bgs. No information was available regarding the screened interval but is assumed this well is screened near the completion depth. This well is drawing water from a zone deeper than the impacted zone at the subject property. The nearest public water supply well is located greater than 1 mile northeast (cross-gradient) and across the Houston Ship Channel from the proposed MSD boundary. The public water supply well is owned by the City of Galena Park. A copy of the well log was not available but the screened interval was noted from 935- to 1,165-ft bgs. It is anticipated that the completion depth is near 1,170-ft bgs. This well draws water from depth much deeper than the impacted zones at the former Lone Star Refinery property. The nearest sensitive receptor (Houston Ship Channel) is located adjacent north to the proposed MSD boundary. The Ship Channel is located downgradient of the area of impacted groundwater.