

US EPA ARCHIVE DOCUMENT

Essential Fish Habitat Assessment

Chocolate Bayou Cracking Furnace Project
Alvin, Brazoria County, Texas

May 2012

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*Prepared For
INEOS USA LLC*

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Acronyms

Act	Magnuson-Stevens Fishery Conservation and Management Act
AVO	Audio, Visual, and Olfactory
BACT	Best Available Control Technology
BA	Biological Assessment
BNWR	Brazoria National Wildlife Refuge
CAA	Clean Air Act
CO	Carbon Monoxide
CO _{2e}	Carbon Dioxide Equivalent
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
FM	Farm to Market Road
GHG	Greenhouse Gas
HHV	Higher Heating Value
INEOS	INEOS USA LLC
LAER	Lowest Achievable Emission Rate
LDAR	Leak Detection and Repair Program
MMBtu	Million Metric British Thermal Units
NH ₃	Ammonia
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NO _x	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
NSR	New Source Review
PPMv	Parts Per Million by Volume
PSD	Prevention of Significant Deterioration
RACT	Reasonably Available Technology
RBLC	RACT/BACT/LAER Clearinghouse
SCR	Selective Catalytic Reduction
SIL	Significant Impact Level
SO ₂	Sulfur Dioxide
TCEQ	Texas Commission on Environmental Quality
TPY	Tons Per Year
TRC	TRC Environmental Corp.
VOC	Volatile Organic Compound

Section 1

Introduction

INEOS operates a chemical manufacturing facility that is located adjacent to the left descending bank of Chocolate Bayou, a tidally influenced tributary to Galveston Bay. The INEOS facility is located on the northwest side of Texas Highway Number FM 2004, approximately 2 miles southwest from the intersection of FM 2004 and FM 2917 (Alvin, Brazoria County, Texas). Figure 1 (Appendix A) is an area map that depicts the approximate boundary of the INEOS site and the surrounding environs.

INEOS is proposing to add one (1) olefins furnace at the Chocolate Bayou facility (the Project). The purpose of the Project is to manufacture olefins, a group of chemicals that is used as a raw material in the production of many useful industrial products. The new furnace will receive feedstock (ethane, propane, and/or liquids such as refinery raffinate or debutanized natural gasoline) via existing pipelines and thermally “crack” them at high temperatures. This creates various olefin products, ranging from hydrogen to pyrolysis gasoline. These various products will be separated by distillation in the existing No. 2 Olefins unit. The furnace will be equipped with a Selective Catalytic Reduction (SCR) unit to reduce NO_x emissions. The furnace will require periodic decoking to remove coke buildup along its tube length. Decoking is conducted by substituting the furnace feed with steam and air to combust the coke to carbon dioxide. The decoke vent is routed through a cyclone to remove any solids before venting to the atmosphere. Solid waste from the decoke operation will be landfilled. There will be only a minimal increase in the volume of this coke material. It is estimated that 22 tpy of coke (increase of 5% for the facility) will break off during the decoking process.

Maintenance, Startup, and Shutdown emissions will be generated from cleaning piping, vessels, exchangers, and pumps/compressors for maintenance. The new furnace and associated equipment will be connected to the existing No. 2 Olefins flare (EPN DDM-3101, Permit No. 95).

The additional furnace will be constructed within the already developed portion of the INEOS facility. The size of the Project will consist of only a 60 -foot by 100 -foot area (actual area of direct construction impact). Construction activities will include site preparation, steel erection, equipment installation; tying-in to existing plant utilities, and commissioning/start-up.

Construction laydown areas will be placed on already cleared, graded, and compacted land within the developed portion of the INEOS facility. The use of undeveloped land at the site will not be required.

Pursuant to the federal Clean Air Act (CAA), INEOS is seeking a permit under the U.S. Environmental Protection Agency's (EPA) Greenhouse Gas (GHG) Prevention of Significant Deterioration (PSD) Program to authorize construction of the Project.

The Magnuson-Stevens Fishery Conservation and Management Act (the Act) of 1976 was passed by congress to regulate the harvest and management of coastal fisheries by consolidating control over territorial waters. This Act is administered by the National Marine Fisheries Service (part of the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce). The Act established eight regional fisheries management councils who determine which commercially important marine species needed federal protection. In 1996 an amendment to the Act added the concept of Essential Fish Habitat (EFH), which has been defined as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (NMFS, 2005).

The Act requires federal agencies to consult with NMFS only when a project is to be permitted, funded, or undertaken by a federal agency and is determined to have an adverse effect on designated EFH. An adverse effect is defined in the Act as "any impact which reduces quality and/or quantity of EFH" including "direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions" (NOAA, 2012).

The purpose of this EFH assessment is to determine whether any areas of EFH will be adversely affected by EPA's issuance of the permit, and if so, to what extent. This EFH assessment is based on the best science available, including, the results of an on-site inspection of the area affected by the action, the views of recognized experts, a review of literature and other information.

A Biological Assessment (BA) was written under separate cover to address potential impacts to threatened and endangered species, marine mammals, migratory birds, bald and golden eagles.

Section 2

Project Description

2.1 Project Purpose and Location

INEOS is proposing to add an additional furnace at the Chocolate Bayou facility. The purpose of the Project is to meet customer demands for olefins, a group of chemicals that is used as raw materials in the production of many useful industrial products. The Project involves constructing an additional furnace at the Chocolate Bayou facility. Installation of the new furnace will reduce the facilities use of an older, less efficient, furnace resulting in a net reduction of NO_x emissions.

Project location information:

USGS Quad	Latitude/ Longitude
Hoskins Mound	29 13' 50.39" N / -95 11' 25.57" W

2.2 Construction Information

Construction of the proposed expansion, associated infrastructure, and auxiliary equipment will take place within the existing facility in an area approximately 60 feet by 100 feet (construction area). No additional earth disturbance will be required outside of this 60-foot by 100-foot area, which is currently a graveled area. The existing graveled area will be scraped and graded to allow installation of auger cast concrete piles and a new mat and pier foundation for the furnace. The proposed construction activities include the installation within a 60 -foot by 100 -foot area of approximately 92 steel-reinforced concrete piles 18-inches in diameter to a depth of 93 feet, ; plus 40 additional 18-inch diameter piles installed to a depth of 25 feet to support the pipe rack running from the new furnace across the existing plant road to the west and into the existing process area of the plant. Construction laydown area adjacent to the construction area will be utilized as a materials laydown and storage area during construction. This area will be in previously disturbed land (gravel or concrete) and will involve impacting vegetated areas. The construction area is shown on Figure 2. The projected construction start date is 01 October 2012. The projected operation start date is November 2013.

Section 3

Background Information

3.1.1 Regional Environmental Information

The facility is located within the Texas Gulf Coastal Plain, which is situated within the Outer Coastal Plain Land Resource Region (LRRT). This area is composed of grasslands and riparian bayous with topography gently sloping to the coast. Historic elevations within the Project area range from sea level at Chocolate Bayou to five feet above sea level on the north side of the Project area. The Project area has been altered due to past rice cultivation and the construction of the facility itself. The facility itself has been in operation for over 40 years.

3.1.2 Water Resources

The watershed of Brazoria County is composed of the Brazos River and the San Bernard River along with numerous smaller creek and bayous that either drain into the aforementioned rivers or go directly into coastal bays. Brazoria County encompasses a portion of West Galveston Bay and all of Christmas and Drum Bays. All of these are part of the larger Galveston Bay complex.

Brazoria County is located on the Upper Texas Coast. It is bounded to the north by Harris (County Seat Houston), Fort Bend (County Seat Richmond) and Wharton (County Seat Wharton) Counties. To the east and west the county is bounded by Galveston (County Seat Galveston) and Matagorda (County Seat Bay City) Counties, respectively. The southern boundary of the county is the Gulf of Mexico.

The southern boundary of the county is the Gulf of Mexico. The Brazos River splits the county into east and west halves. The San Bernard River flows through the western part of the county. These two rivers make up the majority of the watershed in the county. Other minor drainages such as Halls Bayou, Oyster Bayou, Persimmon Bayou, Chocolate Bayou, and Jones Creek flow directly into the bay.

The Project is located within the existing facility on the eastern bank of Chocolate Bayou. Chocolate Bayou empties into Chocolate Bay, which is part of the Galveston Bay system. The Brazos River is approximately 21 miles to the west of the Project. The San Barnard

is even farther away at 30 miles west of the Project. In Brazoria County there are numerous stock tanks, irrigation canals, farm ponds, and emergent wetlands. Two National Wildlife Refuges are located within Brazoria County. San Bernard National Wildlife Refuge is located in the southwestern portion of the county, approximately 30 miles from the Project. The extreme Northeastern corner of the Brazoria National Wildlife Refuge (BNWR) is located 1.6 miles from the construction zone.

Section 4

Air Quality Analysis Results

4.1 Air Pollution Effects Background Research

Research was conducted to determine at what concentration levels pollutants would have an adverse impact on flora and fauna. While the exact answer is likely pollutant and species dependent it is assumed for this Project that acute concentrations would have to be higher than chronic exposure to elicit an acute response. Pollution concentrations are also assumed to have a greater impact on plants and sessile animals such as bivalves because of their lack of mobility.

For the purpose of this analysis the Action Area is determined by the point at which the pollutant concentration reaches the significant impact level (SIL). When pollutant concentrations are at or below the SIL the EPA has determined that no measurable adverse impacts occur.

All pollutants modeled for this Project reached the SIL within the facility. To be conservative the INEOS fence line was used as the Action Area. Predicted emissions concentrations from the Project are shown in table 1 below.

Table 1.
Modeled Emissions for all Pollutants Associated with the Project.

Pollutant	Concentration (lb/hour)	Concentration (TPY)
NO _x	14.85	21.68
CO	125.24	97.88
VOC	4.75	20.41
H ₂ S	0.003	0.02
SO ₂	6.79	1.49
NH ₃	4.79	10.55
PM	5.26	13.07
PM ₁₀	4.7	10.32

Table 1.
Modeled Emissions for all Pollutants Associated with the Project.

Pollutant	Concentration (lb/hour)	Concentration (TPY)
PM _{2.5}	2.18	5.88
CO ₂	63,551	214,592
N ₂ O	1.49	6.51
CH ₄	1.82	8
CO ₂ e	64,051	216,778

Section 5

Effects of the Proposed Action on EFH

This section provides a summation of findings and recommended determination of effect on EFH by the Project.

5.1 Essential Fish Habitat

The Action Area is completely within an existing chemical manufacturing facility. The Action Area does not extend outside the existing facility. Outside the western boundary of the facility is Chocolate Bayou, a tidally influence tributary of Chocolate Bayou and then West Galveston Bay. The portion of Chocolate Bayou that is adjacent to the facility is mapped as EFH for all life stages of red drum (*Sciaenops ocellatus*), white shrimp (*Litopenaeus setiferus*), and brown shrimp (*Farfantepenaeus aztecus*) (NMFS, 2012).

5.2 Habitat Areas of Particular Concern

In addition to EFH the Act also designates Habitat Areas of Particular Concern. These are defined as subsets of EFH that are “rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area” (NOAA, 2012). There are no EFH Habitat Areas of Particular Concern found within or adjacent to the Action Area (NMFS, 2012).

5.3 Potential Land Based Effects on EFH

Designated EFH is not found within the Action Area. EFH will not be directly impacted by construction or operations. Wastewater from the proposed furnace will be discharged to the existing, permitted on-site wastewater treatment facility which has the capacity to accept and treat this wastewater stream. Based on the capacity of the existing wastewater treatment system, it is concluded that the proposed Project will have no significant adverse effects on the volume or quality of treated wastewater discharged from INEOS' Chocolate Bayou facility and will have no significant adverse effects to surface waters or EFH. Storm water runoff is also directed through the existing on-site water treatment facility.

5.3.1 Fugitive Dust

Dust could be emitted during earth disturbing activities associated with construction. This is expected to only last a short time and dust suppression techniques, such as

watering exposed soil, can be implemented to reduce the amount of dust. During operation dust emissions are expected to be negligible. As a result, fugitive dust emissions will have no effect on EFH.

5.3.2 Noise Levels

The proposed Project is being constructed within the developed portion of an active chemical manufacturing facility. The Chocolate Bayou facility is located in an undeveloped portion of Brazoria County. The location of the proposed Project is within the developed portion of an existing manufacturing facility. The increase in noise level is expected to be minimal. As a result, the increases in noise levels associated with construction and operation of the Project will have no effect on EFH.

5.4 Water Quality Effects

5.4.1 Waste Water

The Chocolate Bayou facility is permitted to discharge process wastewater and storm water associated with industrial activity (Texas Pollution Discharge Elimination System [TPDES] Permit No. TXR150000). Chocolate Bayou, the surface water into which treated effluent from the INEOS facility discharges, is not identified by the State of Texas as an impaired waterbody.

Wastewater from the proposed furnace will be discharged to the existing, permitted on-site wastewater treatment facility. The increase in wastewater due to this project is expected to be approximately 20,000 gallons per day (increase of 0.5%) with no change in the character of the wastewater. The existing wastewater treatment facility has the capacity to accept and treat the increase in flow.

Prior to undertaking construction activities associated with the proposed Project, INEOS will apply for coverage under the Texas General Permit for Storm Water Discharges Associated with Construction Activity. INEOS' construction contractor will use appropriate best management practices to manage storm water runoff related to construction. Storm water associated with Project construction will drain to the facility's existing segregated storm water system prior to being discharged. This storm water system is outside. This will allow the water to be impacted by ambient air temperature and therefore will be approximately the same temperature as Chocolate Bayou when it is discharged. No change in surface water temperature (and therefore the capacity of

the water to hold dissolved oxygen) is anticipated from the Project. While in the storm water system the water flow velocity will be reduced to allow suspended solids to settle out of solution. This will reduce the turbidity of the effluent. Chocolate Bayou was named for its high natural turbidity due to high amounts of clay in the local geology. The effluent from the Project will have a lower turbidity level than Chocolate Bayou so no increase, and therefore no impacts, from turbidity are anticipated from the Project.

The United States Geologic Survey has a flow gauge on Chocolate Bayou near Alvin, Texas (actual flow at the Project maybe more than the flow recorded at the above gauge because of tributaries and effluent from other sources between the gauge location and the Project). The gauge has measured flow data for the past 53 years. Over that time the following measurements have been established:

- Minimum recorded flow: 4.4 ft³/second (2001),
- Maximum recorded flow: 1,260 ft³/second (1992),
- Mean flow of 101 ft³/second (USGS, 2012).

The expected increase in flow from this Project will be 0.03%. This expected flow is 3,268 less volume than the long term mean flow in Chocolate Bayou. The minimal increase in flow from the Project will have a negligible impact on the baseline flow of Chocolate Bayou.

Based on the capacity of the existing wastewater treatment system to treat the increased flow from the Project, it is concluded that the proposed Project will have no significant adverse effects on the volume or quality of treated wastewater discharged from INEOS' Chocolate Bayou facility and will have no significant adverse effects to EFH.

5.5 Potential Water Quality Effects on EFH Through Deposition of Air Pollutants Within EFH

The Project will be built on land within an existing chemical manufacturing facility. No areas of EFH are found within the Action Area. Any air emissions from the Project will be below the SIL before it reaches Chocolate Bayou. There is no literature reviewed that would suggest that emissions below the SIL will have an impact on EFH.

Air emissions of NO_x can lead to acidification (lowering of the pH of the receiving water) or eutrophication (increase in nutrient loading). The furnace will be equipped with SCR that will use ammonia to reduce NO_x emissions. The furnace will undergo periodic decoking to remove coke from the tubes by combusting it with air in the presence of steam. Installation of the new

furnace will reduce the facilities use of an older, less efficient, furnace resulting in a net reduction of NO_x emissions. This reduction in NO_x emissions will result in reduced impacts to EFH in Chocolate Bayou.

A more detailed description of the air emission and their potential effect on flora and fauna can be found in the BA.

The reduced NO_x air emissions from the construction of the Project will reduce the amount of NO_x and other air emissions entering Chocolate Bayou. EFH will not be adversely affected by the Project.

Section 6 Conclusion

The Project will be built on land within an existing chemical manufacturing facility. No EFH is found within the facility or the Action Area. Chocolate Bayou, which is just west of the facility, contains EFH for all life stages of red drum, white shrimp and brown shrimp. Changes in water quality (temperature, pH, eutrophication, turbidity, pollutant concentration) are not anticipated to have an adverse impact on EFH. Because no adverse impacts to EFH are anticipated no mitigation strategies or further agency consultations are recommended at this time.

Section 7 References

NMFS. 2012. EFH mapper. Found on May 21, 2012.

http://sharpfin.nmfs.noaa.gov/website/efh_mapper/map.aspx

NMFS. 2005. Magnuson-Stevens Fishery Conservation and Management Act Reauthorization. Viewed on May 23, 2012. <http://www.nmfs.noaa.gov/msa2005/>

NOAA. 2012. Essential Fish Habitat Frequently Asked Questions. Found on May 23, 2012.

http://sero.nmfs.noaa.gov/hcd/efh_faq.htm#Q6

USGS. 2012. Flow data for Chocolate Bayou. Viewed on May 18, 2012.

http://waterdata.usgs.gov/tx/nwis/uv?site_no=08078000

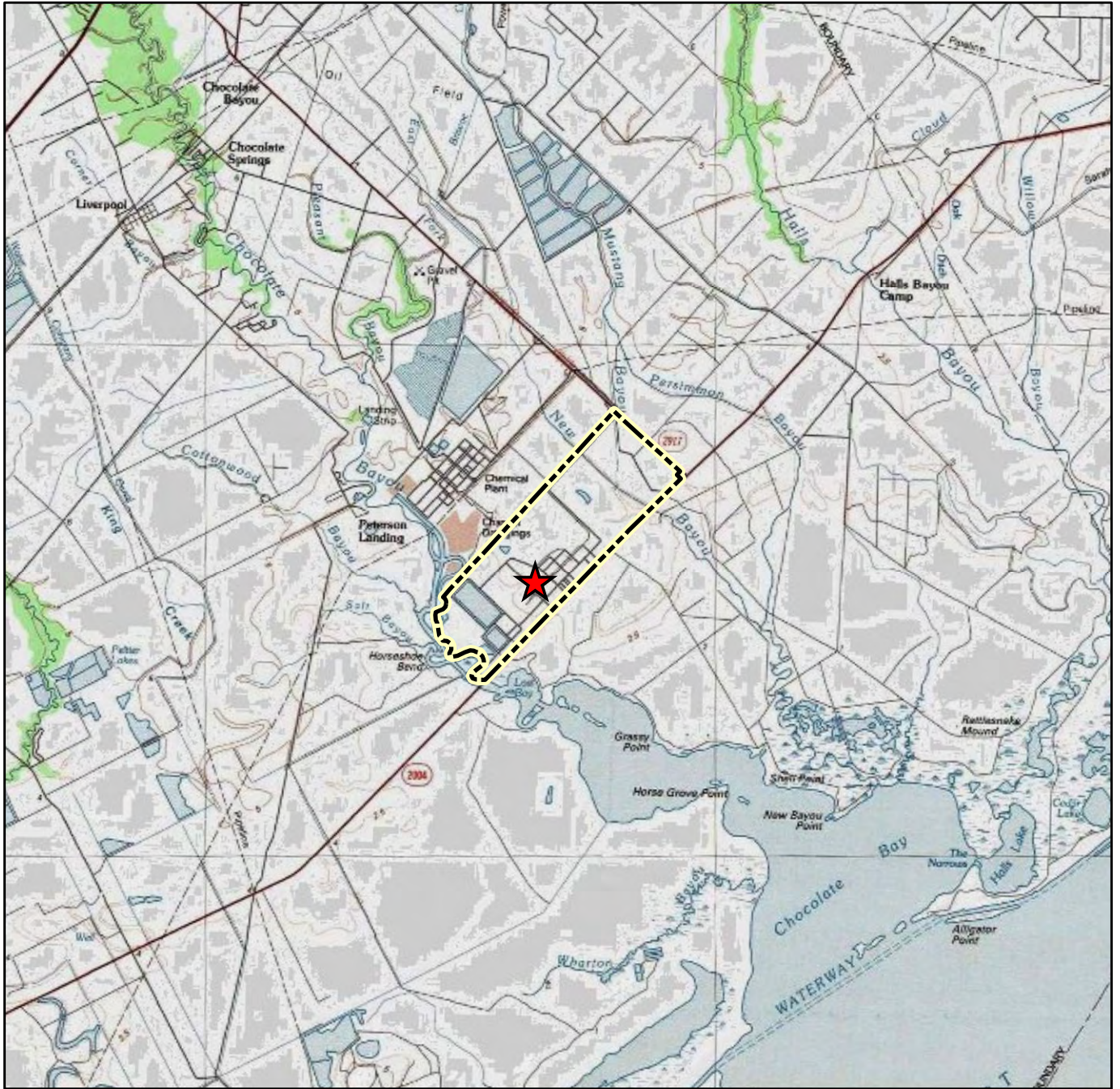
Section 8 List of Preparers

- Mike Robbins, Ecologist
- Mike Budin, Project Manager



Appendix A

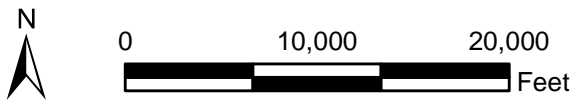
Figures

TRC - GIS



BASE MAP: USGS 100k TOPOGRAPHIC QUADRANGLE
 SERIES: ANGLETON, TX. (1984)

-  PROJECT LOCATION
-  INEOS PROPERTY LINE



**INEOS USA LLC
 CHOCOLATE BAYOU PLANT**

**PROJECT LOCATION
 ESSENTIAL FISH HABITAT
 ALVIN, BRAZORIA COUNTY, TEXAS**


DRAWN BY:	RREDMAN
APPROVED BY:	MROBBINS
PROJECT NO:	192202.0000.0000
FILE NO.	192202.000.01.EFH.mxd
DATE:	MAY 2012

FIGURE 1

TRC - GIS



BASE MAP:ESRI ONLINE DATA
BING HYBRID (2011)

 CONSTRUCTION AREA
60' X 100'



**INEOS USA LLC
CHOCOLATE BAYOU PLANT**

**CONSTRUCTION AREA - 2011 AERIAL PHOTOGRAPH
ESSENTIAL FISH HABITAT
ALVIN, BRAZORIA COUNTY, TEXAS**

DRAWN BY:	RREDMAN
APPROVED BY:	MROBBINS
PROJECT NO:	192202.0000.0000
FILE NO.	192202.000.02.EFH.mxd
DATE:	MAY 2012

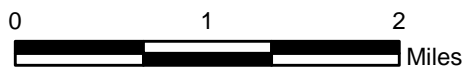
FIGURE 2

TRC - GIS



BASE MAP: ESRI ONLINE DATA
 BING HYBRID (2011)
 ESSENTIAL FISH HABITAT SOURCE:
www.habitat.noaa.gov/protection/efh/newlnv/index.html

- CENTROID OF CONSTRUCTION AREA
60' X 100' (N.T.S.)
- INEOS PROPERTY LINE
- ESSENTIAL FISH HABITAT FOR
WHITE SHRIMP, BROWN SHRIMP
AND RED DRUM



**INEOS USA LLC
 CHOCOLATE BAYOU PLANT**

**SURVEY AREA - 2011 AERIAL PHOTOGRAPH
 ESSENTIAL FISH HABITAT
 ALVIN, BRAZORIA COUNTY, TEXAS**

DRAWN BY:	RREDMAN
APPROVED BY:	MROBBINS
PROJECT NO:	192202.0000.0000
FILE NO.	192202.000.03.EFH.mxd
DATE:	MAY 2012

FIGURE 3