

PUBLIC HEALTH ASSESSMENT

Falcon Refinery

Ingleside, San Patricio County, Texas

EPA Facility ID: TXD086278058

April 8, 2004



Prepared by:

The Texas Department of Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

FOREWORD

The Agency for Toxic Substances and Disease Registry, ATSDR, was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation and Liability Act, also known as the *Superfund* law. This law set up a fund to identify and clean up our country's hazardous waste sites. The Environmental Protection Agency, EPA, and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. (The legal definition of a health assessment is included on the inside front cover). If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperative agreements. The public health assessment program allows the scientists flexibility in format or structure of their response to the public health issues at hazardous waste sites. For example, a public health assessment could be one document or it could be a compilation of several health consultations; the structure may vary from site to site. Nevertheless, the public health assessment process is not considered complete until the public health issues at the site are addressed.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other governmental agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists evaluate whether or not these contacts may result in harmful effects. ATSDR recognizes that children, because of their play activities and their growing bodies, may be more vulnerable to these effects. As a policy, unless data are available to suggest otherwise, ATSDR considers children to be more sensitive and vulnerable to hazardous substances. Thus, the health impact to the children is considered first when evaluating the health threat to a community. The health impacts to other high risk groups within the community (such as the elderly, chronically ill, and people engaging in high risk practices) also receive special attention during the evaluation.

ATSDR uses existing scientific information, which can include the results of medical, toxicological and epidemiological studies and data collected from disease registries, to determine the health effects that may result from exposures. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available. When this is so, the report will suggest what further public health actions are needed.

Conclusions: The report presents conclusions about the public health threat, if any, posed by the site. When health threats have been determined for high risk groups (such as the elderly, chronically ill, and

people engaging in high risk practices), they will be summarized in the conclusion section of the report. Ways to stop or reduce exposure will then be recommended in the public health action plan.

ATSDR is primarily an advisory agency, so usually these reports identify what actions are appropriate to be undertaken by EPA, other responsible parties, or the research or education divisions of ATSDR. However, if there is an urgent health threat, ATSDR can issue a public health advisory, warning people of the danger. ATSDR can also authorize health education or pilot studies of health effects, full scale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

Interactive Process: The health assessment is an interactive process. ATSDR solicits and evaluates information from numerous city, state and federal agencies, the companies responsible for cleaning up the site, and the community. It then shares its conclusions with them. Agencies are asked to respond to an early version of the report to make sure that the data they have provided is accurate and current. When informed of ATSDR's conclusions and recommendations, sometimes the agencies will begin to act on them before the final release of the report.

Community: ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near the site, including residents of the area, civic leaders, health professionals and community groups. To ensure that the report responds to the community's health concerns, an early version is also distributed to the public for their comments. All the comments received from the public are responded to in the final version of the report.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

Agency for Toxic Substances and Disease Registry
1600 Clifton Road (E60)
Atlanta, Georgia 30333

Attention: Chief, Program Evaluation, Records, and Information Services Branch

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1. General Location and Demographics Information

Summary and Statement of Issues

The Falcon Refinery site is located at the intersection of Farm to Market Road 2725 and Bishop Road, Ingleside, San Patricio County, Texas. The site, which is an abandoned refinery that has operated intermittently since 1980, encompasses 104 acres and is approximately 18 miles northeast of the city of Corpus Christi. The refinery used crude oil to produce naphtha, kerosene, jet fuel, diesel, and fuel oil. Peak operating capacity was approximately 40,000 barrels of product a day.

In November 2000, the Texas Commission on Environmental Quality (TCEQ), formerly the Texas Natural Resource Conservation Commission (TNRCC), completed an Expanded Site Inspection (ESI) report of the site. The ESI findings indicated that chemical releases from the facility have affected sediments in Redfish Bay, sediments in the on-site wetlands, and the on-site soils. The Falcon Refinery site was proposed to the National Priorities List (NPL) on September 5, 2002. The NPL is used by the U.S. Environmental Protection Agency (EPA) to determine which sites justify further investigation in order to assess the nature and extent of health and environmental risks associated with the release of hazardous substances.

The Texas Department of Health (TDH) and the Agency for Toxic Substances and Disease Registry (ATSDR) reviewed the environmental information available for the site. Exposure pathways through which the public might possibly come into contact with contaminants from the site were evaluated. These exposure pathways included air, groundwater, surface water, soil, sediment, and biota (food chain). Based on the available information, the Falcon Refinery site poses an indeterminate public health hazard. If in the future, site conditions change, a re-evaluation of the public health significance of this site would be necessary.

Introduction

The Agency for Toxic Substances and Disease Registry (ATSDR) was established under the mandate of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. This act, also known as the “Superfund” law, authorized the U.S. Environmental Protection Agency (EPA) to conduct clean-up activities at hazardous waste sites. EPA was directed to compile a list of sites considered hazardous to public health. This list is termed the National Priorities List (NPL). The 1986 Superfund Amendments and Reauthorization Act (SARA) directed ATSDR to prepare a Public Health Assessment (PHA) for each NPL site. In 1990, federal facilities were included on the NPL. (Note: Appendix A provides a listing of abbreviations and acronyms used in this report.)

In conducting the PHA, three types of information are used: environmental data, community health concerns and health outcome data. The environmental data are reviewed to determine whether people in the community might be exposed to hazardous materials from the NPL facility. If people are being exposed to these chemicals, ATSDR will determine whether the exposure is at levels that might cause harm. Community health concerns are collected to determine whether health concerns expressed by community members could be related to exposure to chemicals released from the facility. If the community raises concerns about specific diseases in the community, health outcome data (information from state and local databases or health care providers) can be used to address the community concerns. Also, if ATSDR finds that harmful exposures have occurred, health outcome data can be used to determine if illnesses are occurring which could be associated with the hazardous chemicals released from the NPL facility.

In accordance with the Interagency Cooperative Agreement between ATSDR and the Texas Department of Health (TDH), this PHA was prepared for the Falcon Refinery site. This PHA presents conclusions about whether exposures are occurring, and whether a health threat is present. In some cases, it is possible to determine whether exposures occurred in the past; however, often a lack of appropriate historical data makes it difficult to quantify past exposures. If it is found that a threat to public health exists, recommendations are made to stop or reduce the threat to public health.

Background

Site Description

The Falcon Refinery is an approximately 104-acre site located at the intersection of Farm to Market Road 2725 and Bishop Road in Ingleside, San Patricio County, Texas. The site is approximately 18 miles northeast of the city of Corpus Christi [1]. Wetlands lie to the northeast and southeast of the site. Commercial businesses are adjacent to the site and the nearest residential area is approximately 0.2 mile northwest of the site. The Gulf of Mexico is approximately 8 miles east of the site.

Site History

Falcon Refinery operated intermittently beginning in 1980 and is currently inactive. The facility refined crude oil into naphtha, jet fuel, kerosene, diesel, and fuel oil. During peak operating capacity, the facility could produce up to 40,000 barrels of product per day. At a nearby dock located on the Intracoastal Waterway, crude oil and refined product were transferred between barges and the facility's storage tanks.

Complaints by residents began in 1978 with the construction of the facility and in 1985-86 because of odors allegedly produced from the processing of impure crude. Regulatory inspections, conducted periodically in response to complaints, indicate operational problems. In 1980, approximately 3 cubic yards of separator sludge were spread on the ground. In 1985, the refinery's wastewater treatment system was inoperable during the processing of 100,000 barrels of slop oil. In 1986, an inspection by the Texas Water Commission revealed cooling tower sludge had been disposed of on-site and untreated wastewater had been discharged into unlined pits. In 1987, an EPA site inspection indicated there was a breach in the dike surrounding some source areas and run-off may have flowed into the wetlands. In 1995, a spill occurred as a result of pipeline testing. In 1996, an inspection conducted in response to an alleged pipeline spill indicated benzene was dumped. A leak from a tank in the naphtha stabilizer unit was observed in January 2000. As a result of that leak, the TNRCC and EPA performed sampling of the site in May 2000 and identified five sources of contamination [2].

- Source 1: soil (associated with bermed areas around storage tanks #10, 11, 26, and 27)
- Source 2: soil (dump area)
- Source 3: soil (storage tanks associated with the main facility)
- Source 4: soil (land treatment basin)
- Source 5: soil (associated with dumped cooling tower sludge)

Containment berms and/or liners were absent in some source areas. Run-on/run-off management systems in some source areas were either absent or not maintained. The Falcon Refinery site was proposed to the National Priorities List on September 5, 2002.

Land Use and Natural Resource Use

The site, located in the San Antonio-Nueces Coastal basin, receives an average rainfall amount of 35 inches per year. At approximately 5 feet above sea level, the site is located in a 100-year flood plain [2]. Land usage adjacent to the site is industrial, commercial, and residential. The site gradually slopes towards the southeast and drains into the facility's on-site wetlands. The southern and eastern portion of the site consists of wetlands and estuarine type land. Drainage from the site eventually flows into Redfish Bay then into the Gulf of Mexico.

Site Visit

TDH personnel visited the site on April 23, 2003. Approximately four hours were spent examining the site and visiting with the surrounding residents and commercial businesses. There was no evidence of recent rainfall, runoff or erosion. All roadways on the site are located near the storage tanks and are composed of concrete, asphalt, and dirt. Berms, which appeared to be intact, surrounded all the storage tanks and were overgrown with grass. TDH noticed past chemical spillage had stained plant growth around one of the storage tanks. Odors associated with the spillage were noted. The land not in use is sandy with low lying grasses and some cactus.

The site is fenced, however a section of fence along Bishop Road, was down on the ground. The front gate area was open at the time of the visit. Tanker trucks were entering the site to receive fuel from storage tanks located near the front gate. "No Trespassing" signs were posted at the front gate. There was no indication of trespassing at the time of the site visit.

Demographics

The 2000 San Patricio County census data reports a total population of 9,388 for the city of Ingleside and a county population of 67,138 residents [3]. The 2000 U.S. Census Bureau data reports a total population of 423 people and 175 housing units within 1 mile of the site [Figure 1]. The nearest occupied residence is approximately 0.2 mile northwest of the site in the 1200 block of Bishop Road.

Community Health Concerns

Community Concerns

In an attempt to determine community health concerns related to the Falcon Refinery site, TDH went door to door and contacted businesses and residents near the site. No community health concerns specific to the Falcon Refinery site were identified; however some individuals reported occasional petrochemical odors emanating from the storage tanks.

Health Outcome Data

Health outcome data (HOD) record certain health conditions that occur in populations. These data can provide information on the general health of communities living near a hazardous waste site. They also can provide information on patterns of specified health conditions. Some examples of health outcome databases are tumor registries, birth defects registries, and vital statistics. Information from local hospitals and other health care providers also can be used to investigate patterns of disease in a specific population. TDH and ATSDR look at appropriate and available health outcome data when a completed exposure pathway or community concern exists. Because no completed exposure pathways and no identified community health concerns exist, a review of HOD was not conducted for this site.

Discussion (Environmental Contamination, Pathways Analysis, and Public Health Implications)

Introduction

The presence of chemical contaminants in the environment does not always result in exposure to or contact with the chemicals. Because chemicals have the potential to cause adverse health effects only when people actually come into contact with them, it is exposure (the contact that people have with the contaminants) that drives the PHA process.

People can be exposed to contaminants by breathing, eating, drinking, or coming into direct contact with a substance containing the contaminant. This section reviews available information to determine whether people in the community have been, currently are, or could in the future be exposed to contaminants associated with this site.

To determine whether people are exposed to site-related contaminants, investigators evaluate the environmental and human components leading to human exposure. This analysis consists of evaluating the five elements of an exposure pathway:

- a source of contamination,
- transport through an environmental medium,
- a point of exposure,
- a route through which the contaminant can enter the body, and
- a receptor population.

Exposure pathways can be complete, potential, or eliminated. For a person to be exposed to a contaminant, the exposure pathway must be complete. An **exposure pathway** is considered complete when all five elements in the pathway are present and exposure has occurred, is occurring, or will occur in the future. A **potential pathway** is missing at least one of the five elements but could be complete in the future. An **eliminated pathway** is missing one or more elements and will never be completed. Table 1 identifies pathways important to this site. The following discussion incorporates only those pathways relevant and important to the site.

Because exposure does not always result in adverse health effects, an evaluation of whether the exposure could be sufficient to pose a hazard to people in the community also is done. The factors that influence whether exposure to a contaminant or contaminants could or would result in adverse health effects include:

(1) the toxicological properties of the contaminant; (2) how much of the contaminant the individual is exposed to; (3) how often and/or how long the exposure occurs; (4) the manner in which the contaminant enters or contacts the body (breathing, eating, drinking, or skin/eye contact); and (5) the number of contaminants to which an individual is exposed (combinations of contaminants).

Once exposure occurs, characteristics such as age, sex, nutritional status, genetics, lifestyle, and health status of the exposed person influence how that person absorbs, distributes, metabolizes, and excretes the contaminant.

When identifying plausible potential exposure scenarios, the first step is assessing the potential public health significance of the exposure. This is done by comparing contaminant concentrations to health assessment comparison (HAC) values for both noncarcinogenic and carcinogenic end points. HAC values are media-specific contaminant concentrations used to screen contaminants for further evaluation. Although exceeding a HAC value does not necessarily mean that a contaminant represents a public health threat, it does suggest that the contaminant warrants further consideration.

Noncancer comparison values are also known as environmental media evaluation guides (EMEGs) or reference dose media evaluation guides (RMEGs) and are based on ATSDR's minimal risk levels (MRLs) and EPA's reference doses (RfDs), respectively. MRLs and RfDs are estimates of daily human exposure to a contaminant that is unlikely to cause adverse noncancer health effects over a lifetime. Cancer risk comparison values are also known as carcinogenic risk evaluation guides (CREGs) and are based on EPA's chemical-specific cancer slope factors and an estimated excess lifetime cancer risk of 1-in-1-million persons exposed for a lifetime. Standard assumptions are used to calculate appropriate HAC values [4].

The environmental data used in this PHA were obtained from soil and sediment sampling conducted by the TNRCC in May 2000 for their Expanded Site Inspection (ESI) Report [5]. The samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, and metals. In reviewing the sampling data, the information provided in the referenced documents was relied upon and it was assumed that adequate Quality Assurance/Quality Control (QA/QC) measures were followed with regard to chain-of-custody, laboratory procedures, and data reporting.

Exposure Pathways

Air

Summary: Air sampling data and historical air releases from the Falcon Refinery site were not available for review. Because of the lack of information available for this pathway, we have concluded that past and current exposure to contaminants in the air at this site pose an indeterminate public health hazard.

Air sampling data from historical air releases from the Falcon Refinery site were not available for review. Volatilization of chemicals at the site from storage tanks, chemical overflows and spills likely occurred during operations. The potentially exposed population would have consisted of on-site workers and people working in the surrounding businesses and living in the neighborhood. The EPA Remedial Investigation and Feasibility Study, planned for a future date, will determine the volume of wastes remaining on-site [1]. During the site visit, chemical odors were noted.

Until further sampling or removal of the remaining chemical wastes, current exposure to contaminants in the air cannot be assessed. Because of the lack of historical and current air sampling data, we have concluded that exposure to contaminants in the air pose an indeterminate public health hazard.

Groundwater

Summary: Groundwater in the vicinity of the site is not currently used as drinking water. Potable water is supplied to area residents and businesses from an approved surface water source. Groundwater sampling data from the site and surrounding areas were not available for review. Past and current exposures to contaminants in the groundwater at this site pose an indeterminate public health hazard.

Groundwater in the vicinity of the site has been used for drinking, food preparation, and bathing. Since 1999, the City of Aransas Pass has supplied potable water from the Nueces River to the residents and businesses surrounding the site. The raw water intakes for the water supply system are located approximately 30 miles west of the Falcon Refinery site [6].

The nearest residential population is northwest of the Falcon Refinery site on Bishop Road. The residential water wells on Bishop Road vary from approximately 45 to 65 feet in depth. All residents contacted by TDH, with one exception, currently use their water wells for landscaping purposes only. One family uses its well for household cleaning purposes, not for food preparation or ingestion. It is not known if the well water is used for showering or bathing. According to the homeowner, the well has been in use since 1959 and the family purchases bottled water. The homeowner stated his family is not financially able to connect with the city water supply.

Groundwater sampling data from the Falcon Refinery site and surrounding areas were not available for review. The Hazard Ranking System (HRS) Documentation Record states, "... groundwater was impacted by the January 4, 2000 spill from the naphtha stabilizer unit ..." [2]. The public health significance of past exposure through the groundwater could not be assessed. Because of the lack of historical and current sampling data, we have concluded that past and present exposure to the groundwater poses an indeterminate public health hazard.

Surface Water

Summary: Sediment sampling results indicate that hazardous substances identified at the Falcon Refinery site have migrated from the site via the surface water pathway. Surface water sampling data were not available for review. Past and current exposures to contaminants in the surface water at this site pose an indeterminate public health hazard.

The HRS report indicates sediment samples collected from Redfish Bay and the on-site wetlands reveal hazardous substances have migrated from the site via the surface water pathway. Surface water drainage enters the site along the southeastern section of the site and enters the on-site

wetlands. A culvert connects the on-site wetlands, travels to off-site wetlands, and then into Redfish Bay (Intracoastal Waterway).

Access to the site and surrounding wetlands is limited. While fishing does occur in Redfish Bay, actual exposure to surface water contaminants through dermal contact or incidental ingestion during this activity would be limited. It is unlikely that people would be exposed to contaminants often enough to be a health concern. Because of the lack of sampling data, we have concluded that past and present exposure to contaminants in the surface water pose an indeterminate public health hazard.

Surface Soil

Summary: Exposure to contaminants in the surface soil at this site would not be expected to result in adverse health effects. Although access to the site is somewhat restricted, we do not consider exposure to contaminants in the soil either through ingestion or dermal contact to be a significant exposure pathway since: 1) the probability of regularly ingesting contaminated soil is low; 2) the frequency and duration of any contact with contaminated soil would likely be low, and; 3) the surface area of skin likely to come into regular contact with the contaminated soil is likely to be small. The surface soil pathway is expected to pose no apparent public health hazard.

Soil samples were collected from 0 to 6 inches in depth during the May 2000 sampling event. Analysis indicated arsenic and benzo(a)pyrene exceeded their respective HAC values (Table 2). Arsenic and benzo(a)pyrene levels were highest in sample SO-28. This sample was collected from a mound located near the southwest corner of the main facility.

Arsenic exceeded its CREG value of 0.5 mg/kg (milligrams per kilogram) in eighteen samples. Only one sample exceeded the non-cancer HAC value for children. The highest arsenic level was 23.3 mg/kg. It is important to point out, with the exception of sample SO-28, the concentration of arsenic collected from the site is similar to or less than the average concentration of 5.5 mg/kg reported for the western United States [7]. Benzo(a)pyrene exceeded its CREG value of 0.1 mg/kg in three samples. The highest result was 1.6 mg/kg.

Access to the site is somewhat restricted and the exposed population would consist of on-site workers and trespassers. Actual exposure to contaminants through dermal contact or incidental ingestion during these activities would be limited. Since it is unlikely that people would be exposed to contaminants often enough at sufficient concentrations to be a health concern, exposure to the surface soil at the Falcon Refinery site would be expected to pose no apparent public health hazard.

Sediment

Summary: Exposure to contaminants in the sediment at this site would not be expected to result in adverse health effects. Although access to the site is somewhat restricted, we do not consider

exposure to contaminants in the sediment either through ingestion or dermal contact to be a significant exposure pathway since: 1) the probability of regularly ingesting contaminated sediment is low; 2) the frequency and duration of any contact with contaminated sediment would likely be low, and; 3) the surface area of skin likely to come into regular contact with the contaminated sediment is likely to be small. The sediment pathway is expected to pose no apparent public health hazard.

Sediment samples were collected from on-site/off-site wetlands and in the Intracoastal Waterway (Redfish Bay). Sample depths ranged from 0 to 30 inches.

Arsenic exceeded its CREG value of 0.5 mg/kg in twenty-five samples. The highest result was 4.4 mg/kg (Table 3). This sample, SE-12, was collected from off-site wetlands located north of Sunray Road. Benzo(a)pyrene exceeded its CREG value of 0.1 mg/kg in three samples. Sample SE-30 contained the highest level at 3.7 mg/kg. This sample was collected near the site's loading dock facility on Redfish Bay.

The loading dock facility is an industrial area with restricted access. The exposed population would be limited to on-site workers and trespassers that may come into contact with sediments. Actual exposure to the contaminant through dermal contact or incidental ingestion would be limited. Since it is unlikely that people would be exposed to contaminants often enough at sufficient concentrations to be a health concern, exposure to sediment at the Falcon Refinery site would be expected to pose no apparent public health hazard.

Biota (Seafood)

Summary: Biota (seafood) sampling data for Redfish Bay were not available for review. Finfish and shellfish sampling has occurred in water bodies adjacent to the bay. Redfish Bay is used by the public for recreational fishing; however, with the lack of sampling data, past and current exposure to contaminants in the biota at this site pose an indeterminate public health hazard.

The Texas Department of Health Seafood Safety Division periodically collects fish and shellfish samples from coastal waters and the Gulf of Mexico. No finfish or shellfish chemical data for Redfish Bay were available for review. The TDH has placed a restriction on the harvesting of shellfish (oysters, clams, and mussels) from Redfish Bay. The current TDH restriction became effective on November 1, 2003 [8]. This restriction is due to the lack of manpower to enforce shellfish regulations, which is provided by the Texas Parks and Wildlife Department [9].

Because of the lack of historical and current sampling data for Redfish Bay, we have concluded that past and present exposure to contaminants in the biota (seafood) pose an indeterminate public health hazard.

Children's Health Considerations

ATSDR recognizes that the unique vulnerabilities of infants and children demand special emphasis in communities faced with contamination of their water, soil, air, or food. Children are at greater risk than are adults from certain kinds of exposures to hazardous substances emitted from waste sites and emergency events. They are more likely to be exposed because they play outdoors and they often bring food into contaminated areas. They are shorter than adults, which means they breathe dust, soil, and heavy vapors close to the ground. Children are also smaller, resulting in higher doses of chemical exposure per body weight. The developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages. Most importantly, children depend completely on adults for risk identification and management decisions, housing decision, and access to medical care.

ATSDR evaluated the likelihood for children living in the vicinity of the Falcon Refinery site to be exposed to site contaminants at levels of health concern. Children currently are not likely to be exposed to contaminants from the site. Access to the site by children is unlikely because of the distance from residential areas and the limited accessibility to the property. Abandoned equipment and machinery could pose a physical hazard to small children if they were to trespass on the site; however, the plausibility that this will occur is low.

Conclusions

- Based on available information, contaminants in the soil and sediment pose no apparent public health hazard. This is either because contaminants are at low concentration or exposure would be too infrequent to result in adverse health effects.
- Due to the lack of data, we were not able to evaluate the air, groundwater, surface water, and seafood consumption pathways. Therefore we have concluded that the Falcon Refinery site poses an indeterminate public health hazard.

Recommendations

- Sample and analyze the chemical wastes remaining on-site.
- Sample and analyze the on-site groundwater
- Sample and analyze the residential well being used for household cleaning purposes. Determine if the residential well is used for showering and bathing.
- Sample and analyze edible finfish and shellfish in Redfish Bay.

Public Health Action Plan

Actions Taken

- The public health assessment was released for public comment beginning February 8, 2004 and ending March 15, 2004. No additional public comments or concerns were received.

Actions Planned

- The EPA is currently planning to conduct a Remedial Investigation and Feasibility Study. The study is expected to be completed in approximately 1½ years from the start date.
- The TDH and ATSDR will continue to collaborate and review any additional environmental sampling results as they become available.

Authors, Technical Advisors, and Organizations

Report Prepared by

Tom Ellerbee
Environmental Specialist
Environmental Epidemiology and Toxicology Division

Tina Walker, EMT
Information Specialist
Environmental Epidemiology and Toxicology Division

John F. Villanacci, PhD, EMT
Director
Environmental Epidemiology and Toxicology Division

George Pettigrew, PE
Senior Regional Representative
ATSDR Region 6

Robert Knowles, MS, REHS
Environmental Health Scientist
Division of Health Assessment and Consultation
Superfund Site Assessment Branch
State Programs Section

Certification

This public health assessment was prepared by the Texas Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the public health assessment was initiated.

Technical Project Officer, SPS, SSAB, DHAC

The Division of Health Assessment and Consultation, ATSDR, has reviewed this Public Health Assessment and concurs with its findings.

Chief, State Programs Section, SSAB, DHAC, ATSDR

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Appendices

APPENDIX A: Acronyms and Abbreviations

APPENDIX B: Tables

APPENDIX C: Figure

Appendix A - Acronyms and Abbreviations

Acronyms and Abbreviations

ATSDR	Agency for Toxic Substances and Disease Registry
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CREG	Cancer Risk Evaluation Guide
EMEG	Environmental Media Evaluation Guide
EPA	Environmental Protection Agency
ESI	Expanded Site Inspection
HAC	Health Assessment Comparison Value
HOD	Health Outcome Data
HRS	Hazard Ranking System
MRL	Minimal Risk Level
NPL	National Priorities List
PCBs	Polychlorinated Biphenyls
PHA	Public Health Assessment
QA/QC	Quality Assurance/Quality Control
RfD	Reference Dose
RMEG	Reference Dose Media Evaluation Guide
SARA	Superfund Amendments and Reauthorization Act of 1986
SVOCs	Semi-Volatile Organic Compounds
TCEQ	Texas Commission on Environmental Quality
TDH	Texas Department of Health
TNRCC	Texas Natural Resource Conservation Commission
VOCs	Volatile Organic Compounds

Appendix B – Tables



Table 1. Evaluation of Potential Exposure Pathways for Falcon Refinery

Pathway Name	Contaminants of Concern	EXPOSURE PATHWAY ELEMENTS					Time	Conclusions
		Source	Transport Media	Point of Exposure	Route Of Exposure	Exposed Population		
Air (incomplete)	no data	site operations, spills	air	on-site, off-site	inhalation	area residents, workers, trespassers	past present future	Indeterminate public health hazard; due to the lack of sampling data.
Groundwater (incomplete)	no data	site operations, spills	groundwater	on-site, off-site	dermal contact, incidental ingestion	area residents and workers using well water	past present future	Indeterminate public health hazard; due to the lack of sampling data.
Surface Water (incomplete)	no data	site operations, spills	surface water	on-site wetlands, off-site wetlands, Redfish Bay	dermal contact, incidental ingestion	workers, trespassers, off-site fishermen	past present future	Indeterminate public health hazard; due to the lack of sampling data.
Surface Soil (potential)	arsenic, benzo(a)pyrene	site operations, spills	soil	on-site	dermal contact, incidental ingestion	workers, trespassers	past present future	No apparent public health hazard; sufficient evidence indicates that people would not be exposed to potential contaminants in the surface soil at sufficient concentrations and often enough to present a health concern.
Sediment (potential)	arsenic, benzo(a)pyrene	site operations, spills, surface water migration	surface water	off-site	dermal contact, incidental ingestion	workers, trespassers	past present future	No apparent public health hazard; sufficient evidence indicates that people would not be exposed to potential contaminants in the sediment at sufficient concentrations and often enough to present a health concern.
Biota/seafood (incomplete)	no data	surface water migration from site operations, spills	finfish shellfish	off-site fishing	ingestion	off-site fishermen	past present future	Indeterminate public health hazard; due to the lack of sampling data.

Falcon Refinery			
Table 2. – Soil Samples			
Constituents exceeding Health Assessment Comparison (HAC) values			
Constituent	HAC Value	# samples \geq HAC value per total # of samples	Range (mg/kg)
Arsenic	0.5 CREG 20 child / 200adult - chronic EMEG & RMEG	18/33	n.d. – 23.3
Benzo(a)pyrene	0.1 CREG	3/26	n.d. – 1.6 LJ

Falcon Refinery			
Table 3. – Sediment Samples			
Constituents exceeding Health Assessment Comparison (HAC) values			
Constituent	HAC Value	# samples \geq HAC value per total # of samples	Range (mg/kg)
Arsenic	0.5 CREG 20 child / 200adult - chronic EMEG & RMEG	25/33	n.d. – 4.4 J [^]
Benzo(a)pyrene	0.1 CREG	3/33	n.d. – 3.7

CREG = Cancer Risk Evaluation Guide. Based on an excess cancer risk of 1 in 1 million persons exposed over a lifetime.

EMEG = Environmental Media Evaluation Guide

L = reported concentration is between the IDL (instrument detection limit) and the CRDL (contract required detection limit)

J = estimated concentration

mg/kg = milligrams per kilogram

n.d. = not detected

RMEG = Reference Dose Media Evaluation Guide

[^] = actual concentration may be lower than the concentration reported

Appendix C – Figure

Figure 1. General Location and Demographics Information

