Final
Preassessment Screen Determination
For
The Former Indian Refinery NPL Site

United States Department of the Interior
U.S. Fish and Wildlife Service
and
The State of Illinois
The Illinois Department of Natural Resources
The Illinois Environmental Protection Agency
as Trustees of Natural Resources
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1.0 INTRODUCTION

1.1 *Trustee Authority*

Pursuant to the authority of Section 107(f) of the Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended 42 U.S.C. Section 9607(f), Section 311(f) of the Clean Water Act (CWA), 33 U.S.C. Section 1321(f), and Section 2702(b) of the Oil Pollution Act of 1990 (OPA), 33 U.S.C. 2701, and other applicable federal laws, designated federal and state authorities may act on behalf of the public as natural resource trustees to pursue claims for natural resource damages arising from injury to, destruction of, or loss of natural resources resulting from the release of oil and hazardous substances to the environment. Claims may be pursued against parties that have been identified as responsible for releasing oil and hazardous substances to the environment. The objective of such claims is to restore, replace, or acquire the equivalent of such natural resources.

The President has designated the Secretary of Interior as a natural resource trustee for the purpose of pursuing natural resource claims under the authority of CERCLA, CWA and OPA. The U.S. Department of Interior (DOI) is acting through the U.S. Fish and Wildlife Service (FWS) as a natural resource trustee at this site.

The Directors of the Illinois Environmental Protection Agency (IEPA) and the Illinois Department of Natural Resources (IDNR) are designated by the Governor of the State of Illinois as natural resource trustees for the purpose of pursuing natural resource claims under the authority of CERCLA, CWA, and OPA.

Regulations setting forth a process for conducting natural resource damage assessments for the release of hazardous substances have been promulgated and are set forth in 43 CFR Part 11 for CERCLA and the Clean Water Act, and 15 CFR Part 990 for OPA. Under these regulations, damage claims resulting from the discharge of a mixture of oil and hazardous substances must be prepared under 43 CFR Part 11.

1.2 *Preassessment Screen*

The first step in developing a natural resource damage assessment is the completion of a preassessment screen. The purpose of the preassessment screen is to provide a rapid review of readily available information on hazardous substance releases and the potential impacts of those releases on natural resources under the trusteeship of federal and state authorities. The intent is to ensure that a reasonable probability of making a successful claim exists, and thus documents that further investigation and assessment work are warranted at the site.

The decision to proceed beyond the preassessment phase is based upon meeting the following criteria as set forth in 43 CFR 11.23(e):

1. A release of a hazardous substance has occurred;

2. Natural resources for which the trustees may assert trusteeship under CERCLA have been or are likely to have been adversely affected by the release;

3. The quantity and concentration of the released hazardous substance is sufficient to potentially cause injury to natural resources;

4. Data sufficient to pursue an assessment are readily available, or likely to be obtained at a reasonable cost; and

5. Response actions if any, carried out, or planned do not or will not sufficiently remedy the injury to natural resources without further action.

This preassessment screen addresses potential claims for natural resource damages associated with injuries resulting from the release of oil and hazardous substances associated with the Former Indian Refinery to the environment, including the Embarras River and select floodplain areas. This preassessment screen has been prepared by FWS, IDNR and IEPA, as trustees for natural resources (Trustees).

1.3 *Site Setting*

The Former Indian Refinery NPL Site (Former Indian Refinery) encompasses approximately 990 acres located south of the City of Lawrenceville, Lawrence County, IL (Figures 1 and 2). The refinery property sits, in part, in the 100-year floodplain for the Embarras River. The site is bounded by various land uses including residential neighborhoods, cropland, bottomland forest, the Embarras River, and an unnamed tributary to Indian Creek. The site can be broken into five geographical areas for further consideration:

1. Refinery Operations Area;
2. Land Treatment Unit;
3. Indian Acres Area;
4. Bottomland Area; and
5. Embarras River Floodplain Area.

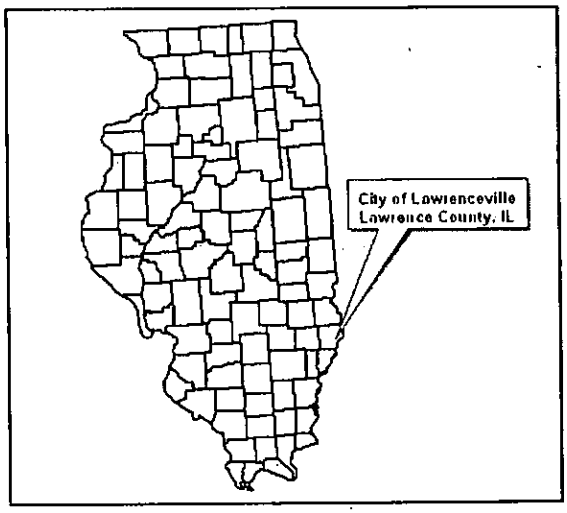

Figure 1: Location of Lawrenceville, Illinois

The Refinery Operations Area is that portion of the site where refinery processes historically occurred. It is predominantly characterized by roads, buildings, and refinery machinery. However, the eastern portion of this area contains some wetlands and grassland areas (ELM Unpublished Data).

The Land Treatment Unit (LTU) was used as a land farm for the treatment of hazardous wastes. The unit is bordered to the west by an unnamed tributary to Indian Creek. Open water in the westernmost portion of this unit contains early successional aquatic plants (ELM Unpubl. Data).

The Indian Acres Area (Indian Acres) contains wetlands located in the northeast corner of the site. It is hydraulically connected to the Embarras River, and is subject to periodic flooding. This area is characterized as bottomland forest, emergent wetlands, and seasonal ponds (ELM Unpublished Data).

The Bottomland Area is the area along the eastern and southern portion of the site. It consists of those portions of the refinery property that are not known to have been associated with refinery operations and are located in the 100-year floodplain of the Embarras River. This area is characterized by floodplain forest, early successional fields, emergent wetlands, and several oxbow ponds (ELM Unpublished Data).

The Embarras River flows along the eastern border of the refinery property. The Former Indian Refinery is located along a reach of the lower portion of the river. The Embarras River near this area has been channelized for several miles to the north of the City of Lawrenceville, and then again from a point adjacent to the refinery for approximately six miles to the confluence with the Wabash River. However, the area adjacent to the City of Lawrenceville and the northern portion of the site still has some of its natural qualities.

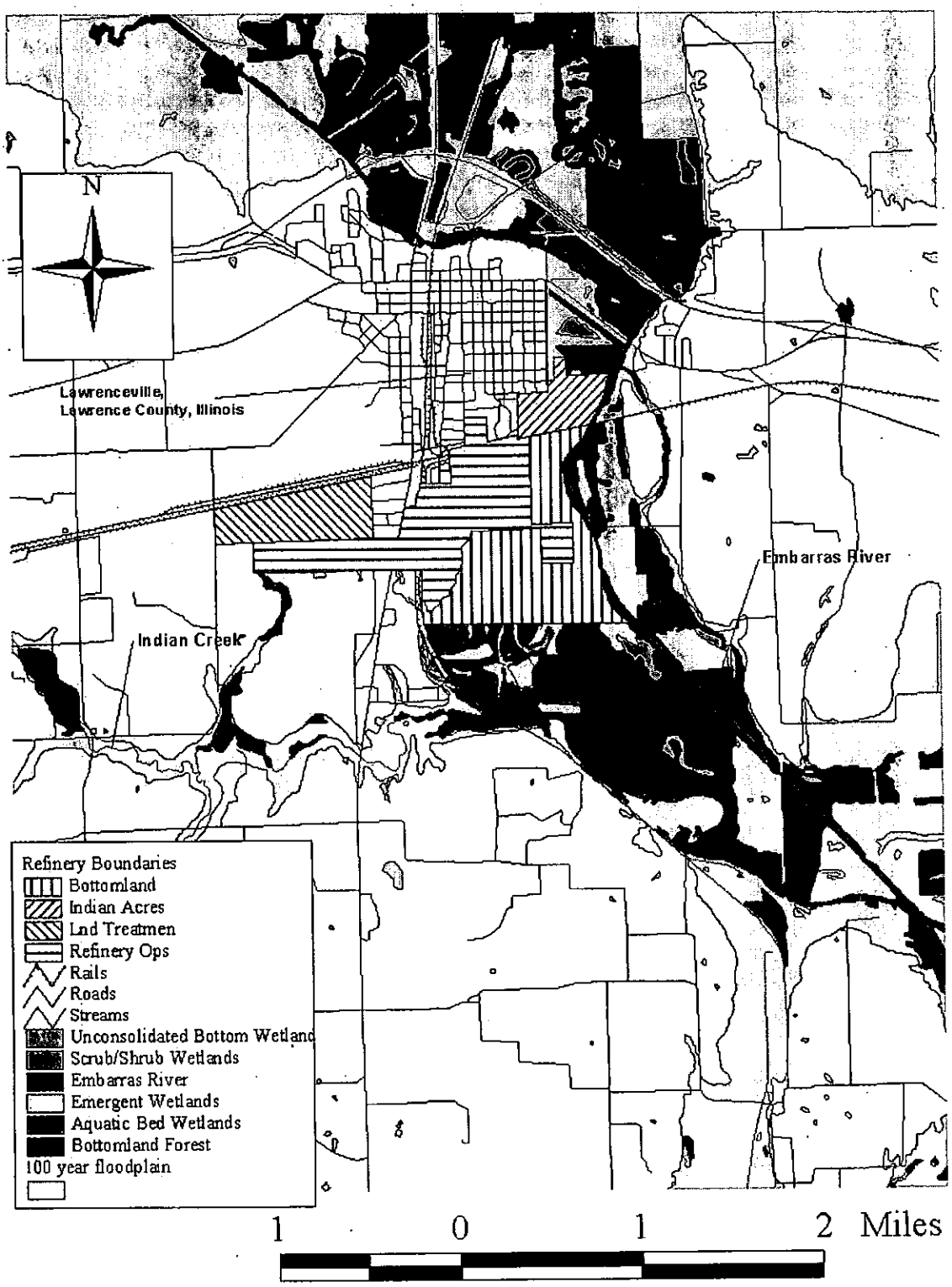

Figure 2: Location of the Former Indian Refinery NPL Site within the surrounding area.

2.0 INFORMATION ON THE SITE AND THE RELEASE OF HAZARDOUS SUBSTANCES

2.1 *Time, Quantity, Duration and Frequency of Releases*

The Former Indian Refinery is the site of an inactive oil refinery facility located on the southern end of the City of Lawrenceville, Lawrence County, IL. The refinery was established and began operation in the early 1900s, and operated for a number of years until its shutdown in 1995. The Trustees believe that releases to the environment have occurred at various times throughout the operation of the refinery, and continue to occur today.

During the time of operation, various products were produced at the refinery such as liquid petroleum gas, motor gasoline, aviation gasoline, jet fuel, burner oil, diesel oil, home heating oil, fuel oil, and asphalt materials. Also, various waste products such as oily sludges, acidic lube oil filter clay, lime sludge, catalyst waste, tar, and asphalt wastes were generated and disposed of on site and in the floodplain of the Embarras River (ATSDR 2000; USEPA 1999).

The site has recently been listed on the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) National Priorities List (ATSDR 2000). The remedial investigation for the site has only recently begun, and the full extent of contamination is not yet fully understood.

2.2 *Description of Hazardous Substances Released*

2.2.1 Acidic Sludge

The most obvious waste located on the Former Indian Refinery is an acidic sludge (IEPA 1998; USFWS Unpublished Data). The material is believed to be a low pH tar waste formed from a combination of lube oil filter clay, sulfuric acid, and various oily wastes (IEPA 1998; USEPA 1999). The sludge has been described as a hard and crystalline material which when left in a pile will deform and flow. This material has been documented as seeping to the surface in the warmer months (IEPA 1998). Further investigation of the waste is needed to determine if all occurrences of acidic sludge consist of the same chemical makeup, and if there are further hazardous wastes associated with this waste.

2.2.2 Polycyclic Aromatic Hydrocarbons (PAHs)

Polycyclic aromatic hydrocarbons (PAHs) have been identified in sediments in various ponds and sludge waste piles at the Former Indian Refinery. They are a large group of compounds consisting of two or more fused benzene rings in various combinations, which may or may not have substituted groups attached to one or more rings. PAHs may have been produced at the site through a number of activities associated with significant production of PAHs including catalytic cracking; manufacture coal tar pitch and asphalt; controlled refuse incineration; open burning; and emissions from internal combustion engines used in transportation (Eisler 1987). Weathering processes occurring in aquatic environments include evaporation, photochemical oxidation, microbial degradation, dispersion and dissolution in the water, and deposition on sediments. In general, due to the hydrophobic and lipophillic nature of PAHs, they are found in much higher concentrations in the sediments than in the water column. PAHs in the water column are usually found in suspended material rather than in the water itself (Beyer et. al. 1996).

PAHs may be taken into the body through inhalation, ingestion, or skin contact. Many animals and microorganisms have the ability to metabolize PAHs. Some PAHs are transformed to intermediates, which are highly toxic, mutagenic, or carcinogenic to the host (Eisler 1987).

Many PAHs are among the most potent known carcinogens. PAHs of different molecular weights vary substantially in their behavior and their biological effects. Generally, the lower molecular weight unsubstituted PAH compounds, containing two or three rings have significant acute toxicity to some organisms. However, all known PAH carcinogens and tumor producers are in the high molecular weight PAH group (Eisler 1987). Several studies have shown that toxicity of PAHs to aquatic organisms is enhanced by exposure to ultraviolet light sources such as sunlight (Ankley et. al. 1994; Monson et. al. 1995; Walker et. al. 1998; Weinstein and Polk 2001).

2.2.3 Benzene, Toluene, Ethyl-benzene, Xylene (BTEX)

Benzene, toluene, ethyl-benzene, and xylene (BTEX) components have been detected in groundwater at the Former Indian Refinery (SECOR 2002). They are a highly volatile group of monocyclic aromatic hydrocarbons. BTEX components are products of the refining process and are components of motor fuels. Generally, BTEX constituents volatilize rapidly at the soil or water surface to the atmosphere. However, they often persist for longer periods of time in subsurface soils, and groundwater due to restricted underground evaporation (Green and Trett 1989).

BTEX uptake is generally through the route of inhalation, or ingestion. BTEX compounds represent some of the most hazardous components of gasoline. Acute hazards of these compounds include acute toxicity to aquatic life in the water column, as well as inhalation hazards to terrestrial organisms. Long term BTEX hazards include changes in the liver and harmful effects on the kidneys, heart, lungs, and nervous system (Irwin et. al. 1997).

2.2.4 Metals

Refinery oil waste is known to contain a wide range of metals. Some key metals include vanadium, lead, zinc and copper, which may be deleterious in freshwater environments (Green and Trett 1989). Sampling at the Former Indian Refinery has confirmed the presence of cadmium and lead in waste piles and soils (IEPA 1998). However, at this time, the site has not been fully characterized, and other metal contaminants may be present at the site.

Cadmium

Cadmium is a relatively rare metal, and is commercially obtained as an industrial by-product of the production of zinc, copper, and lead. Major uses of cadmium are in electroplating, in pigment production, and in the manufacture of plastic stabilizers and batteries. Anthropogenic sources of cadmium include smelter fumes and dusts, the products of incineration of cadmium bearing materials and fossil fuels, fertilizers, and municipal wastewater and sludge discharges (Eisler 1985).

Cadmium has no known biological function. It may be taken into the body through respiration or ingestion where it may gradually accumulate in target organs resulting in eventual tissue dysfunction (Beyer et. al 1996). Cadmium is a known teratogen and carcinogen, a probable mutagen, and has been implicated as the cause of deleterious effects on fish and wildlife. In sufficient concentration, it is toxic to all forms of life, including microorganisms, higher plants, animals, and humans. Teratogenic effects on animals appear to be greater for cadmium than for other metals, including lead, mercury, copper, indium, and arsenic (Eisler 1985).

Lead

Lead is ubiquitous and is a characteristic trace constituent in rocks, soils, water, plants, animals, and air. More than 4 million metric tons of lead are produced worldwide each year, mostly for the manufacture of storage batteries, gasoline additives, pigments, alloys, and ammunition. Until recently, about 20% of all domestic lead consumption was in the manufacture of gasoline antiknock additives such as tetramethyllead (TML) and tetraethyllead (TEL). The widespread

broadcasting of lead through anthropogenic activities, especially during the past 40 years, has resulted in an increase in lead residues throughout the environment. Lead is neither essential nor beneficial to living organisms; all existing data show that its metabolic effects are adverse (Eisler 1988).

Lead is toxic in most of its chemical forms and can be incorporated into the body by inhalation, ingestion, dermal absorption, and placental transfer to the fetus. It is an accumulative metabolic poison that affects behavior, as well as the hematopoietic (blood formation), vascular, nervous, renal, and reproductive systems. Lead damages nerve cells and ganglia, and alters cell structure and enzyme function. It adversely affects survival, growth, reproduction, development, and metabolism of most species under controlled conditions, but its effects are substantially modified by numerous physical, chemical, and biological variables. Lead is toxic to all phyla of aquatic biota, though effects are modified significantly by various biological and abiotic variables (Eisler 1988). Lead is especially toxic to fish where it can lead to excess mucous formation which can coat the gills and impact respiration (Irwin et. al. 1997). Lead is not essential for plants, and excessive amounts can cause growth inhibition, as well as reduced photosynthesis, mitosis, and water absorption (Eisler 1988).

2.3 *History, Current/Past Use and Relevant Operations at the Sites Identified as Sources of the Discharge of Oil or Release of Hazardous Substances*

Oil refining operations at the Former Indian Refinery near the City of Lawrenceville, IL began in the early 1900s. Refinery operations ceased in 1995 when the refinery was closed (USEPA 1999).

Between 1915 and 1950, the refinery processed crude oil with sulfuric acid to produce lubricating oil. This process involved the treatment of the materials with filter clays producing an acid filter cake sludge waste product. This sludge consists of paraffin, the waxy portion of the crude oil, various polycyclic aromatic hydrocarbons, and has a pH of 1-2. It was historically disposed of in Indian Acres (USEPA 1999).

In June 1996, the IEPA issued a seal order for the Indian Acres property (IEPA 1996). In late 1996, the U.S. Environmental Protection Agency (EPA) on-scene coordinator and Superfund Technical Assistance and Response Team conducted a removal site assessment at Indian Acres and found numerous lagoons and waste exposed at the area's surface (USEPA 1999).

In 1996, an acidic sludge was found at the soil surface of a residential neighborhood north of and adjacent to Indian Acres. EPA and IEPA initiated a removal action to address off-site contamination in this residential area. Similar material is found at or near the surface in various locations throughout the refinery property (ATSDR 2000).

In 1997, the City of Lawrenceville initiated a storm sewer upgrade project to address flooding problems in an area located near Indian Acres. The City installed a new sewer line consisting of a 48-inch corrugated metal pipe placed in a gravel filled trench, over two under-drain perforated pipes. This new sewer line ran from the existing sewer line under the railroad berm along the southern edge of Indian Acres, in violation of the IEPA Indian Acres seal order, to an outfall at the Embarras River. As a result of the installation of the new storm sewer line, under-drain pipes and trench, contaminants associated with Indian Acres have been and continue to be released to the Embarras River (USEPA 2002). An administrative order was issued by EPA to the City for the implementation of corrective actions (USEPA 2002).

In June 1997, the FWS discovered an ongoing discharge of oil on the southern portion of the property. During a site inspection associated with this investigation, dead waterfowl were collected from the "C-pond" by FWS Special Agents (USFWS Unpublished Data). The EPA and IEPA conducted a preliminary site assessment and site inspection of the refinery. The assessment confirmed that a subsurface oil product floating on the groundwater was discharging into wetlands hydraulically connected to the Embarras River (USEPA 1999). Most of the vegetation in the

affected bottomland forest area impacted by the release was found to be dead. From June of 1997 to January 1998, EPA conducted a removal action for the oil release area (USEPA 1999).

In May 1998, a prospective purchaser agreement was executed between the United States, the State of Illinois, Clark Oil Trading Company, and Blastco Services Company. In this agreement a settlement was paid to the Trustees for use in restoring, replacing, acquiring or assessing natural resource damages at the site (USEPA 1998).

In June 1999, EPA, IEPA, and Texaco, Inc. signed an Administrative Order by Consent requiring Texaco, Inc. to conduct a Remedial Investigation and Feasibility Study of the Former Indian Refinery and adjacent areas (USEPA 1999). In December 2000, the State of Illinois, and Texaco, Inc. signed a similar consent decree resulting in remedial activities for the site falling under the lead of the IEPA with minimal EPA involvement.

In the spring of 2002, Indian Acres was inundated when the Embarras River flooded and left its banks. When the water receded, large deposits of acidic sludge on the soil surface near the B&O railroad bridge were found to have been scoured away and presumably carried downstream for deposition (IEPA Unpublished Data).

In the fall of 2002, EPA issued an administrative order to the City of Lawrenceville. This order requires the City to install a new sewer line, remove the sewer line that runs through Indian Acres, and install a permanent engineered barrier to prevent migration of contaminants to the Embarras River (USEPA 2002).

On several occasions, groundwater seeps have been identified on the banks of the Embarras River. The most recent of these discharges occurred in October 2002 following a large rain event. The seeps are usually found along the stretch of the river between the heliport landfill area and the NPDES outfall (IEPA Unpublished Data).

2.4 *Additional Hazardous Substances Potentially Released from the Sites*

Metals

In addition to the metals discussed in section 2.2, other metals are known to be associated with refinery processes. EPA Region 5 Office of Solid Waste has developed a list of hazardous constituents applicable to refinery wastes (Skinner list). The current list includes antimony, arsenic, barium, beryllium, chromium, cobalt, cyanide, mercury, nickel, selenium, silver, vanadium, and zinc as well as the metals addressed in section 2.2.4 of this document. Present sampling efforts at the Former Indian Refinery have not yet confirmed the presence of these additional metals. However, at this time, the site has not been fully characterized, and other metal contaminants may be present at the site.

Polychlorinated Biphenyls

Polychlorinated biphenyls (PCBs) were used in various electrical components at the refinery during its operating history. A recent survey of oil immersed electrical equipment records accounted for the majority of this equipment. However, 29 transformers containing low concentrations of PCBs, and several drums of transformer oil containing low concentrations of PCBs were not located. There were several empty drums located in the refinery electrical shop, but it is unclear as to whether these are the missing drums or not (Hanson Engineers, Inc 2000).

The site is in the early stages of investigation and the full extent of contamination is not yet understood. Additional hazardous substances may be discovered as the site investigation progresses.

Other Organic substances

The Region 5 Skinner list includes a number of other various volatile and semi-volatile organic compounds which have not yet been detected at the Former Indian Refinery, but may be identified as the site investigation progresses. These include phthalates, phenols, and cresols among others.

2.5 *Potentially Responsible Parties*

The refinery and properties associated with the refinery operations throughout its history have been held or operated by various entities. These include the Indian Refining Company, a Maine Corporation; the Central Refining Company; Texaco, Inc.; Getty Refining and Marketing Inc.; Texaco Refining and Marketing, Inc.; Indian Refining Company, a Delaware Corporation; OPA Refining and Marketing, Inc.; Casperco, Inc.; Castle Refining Corporation; Indian Refining Limited Partnership; and the City of Lawrenceville (USEPA 1999; ATSDR 2000). In 1996 the refinery property was transferred to American Western Refining Limited Partnership (USEPA 1999).

Chevron Texaco, one of the potentially responsible parties at the Former Indian Refinery, has expressed an interest in working with the Trustees to integrate the remedial investigation process with the natural resource damage assessment activities, simultaneously assessing natural resource injuries and characterizing ecological risks associated with releases from the site.

2.6 *Damages Excluded from Liability under CERCLA or CWA*

The Regulations at 43 CFR Part 11.24 require that Trustees must determine whether the damages being considered are barred by specific defenses or exclusions from liability under CERCLA or the CWA. The Trustees have made such determinations, and believe that such defenses or exclusions from liability are not dispositive, and are without merit. These required determinations are as follows:

- The Trustees must determine whether the damages (i) result from the discharge or release were specifically identified as an irreversible and irretrievable commitment of natural resources in an environmental impact statement or other comparable environmental analysis, that the decision to grant the permit or license authorizes such commitment of natural resources, and that the facility or project was otherwise operating within the terms of its permit or license, so long as, in the case of damages to an Indian tribe occurring pursuant to a Federal permit or license, the issuance of the permit or license was not inconsistent with the fiduciary duty of the United States with respect to such Indian Tribe; or

- (ii) Resulted from releases of a hazardous substance which have occurred wholly before the enactment of CERCLA; or

- (iii) Resulted from the application of a pesticide product registered under the Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. 135-135k; or

- (iv) Resulted from any other federally permitted release, as defined in Section 101 (10) of CERCLA; or

- (v) Resulted from the release or threatened release of recycled oil from a service station dealer described in Section 107 (a)(3) or (4) of CERCLA if such recycled oil is not mixed with any other hazardous substance and is stored, treated, transported or otherwise managed in compliance with regulations or standards promulgated pursuant to section 3014 of the Solid Waste Disposal Act and other applicable authorities.

- The Trustees must also determine whether the discharge meets one or more of the exclusions provided in Section 311 (a)(2) or (b)(3) of the CWA.

The Trustees have determined that none of the potential injuries referred to herein meet one or more of the above criteria, nor are they subject to the exceptions to liability provided under section 107 (f), (i) and (j) and 114(c) of CERCLA, and section 311(a)(2) or (b)(3) of the CWA.

3.0 PRELIMINARY IDENTIFICATION OF RESOURCES POTENTIALLY AT RISK

3.1 *Preliminary Identification of Pathways*

3.1.1 Direct Contact

As there is a large quantity of uncontained waste exposed at the soil surface at various locations throughout the eastern portion of the site, there is the potential for direct contact with free product and contaminated media. Direct contact with acidic sludge wastes could pose a threat due to the acidic nature of the waste. Samples taken of the waste indicate a pH range of 1.0 to 4.6 (IEPA 1998).

Soil samples collected at certain portions of the site indicate elevated concentrations of PAHs, metals, and BTEX compounds in the top 12 inches of the soil profile (IEPA 1998). Surface soil contaminants may pose a threat by direct contact to burrowing mammals, soil invertebrates, as well as a threat through incidental ingestion for avian species that ingest soil for use as grit or when it is attached to their food items (King and Bendell-Young 2000).

3.1.2 Surface Water

One exposure pathway for site-related contaminants from source areas to natural resources is through the combination of stormwater and surface water drainage pathways. Surface water runoff at the site eventually discharges to the Embarras River, oxbow ponds, swampy waters, the "C-pond", and the tributary to Indian Creek.

As a large part of the site is located in the 100-year floodplain of the Embarras River, Indian Acres, the Bottomland Area, and portions of the Refinery Operations Area regularly become inundated with floodwaters from the Embarras River (IEPA 1998) allowing contaminants, and contaminated media to be carried off site through the Embarras River.

The Embarras River immediately downstream of the site has, at some point in time, been channelized. Channelization can cause increased sediment loads and load transport through higher velocity and flow regimes. Contaminants and contaminated media that enter the Embarras River most likely will be carried downstream until they reach a point where the flow velocity is reduced. The first apparent depositional area downstream of the site is at the confluence of the Embarras and Wabash Rivers.

Contaminants in surface water pose a threat to purely aquatic species such as fish, mussels, and invertebrates which spend their entire life cycle in the surface waters. Releases to surface waters may also adversely affect species which have a portion of their life cycles dependent on surface water such as amphibians, and emergent insects. Aquatic dependent species which depend on aquatic resources for their food, or water supply such as piscivorous birds, insectivorous birds, and migratory waterfowl are also adversely affected by surface water contaminants.

3.1.3 Particulates and Sediments

Due to their physical and chemical properties, contaminants currently identified with the site have a high affinity to associate with particulate organic matter and charged inorganic substances, such as clays, found in the water column and sediments. Contaminants associated with the site may be transported with soils and organic material into the various surface water bodies. They may eventually be deposited in the sediments or carried with particulate matter in the water column, where they may be made available to biota.

3.1.4 Remnant Deposits

The remnant deposits in the Embarras River are areas of former depositional areas that become exposed through scouring of the river bed during flood events. Contaminants from the site may settle in depositional areas and become buried over the years. When a flood event of sufficient magnitude occurs, the clean deposits may become scoured away exposing a new source of contaminants to biota.

3.1.5 Groundwater

Recent sampling of groundwater along the fenceline of the refinery property revealed the presence of "free product" in the form of light non-aqueous phase liquids (LNAPL) at a number of sampling points. Groundwater on the site generally flows to the southeast where it most likely discharges to the Embarras River. There appears to be a split in the direction of flow for the aquifer at some unknown location in the LTU where the eastern half of the LTU flows east towards the Embarras River and the western portion of the aquifer flows west towards the tributary to Indian Creek (SECOR 2002).

3.1.6 Air

Air may serve as an exposure pathway to soils, surface water, and biota by transport of particulate and volatile organic compounds. Acidic sludge wastes seeping to the surface have been shown to contain volatile and semi volatile organic compounds (IEPA 1998). Birds and mammals may be exposed to hazardous substances through inhalation of these volatile emissions.

3.1.7 Biota

Fish and wildlife may be exposed to site contaminants directly or indirectly through the food chain. Food chain exposures can occur when contaminants accumulate in the tissues of prey, and are subsequently consumed by predatory animals. Some of the hazardous substances presently identified at the Former Indian Refinery bioaccumulate in tissues (Eisler 1985; 1987; 1988).

Lower trophic level organisms may be directly exposed to metals, PAHs, and other hydrocarbons from sediments, surface waters, soils, waste piles, or air. These lower trophic level organisms serve as prey for higher trophic level consumers. Reduction of the prey base or loss of selected prey items affects the use of the site by predators.

3.2 *Exposure Areas*

3.2.1 Areas of Direct Exposure

As discussed in section 1.3 of this document, the site can be divided into five geographical areas for discussion. This section will discuss the areas of direct exposure based upon these divisions.

Refinery Operations Area

The Refinery Operations Area consists of the highly industrialized areas where the refinery operations took place including various support structures. The refinery is currently being dismantled. Some prominent features located in this area include refinery process machinery, support buildings, oil water separators, a former heliport area, non-RCRA landfills, a firewater pond, wastewater treatment ponds, the "C-pond", various small jurisdictional wetlands, and several tank farms (SECOR and ELM 2000).

Land Treatment Unit

The LTU or land farm is located in the northwestern corner of the site. A residential area bounds the unit to the east, cropland to the north, an unnamed tributary to Indian Creek to the west, and a tank farm to the south. In recent years, early successional wetland plants have become established in the open water portion of the unit adjacent to the unnamed tributary to Indian Creek. The LTU was operated from 1973 to 1988 for handling hazardous waste and lime sludge material (SECOR and ELM 2000). It is awaiting proper closure.

Indian Acres Area

Indian Acres is an approximately 21-acre parcel of land located in the northeast section of the site. The City of Lawrenceville Sewage Treatment Plant borders this area to the north, a residential neighborhood to the west, the Refinery Operations Area to the south, and the Embarras River to the east. Indian Acres is a portion of the property which was used for tank farming and waste disposal as well as the site of some of the original refinery process area, which was dismantled shortly after World War II. This area is predominately bottomland forest with several open water areas (SECOR and ELM 2000).

Bottomland Areas

The Bottomland Area encompasses the largest portion of the site. Located in the southeastern portion of the site, the area is bounded to the east by the Embarras River, to the south by bottomland forest, and to the north and west by the Refinery Operations Area. Features in this area include several open water and swampy areas, mixed hardwood bottomland forest, a lime sludge disposal area, oil/water/sludge separator ponds, and a former land treatment unit for settling pond dredged sediments (SECOR and ELM 2000).

Embarras River Floodplain Areas

The Embarras River is the predominant drainage pathway for surface water in the area. The river discharges into the Wabash River approximately 4 miles downstream of the refinery. At some unknown point in time, the Embarras River was channelized between the site and the Wabash River. The channelization of the Embarras River has resulted in a swifter current in the channel, and it is likely that water-entrained contaminants and contaminated media do not likely settle out of the water column until they reach the Wabash River. Also, as a result of this channelization, several oxbows were created in adjacent floodplains. As the refinery had been operated for a period of time before and after the river was channelized, these oxbows may be repositories for site-related contaminants released to the river prior to channelization.

In 1996, an acidic sludge material was found at the soil surface of a residential neighborhood in the floodplain of the Embarras River north of and adjacent to Indian Acres (USEPA 1999). Stormwater runoff from this area was directed through a culvert directly to the Embarras River at a location north of the City of Lawrenceville's wastewater treatment plant (IEPA 1998). EPA and IEPA completed a removal action to address off site contamination in this residential area (ATSDR 2000).

3.2.2 Areas of Indirect Exposure

Areas of indirect exposure include several off site areas where colonial bird rookeries have been started over the years. Several colonial birds have been seen utilizing surface water areas on the site for foraging and feeding. A number of heron rookeries have been established, disappeared, and reestablished over the years located within a few miles of the site (Kleen 1999; 2000; 2001). The birds at these rookeries utilize the site for feeding and foraging, and may be exposed to site contaminants that bioaccumulate in the food items.

3.3 *Potentially Affected Resources and Resource Services*

3.3.1 Biotic Resources and Services

Threatened and Endangered Species

There are several threatened and endangered species that potentially occur in the vicinity of Lawrenceville, IL. Field surveys for threatened and endangered species are on-going. The field survey data will allow for a complete list of threatened and endangered species found at the site. The only federally listed endangered species potentially impacted by site contaminants on or near the site are the Indiana Bat (*Myotis sodalis*) and the fanshell mussel (*Cyprogenia stegaria*). The eastern massasauga rattlesnake (*Sisturus catenatus catenatus*), a federal candidate species, may potentially be found in the vicinity of the site.

State listed threatened species that could potentially be impacted by discharges from the site include the River otter (*Lontra candensis*), eastern sand darter (*Ammocrypta pellucidum*), brown creeper (*Certhia americana*), pied-billed grebe (*Podilymbus podiceps*), red-shouldered hawk (*Buteo lineatus*), least bittern (*Ixobrychus exilis*), common moorhen (*Gallinula chloropus*), spike (*Elliptio dilatata*), American snowbell (*Styrax Americana*), broomrape (*Orobranche ludoviciana*), the four-toed salamander (*Hemidactylium scutatum*), and Kirtland's snake (*Clonophis kirtlandi*) (Herkert 1991; 1992; 1994).

State listed endangered species that could potentially occur at the site include the short-eared owl (*Asio flammeus*), Henslow's sparrow (*Ammodramus henslowii*), American bittern (*Botaurus lentigiosus*), northern harrier (*Circus cyaneus*), upland sandpiper (*Bartramia longicauda*), black rail (*Laterallus jamaicensis*), king rail (*Rallus elegans*), Wilson's phalarope (*Phalaropus tricolor*), harlequin darter (*Etheostoma histrio*), bigeye chub (*Hybopsis amblops*), bigeye shiner (*Notropis boops*), snuffbox (*Epioblasma triquetra*), round hickorynut (*Obovaria subrotunda*), sheepnose (*Plethobasus cyphyus*), kidneyshell (*Ptychobranchus fasciolaris*), rabbitsfoot (*Quadrula cylindrical*), purple lilliput (*Toxoplasma lividus*), rainbow (*Villosa iris*), little spectacle case (*Villosa lienosa*), salamander mussel (*Simpsonaias ambigua*), rayed bean (*Villosa fabalis*), eastern massasauga (*Sistrurus catenatus catenatus*), eastern ribbonsnake (*Thamnophis sauritus*), and leatherflower (*Clematis viorna*) (Herkert 1991; 1992; 1994; Endangered Species Protection Board 1999).

Copperbelly watersnakes (*Nerodia erythrogaster neglecta*) have been observed on the Former Indian Refinery (IDNR Personal Communication 2002). The copperbelly watersnake has a special designation in the State of Illinois. The DOI and the State of Illinois have a conservation agreement that protects this watersnake as if it was a federally listed species (IDNR personal communication 2002; USFWS personal communication 2002).

As discussed in Section 3.2.1, contaminants released from the site into the Embarras River are likely to be carried downstream and become deposited in the Wabash River. Several endangered mussel species are known to exist in the Wabash River. The federally listed species in the Wabash River include the fanshell mussel (*Cyprogenia stegaria*), fat pocketbook pearlymussel (*Potamilus capax*), orange-footed pearlymussel (*Plethobasus cooperianus*), clubshell (*Pleurobema clava*). The federally endangered rough pigtoe (*Pleurobema plenum*) is believed to be extirpated from the

Wabash River. In addition to these species, State listed species in the Wabash River include the elephant ear (*Elliptio crassidens*), ebonyshell (*Fusconaia ebena*), and sheepnose (*Plethobasus cyphyus*) mussels (IDNR 2002).

Contaminant effects and services for endangered species will be discussed in the following subsections under the general species type.

Benthic and Epibenthic Species

As the site contains both lentic and lotic surface water habitats, several benthic and epibenthic species are likely to occur in the vicinity of the Former Indian Refinery. Some representative species at the site include mayflies (order Ephemeroptera), dragonflies and damselflies (order Odonata), caddisflies (order Trichoptera) , stoneflies (order Plecoptera), beetles (order Coleoptera), flies (order Diptera), bugs (order Hemiptera), oligochaetes (class Oligochaeta), isopods (order Isopoda), amphipods (order Amphipoda), crayfish (order Decapoda), mussels (order Unionoida), and snails (order Basommatophora) (IDNR 1997).

Invertebrates play a key role near the base of the food chain. These lower trophic level organisms are sensitive to contaminants identified at the Former Indian Refinery. Contamination may potentially have affected and continue to affect the relative abundance and diversity of these prey organisms needed by second order consumers such as fish and birds.

Fish

Located in the waters of the Former Indian Refinery and the Embarras River are several game and non-game fish species. These include gar (family Lepisosteidae), shad (family Clupeidae), minnow species (family Cyprinidae), darter species (family Percidae), sucker species (family Catostomidae), drum (family Sciaenidae), catfish (family Ictaluridae), and several sunfish species (family Centrarchidae) (ELM Unpublished Data; IDNR 1997).

Fish are susceptible to site-related constituents. These contaminants can bioconcentrate and bioaccumulate and be stored in the tissues and reproductive organs. They may adversely affect the growth, survival and reproduction of the organism, which in turn reduce biodiversity, and relative abundance in the community.

Fish in the Embarras River provide supplemental income to commercial fisherman as well as food and recreation to recreational fisherman (IDNR personal communication 2002; IDNR 1997). Additionally, fish species provide ecological value as prey for piscivorous fish, birds and mammals.

Migratory Birds

The Former Indian Refinery is located in a major migratory bird flyway. With its diverse ecological settings, including its many surface water areas, it is an attractive stopping over spot for migratory waterfowl during the spring and fall migrations. The site is utilized for foraging and feeding by waterfowl, colonial waterbirds, and songbirds. The site may also provide valuable habitat for bird breeding and rearing of broods.

During the Tank 572 oil release investigation, FWS Special Agents collected dead waterfowl from the "C-pond." The birds died from contact with oil-related contaminants contained in the pond (USFWS Unpublished Data). It is likely that more waterfowl were killed than those found on this one time search.

Migratory birds provide consumptive and non-consumptive recreational opportunities such as bird watching, nature photography, and waterfowl hunting. Smaller birds also play a part in the food chain as prey species.

Mammals

The Former Indian Refinery is potentially utilized by several species of mammals. Some representative species of mammals include the white-tailed deer (*Odocoileus virginianus*), rabbit (Family Leporidae), beaver (*Castor canadensis*), several species of bat (family Vespertilionidae), mink (*Mustela vison*), muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), river otter (*Lutra canadensis*), voles and mice (family Cricetidae) (IDNR 1997).

Larger mammalian species are particularly susceptible to chemicals which biomagnify as they are generally the top level consumers in the ecosystem ingesting large numbers of organisms with lower concentrations of contamination.

Some mammalian species associated with the site are game species which provide recreational hunting. Additionally, there are many furbearing species located near the site which may provide supplemental income to commercial trappers.

Reptiles and Amphibians

The Former Indian Refinery is potentially used by several species of reptiles and amphibians. Some species typically found in the habitats associated with the site include turtles (order Testudinia), snakes (order Squamata), frogs (order Anura), and salamanders (order Urodelea) (IDNR 1997).

Due to the unique physiology associated with herpetofauna, especially amphibians, they are especially susceptible to site-related contaminants. They may be exposed to contaminants through contact with soils and water, and through ingestion of food items, water, or soils. Contaminants can then bioaccumulate in tissues where they can interfere with growth, survival, and reproduction.

Reptiles and amphibians provide important ecological services as prey items for higher trophic level organisms such as birds, mammals, and fish.

3.3.2 Surface Water and Sediment Resources and Services

The Embarras River and potentially the Wabash River have received and continue to receive discharges from the site. Additionally, several ponds and an unnamed tributary to Indian Creek may receive discharges of chemical contamination from site storm water runoff. Waters found to be in contact with the acidic sludge material during previous investigations were found to have been highly acidic (IEPA 1998).

The Embarras River is designated for use for aquatic life, fish consumption, and swimming from the City of Lawrenceville to the Wabash River (IEPA 2002). Services provided by surface water resources include habitat for fish, shellfish, amphibian, and reptile species. Surface waters also provide foraging areas for mammalian and avian species. These waters also support recreational and commercial fishing, recreational boating, and wildlife viewing (IDNR 1997).

Given the nature of many of the chemical constituents associated with the site, discharges to the surface waters will most likely result in impacts to the floodplain soils, sediments and the services associated with them. Services associated with sediments include energy and nutrient transport pathways, and habitat for many benthic biota, including benthic finfish and shellfish.

In 1996, sediment sampling conducted in a pond in Indian Acres found the presence of PAHs in concentrations that greatly exceeded many ecological screening level benchmarks. Sediment samples taken in the "C-pond" revealed the presence of BTEX compounds, and PAHs in exceedance of ecological threshold values. (IEPA 1998; McDonald et. al. 1999; Ingersoll et. al. 1996; NOAA 1999; Ontario Ministry of Environment and Energy 1995; Long et. al. 1995). Maximum sediment concentrations found in these two areas are summarized in Table 1.

Table 1: Maximum concentrations of sediment contaminants found in B&O pond at Indian Acres, and the "C-Pond" Area

CONTAMINANT	MAXIMUM CONCENTRATION (MG/KG)	LOCATION
Benzene	5.1	C-Pond
Xylene	16.0	C-Pond
2-methylnapthalene	84.0	C-Pond
Fluorene	48.0	C-Pond
Phenanthrene	36.0	C-Pond
Fluoranthene	8.8	B&O Pond
Pyrene	11.0	B&O Pond
Chrysene	5.5	B&O Pond
Benzo (a) anthracene	4.6	B&O Pond
Benzo (b) fluoranthene	9.5	B&O Pond
Benzo (a) pyrene	3.8	B&O Pond
Benzo (g,h,i) perylene	2.9	B&O Pond

3.3.3 Soil Resources and Services

Upland and floodplain soils have been impacted by site-related contaminants. Contaminant sources have been identified at the soil surface in various locations throughout the site. Several areas at the site are devoid of vegetation or exhibit basic soil tolerant vegetation in an area that should contain acidic soils (USFWS Unpublished Data). This phenomenon is most likely caused by site-related chemical constituents altering the soil chemistry in such a way as to alter the plant community.

The release from tank 572 identified in 1997 resulted in the removal of oil soaked floodplain soils (USEPA 1999). To this date, the lost services associated with the removal of these soils have still not been restored or replaced.

Services associated with soils include energy and nutrient transport, habitat for terrestrial biota, and filtration of surface water infiltration associated with groundwater recharge.

3.3.4 Groundwater Resources and Services

A recent perimeter investigation of groundwater indicates "free product" associated with the refinery processes has entered the groundwater resources under the refinery property. Elevated levels of site-related chemical constituents identified in groundwater at the site boundaries indicate an offsite migration of contaminated groundwater (SECOR 2002). Services provided by the groundwater in this area include recharge of surface water systems and, in one neighborhood, residential wells.

4.0 PRELIMINARY DETERMINATIONS REGARDING PREASSESSMENT SCREEN CRITERIA

4.1 *Criterion 1 – A release of hazardous substance has occurred*

Releases of hazardous substances associated with the Former Indian Refinery to soils, groundwater, and surface waterbodies have been documented (IEPA 1998; IEPA Unpublished Data; USEPA 2002; USFWS Unpublished Data). Currently, uncontrolled waste products are present at the soil surface, and are frequently exposed to floodwaters of the Embarras River (IEPA

Unpublished Data). The remedial investigation and site characterization activities are in their early stages, and further contaminant sources may yet be discovered.

Groundwater is contaminated. Site-related contaminants have been found in the groundwater at the site perimeter indicating that the contaminants are migrating off site through the groundwater (SECOR 2002).

For the last 5 years, there has been a continual release of site-related constituents to the Embarras River through the City of Lawrenceville's storm sewer running through Indian Acres (USEPA 2002).

4.2 *Criterion 2 - Natural Resources for which the Trustees may assert trusteeship under CERCLA have been or are likely to have been adversely affected by the release*

Surface waters, soils, and groundwater have been and continue to be impacted by releases of contaminants associated with the site. Uncontrolled sources of contamination persist at the soil surface (IEPA Unpublished Data, USFWS Unpublished Data). Additional contaminant sources may be discovered as the site remedial investigation progresses.

Dead waterfowl have been collected from the facility. The waterfowl were covered with oily wastes (USFWS Unpublished Data). Groundwater has been found to contain volatile organic compounds and LNAPL (SECOR 2002). Removal activities to date have resulted in the removal of floodplain soils (USEPA 1999). This removal activity resulted in the destruction of floodplain forest habitat which has not been restored or replaced.

There are a number of trust resources found or likely to be found in the vicinity of the Former Indian Refinery.. Chemical transport pathways to these resources exist at the site. It is likely that trust resources have been adversely impacted by releases of hazardous substances from the site.

4.3 *Criterion 3 – The quantity and concentration of the released hazardous substance is sufficient to potentially cause injury to natural resources*

The site is currently in the beginning stages of a remedial investigation and feasibility study and has not been fully characterized. Currently there are little data regarding the extent of contamination from the site.

Based upon surface waste pile characterization and sediment data used for the scoring of the site for inclusion on the NPL, there are contaminant sources of sufficient quantity and concentration to cause injury to natural resources (IEPA 1998). Dead waterfowl were collected from the "C-pond" by FWS Special Agents. The birds died from contact with oil-related contaminants (USFWS Unpublished Data).

Natural resource injuries resulting from the tank 572 release to the Bottomland Area included destruction of habitat by a removal activity (USEPA 1999). The Trustees are unaware of any planned rehabilitation or restoration activities for this area.

Some areas at the site have been found to be devoid of vegetation, or have vegetation uncharacteristic of the natural habitat type (USFWS Unpublished Data). These vegetation changes are indicative of soil injuries most likely caused by site-related contaminants.

4.4 *Criterion 4 - Data sufficient to pursue an assessment are readily available or are likely to be obtained at a reasonable cost*

At this point in time, some data with which to pursue an assessment are available. Additional studies and data collection efforts are required in order to adequately characterize and quantify injury at the site.

Chevron Texaco, Inc. is currently performing a remedial investigation at the site which should generate much of these data. Chevron Texaco has expressed an interest in integrating the NRDA process with the remedial process at the site.

If the Trustees and Chevron Texaco are successful in integrating the NRDA and the remedial process, the data required for the performance of an assessment will likely be obtained at a reasonable cost. If they are unsuccessful, the Trustees believe they will still be able to obtain data at a reasonable cost as much of the information required for the completion of a natural resource damage assessment would be collected by Chevron Texaco for the completion of the remedial investigation, and human health and ecological risk assessment.

4.5 *Criterion 5 – Response Actions carried out or planned do not or will not sufficiently remedy the injury to natural resources without further action*

Response activities at the site have not yet mitigated for natural resource injuries and have concentrated on engineering controls (chain-link fences, warning signs, etc.) to keep people from becoming exposed to site contaminants. Injuries of natural resources affected by past removal actions at the site have still not been addressed, and the Trustees are unaware of any plan to mitigate for them.

The information available at this time suggest the possibility of offsite impacts to natural resources which are not currently being investigated or planned to be investigated under the Remedial Investigation and Feasibility Study.

Extensive rehabilitation, restoration and/or replacement of natural resources are needed to completely address injuries to and losses of natural resources within the trusteeship of the State of Illinois, and the DOI.

5.0 CONCLUSIONS

Following the review of information as described in this Preassessment Screen, the Trustees have made a preliminary determination that the criteria specified in 43 CFR Part 11 as discussed in Section 1.2 of this document have been met. The Trustees have further determined that there is a reasonable probability of making a successful claim for damages with respect to natural resources over which the Trustees have trusteeship. Therefore, the Trustees have determined that an assessment of natural resource damages is warranted.

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Approval Signatures:

Renee Cipriano — Date

Director, Illinois Environmental Protection Agency

Joel Brunsvold — Date

Director, Illinois Department of Natural Resources

Robyn Thorson — SEP 15 2004

Robyn Thorson — Date

Regional Director, U.S. Fish and Wildlife Service, Region 3