



*On this day, March 22, 2012,*

the U.S. Environmental Protection Agency (EPA) Determines that

***Quadrant 1, Operable Unit 3 of the LCP Chemicals Site Is Ready for Commercial and Industrial Use, and use as a Detention Facility.***

A handwritten signature in black ink, appearing to read "Franklin E. Hill", written over a horizontal line.

*Franklin E. Hill  
Superfund Division  
EPA Region 4*

This Ready for Reuse (RfR) Determination is for Parcel B05308053001 and Tract 4 of Parcel B007800000001 of the LCP Chemicals Superfund Site (the Site) in Brunswick, Georgia. Both of these areas compose Quadrant 1, as defined in the current Human Health Risk Assessment for the Uplands, Operable Unit (OU) 3 of the Site. This RfR Determination is based on information established in United States Environmental Protection Agency (EPA) reports and letters documenting potential risks at the Site, specifically the January 2012 Human Health Baseline Risk Assessment for Upland Soils (Operable Unit 3) (hereafter referred to as the HHBRA); the July 2011 ISM Dioxin/Furan Study (OU3); the February 2012 Petroleum Hydrocarbons and Quadrant 1: LCP Chemicals NPL Site Memorandum; and the December 1997 Removal Close-Out Report: North Area, Revision 0, LCP Chemicals-Georgia, Brunswick, Georgia. EPA has made a technical determination that Quadrant 1 of OU3 is ready for commercial and industrial use, as well as use as a detention facility. Potential remedies that may be implemented in Quadrant 1, pursuant to a Record of Decision (ROD) issued for OU3, will likely include institutional controls associated with land and ground water use.

This RfR Determination is a technical document and does not have any legally binding effect. Further, it does not expressly or implicitly change, create, expand or limit any legal rights, obligations, responsibilities, expectations or benefits of any party. EPA assumes no responsibility for reuse activities and/or for any potential harm that might result from reuse activities. EPA retains any and all rights and authorities it has, including, but not limited to, legal, equitable or administrative rights. EPA specifically retains any and all rights and authorities it has to conduct, direct, oversee and/or require environmental response actions in connection with Quadrant 1 of OU3 and the rest of the Site, including, but not limited to, instances when new or additional information regarding the contamination or conditions at Quadrant 1 of OU3 indicates there may be unacceptable risks to human health or the environment from the uses identified in the RfR Determination.

The types of uses identified as protective in this RfR Determination remain subject to (i) applicable federal, state and local regulation, and to (ii) title documents, including but not limited to easements, restrictions and institutional controls. This RfR Determination is based on all the information currently available to EPA. Should conditions change or new information become available which indicates re-evaluation is necessary, this RfR Determination will no longer be valid.

**Ready for Reuse Determination  
Quadrant 1, Operable Unit 3  
LCP Chemicals Superfund Site**

I. Executive Summary ..... 2

II. Site and Parcel Location ..... 4

III. Site Summary..... 5

Site and Contaminant History..... 5

Description of Risks..... 6

Summary of Cleanup Activities..... 7

IV. EPA’s Basis for the Ready for Reuse (RfR) Determination for Quadrant 1 of OU3 8

V. Ongoing Limitations and Responsibilities Previously Established by EPA..... 9

Institutional and Engineering Controls ..... 9

Operations and Maintenance Requirements ..... 10

VI. Provisos..... 10

**List of Figures and Tables**

Figure 1: Site Location Map ..... 4

Figure 2: Site Parcel Map ..... 5

Table 1: Chronology of Site Events..... 7

Table 2: Quadrant 1 of OU3 Risk Estimate..... 9

## **I. Executive Summary**

This Ready for Reuse (RfR) Determination is for Parcel B05308053001 and Tract 4 of Parcel B007800000001 of the LCP Chemicals Superfund Site (the Site) in Brunswick, Georgia. Both of these areas compose Quadrant 1, as defined in the Human Health Baseline Risk Assessment for the Uplands, Operable Unit (OU) 3 of the Site. The entire Site is approximately 813 acres. The two parcels covered by this RfR Determination are approximately 38 acres combined.

Industrial activities began at the Site in 1836, with construction starting on an approximately 4,000-foot segment of the Brunswick-Altamaha Canal, which ran in a north-south direction along the interface between the upland and estuarine parts of the Site. The canal eventually extended about 12 miles from Academy Creek (Brunswick Harbor) north to the Altamaha River. The canal opened in 1854, but was used only until 1855. In 1919, the Atlantic Refining Company (ARCO) built a petroleum refining operation on the property. Refinery waste-disposal and soil-filling activities appear to have occurred along parts of the canal that traversed the Site, in the north and south disposal areas.

In 1937, 1942 and 1950, the Georgia Power Company (Georgia Power) acquired portions of the Site. From 1941 to 1955, Dixie Paint and Varnish Company (subsequently the Dixie O'Brien Corporation and eventually a wholly-owned subsidiary of the O'Brien Corporation) produced paints and varnishes on a portion of the Site south of the Georgia Power property. In the mid-1950s, Allied Chemical (now Honeywell International, Inc.) acquired almost the entire Site, and utilized it primarily for the production of caustic, hydrogen gas and chlorine gas. In 1979, LCP Chemicals-Georgia (LCP) acquired the Site and continued the chlor-alkali manufacturing processes until operations ceased in early 1994. Honeywell repurchased the Site in 1998 and is still the owner.

This RfR Determination is based on information established in United States Environmental Protection Agency (EPA) reports and letters documenting potential risks at the Site, specifically the January 2012 Human Health Baseline Risk Assessment for Upland Soils (Operable Unit 3) (hereafter referred to as the HHBRA); the July 2011 ISM Dioxin/Furan Study (OU3); the February 2012 Petroleum Hydrocarbons and Quadrant 1: LCP Chemicals NPL Site Memorandum; and the December 1997 Close-Out Report: North Area, Revision 0, LCP Chemicals-Georgia, Brunswick, Georgia. The former Cell Building Area was not evaluated in the OU3 HHBRA, as it will be evaluated as part of OU2 (ground water). EPA has made a technical determination that Quadrant 1 of OU3 is ready for commercial, industrial and appropriate residential use.

Potential remedies that may be implemented in Quadrant 1, pursuant to a Record of Decision (ROD) issued for OU3, will likely include institutional controls associated with ground water use.

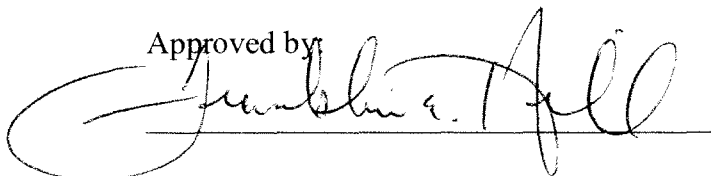
EPA has assessed the risk to human health and the environment resulting from contaminants of potential concern (COPCs) in surface and shallow subsurface soil. Even when using conservative concentrations and assumptions, EPA has concluded that the future use of Quadrant 1 of OU3 is

within acceptable risk ranges for commercial, industrial and appropriate residential future use, with a total lifetime excess cancer risk of  $1.4 \times 10^{-5}$  and a Hazard Index of 1.0 for a lifetime resident. Lead and dioxins/furans pose no unacceptable risks to future users of Quadrant 1 of OU3.

Based upon information available as of this date, EPA has determined that Quadrant 1 of OU3 poses no unacceptable risk to commercial, industrial and appropriate residential users. Quadrant 1 of OU3 is ready for commercial, industrial and appropriate residential use. Use of Quadrant 1 of OU3 as a detention center is appropriate because finalized human health risk assessment tables for OU3 Quadrant 1 surface and shallow subsurface soil show cancer and non-cancer risks all within EPA acceptable risk ranges, even for hypothetical residential exposure.

EPA Region 4 issued this Ready for Reuse Determination, effective March 22, 2012.

Approved by



Franklin E. Hill, Director  
Superfund Division  
U.S. EPA Region 4

Date:

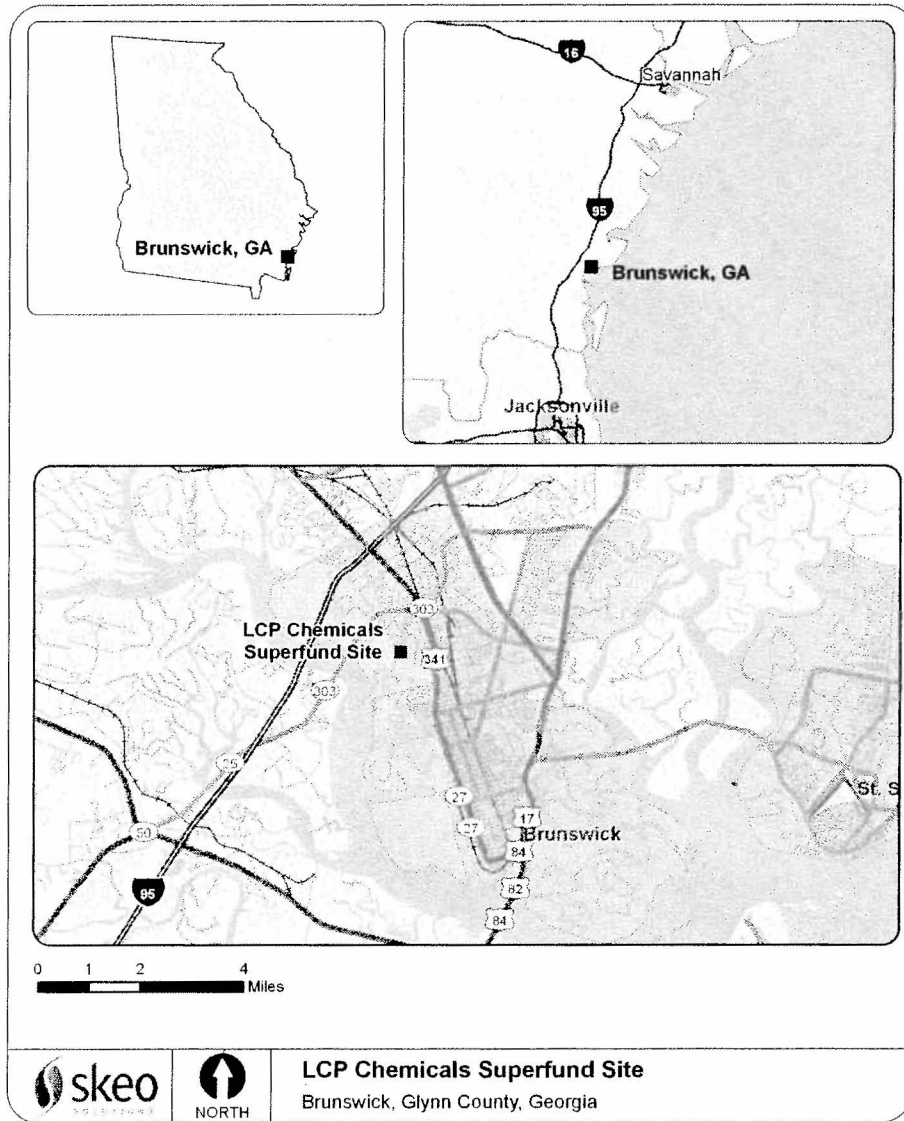
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Documents pertaining to the Site, OU3 and the RfR Determination for Quadrant 1 of OU3 may be found at the LCP Chemicals' Electronic Reading Room, which is available for review at [http://www.epa.gov/region4/foia/readingroom/lcp\\_chemicals\\_site/index.htm](http://www.epa.gov/region4/foia/readingroom/lcp_chemicals_site/index.htm) and at the EPA Region 4 Superfund Division's offices, located at 61 Forsyth Street, S.W., Atlanta, Georgia 30303. Additional information can be obtained from Galo Jackson, EPA's Remedial Project Manager (RPM) for the Site, who can be reached at (404) 562-8937 or [jackson.galo@epa.gov](mailto:jackson.galo@epa.gov).

## II. Site and Parcel Location

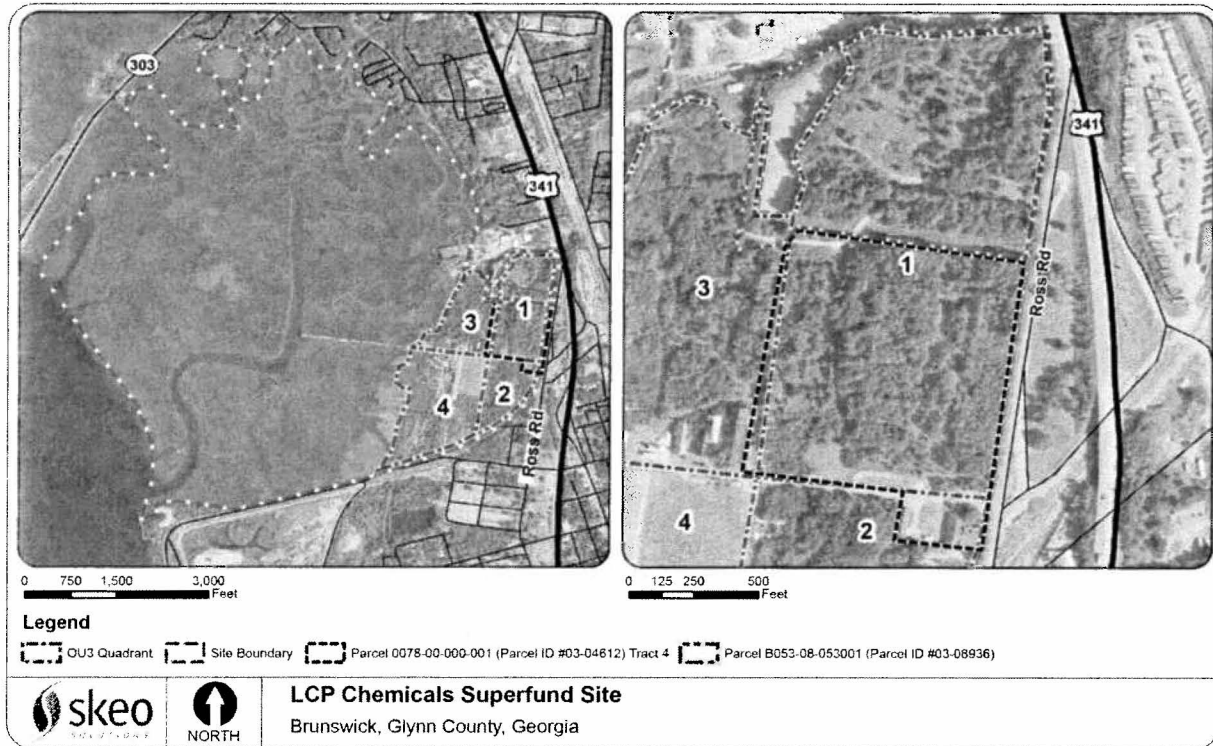
The LCP Chemicals Superfund Site (the Site) is located in Brunswick, Georgia (Figure 1). The entire Site, approximately 813 acres, is located on Ross Road in Glynn County, Georgia. Approximately 114 acres compose the uplands area, where the various operations occurred at the Site (called the 'upland' area). Approximately 699 acres are tidal marshlands. The Site is bordered by the Turtle River marshes to the west and south and the urban population of Brunswick to the north and east. The Site is divided into three operable units (OUs): OU1 (marsh area); OU2 (ground water); and OU3 (contaminated upland soil). OU3 has subsequently been divided into four quadrants.

**Figure 1: Site Location Map**



This RfR Determination is for Quadrant 1 of OU3, which is made up of Parcel B05308053001 and Tract 4 of Parcel B007800000001. Parcel B05308053001, formerly known as the Sunset Drive-In Theater, is 17.59 acres in size and is currently zoned as basic industrial. The parcel is the northern-most parcel of OU3 of the LCP Chemicals Superfund Site. Tract 4 of Parcel B007800000001 is about 20.5 acres in size and is also currently zoned basic industrial. The total area covered by this RfR Determination is roughly 38 acres. Figure 2 outlines the parcels, and includes the parcel ID numbers available through Brunswick County, in addition to the tax parcel numbers.

**Figure 2: Site Parcel Map**



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only.

### III. Site Summary

#### *Site and Contaminant History*

Industrial activities began at the Site in 1836, when construction was initiated on an approximately 4,000-foot segment of the Brunswick-Altamaha Canal that ran in a north-south direction along the interface between the upland and estuarine parts of the Site. The canal eventually extended about 12 miles from Academy Creek (Brunswick Harbor) north to the Altamaha River. The canal opened in 1854, but operated only until 1855. In 1919, the Atlantic Refining Company (ARCO) built a petroleum refining operation on the Site. Refinery waste-disposal and soil-filling activities appear to have occurred along parts of the canal that traversed

the Site, in the north and south disposal areas.

In 1937, 1942 and 1950, the Georgia Power Company (Georgia Power) acquired portions of the Site. From 1941 to 1955, Dixie Paint and Varnish Company (subsequently the Dixie O'Brien Corporation and eventually a wholly owned subsidiary of the O'Brien Corporation) produced paints and varnishes on a portion of the Site south of the Georgia Power property. In the mid 1950s, Allied Chemical (now Honeywell International, Inc.) acquired almost the entire Site, and utilized it primarily for the production of caustic, hydrogen gas and chlorine gas. In 1979, LCP Chemicals-Georgia (LCP) acquired the Site and continued the chlor-alkali manufacturing processes until operations ceased in early 1994. Honeywell repurchased the Site in 1998 and currently owns it.

Glynn County Planning Commission Land Use Maps show that the Site is zoned as industrial property for both current and future use.

*Description of Risks*

Since 1994, thousands of surface and/or subsurface soil samples have been collected to support both OU3 risk assessments. The majority of these samples were collected between 1994 and 1999 during the assessment, removal and post-excavation sampling phases of the upland removal action. The January 2012 HHBRA for OU3 considered the following exposure scenarios for soil: commercial/industrial worker, excavation worker, trespasser (current/future scenario) and hypothetical resident (current/future scenario).

Specific contaminants of potential concern (COPCs) in Quadrant 1 of OU3 soils are:

<b>Quadrant 1 of OU3 Contaminants of Potential Concern</b>		
Aroclor-1260	Benzo(b)fluoranthene	Indeno(1,2,3-cd)pyrene
Aroclor-1268	Benzo(b/k)fluoranthene	Iron
Arsenic	bis(2-Ethylhexyl) phthalate	Lead
Benzo(a)anthracene	Chromium	Mercury
Benzo(a)pyrene	Dibenzo(a,h)anthracene	Vanadium

Although the COPCs listed in the preceding table failed the initial screen, these COPCs were further evaluated in the HHBRA.

The ground water in Quadrant 1 of OU3 has been sampled on a number of occasions. There are five monitoring well clusters located in or near Quadrant 1 of OU3. Principally, naphthalene has been detected in two of the five well clusters. There is no federal or State of Georgia maximum contaminant level for naphthalene. EPA's current lifetime health advisory for naphthalene in ground water is 100 parts per billion. EPA recommends that ground water not be used on any part of the Site. This recommendation is based on the fact that a human health risk assessment for OU2 (ground water) has not been concluded and data collection is ongoing. In addition, large-scale ground water withdrawals might pull the contaminated ground water present in the western quadrants toward Quadrant 1. The maximum naphthalene concentration detected in

Quadrant 1 of OU3 does not pose risks to human health based on inhalation.

All three OUs are currently undergoing a remedial investigation/feasibility study (RI/FS).

*Summary of Cleanup Activities*

Table 1 summarizes relevant events and important dates in the Site’s history.

**Table 1: Chronology of Site Events**

Event	Date
Initial discovery of contamination	August 1, 1980
Georgia Environmental Protection Division (EPD) completed preliminary assessment.	January 5, 1984
Potentially responsible parties (PRPs) began sitewide removal action: excavation of soil and waste.	March 16, 1994
EPA conducted an integrated assessment.	April 28, 1994
EPA completed the hazard ranking system package.	June 6, 1994
PRPs began RI/FS for contaminated upland soil (OU3) and marsh area (OU1).	July 6, 1995
EPA proposed Site for listing on the National Priorities List (NPL).	October 2, 1995
Technical Assistance Grant provided.	December 1, 1995
PRPs began RI/FS for ground water (OU2).	December 12, 1995
EPA finalized listing the Site on the NPL.	June 17, 1996
PRPs completed sitewide removal action.	June 1, 1997
PRPs began sitewide removal action.	February 4, 1998
PRPs completed unapproved first upland risk assessment.	1999
PRPs completed sitewide removal action.	July 16, 1999
PRPs began removal action for ground water (OU2).	September 25, 2007
Upland soil samples collected.	2008
Upland soil samples collected.	2009
Soil samples collected from former drive-in theater area.	2010
PRPs submitted revised draft of HHBRA to EPA.	January 2010
EPA submitted comments on HHBRA.	August 12, 2010
Soil samples collected for dioxin analysis.	April 2011
EPA approved Human Health Baseline Risk Assessment for Upland Soils (Operable Unit 3).	January 2012

Dates for the activities highlighted in Table 1, and additional information about site activities, are available online from the Superfund Information System, which can be viewed by going to the following website: <http://cumulis.epa.gov/supercpad/cursites/srchsites.cfm>.<sup>1</sup>

Between 1994 and 1997, a removal response action was performed on the upland portion of the Site. The removal action included the excavation of contaminated soils and industrial process waste. A total of approximately 167,000 cubic yards of soil and waste was removed for off-site disposal during the response action. The contamination in the removal areas included polynuclear aromatic hydrocarbons (PAHs), mercury, alkaline sludges, polychlorinated biphenyls (PCBs) and lead.

<sup>1</sup> Specific dates for the LCP Chemicals Superfund site were obtained from: <http://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.CleanupActs&id=0401634> on January 18, 2012.



Removal activities in Quadrant 1 of OU3 covered an area called the Raw Brine Enclosures. This area consisted of five separate enclosures, all located in the southern portion of Quadrant 1. The Southwest Raw Brine Enclosure was the only one that required excavation because the average concentration exceeded the removal clean-up goal for mercury. The excavated material was approved for use as deep backfill in other areas of the Site not covered by this RfR Determination. Salt mud in the eastern three enclosures was covered with approximately one foot of borrow fill for aesthetics and to eliminate contact by foot traffic. Excavation at the Southwest Raw Brine Enclosure commenced on February 12, 1997 and was completed on February 24, 1997. A total of approximately 1,340 yd<sup>3</sup> (1025 m<sup>3</sup>) was excavated at the Southwest Raw Brine Enclosure. All of the salt mud material was reclaimed for use as deep backfill. Two of the enclosures contained steel storage tanks, which were demolished.

#### *Redevelopment/Reuse History*

Quadrant 1 of OU3 is currently vacant, but ready for commercial, industrial and appropriate residential reuse. Glynn County has expressed interest in purchasing all of Quadrant 1 and using Parcel B0530805300 for a County-operated detention facility. Use of Quadrant 1 of OU3 as a detention center is appropriate because the finalized human health risk assessment for OU3 Quadrant 1 surface and shallow subsurface soil shows cancer and non-cancer risks all within EPA acceptable risk ranges, even for hypothetical residential exposure.

#### **IV. EPA's Basis for the Ready for Reuse (RfR) Determination for Quadrant 1 of OU3**

EPA has based the LCP Chemicals Superfund Site RfR Determination for Quadrant 1 of OU3 on the HHBRA document produced during the course of the ongoing investigation at the Site, the July 2011 ISM Dioxin/Furan Study (OU3); the February 2012 Petroleum Hydrocarbons and Quadrant 1: LCP Chemicals NPL Site Memorandum; and the 1997 Removal Close-Out Report. These documents demonstrate that Quadrant 1 of OU3 is ready for commercial, industrial and appropriate residential use, and that use for a detention center is an appropriate residential use given the findings of the HHBRA.

The HHBRA for OU3 looked at the potential risks associated with Quadrant 1 of OU3. The HHBRA quantified the potential risks posed by COPCs, after the 1994 to 1997 removal action, under a broad range of land use and exposure scenarios in surface and shallow subsurface soil. Even when using conservative assumptions, EPA has concluded that the future use of Quadrant 1 of OU3 for commercial, industrial and appropriate residential purposes does not pose an unacceptable human health risk, based on contaminants found in the soil. The results of the HHBRA are summarized in Table 2. The total lifetime excess cancer risk is  $1.4 \times 10^{-5}$  for a resident. EPA considers a Hazard Index (HI) of 1.08 to be equal to 1.

The HHBRA also evaluated risks posed by lead in Quadrant 1 of OU3. The arithmetic mean for lead in soil in Quadrant 1 of OU3 was under 100 mg/kg. EPA's model for residential exposure predicts an average soil lead concentration of 400 mg/kg to be protective of health.

In 2011, the surficial soil in Quadrant 1 of OU3 was sampled and analyzed for dioxins/furans. Results show a concentration of about six nanograms per kilogram or parts per trillion (ppt) of dioxins/furans in soil present in Quadrant 1 of OU3. This value does not pose any unacceptable risks based on EPA's newly drafted guidance regarding acceptable doses per day. Hence, dioxins/furans pose no unacceptable health risk related to the reuse of Quadrant 1 of OU3.

For more information about risk and findings of the HHBRA, please see Appendix B.

**Table 2: Quadrant 1 of OU3 Risk Estimate**

Receptors	Pathways	Total Risk	
		Carcinogenic	Non-carcinogenic (HI)
Commercial/industrial worker	Ingestion of surface soil; Dermal contact with surface soil; Inhalation of particulates and vapors in the air	$3.2 \times 10^{-6}$	0.08
Excavation worker	Ingestion of surface soil; Dermal contact with surface soil; Inhalation of particulates and vapors in the air	$1.7 \times 10^{-7}$	0.18
Trespasser (current scenario)	Ingestion of surface soil; Dermal contact with surface soil; Inhalation of particulates and vapors in the air	$1.4 \times 10^{-7}$	0.008
Trespasser (future scenario) <sup>(1)</sup>	Ingestion of surface soil; Dermal contact with surface soil; Inhalation of particulates and vapors in the air	$3.1 \times 10^{-7}$	0.018
Hypothetical resident (future scenario) Adult resident/Child resident	Ingestion of surface soil; Dermal contact with surface soil; Inhalation of particulates and vapors in the air	$5.4 \times 10^{-6}$ / $9.5 \times 10^{-6}$	0.12/1.08
Lifetime resident (cancer risk only)		$1.4 \times 10^{-5}$	

<sup>(1)</sup> The current and the future trespasser scenarios differ only with respect to the assumptions about the frequency with which trespassers might access the property. The current trespasser scenario assumes that access is limited by security measures. The future trespasser scenario assumes that the exposure frequency increases, reflecting the possibility that site access might not be controlled as tightly in the future.

Although petroleum and petroleum product tanks were once located in Quadrant 1 of OU3, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) does not address petroleum. However, a review of ground water data collected since 1995 indicates the absence of detections or detections of low- to-trace levels of petroleum-related analytes. One exception is naphthalene, which is discussed below. For more information, see the February 2012 Petroleum Hydrocarbons and Quadrant 1: LCP Chemicals NPL Site Memorandum.

## V. Ongoing Limitations and Responsibilities Previously Established by EPA

### *Institutional and Engineering Controls*

There are currently no institutional or engineering controls required for Quadrant 1. However, naphthalene has been detected in two of the five well clusters. There is no federal or State of Georgia maximum contaminant level for naphthalene. EPA's current lifetime health advisory for naphthalene in ground water is 100 parts per billion.

Potential remedies that may be implemented in Quadrant 1, pursuant to a ROD issued for OU3, will likely include institutional controls associated with ground water use.

#### *Operations and Maintenance Requirements*

Since Quadrant 1 of OU3, like the rest of the Site, is currently in the remedial investigation phase of cleanup, no operations and maintenance requirements have been identified.

#### **VI. Provisos**

This Ready for Reuse Determination is a technical document and does not have any legally binding effect. Further, it does not expressly or implicitly change, create, expand or limit any legal rights, obligations, responsibilities, expectations or benefits of any party. EPA assumes no responsibility for reuse activities and/or for any potential harm that might result from reuse activities. EPA retains any and all rights and authorities it has, including, but not limited to, legal, equitable or administrative rights. EPA specifically retains any and all rights and authorities it has to conduct, direct, oversee and/or require environmental response actions in connection with Quadrant 1 of OU3 and the rest of the Site, including, but not limited to, instances when new or additional information regarding the contamination or conditions at Quadrant 1 of OU3 indicates there may be unacceptable risks to human health or the environment from the uses identified in the RfR Determination.

The types of uses identified as protective in this RfR Determination remain subject to: (i) applicable federal, state and local regulation; and to (ii) title documents, including, but not limited to, easements, restrictions and ICs.

This RfR Determination is based on all the information currently available to EPA. Should conditions change or new information become available that indicates re-evaluation is necessary, this RfR Determination will no longer be valid.

## APPENDIX A

### ACRONYMS AND ABBREVIATIONS

ARCO	Atlantic Refining Company
ATSDR	Agency for Toxic Substances and Disease Registry
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPCs	contaminants of potential concern
EPA	United States Environmental Protection Agency
EPD	Georgia Environmental Protection Division
HI	hazard index
HHBRA	human health baseline risk assessment
ICs	Institutional Controls
LCP	LCP Chemicals-Georgia
mg/kg	milligrams per kilogram
NPL	National Priorities List
O&M	Operations and Maintenance
OU	Operable Unit
PCBs	polychlorinated biphenyls
PAHs	polycyclic aromatic hydrocarbons
PHA	Public Health Assessment
ppt	parts per trillion
RfR	Ready for Reuse Determination
RI/FS	remedial investigation/feasibility study
RME	reasonable maximum exposure
ROD	Record of Decision
RPM	Remedial Project Manager
TEQ	Toxic Equivalents
VOCs	Volatile Organic Compounds

## APPENDIX B

### Risk Assessment Summary

EPA has based the LCP Chemicals Superfund Site Quadrant 1 of OU3 RfR Determination on risk assessment documents produced during the course of the ongoing investigation at the Site. These documents demonstrate that Quadrant 1 of OU3 is ready for commercial, industrial and appropriate residential use.

The HHBRA for OU3 looked at the potential risks associated with Quadrant 1 of OU3. The HHBRA quantifies the potential risks posed by COPCs, after the 1994 to 1997 removal action, under a broad range of land use and exposure scenarios in surface and shallow subsurface soil. Even when using conservative numbers and assumptions, EPA has concluded that the future use of Quadrant 1 of OU3 for commercial, industrial and appropriate residential purposes does not pose an unacceptable human health risk, based on contaminants found in the soil. Even when using the conservative numbers and assumptions, EPA has concluded that the future use of Quadrant 1 of OU3 is within acceptable risk ranges for commercial, industrial and appropriate residential future use, with a total lifetime excess cancer risk of  $1.4 \times 10^{-5}$  for a lifetime resident. Lead and dioxins/furans pose no unacceptable risks to commercial, industrial or residential future users of Quadrant 1 of OU3

A carcinogenic risk of  $1 \times 10^{-6}$  to a population means that for every 1,000,000 people exposed to the related chemical concentration, one additional case of cancer may occur beyond what would be expected to occur. In terms of risk to an individual, an excess carcinogenic risk of  $1 \times 10^{-6}$  means that the individual has an additional chance (added to his/her existing chance) of one in one million of developing cancer over a lifetime due to the assumed exposure. The carcinogenic risk range established under CERCLA designates risks between  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  as acceptable and protective of human health. Risks greater than this range indicate that the risks pose an unacceptable carcinogenic risk to human health. The hazard index (HI) describes whether exposure to non-carcinogenic contaminants at a site poses an unacceptable health risk to humans. Each HI represents the ratio between the estimated exposure dose and a reference dose. An HI greater than one indicates that the estimated exposure dose for that contaminant exceeds acceptable levels for protection against non-carcinogenic health effects.

The table below summarizes the risks posed to current and future users based on the reasonable maximum exposure (RME). RME is the maximum exposure that is reasonably expected to occur at Quadrant 1 of OU3. EPA has indicated that individual factors included in estimating exposure for an RME receptor should result in a final exposure estimate that approximates an upper percentile from a range of possible exposure estimates. Table 2 displays the conservative risk values taken from the RME levels and the conservative reference dose (RfD) for Quadrant 1 only. Cancer risk estimates must be within EPA's acceptable risk range of  $10^{-4}$  to  $10^{-6}$  to indicate that the exposure is unlikely to be associated with a potential health concern. Any Hazard Index (HI) at or below 1 indicates the exposure is unlikely to be associated with a potential non-carcinogenic health concern. EPA considers an HI of 1.08 to be equal to 1.

The table below demonstrates that even when conservative numbers and assumptions are used, the future use of Quadrant 1 of OU3 for commercial, industrial and appropriate residential purposes does not pose an unacceptable human health risk based on the contaminants found in soil. The hypothetical future resident risk characterization is useful as a conservative surrogate for virtually any type of unrestricted land use and, as such, the analysis may be useful for future land planning of various sub-portions of Quadrant 1.

### Quadrant 1 of OU3 Reasonable Maximum Exposure (RME)

Receptors	Pathways	Total Risk	
		Carcinogenic	Non-carcinogenic (HI)
Commercial/industrial worker	Ingestion of surface soil; Dermal contact with surface soil; Inhalation of particulates and vapors in the air	$3.2 \times 10^{-6}$	0.08
Excavation worker	Ingestion of surface soil; Dermal contact with surface soil; Inhalation of particulates and vapors in the air	$1.7 \times 10^{-7}$	0.18
Trespasser (current scenario)	Ingestion of surface soil; Dermal contact with surface soil; Inhalation of particulates and vapors in the air	$1.4 \times 10^{-7}$	0.008
Trespasser (future scenario) <sup>(1)</sup>	Ingestion of surface soil; Dermal contact with surface soil; Inhalation of particulates and vapors in the air	$3.1 \times 10^{-7}$	0.018
Hypothetical resident (future scenario) Adult resident/Child resident	Ingestion of surface soil; Dermal contact with surface soil; Inhalation of particulates and vapors in the air	$5.4 \times 10^{-6}$ / $9.5 \times 10^{-6}$	0.12/1.08
Lifetime resident (cancer risk only)		$1.4 \times 10^{-5}$	
<sup>(1)</sup> The current and the future trespasser scenarios differ only with respect to the assumptions about the frequency with which trespassers might access the property. The current trespasser scenario assumes that access is limited by security measures. The future trespasser scenario assumes that the exposure frequency increases, reflecting the possibility that site access might not be controlled as tightly in the future.			

The HHBRA also evaluated risks posed by lead in Quadrant 1 of OU3. The arithmetic mean for lead in soil in Quadrant 1 of OU3 was under 100 mg/kg. EPA's model for residential exposure predicts an average soil lead concentration of 400 mg/kg to be protective of health.

In 2011, the surficial soil in Quadrant 1 of OU3 was sampled and analyzed for dioxins/furans. All results, in terms of 2,3,7,8-tetrachloro dibenzo-p-dioxin (2,3,7,8-TCDD) Toxic Equivalents (TEQ), were about six nanograms per kilogram or parts per trillion (ppt). To put this value in context, the EPA draft interim residential and commercial/industrial preliminary remediation goals for TCDD TEQ in soil are 72 ppt and 950 ppt, respectively. Hence, dioxins/furans pose no unacceptable health risk related to the reuse of Quadrant 1 of OU3.

## APPENDIX C

### References

CERCLA Information System Site Information. LCP Chemicals Georgia.

<http://cumulis.epa.gov/supercpad/cursites/esitinfo.cfm?id=0401634>.

Closeout Report: North Area, Revision 0, LCP Chemicals-Georgia. Brunswick, Georgia.

Prepared by GeoSyntec Consultants. December 1997.

Galo Jackson. 2012. Memorandum SUBJECT: Petroleum Hydrocarbons and Quadrant 1: LCP Chemicals NPL Site. February 2012.

Human Health Baseline Risk Assessment for Upland Soils (Operable Unit 3). LCP Chemicals Site, Brunswick, Georgia. Prepared by EPS. January 2012.

ISM Dioxin/Furan Study (Operable Unit3 ). LCP Chemicals Site, Brunswick, Georgia. Prepared by EPS. July 2011.

Documents pertaining to the Site, OU3 and the RfR Determination for Quadrant 1 of OU3 may be found at the LCP Chemicals' Electronic Reading Room, which is available for review at [http://www.epa.gov/region4/foia/readingroom/lcp\\_chemicals\\_site/index.htm](http://www.epa.gov/region4/foia/readingroom/lcp_chemicals_site/index.htm).

Additional information can be obtained from Galo Jackson, EPA's Remedial Project Manager (RPM) for the Site, who can be reached at (404) 562-8937 or [jackson.galo@epa.gov](mailto:jackson.galo@epa.gov).