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HOUSTON, TX 77002

CALPINE CORPORATION

NYSE CPN November 5, 2012

Mr. Jeff Robinson
Chief, Air Permits Section
U.S. EPA Region VI, 6PD
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Re: Channel Energy Center PSD Permit Application for GHG emissions

Mr. Robinson,

Calpine is proposing to add a CT/HRSG at Channel Energy Center (CEC) which is a CHP facility that provides electricity and steam to a petroleum refinery located in Houston, TX and to the wholesale electric market in Texas. This expansion represents 260 MW of Natural Gas Combined Heat and Power meeting the goals of the President's August 30, 2012 Executive Order -- Accelerating Investment in Industrial Energy Efficiency. This expansion will generate electricity sufficient to supply 250,000 homes and is needed to serve ERCOT beginning in 2014, when ERCOT's Annual Planning Reserve Margin is projected to fall to 9.8%, well below the targeted minimum of 13.75%.

The current version of the Channel Energy Center (CEC) Biological Assessment (BA) submitted to the EPA on July 9, 2012 utilized an Action Area for determining potential effects on federally protected species that was based on preliminary dispersion modeling. Final PSD emissions calculations were approved by the TCEQ in late July 2012 and subsequent dispersion modeling resulted in a significant reduction in the size of the initial Action Area.

The following addendum was prepared to address the potential effects on federally protected species in relation to the revised dispersion modeling and subsequent reduction in the Action Area. This addendum includes a discussion of the final dispersion modeling and potential effects analyses related to air emissions and wastewater discharges from the proposed project.

The Action Area in this addendum represents a reduction in size from 0.9 km to 0.1 km reflecting the distance to the farthest receptor point at which a significant impact level was identified. The land within the revised Action Area is entirely under industrial use, and is devoid of vegetation, open soils, and aquatic habitats. Wastewater and storm water discharges from the proposed project were also reevaluated to confirm that they did not result in an expansion of the revised Action Area. As a result, the following determinations are recommended for inclusion the CEC Biological Assessment:

Anticipated Effects on Federally Listed Species of Potential Occurrence in the Action Area

Federally Listed Species	Listing Agency	Recommended Determination of Effect
Houston Toad	TPWD	No effect
Green Sea Turtle	TPWD/NMFS	No effect
Kemp's Ridley Sea Turtle	TPWD/NMFS	No effect
Leatherback Sea Turtle	TPWD/NMFS	No effect
Loggerhead Sea Turtle	TPWD/NMFS	No effect
West Indian Manatee	TPWD	No effect
Texas Prairie Dawn-flower	USFWS/TPWD	No effect

Calpine requests an expeditious review of this addendum. Calpine further requests that, upon completing such review, USEPA withdraw the request for concurrence from both the NOAA and USFWS based on the recommended determinations of effect summarized above.

Calpine appreciates your continued support of our efforts to obtain the authorization that will allow the initiation of construction on these very important projects. We will work with EPA Region VI to schedule a follow up meeting to review any questions regarding this addendum. In the meantime, please contact me directly at 713-320-8860 if you have any questions regarding this submittal.

Regards,

Patrick Blanchard
Director, Environmental Services-Texas
Calpine Corporation

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ADDENDUM TO THE BIOLOGICAL ASSESSMENT
CHANNEL ENERGY CENTER UPGRADE
HARRIS COUNTY, TEXAS

Submitted To:

ENVIRONMENTAL PROTECTION AGENCY
REGION 6
MULTIMEDIA PLANNING AND PERMITTING DIVISION
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Submitted By:

CHANNEL ENERGY CENTER LLC
HOUSTON, TEXAS 77536

Prepared By:

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NOVEMBER 2012

zephyr

CONTENTS

FIGURES

ACRONYMS AND ABBREVIATIONS

ASI	area of significant impact
BA	Biological Assessment
CEC	Channel Energy Center
EPA	Environmental Protection Agency
ESL	Effect Screening Level
GCWDA	Gulf Coast Waste Disposal Authority
MGD	million gallons per day
NAAQS	National Ambient Air Quality Standard
NMFS	National Marine Fisheries Service
NSR	New Source Review
POTW	Publicly Owned Wastewater Treatment Works
PSD	Prevention of Significant Deterioration
SIL	significant impact levels
TCEQ	Texas Commission on Environmental Quality
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TXNDD	Texas Natural Diversity Database
USFWS	U.S. Fish and Wildlife Service
WET	whole effluent toxicity testing

EXECUTIVE SUMMARY

The current version of the Channel Energy Center (CEC) Biological Assessment (BA) submitted to the U.S. Environmental Protection Agency (EPA) on July 9, 2012, utilized an "Action Area" for determining potential effects on federally protected species that was based on preliminary dispersion modeling. Final Prevention of Significant Deterioration (PSD) emissions calculations were approved by the Texas Commission on Environmental Quality (TCEQ) in late July 2012 and subsequent dispersion modeling resulted in a significant reduction in the size of the initial Action Area.

The revised Action Area was reduced in size from 0.9 km to 0.1 km reflecting the distance to farthest receptor point at which a significant impact level was identified. The land within the revised Action Area is entirely under industrial use, and is devoid of vegetation, open soils, and aquatic habitats. As a result the following revised determinations are recommended to the CEC BA:

Anticipated Effects on Federally Listed Species of Potential Occurrence in the Action Area

Federally Listed Species	Listing Agency	Recommended Determination of Effect
Houston Toad	TPWD	No effect
Green Sea Turtle	TPWD/NMFS	No effect
Kemp's Ridley Sea Turtle	TPWD/NMFS	No effect
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Loggerhead Sea Turtle	TPWD/NMFS	No effect
West Indian Manatee	TPWD	No effect
Texas Prairie Dawn-flower	USFWS/TPWD	No effect

1.0 INTRODUCTION

The latest version of the CEC BA was submitted to the EPA in July 2012. The methodology used to determine the Action Area was conservatively delineated by applying EPA "significant impact levels" (SILs). A SIL is established for each National Ambient Air Quality Standard (NAAQS), yet at a concentration significantly less than the corresponding NAAQS. The boundary of the Action Area identified in the July 2012 was based on preliminary air dispersion modeling prepared in support of the PSD air permit application for criteria pollutants. At that time, the delineation of the Action Area was based on the 24-hour $PM_{2.5}$ modeling as the results for all other pollutants and averaging periods were below their respective SILs. This resulted with a distance to the farthest modeling receptor above the SIL of 0.9 km.

Revised emission calculations for the new Cogeneration Unit were submitted to the TCEQ on July 12, 2012, and reflected a reduction in authorized PM_{10} and $PM_{2.5}$ emissions. Subsequent dispersion modeling using the final PM_{10}/$PM_{2.5}$ emissions was conducted and a revised modeling report was submitted to the TCEQ on July 20, 2012. Based on the revised dispersion modeling, the distance to the farthest modeling receptor point for which 24-hr $PM_{2.5}$ was above the SIL was reduced from 0.9 km to 0.1 km.

The following addendum was prepared to address the potential effects on federally protected species in relation to the revised dispersion modeling and subsequent reduction in the Action Area. This report includes a discussion of the final dispersion modeling and potential effects analyses related to air emissions and wastewater discharges from the proposed project.

2.0 FINAL DISPERSION MODELING

2.1 FINAL DISPERSION MODELING INFORMATION

Emissions associated with the proposed project were modeled using the EPA AERMOD air dispersion model in support of the PSD and State New Source Review (NSR) applications. Emissions from both phases of the proposed project were considered and the largest emissions between the FD-2 and FD-3 series turbines were modeled. The latest version of the CEC BA was submitted to the EPA in July 2012. At that time, the Action Area for the BA was based on preliminary air dispersion modeling prepared in support of the PSD air permit application for criteria pollutants that was being conducted for submittal to the TCEQ. Revised emission calculations for the new cogeneration unit were submitted to the TCEQ on July 12, 2012, in which the PM_{10} and $PM_{2.5}$ emissions were lowered. Subsequent dispersion modeling using the lower PM_{10}/$PM_{2.5}$ emissions was conducted and a revised modeling report was submitted to the TCEQ on July 20, 2012.

The ambient air concentration results were then compared with SILs associated with the Primary NAAQS, Secondary NAAQS, and TCEQ property line standards (Table 1). The predicted concentrations of non-criteria pollutants were compared with TCEQ ESL de minimis levels (Table 2). All short-term modeling concentrations correspond to the maximum proposed emission rates during normal operations. All annual modeling concentrations correspond to the proposed annual emission rates. An “area of significant impacts” (ASI) for a given pollutant and averaging period is defined by the distance to which predicted concentrations are greater than the respective SILs. The Action Area was then defined by the largest ASI modeling result for any pollutant and averaging period.

The original Action Area for the BA was based on the 24-hour $PM_{2.5}$ modeling with a distance to the farthest modeling receptor above the SIL of 0.9 km. The results for all other pollutants and averaging periods were below their respective SILs. Based on the revised dispersion modeling, the distance to the farthest modeling receptor point for which 24-hr $PM_{2.5}$ was above the SIL was reduced from 0.9 km to 0.1 km.

The revised Action Area is identified on Figure 1. As a basis for comparison, the original Action Area can be seen in Figure 2.

Table 1
Channel Energy Center ASI Analysis Results from FD-3 Modeling
Revised November 2, 2012

Pollutant	Averaging Period	NAAQS		TCEQ Property Line Standard**	SIL	ASI Modeling Results	
		Primary	Secondary			Maximum Predicted Concentration	ASI
		µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3	km
NO_2	1-Hour	188	None	---	7.5	2.61	0
	Annual	100	100	---	1	0.14	0
CO	1-Hour	40,000	None	---	2,000	62.6	0
	8-Hour	10,000	None	---	500	36.4	0
SO_2	30-Minutes	---	---	715	---	7.11	0
	1-Hour	196	None	---	7.8	5.85	0
	3-Hour	None	1300	---	25	5.80	0
	24-Hour	365	None	---	5	0.30	0
	Annual	80	None	---	1	0.02	0
PM_{10}	24-Hour	150	150	---	5	4.72	0
	Annual	None	None	---	1	0.25	0
$PM_{2.5}$	24-Hour	35	35	---	1.2	3.83	0.1
	Annual	15	15	---	0.3	0.17	0
H_2SO_4	1-Hour	---	---	50	---	1.09	0
	24-Hour	---	---	15	---	0.03	0
Proposed Action Area							**0.1**

* This information is based on FD-3 emission estimates because they exceed those for FD-2 emissions.

** TCEQ de minimis value ~2 percent of the standard, Air Dispersion Modeling Guidelines, RG-25, Feb. 1999.

Table 2
Channel Energy Center Impacts from Non-Criteria Pollutants*
Revised November 2, 2012

Pollutant	Averaging Period	Maximum Predicted Concentration** (µg/m^3)	TCEQ ESL (µg/m^3)	% of ESL	ASI*** (km)
Ammonium Sulfate	1-Hour	1.47E01	50	2.9	0
	Annual	2.71E-03	5	<0.1	0
Ammonia	1-Hour	5.72E01	170	3.4	0
	Annual	2.11E-01	17	1.2	0
1,3-Butadiene	1-Hour	2.25E-04	510	<0.1	0
	Annual	8.01E-06	9.9	<0.1	0
Acetaldehyde	1-Hour	2.09E-02	90	<0.1	0
	Annual	7.45E-04	45	<0.1	0

Pollutant	Averaging Period	Maximum Predicted Concentration** ($\mu g/m^3$)	TCEQ ESL ($\mu g/m^3$)	% of ESL	ASI*** (km)
Acrolein	1-Hour	3.34E-03	3.2	0.1	0
	Annual	1.19E-04	0.15	<0.1	0
Benzene	1-Hour	6.27E-03	170	<0.1	0
	Annual	2.23E-04	4.5	<0.1	0
Ethylbenzene	1-Hour	1.67E-02	740	<0.1	0
	Annual	5.96E-04	570	<0.1	0
Formaldehyde	1-Hour	1.06-01	15	0.7	0
	Annual	3.76E-03	3.3	0.1	0
Polycyclic Aromatic Hydrocarbons (PAH)	1-Hour	1.83E-03	0.5	0.4	0
	Annual	5.40E-04	0.05	1.1	0
Propylene Oxide	1-Hour	1.52E-02	70	<0.1	0
	Annual	5.40E-04	7	<0.1	0
Toluene	1-Hour	6.79E-02	640	<0.1	0
	Annual	2.42E-03	1200	<0.1	0
Xylenes	1-Hour	3.34E-02	350	<0.1	0
	Annual	1.19E-03	180	<0.1	0

* This information is based on FD-3 emission estimates because they exceed those for FD-2 emissions.

** AERMOD modeling analysis results.

*** De minimis for emission increases of non-criteria pollutants with no federal or TCEQ ambient standards is 10% of the ESL (TCEQ, Modeling and Effects Review Applicability, APDG 5874, July 2009).

2.2 POTENTIAL EFFECTS ANALYSIS

The original Action Area from the CEC BA was a radius that extended 0.9 kilometers from the Channel facility and encompassed multiple potential habitat types, including the Houston Ship Channel and other aquatic features. After revising the dispersion models, the Action Area was reduced to a maximum distance of 0.1 kilometers from the facility (Figure 1). The new Action Area includes an adjacent property that is under industrial land use, and contains no aquatic or vegetated features.

Due to lack of any aquatic features within the Action Area, it is recommended that the following species listed by Texas Parks and Wildlife (TPWD) and National Marine Fisheries Service (NMFS) be revised from "may effect, but is not likely to adversely affect" from the original BA to "no effect". These species include the green sea turtle, Kemp's Ridley sea turtle, leatherback sea turtle, Loggerhead sea turtle, and the West Indian manatee.

It is further recommended that the two terrestrial species, Texas Prairie Dawn-flower and Houston Toad, listed by TPWD and the U.S. Fish and Wildlife Service (FWS) be revised from "may effect, but is not likely to adversely affect" to "no effect" due to complete absence of habitat. The revised Action Area is entirely industrialized and is surfaced by either

concrete, crushed gravel, or operational facilities. Additionally, the area is devoid of vegetation, open soils, and aquatic habitats thus removing any potential for the possible occurrence of either the Houston toad or the Texas prairie dawn flower. Furthermore, the Texas Natural Diversity Database (TXNDD) does not show any occurrences of either of these species within five miles of the Action Area. Table 9 of the CEC BA provides the TXNDD data on both of these species. Finally, it has been determined that the only Houston toad population listed in Table 9 is no longer present due to urbanization and loss of habitat.

3.0 WASTEWATER INFORMATION

3.1 SUPPLEMENTAL WASTEWATER INFORMATION

The following wastewater information is intended to supplement data from Section 2.6 in the CEC BA.

3.1.1 Storm Water Information

Storm water that can potentially come in contact with the facility wastewater is comingled with non-contact cooling water and other low volume wastes and discharged under contract to the adjacent refinery. CEC is authorized to discharge its industrial wastewater, including storm water, to Houston Refining, LP who in turn discharges its process wastewater to the Gulf Coast Waste Disposal Authority (GCWDA) in accordance with Effluent Permit 401/601. The GCWDA operates a Publicly Owned Wastewater Treatment Works (POTW) in accordance with 40 CFR 403, TPDES Permit No. WQ0001740000, and provisions of the Pretreatment Program Industrial Rule.

New construction will be performed within the existing plant boundaries. Any storm water runoff from the construction area will be managed in accordance with the requirements of the TPDES General Permit TXR150000 during the performance of construction activities. Environmental controls, such as but not limited to, silt fencing, velocity dissipation devices, and riprap will be provided onsite. Site inspections of the storm water controls and material management practices will be provided during construction to ensure that there are no impacts to the water quality of the surface storm water runoff.

3.1.2 TPDES Information

The industrial wastewater discharge from CEC is monitored at the “end of pipe” discharge prior to commingling with wastewater from Houston Refining, LP. Operation of the new cogeneration unit will result in an increase in the total volume of wastewater being discharged from CEC of 0.25 MGD. (i.e. 1.9 to 2.15 MGD). However, as discussed in the BA, there will be no increase in the concentrations of the pollutants being discharged. Since commercial operations began in 2002, there have been no violations of the terms and conditions of the CGWDA pretreatment permit by CEC. In this addendum, we are making the clarification that the Action Area for the purposes of the wastewater discharge is at the “end of pipe” discharge from CEC prior to comingling with Houston Refining, LP wastewater.

3.2 POTENTIAL EFFECTS ANALYSIS

As discussed previously, the proposed expansion project will result in an increase in wastewater discharge volume of 0.25 MGD. For comparison, the GCWDA POTW wastewater discharge volume is 54.7 MGD. Accordingly, the proposed discharge associated with this project would result in an increase to the GCWDA discharge volume of approximately 0.45%. The water quality and pollutant concentrations from CEC will be nearly identical to another Calpine facility in the area that utilizes similar combustion technology and raw water treatment, as well as having the same chemical supplier. This related Calpine facility performs whole effluent toxicity testing (WET) in compliance with its TPDES permit in order to discharge wastewater to the Houston Ship Channel. Through nearly 10 years of operation, WET testing performed on this identical facility's discharge has never failed and thus never indicated the presence of harmful quantities of toxic constituents in the effluent. The quality of the wastewater discharged from CEC will be nearly identical to other Calpine facilities with similar operations, and thereby present no harmful quantities of toxic constituents. Considering the lack of toxicity and continued compliance with the Houston Refining, LP water services contract and related POTW permit, the Action Area did not expand beyond the boundary established by air dispersion modeling due to the absence of potential effects

4.0 REFERENCES

Blanton & Associates Inc. and Zephyr Environmental Corporation Biological Assessment – Channel Energy Center Upgrade, July 2012.

FIGURE 1
REVISED ACTION AREA

N

Datum:
GCS NAD 1983, UTM Zone 14
Map Sources:
ESRI-USGS Topographic
Basemap; Calpine Corp.

zephyr

FIGURE 1 - NEW ACTION AREA
24-HR PM2.5 Receptors Above SIL

Channel Energy Center
Harris County, Texas

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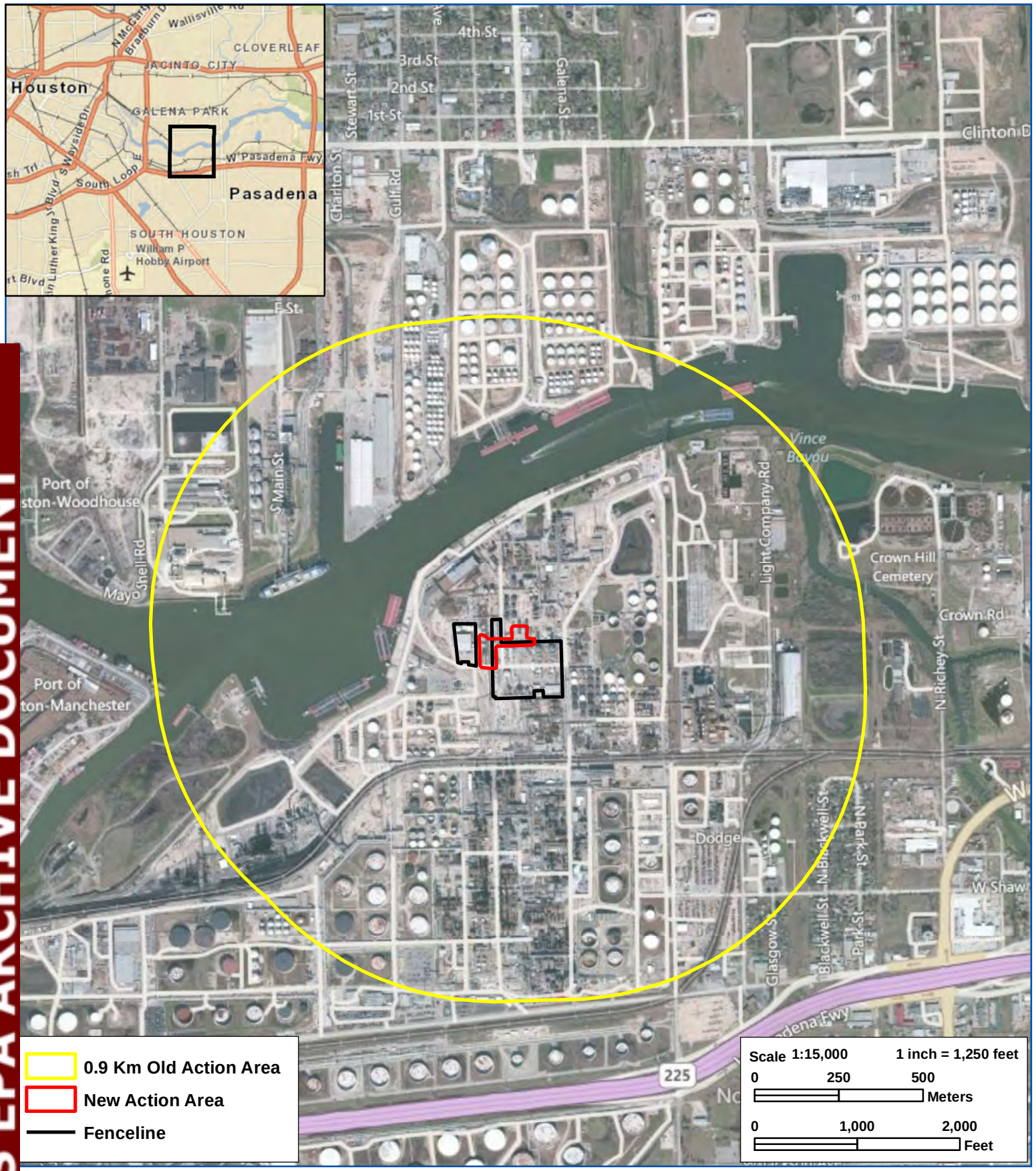
Drafted By:	Reviewed By:	Project No.:	Date:
J. Knowles	L. Moon	011337	11.01.2012

FIGURE 2
ORIGINAL ACTION AREA



N

Datum:
GCS NAD 1983, UTM Zone 14
Map Sources:
ESRI-USGS Topographic Basemap; Calpine Corp.

zephyr

FIGURE 2 - Comparison of Old Action Area to New Action Area

Channel Energy Center

Harris County, Texas

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