

PAUL FURRH, JR.
Attorney at Law
Chief Executive Officer

ROSLYN O. JACKSON
Directing Attorney

MARTHA OROZCO
Project Director
Directing Attorney

MARK GRANDICH
DAVID GUILLORY
JAMES "ED" MULLIKIN
Litigation Directors



Lone Star Legal Aid
Equitable Development Initiative

AMY DINN
TARIQ GLADNEY
KIMBERLY BROWN MYLES
Managing Attorneys

RODRIGO CANTÚ
COLIN COX
BRYAN FRENCH
ASHEA JONES
MARIA LUISA MERCADO
VELIMIR RASIC
EBONY YOUNG
Staff Attorneys

Mailing Address:
P.O. Box 398
Houston, Texas 77001-0398

713-652-0077 Telephone
713-652-3815 Fax
800-733-8394 Toll-free

December 11, 2018

Ms. Bridget C. Bohac,
Chief Clerk, MC 105
Texas Commission on Environmental Quality
PO Box 13087
Austin TX 78711-3087

**Re: Public Comments Submitted on Behalf of Impact and Anna Ortiz Regarding Draft
Renewal Permit/Compliance Plan 50343/ISWR No. 31547, Authorizing Renewal of
Hazardous Waste Permit**

The Union Pacific Railroad Company ("Union Pacific") has applied to the Texas Commission on Environmental Quality ("TCEQ") for a permit renewal with a major amendment to authorize the continuation of terms and conditions of the Permit and to submit the Response Action Plan ("RAP") to address the facility-wide soil and groundwater contamination. Union Pacific owns the Houston Wood Preserving Works Facility ("the Site") located at 4910 Liberty Road, Houston, Harris County, Texas 77026.

Lone Star Legal Aid ("Lone Star") submits these comments on behalf of Impact, a community group based in the Fifth Ward neighborhood of Houston, dedicated to raising awareness around environmental and health issues for the low-income, predominately African-American neighborhood in which it works. Lone Star also submits these comments on behalf of Anna Ortiz, a long-term resident of the Fifth Ward neighborhood. Both Impact and Mrs. Ortiz request that the TCEQ host a Public Meeting regarding the permit. Impact and Mrs. Ortiz also request that the TCEQ refer the matter to the State Office of Administrative Hearings for a Contested Case Hearing.

I. Impact and Anna Ortiz's Right to Request a Contested Case Hearing

One member of Impact resides at and is owner of property inside the Plume Management Zone ("PMZ") that Union Pacific seeks to establish. A second member owns real property that sits along the border of this very same PMZ. A third member is owner of a property inside the PMZ. Other members of Impact live in close proximity to the facility, previously lived in close proximity to the facility, or have property very close to the Site. Because of their unique circumstances, members of Impact are affected in a manner that is not common to the general public. Impact's named members include the following:

- Mary Hutchins who resides at 2938 Lavender Street (within the PMZ);
- Sandra Edwards who resides at 2925 Lavender Street (along the border of the PMZ);
- Leisa Harris Glenn who resides at 6330 Sheringham Street in Houston, Texas but owns property at 2924 Lavender Street (inside the PMZ);
- Sandra Small who resides at 17823 Torregon Lane in Humble, Texas but whose grandchildren have a property interest at 4616 Eddie Street in Houston, Texas;
- Andre Small who resides at 2102 Waco St in Houston, Texas;
- Robert Lewis who resides at 4614 New Orleans St. in Houston, Texas;
- Bertha Jackson who resides at 4006 Caplin St. in Houston, Texas;
- Nancy McCarter who resides at 3101 Wayne Street in Houston, Texas; and
- Keyarra Price who resides at 3019 Hare St. in Houston, Texas;

Mrs. Ortiz, who is not a member of Impact, resides at 4605 Lucille Street, just over three and a half blocks from the PMZ and under a mile from the Site. She, like the members of Impact, is affected in a manner not common to the general public. Impact and Mrs. Ortiz are concerned with the proposed handling of legacy contamination at the Site located at 4910 Liberty Road in Houston, Texas. Specifically, Union Pacific is in negotiation with the TCEQ to renew its hazardous waste Permit/Compliance Plan No. 50343 which is meant to address contamination that is both on and off-site. Impact and Mrs. Ortiz oppose the awarding of the permit in its current form because of an unreasonable risk to the surrounding residential community if Union Pacific is allowed to carry out its Renewal Permit/Compliance Plan as it currently stands without substantive changes. The red star on Figure 1 below denotes the location of Mrs. Ortiz's residence.

Mary Hutchins resides at 2938 Lavender, a property inside the PMZ and less than one block away from the Union Pacific Site. She has resided at this home for 52 years. Both her daughter (Whitney Hutchins, b. 1988) and son (JaHoward Hutchins, b. 1990) were raised in the home. Whitney still lives with her mother to this day and JaHoward only recently moved out in 2015. All three suffer from asthma. Ms. Hutchins is a thyroid cancer survivor. Mary's mother also lived in the home until she passed away of breast cancer. Mary's cousin resided in the home as well before she passed away of cancer. Mary's brother, now deceased, passed away of psoriasis of the liver after having spent several years living in the home at 2938 Lavender Street as well. The granting of the requested Renewal Permit/Compliance Plan will affect Mary

Hutchin's property. The green star on Figure 1 below denotes the location of Ms. Hutchins' residence.

Sandra Edwards' property, 2925 Lavender Street, lies along the western edge of the off-site PMZ that Union Pacific seeks to establish. Ms. Edwards was born in 1965 and raised at the home on 2925 Lavender until 1985. Her daughter, born in 1981, lived at 2925 Lavender until 1987. Ms. Edwards can recall the smells coming off the creosote site, and the shiny gleam that accompanied the water in the form of runoff. She recently returned to the home and currently resides there. Her mother passed away in 2010 of cancer while her father passed two years later, also of cancer. The granting of the requested Renewal Permit/Compliance Plan will affect Sandra Edwards' property. The purple star on Figure 1 below denotes the location of Ms. Edwards' property.

Leisa Harris Glenn is the owner of 2924 Lavender Street, a property inside the proposed PMZ and less than one block away from the Union Pacific Site. She moved to the home in 1984 when she was 27 years old and lived there with her mom and son until about 2000. Her five siblings likewise lived there for various periods of time starting in 1984. Although she no longer resides in the area, she often returns to her old home to visit her brother and nephew who continue to reside at 2924 Lavender. Ms. Glen's mother passed away in 2005 of a cancer that originated in her stomach and spread throughout her body. Ms. Glen has had multiple colonoscopies over the years for various stomach issues. She can recall multiple households in the area where a resident was affected by illness especially cancer. In her words, "the whole street died of cancer." Ms. Glen can recall an explosion at the railyard before the creosoting operations shut down in the 80s. The explosion sent debris that took the form of "little brown diamonds" into the neighborhood. Granting the requested Renewal Permit/Compliance Plan will affect Leisa Harris Glenn's property. The blue star on Figure 1 below denotes the location of Ms. Glenn's property.

Sandra Small, one of Impact's founding members and its primary representative, lived at 4516 Eddie Street from 1974 until 1989. Sandra's grandchildren retain an interest in this property. This residence sits along the western perimeter of the Site and it was from this home that Ms. Small can recall the creosoting operations that took place at the Union Pacific Site. Ms. Small can still recall a basketball size pond where the creosote was stored, uncovered and completely accessible by residents of the neighborhood. Her home on Eddie Street is mere yards from where this impoundment was sited. From 1989 until 2015 she continued to live in the area, first at 3719 Bain Street and then 3926 Sayers street, both addresses located about 1 mile from the Houston Wood Preserving Works Site. Sandra says that she knows at least ten people who have died of cancer in the neighborhood. Sandra's son, Andre Small, is also one of Impact's founding members and lived with his mother at Eddie Street from the age of 3 until he was 21. He currently still resides in the area at 2102 Waco Street, less than half a mile from the Site. Both Sandra and Andre can recall the noxious smell of creosote that emanated from the facility with which they share a property line. Both can also describe the contaminant-soaked runoff from the site that carried with it a rainbow colored sheen onto surfaces and soils not belonging to Union Pacific, including public ditches and the grasses of their very own yard on Eddie Street. Back then, there was no fence that separated the rail yard from neighboring homes. Andre describes the runoff as having a slimy consistency. Andre can even recall playing in puddles that

he would refer to as “quicksand” that were filled with the creosote. Andre’s brother and Sandra Small’s son, Andrew Small, recently passed away of stage 4 cancer at the young age of 52. Like his brother Andre, Andrew spent his younger years in the 5th ward and lived there until the 1990s. The orange star on Figure 1 below denotes the location of Ms. Small’s property in question.

Mr. Róbert Lewis has lived all his life in the Fifth Ward, on New Orleans Street since 1979. Before 1979 he lived off of Lyons Street to the south of the Site. Mr. Lewis suffers from lymphoma and has been receiving treatment since 2010. He is often very weak and unable to leave his home. He can recall the smell of the creosote drifting all around the neighborhood when the operations were still up and running. He can recall being woken up early in the morning because of the smell of creosote.

Bertha Jackson has lived in the Fifth Ward at her current address since 2000, but her history in the area goes back several decades. As a young lady she spent a lot of time in the homes of her two grandmothers. One home, located at 4612 Rawley Street and the other located at 4006 Caplin Street.

The request for a Public Meeting and the request for a Contested Case Hearing submitted by Impact demonstrates that the group has standing to request both of these, because at least one of the members of the group, identified above, would otherwise have standing to request a hearing in their own right; the interests the group seeks to protect are germane to the organization’s purpose; and neither the claim asserted nor the relief requested requires the participation of the individual members in the case.

Anna Ortiz, who is not a member of Impact, is a longtime resident of the Fifth Ward neighborhood and resides at 4605 Lucille Street, less than half a mile from the Site and just three and a half blocks from the PMZ that Union Pacific seeks to establish. She has resided in the home since she was born. She suffers from stage 4 cancer and emphysema. Along with her sister Sarah Prado, she can recall the smell of the creosote that drifted over their home when they were younger. They can even recall their neighbor bringing into his yard creosote soaked wooden barrels which he would then cut in two and allow the neighborhood children to play in. Mrs. Ortiz’s sister states that so many people from the neighborhood died of cancer, many of those of lung cancer, including neighbors and their grandmother. Mrs. Ortiz’s opposition to the Renewal/Compliance Plan stems from her belief that the PMZ is not an accurate reflection of the extent of contamination in the subsurface and that it could in fact be much closer to her property than Union Pacific has represented.

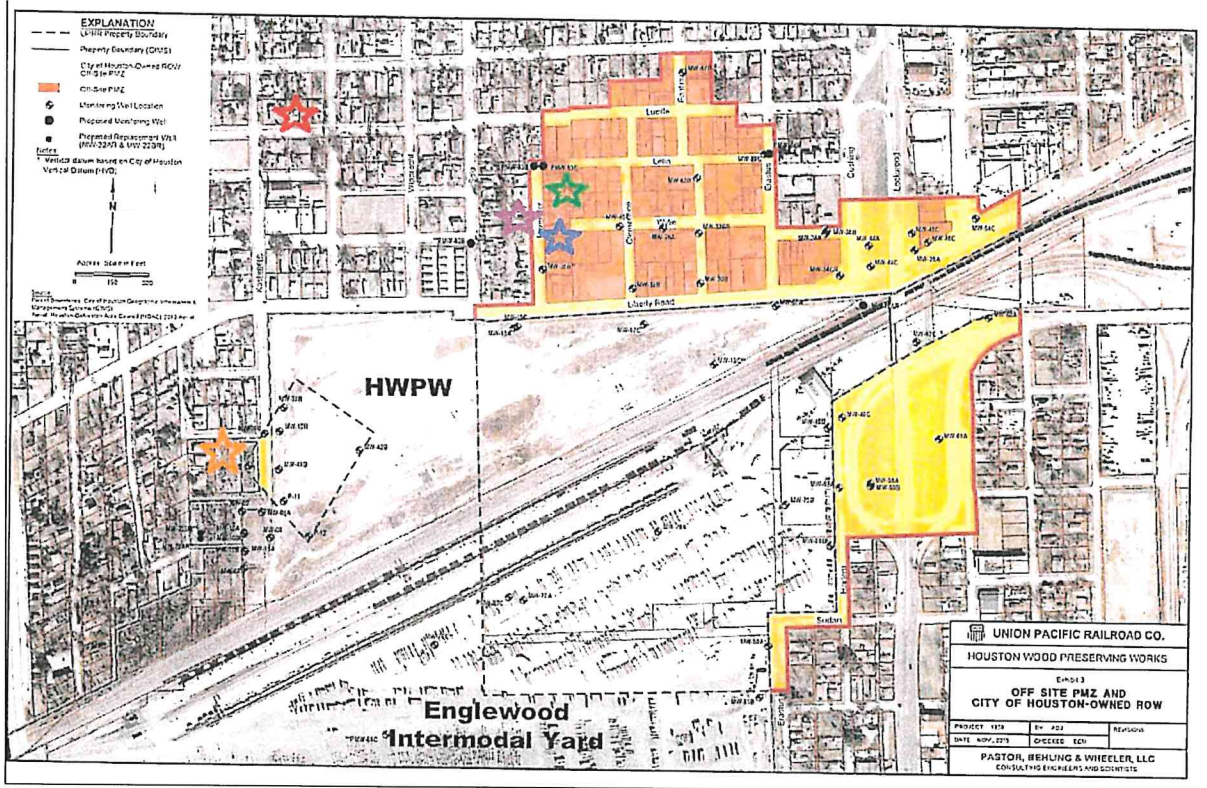


Figure 1 Off-Site PMZ and Location of Affected Residences/Properties Belonging to Members of Impact

Lone Star requests that the TCEQ consider and respond to these comments before awarding Union Pacific any permit. Lone Star also requests that the TCEQ make changes to Union Pacific's obligations that reflect its responsibility to better protect human health and the environment.

II. Relevant Factual Background

Operations utilizing creosote at the Houston Wood Preserving Works site ceased in 1984 with all the facilities having been dismantled and removed from the Site by the early 1990s.¹

The Permit and Compliance Plan No. 50343 were originally issued by the Texas Natural Resources Conservation Commission (TNRCC) in 1994 after having been submitted to the Agency in 1991 by Southern Pacific Transportation Company (SPTCo).²

Union Pacific has proposed a RAP composed of a PMZ to make sure that Chemicals of Concern ("COCs") do not pose a potential hazard to human health or the environment as long as the PMZ attenuation action levels ("AALs") are not exceeded at the respective attenuation monitoring points ("AMPs") and COC concentrations less than critical PCLs ("cPCLs") at the

¹ RCRA Part B, SWR No. 31547, Attachment 2G, Section 5.1 Source Control, pg. 11 (December 7, 2015).

² RCRA Part B, SWR No. 31547, Site Chronology, Revision 0, December 2014.

proposed Point of Exposure (“POE”) wells.³ The current Compliance Plan under review has the stated goal of complying with the TRRP based Groundwater Protection Standards (“GWPS”) at various POE wells at the PMZ boundary.⁴

Union Pacific has provided what it asserts to be the properly delineated Protective Concentration Level Exceedance (PCLE) Zone. Surface and subsurface soil data collected from 1997 through June 2010, with subsequent sampling in 2013 and 2014, were evaluated to assess the affected properties and the PCLE zone in surface and subsurface soils. The data from the groundwater sampling event conducted in July/August 2014 was evaluated to assess COC exceedances in groundwater.⁵

The Dense Non Aqueous Phase Liquid (“DNAPL”) mass that has migrated into the groundwater bearing units (“GWBU”) continues to act as a source of material for dissolved phase COCs in the groundwater.⁶ Heavier than water and not capable of mixing in water, the DNAPL sinks farther into the subsurface as time goes on. Individual chemicals escape from the DNAPL mass where they dissolve in groundwater, cling to subsurface soils, or vaporize, and travel up towards the surface where they are released into the atmosphere. Dissolved phase chemical constituents have leached out of the DNAPL mass and have absorbed into groundwater, the extent of which has now been mapped as the groundwater contamination plume that largely resembles what is thought to be the extent of the DNAPL mass itself.⁷ Union Pacific has stated that “(e)vidence of the DNAPL migration extends across a majority of the area where the groundwater PCLE Zones have been identified.”⁸

Union Pacific has proposed to use Monitored Natural Attenuation as a control response to address the PCLE zones within the PMZ.⁹ Union Pacific first implemented a pilot DNAPL recovery program in early 2013 and has continued these DNAPL recovery activities up to the present. The activities consist of measuring the depth to groundwater surface, the depth to the groundwater/DNAPL interface, and the total depth of the well relative to the top of well casing prior to DNAPL recovery. DNAPL is then pumped from the bottom of the well until groundwater returns in the pump discharge. The volume of recovered DNAPL is estimated from each well based on the volume pumped, and the well is gauged to measure the total depth of the well and depth to residual DNAPL following pumping. Recovered DNAPL is temporarily stored at the Containment Storage Area.¹⁰

To use a PMZ, Union Pacific must demonstrate that the COCs will not pose a “substantial present or potential hazard to human health or the environment” with such a demonstration based on a consideration of potentially adverse effects on groundwater, among other considerations.¹¹ Union Pacific has represented that the contaminants within the PMZ will

³ RCRA Part B, Attachment 2G, Section 4.3 Receptors, pg. 10 (December 7, 2015).

⁴ RCRA No. 50343, Volume I, Compliance Plan Section XI, pg. 15, Revision 0, December 2014.

⁵ RCRA Part B, SWR No. 31547, RAP Executive Summary pg. 2, (December 7, 2015).

⁶ RCRA Part B, SWR No. 31547, Attachment 2G, Section 5.1 Source Control, pg. 11 (December 7, 2015).

⁷ RCRA Part B Application, Volume 1- Compliance Plan 2014, Section XI-pg. 29.

⁸ RCRA Part B, SWR No. 31547, Attachment 2G, Section 5.1 Source Control, pg. 11 (December 7, 2015).

⁹ RCRA No. 50343, Volume I, Compliance Plan Section XI, pg. 15, Revision 0, December 2014.

¹⁰ Letter to TCEQ, DNAPL Recovery Activities Quarterly Report -1st Quarter 2018, April 17, 2018, pg.1.

¹¹ 30 Tex. Admin. Code § 350.33(f)(4)(A).

be addressed via natural attenuation and institutional controls placed on private residential properties, off site, including the use of restrictive covenants to prohibit the drawing of groundwater from private property. In order to establish its PMZ, Union Pacific is under the obligation to obtain Restrictive Covenants from all private homeowners in the proposed PMZ. As of 2017, Union Pacific had yet to obtain Restrictive Covenants from twenty three of the required fifty property owners.

III. Relevant Legal Standards

As Texas has been delegated authority from the United States Environmental Protection Agency to implement Resource Conservation and Recovery Act (“RCRA”) programs, Union Pacific’s permit must comply with any rules adopted by the TCEQ to implement RCRA in addition to those federal requirements that are more stringent.¹² The TCEQ’s Texas Risk Reduction Program sets out the various requirements for RCRA site closures and corrective actions including those that pertain to assessment, monitoring, cleanup, reporting and post-response action care, as well as financial assurance.¹³

Of particular note are RCRA and TCEQ requirements that waste facilities must be closed in a manner that minimizes or eliminates the need for further maintenance and controls while also minimizing or eliminating “*to the extent necessary to protect human health and the environment,*” the post-closure escape of waste contaminants, leachate, run-off, or decomposition products to the surrounding environmental media.¹⁴

Under the RCRA program a facility may choose from two standards for closure; clean closure and closure in place.¹⁵ Under the chosen closure in place standard for the Site, Union Pacific must create a post-closure plan that includes monitoring, maintenance, and other protections from the release of hazardous waste of affected property and adjacent property.¹⁶ Beyond closing its regulated units, Union Pacific must perform corrective action to address releases of hazardous contaminants including those releases that have moved beyond the facility boundary.

Under the TCEQ’s TRRP, a closure in place is performed under Remedy Standard B and must “*ensure that the affected property is rendered protective of human health and the environment.*”¹⁷ The goals of a cleanup action are determined by the Protective Concentration Levels (PCLs) for the particular Contaminants of Concern (COCs) that are present on and off the site. The PCLs must be protective of human health and the environment and are determined by assessing the potential exposure pathways that are complete or reasonably anticipated to be complete. 30 Tex. Admin. Code § 350.71(c).

¹² 42 USC § 6929.

¹³ 30 Tex. Admin. Code § 350; 40 C.F.R. § 264.1, 40 C.F.R. § 300.430

¹⁴ 30 Tex. Admin. Code § 350.2(h); 40 C.F.R. § 264.111.

¹⁵ 40 C.F.R. § 265.111; 40 C.F.R. § 264.

¹⁶ 30 Tex. Admin. Code § 350.33(g).

¹⁷ 30 Tex. Admin. Code § 350.31.

Remedy Standard B

Under Remedy B, there exists the option to remove, decontaminate, or control COCs present on the site, so long as the methods chosen achieve all of the following goals:¹⁸

- Humans will not be exposed to concentrations of COCs in excess of the applicable PCLs; and
- Leachate from the surface and subsurface soil will not increase the concentration of COCs in class 2 groundwater.

Under Remedy Standard B, Union Pacific is not necessarily required to remove waste and is instead permitted to use control measures to prevent COC exposure to human or ecological receptors.

Two types of controls are permitted under Remedy Standard B: physical controls and institutional controls. Allowable institutional controls include restrictive covenants, deed notices, Voluntary Cleanup Program Certificates of Completion, and equivalent zoning or ordinances, all of which constitute legal limits on the use of contaminated property and are intended to limit potential human exposure to the COCs.

Cleanup of Soils Under Remedy Standard B

When controls are used as part of soil cleanup, Union Pacific is under the obligation to demonstrate that the control measures will “reliably contain the COCs within and/or derived from the surface and subsurface soil PCL zone materials over time” in addition to complying with post-closure care obligations and providing financial assurances.¹⁹

Cleanup of Groundwater Under Remedy Standard B

Groundwater cleanups must generally meet the following objectives under Remedy Standard B:

- Use active restoration or monitored natural attenuation to reduce concentrations of COC to the critical groundwater PCLs throughout the groundwater PCLE zone;²⁰
- Prevent COCs at concentrations above the critical groundwater PCLs from migrating beyond the boundary of the groundwater PCLE zone;
- Prevent COCs from migrating to air at concentrations above the PCLs for air;
- Prevent COCs from migrating to surface water at concentrations above the PCLs for groundwater discharges to surface water; and
- Prevent human and ecological receptor exposure to the groundwater PCLE zone.²¹

¹⁸ 30 Tex. Admin. Code § 350.33(b).

¹⁹ 30 Tex. Admin. Code § 350.33(e)(2)(B),(C).

²⁰ The rules state that acceptable use of natural attenuation depends upon the hydrogeologic characteristics of the affected property, chemical-specific data for the COCs, and whether the anticipated time frame to achieve the critical groundwater PCLs is reasonable. 30 Tex. Admin. Code § 350.33(f)(1)(A).

²¹ 30 Tex. Admin. Code § 350.33(f)(1).

IV. Unacceptable Risks to Human Health and the Environment Presented By Renewal Permit/Compliance Plan in its Current Form

Lone Star asserts that the Renewal Permit/Compliance Plan as currently proposed by Union Pacific presents multiple risks. Union Pacific has failed to ensure that the Renewal Permit/Compliance Plan is protective of “human health and the environment” as required by the TRRP and, on these grounds, opposes the granting of the Renewal Permit/Compliance Plan. The three main risks are as follows:

- (1) Vapor Intrusion: Unknown risk to residents above the PCLE Zone and surrounding areas due to possible vapor intrusion originating from the DNAPL mass. This possible vapor intrusion would be due to the chemical constituents of the DNAPL mass in groundwater volatilizing and seeping up toward the land surface and escaping into the atmosphere.
- (2) Failure to Remove All Recoverable DNAPL: Union Pacific’s DNAPL extraction activities are not recovering all readily recoverable DNAPL, and as a result, much of the DNAPL is to be left in place, where it will serve as a continuous source of contamination for the groundwater below residential homes. There exists the possibility that the DNAPL that is left behind will begin to volatilize and present a risk to residents who live above the plume and will only exacerbate the risk touched on in item number (1) above.
- (3) Poorly Delineated PCLE Zone: The PCLE Zone as represented by Union Pacific is dubious and the actual contamination plume is likely larger than thought. A larger PCLE Zone would mean more affected private properties than is currently believed and, therefore, more people living over a contaminated groundwater plume. The residents living on these potentially affected properties would have no knowledge of the contamination plume because Union Pacific is not under any obligation to contact them in order to obtain a restrictive covenant. The possibility of affected properties going unaccounted for by either Union Pacific or the TCEQ within an expanded PCLE is unacceptable and would therefore present an unreasonable risk to public health and the environment for those property owners and residents alike.

V. Suggestions for Remedying the Unacceptable Risks to Human Health and the Environment

Impact and Mrs. Ortiz both suggest that the following actions be undertaken to bring the Permit Renewal/Compliance Plan into conformity with relevant regulations and to ensure the protection of human health and the environment in the Fifth Ward neighborhood. These suggested actions and corrections to the Compliance Plan will help to address the three above-identified risks.

- (1) Passive Volatilization Soil testing across the entirety of the residential, off-site area for which Union Pacific intends to implement a PMZ. This type of testing is necessary to show compliance with 30 Tex. Admin. Code §350.71(c) which requires, amongst other things, that Union Pacific consider inhalation of volatile emissions of COCs in outdoor air originating in the groundwater bearing units, subsurface soils and surface soils. Specifically, the regulation requires that Union Pacific “consider this to be a complete or reasonably anticipated to be completed exposure pathway.” This type of testing must be done in order to bring Union Pacific into compliance with the regulation and to account for the risk to human health and the environment posed by the volatilization of toxic vapors that is known to exist within the footprint of the DNAPL plume. As of now, this risk has not been adequately assessed. Passive vapor soil testing should likewise be done on parts of Union Pacific’s property that are noted as having bare patches of vegetation, such as those observed in September of 2017 following hurricane Harvey. Bare patches can be indicative of vapor seeping up through the subsurface soils, to the surface soils and subsequently into the atmosphere.²² The TCEQ suggested as early as 2004 that some type of testing be performed in order to account for the fact that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than had previously been believed.²³ The TCEQ should also consider conducting indoor air quality sampling given that these vapors may be coming through foundations.
- (2) More frequent extraction of DNAPL from extraction wells must be done. This would create greater confidence that the maximum removal of recoverable DNAPL is taking place. Union Pacific has an ongoing obligation to “reduce NAPLs which contain COCs in excess of PCLs...to the extent practicable.” 30 Tex. Admin. Code § 350.33(f)(4)(E). On average, Union Pacific has been removing DNAPL from extraction wells once a month in the time period from February 2013 until February 2018.²⁴ Nevertheless, Union Pacific has not verified the rate at which the extraction well is refilled with DNAPL. It could take as little as a few days or even several hours for the extraction well to refill to the same level that was present when the previous extraction was completed. Without knowing the rate of refill, neither the TCEQ, the public, Impact nor Mrs. Ortiz can be confident that the maximum amount of readily recoverable DNAPL is being recovered.
- (3) The installation, monitoring, and utilization of new, deeper monitoring extraction wells to assess the extent of the DNAPL contamination in groundwater will allow the Renewal Permit/Compliance Plan to be in accordance with 30 Tex. Admin. Code § 350.33(f)(4)(E) which lays out Union Pacific’s ongoing duty to “reduce NAPLs which contain COCs in excess of PCLs...to the extent practicable.” Because Union Pacific has not adequately assessed the extent of the DNAPL contamination (addressed in greater detail below), it cannot accurately state that it is reducing NAPLs which contain the COCs in excess of PCLs to the extent practicable. A

²² See Post-Response Action Completion Report – Post-Hurricane Harvey Inspection, Attachment A, pgs. 1, 4, 5, submitted by Pastor, Behling & Wheeler, LLC September 29, 2017.

²³ Documentation of Environmental Indicator Determination, Current Human Exposures Under Control, Interim Final 2/5/1999, signed by the Agency July 29, 2004.

²⁴ Letter to Texas Commission on Environmental Quality, Re: DNAPL Recovery Activities Quarterly Report – 1st Quarter 2018, April 17, 2018, Table 1.

comprehensive review of documents shows that extraction wells used by Union Pacific up to this point have been 2-inch diameter wells that do not allow for efficient sample recovery because of the density of DNAPL. A 2-inch diameter extraction well therefore likely under-reports DNAPL thickness. Lone Star applauds the installation of two new APOE wells in 2018 but insists that they (and any other future wells) be drilled to greater depths below ground surface in order to assess and remove DNAPL.²⁵

- (4) The drilling of an exploratory bore hole to a depth of 200 to 250 feet below the land surface, at the existing off-site monitoring wells #34 or #44, with alternative locations at wells #33 or #63. If constituents of concern are encountered, then the bore hole should be finished as a monitoring well. Ideally, the bore hole would be deep enough to verify the existence of a thick, 'fat clay' confining layer beneath the heterogeneous sediments.
- (5) If TCEQ permits Union Pacific to use Natural Attenuation as its sole remedial response then it must also be required to implement measures that will ensure that the response is actually achieving protective concentration levels and in a reasonable time frame as required by 30 Tex. Admin. Code § 350.33(f)(4)(F)(i). That is, Union Pacific must implement a plan that actually monitors the progress of the natural attenuation process. Union Pacific must verify that natural attenuation other than sorption is taking place, what types of chemical reactions are degrading the COCs, identify the daughter products, and determine how long it will take for the Site to reach its clean-up goals. Lone Star asserts that not only does Union Pacific not qualify to use natural attenuation as its sole remedy (addressed in greater detail below), but that its proposal to do so lacks the specificity required by the TRRP. TCEQ must obligate Union Pacific to carry out additional specific actions in order to bring the Renewal/Compliance Plan into compliance with the TRRP.
- (6) Impact and Mrs. Ortiz also take note of the "tar-like substances" that have been observed seeping up from the Englewood Intermodal Yard starting in July 2017.²⁶ Up to the present date Union Pacific has not affirmatively identified the chemical makeup, properties, or constituents of the tar-like substances that have been observed. Impact and Mrs. Ortiz request that such an identification be made through testing and that the results of such process dictate a comprehensive response to remedy the issue.

VI. Deficiencies with the Permit Renewal/Compliance Plan that Create an Unacceptable Risk to Human Health and the Environment

The comments focus primarily on the offsite contamination found in groundwater. Nevertheless, Lone Star recognizes the interconnectivity between the groundwater, the subsurface soils, the surface soil, and the potential for contaminants in one medium to influence the presence and nature of the contaminants in other geologic medium. Lone Star encourages

²⁵ Letter to TCEQ, Re: Notification of Monitoring Well installation at the Union Pacific Railroad Houston Wood Preserving Works, by Eric Matzner, Associate Hydrogeologist with Golder, June 12, 2018.

²⁶ Response to TCEQ Comments on Post-Response Action Care Report, January 17, 2018, PRACR Worksheet 2.0, pg. 1, Pastor, Behling and Wheeler, LLC.

both the TCEQ and Union Pacific to address the noted deficiencies in a way that takes this interconnectivity into account and that is most protective of the long term health of humans and the environment.

Impact and Mrs. Ortiz are concerned with the contamination of off-site groundwater that is known to be directly underneath several blocks of residential homes just north of Liberty Road along the northern perimeter of the Union Pacific Site. Impact and Mrs. Ortiz oppose the RAP proposed by Union Pacific which calls for the establishment of a PMZ as the proper long-term solution for addressing the contamination plume as shown by the PCLE.

Lone Star notes the deficiencies in the Permit Renewal/Compliance Plan (mentioned earlier in *Part I*) can best be understood as stemming from one of the four following major deficiencies:

1. Union Pacific Has Failed to Adequately Assess the Site and Has Erroneously Concluded The Contamination Plume is Stable
2. Union Pacific Has Not Demonstrated that it Can Comply with the Institutional Control Requirements on Residential Properties
3. Union Pacific Does Not Qualify to Use Natural Attenuation as Sole Remedy
4. Union Pacific Does Not Qualify to use a Plume Management Zone.

Impact and Mrs. Ortiz oppose the granting of Union Pacific's RAP in its current form because of these major deficiencies and the substantial present or potential risks to human health and the environment that will flow from them as a result of their approval by the TCEQ.

1. Union Pacific Has Failed To Adequately Assess the Site And Has Erroneously Concluded The Contamination Plume Is Stable

Lone Star asserts that Union Pacific has failed to adequately assess subsurface and groundwater conditions, both on and off-site, and that by doing so Union Pacific's application fails to demonstrate that its RAP will prevent the post-closure escape of waste, contaminants, leachate, run-off, or decomposition products to the surrounding environmental media as necessary to protect human health and the environment, as required by RCRA regulations and TCEQ rules.²⁷ Specifically, the RAP fails to show that humans will not be exposed to concentrations of COCs above the PCLs. The failure to assess the site puts in doubt any representation by Union Pacific that the contamination plume is stable or that it has been delineated properly. Without more confidence in the stability and extent of the contamination plume, the Permit Renewal/Compliance Plan is not ensuring the long-term integrity of public health and the environment. Figure 2 below shows what Union Pacific believes to be the physical extent of the PCLE inside the PMZ.

²⁷ 30 Tex. Admin. Code § 350.2(h); 40 C.F.R. § 264.111.

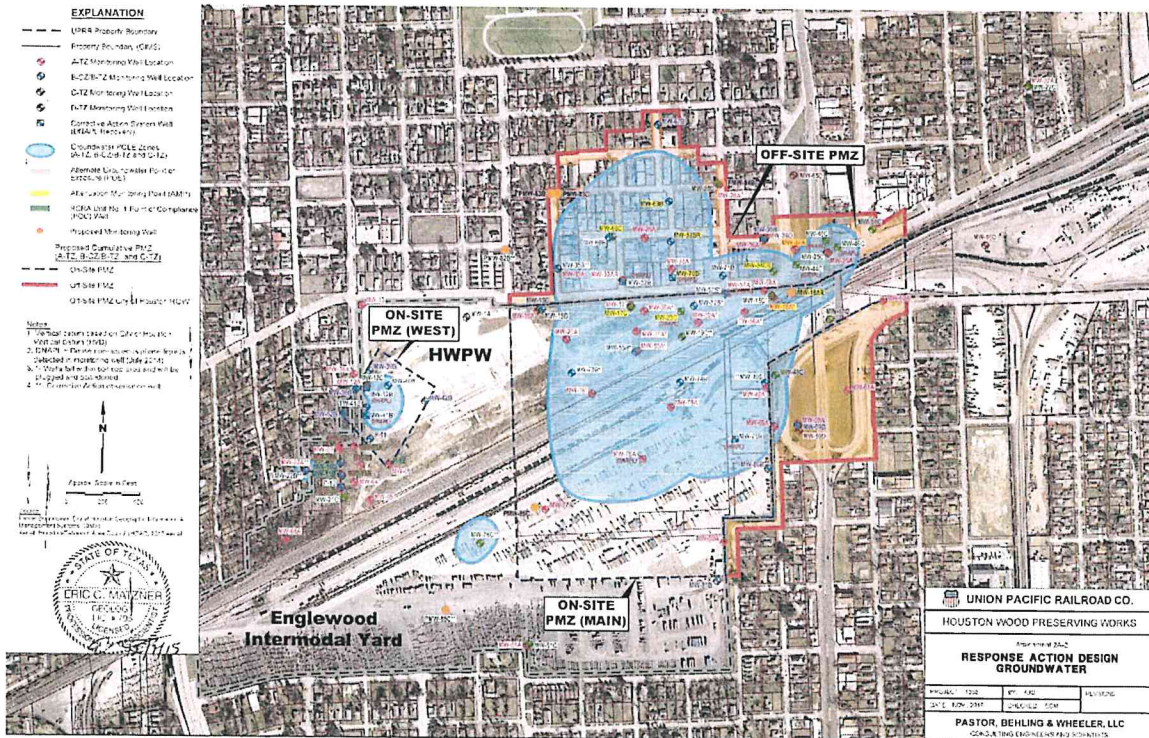


Figure 2 RAP Showing Groundwater PCLE Inside PMZ

It is the accuracy of the PCLE Zone that is in doubt. Lone Star asserts the PCLE is unstable and is therefore larger and more extensive than what Union Pacific has represented. The following irregularities with the Renewal Permit/Compliance Plan all point to Union Pacific's failure to adequately assess the Site:

A. Failure To Comply With Requirement That Inhalation Of Volatile Emissions Be Considered A Complete Exposure Pathway:

Union Pacific has not shown compliance with its obligation to consider inhalation of volatile emissions of COC's originating from GWBUs, surface soils, and subsurface soils, as required by the TCEQ's regulations. The relevant provision states that, when an actor like Union Pacific pursues a PMZ under §350.33(f) (as Union Pacific is), then it *shall* consider these particular exposure pathways to be a completed pathway.²⁸ Union Pacific has not ever completed any type of vapor monitoring testing nor has it asserted that the exposure pathway for volatile emissions is incomplete throughout the entirety of the affected property. Therefore, it must consider inhalation of volatile emissions of COCs from GWBU, subsurface and surface soils, to be completed exposure pathways and must take steps to account for this exposure pathway and any risk that might exist for residents above the contamination plume. By omitting this consideration, Union Pacific has failed to adequately characterize its Site and has therefore failed to account for a potential hazard to human health and the environment.

²⁸ 30 Tex. Admin. Code § 350.71(c)(3)(A)-(B); 40 CFR 264.93(b)(1)(vii) & (ix).

The exposure pathways that must be considered are laid out in the TRRP and read, in relevant part:²⁹

- (1) Ingestion of COCs in class 1 or 2 groundwater. The person shall consider the ingestion of COCs in class 1 or 2 groundwater to be a complete or reasonably anticipated to be completed exposure pathway when class 1 or 2 groundwater is affected.
- (2) COCs in class 3 groundwater. The person shall establish PCLs for class 3 groundwater as necessary to protect human health and safety, and the environment, and to comply with the groundwater response objectives in accordance with Subchapter B of this chapter (relating to Remedy Standards).
- (3) Inhalation of volatile emissions in outdoor air from COCs in groundwater-bearing units. The person shall at a minimum consider this to be a complete or reasonably anticipated to be completed exposure pathway when a plume management zone is established in accordance with §350.33(f) of this title (relating to Remedy Standard B) unless the person:
 - (A) demonstrates with representative and appropriate vapor monitoring data or other technically appropriate method that volatile emissions from groundwater are protective; or
 - (B) otherwise demonstrates that the pathway is incomplete at the affected property. A competent, existing physical control which prevents the release of COCs from groundwater into air above the PCLs may be considered in accordance with subsection (d) of this section.

- ...
- (5) Leaching of COCs in surface and subsurface soils to groundwater. The person shall consider this to be a complete or reasonably anticipated to be completed exposure pathway; however, a competent existing physical control which prevents the release of COCs from soils to groundwater above the PCLs may be considered in accordance with subsection (d) of this section.
 - (6) Inhalation of volatile emissions from COCs in subsurface soils. Other than below a waste control unit, the person shall consider this to be a complete or reasonably anticipated to be completed exposure pathway unless the person demonstrates with representative and appropriate vapor monitoring data, or other technically appropriate method that the exposure pathway is incomplete. A competent existing physical control which prevents the release of COCs from subsurface soils to air above the PCLs may be considered in accordance with subsection (d) of this section.

Once the above-existing or likely to exist exposure pathways are determined, the point of exposure and risk-based exposure limits (PCLs) are established. The objective of a cleanup is to reduce the concentration of the COCs to their corresponding PCLs at the relevant point of exposure, whichever it may be. Union Pacific has failed to demonstrate that it has adequately considered these exposure pathways given the physical conditions of the site and the known nature of the chemical constituents. Regarding requirement number (3) above, Union Pacific has

²⁹ 30 Tex. Admin. Code § 350.71(c); 40 CFR 264.93.

the obligation to assume that inhalation of volatile emissions in outdoor air from COCs in GWBU is a complete exposure pathway unless it is able to demonstrate one of two things:

- either through vapor monitoring that the volatile emissions are protective or
- that the exposure pathway is incomplete at the affected property, such as might happen due to the existence of a physical control which prevents the release of the COCs from the groundwater.

Union Pacific has done *neither* of these regarding COCs originating in groundwater that present a risk of inhalation. This failure informs Lone Star's request that Union Pacific be required to implement a comprehensive volatilization test on offsite residential properties. Similarly regarding requirement number (5) above, Union Pacific has failed to consider the dynamic, interactive nature between the chemical constituents in subsurface soils and how they may transfer to the groundwater, given variations in soil and atmospheric pressure. Finally, Union Pacific has not demonstrated compliance with requirement number (6) above, which obligates it to assume that inhalation of volatile emissions from subsurface soils is a completed exposure pathway unless it is able to demonstrate through vapor monitoring data that the exposure pathway is not complete. For these reasons alone, the TCEQ has sufficient grounds to require that Union Pacific employ the use of vapor monitoring data to account for the risk posed to residential properties and those that live on them in order to demonstrate compliance with 30 Tex. Admin. Code § 350.71(c).

Union Pacific's latest groundwater study likewise shows not only the need for this type of Passive Volatilization Soil testing but also the instability of the contamination plume. Variations in soil and atmospheric pressure can influence chemical constituent concentration which has a direct effect on how these chemical constituents volatilize and then escape the DNAPL mass. These volatile contaminants are capable of evaporating from deep contamination sources, like the DNAPL and the contaminated groundwater. They can then linger in the subsurface soil and then escape into the atmosphere and present a risk to those who reside above them. For example, Union Pacific's application notes that groundwater samples from wells with DNAPL present have naphthalene concentrations that are greater than the groundwater-to-air PCL.³⁰ The groundwater testing, conducted between January and July of 2018, generally shows that constituent chemicals are measured in higher concentrations at deeper levels. In comparing, for example, the Groundwater COC Concentration Maps of the B-TZ AND B-CZ boundary area as reported during the January/February sampling event and the March/April sampling event, one will note that the higher concentrations-which are chemical constituents dissolved in water- are observed as being in the deeper portions of the subsurface, which indicates that the source of the chemicals is farther down still.³¹ One can also note that at certain wells, some contaminants were detected at higher levels during the March/April timeframe compared to the earlier January/February timeframe. For example, when looking at Figures 3 and 4 below, and specifically at the data collected at well #68, one notes an increase in concentration of chemical 2-methylnaphthalene from 0.60 in January/February to 0.67 in March/April. Similarly, the

³⁰ UPRR Permit Application , Part B, Response Action Objectives.

³¹ Response to TCEQ Letter dated November 28, 2017 UPRR Groundwater Monitoring Data, Golder, August 13, 2018, Attachment C Groundwater COC Concentration Maps.

B. Misrepresentation of Subsurface Conditions As Being Composed of Transmissive and Cohesive Zones Which Allows Union Pacific To Improperly Conclude That The Contamination Plume Is Stable:

Union Pacific has artificially divided the groundwater into transmissive and cohesive zones, without offering any geological justification in its conceptual site model for such divisions. The consequence of this is that Union Pacific presents subsurface conditions to be a type of layered system of alternating cohesive and transmissive zones as one works their way farther down the groundwater bearing units away from the surface. Without any demonstrable basis for such divisions, to divide the groundwater into such zones is an arbitrary oversimplification of the subsurface geology. Because much of Union Pacific's conclusion on groundwater flow is based on its faulty assertion that the subsurface is divided into unique transmissive and cohesive zones that are not in communication with one another, any assertion by Union Pacific that the contamination plume is stable and not expanding is therefore in doubt.

Data produced by Union Pacific demonstrates that oversimplification of the subsurface conditions into alternating layered zones is contrary to the actual subsurface conditions. First, Union Pacific's boring logs concerning the subsurface conditions collected in early 2013 were seemingly ignored later in 2014 when Union Pacific presented multiple cross sections showing the subsurface as a layered system as part of its initial application. The boring logs below show what two of the twenty-two samples taken using the Cone Penetration Technique ("CPT") at the Site demonstrate in the subsurface. The logs show the various subsurface soil types and the elevations at which they are found.



Job Number 04.1913-0008 CPT Number IM-CPT-02 Location Houston, Texas
Operator Robert Biehle Date and Time 11-Feb-2013 12:58:23 Cone Number A15F2.5CKE2H2053
Client Pastor, Behling & Wheeler, LLC

Pre-punched 2'

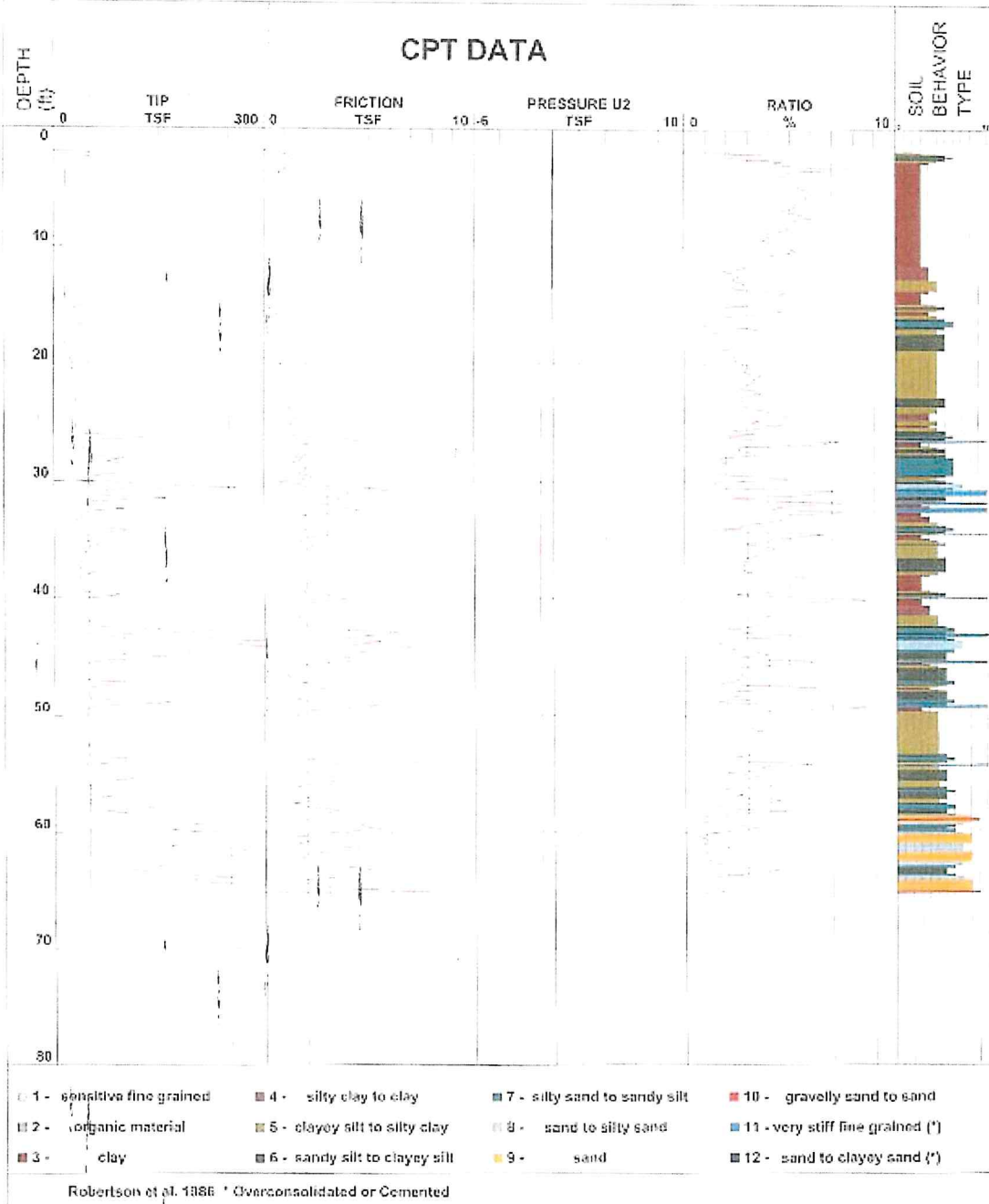


Figure 5 Cone Penetration Technique Data, IM-CPT-02



Job Number 04.1013-0003 CPT Number IM-CPT-10 Location Houston, Texas
 Operator Robert Biehle Date and Time 13-Feb-2013 08:31:49 Cone Number A15F2.5CKE2H2053
 Client Pastor, Bahling & Wheeler, LLC

Pre-punched 1.37'

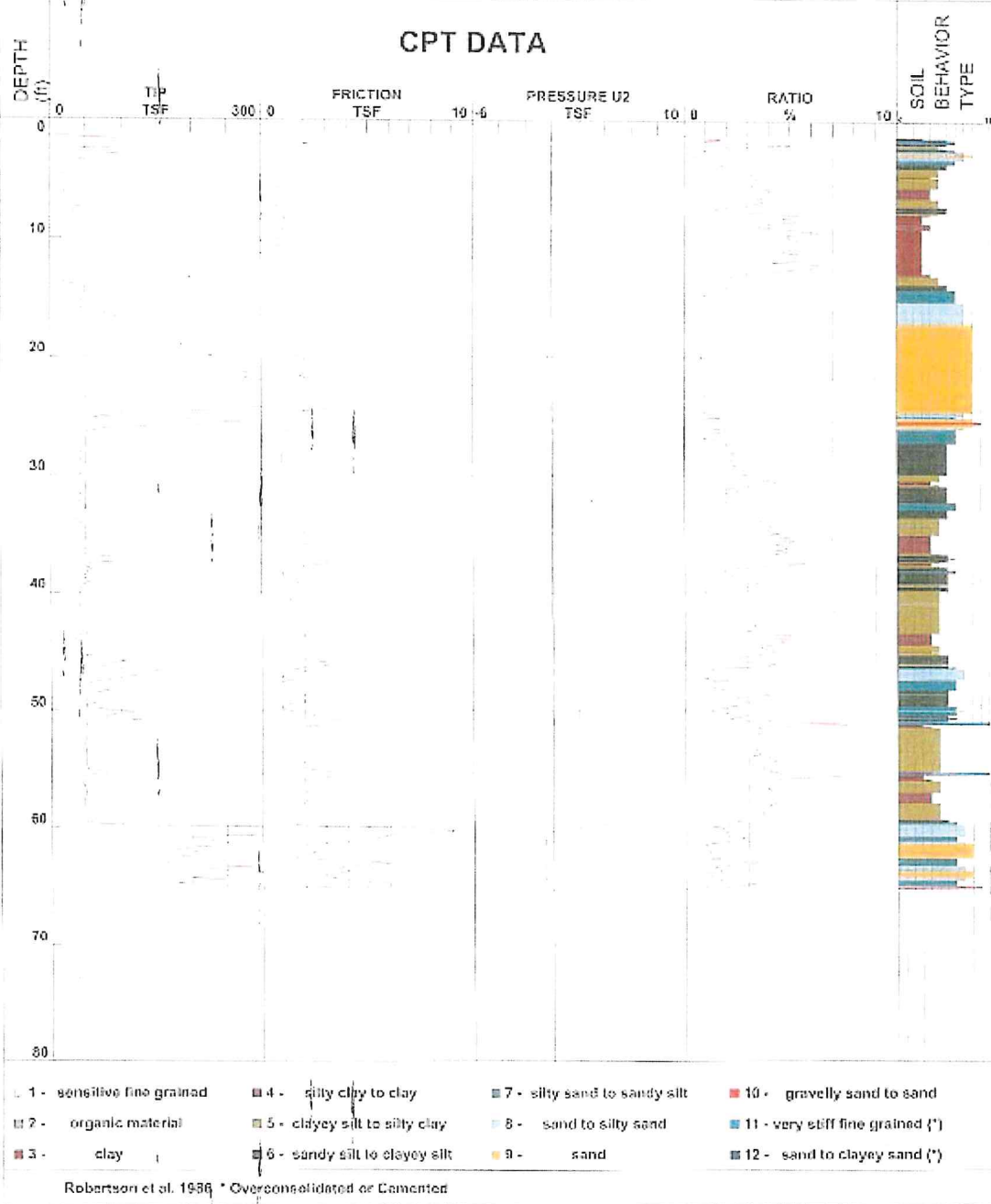


Figure 6 Cone Penetration Technique Data, IM-CPT-10

The CPT is a widely used and trusted technique for characterizing subsurface conditions and soil types. The work done by Fugro identified multiple types of soils using the CPT including clay, silt, sand, and gravelly sand, as well as other soil types, all of which are described as being varying combinations of the aforementioned soil types. A total of 10 different soil types were identified in the 22 samples by Fugro using the CPT.³³ A proper understanding of the CPT data compiled by Fugro is that the subsurface conditions are made up of little layers of mixed soil type characteristics with no one soil type being consistent across the Site horizontally. Although the CPT data may seem complex, it is not. The CPT suggests that the subsurface is best understood as a single saturated unit or zone that is made up of distinct soil types. None of these soil types are uniform across the site, and are therefore accurately described as “lenses.”

After collecting this CPT data, it is supposed to be used in a way that informs the cross-sectional maps, which are to be as accurate as possible demonstration of subsurface conditions. When properly done, the cross-sectional maps would show subsurface conditions that are closely aligned with the CPT data. That is, the cross sections should show a subsurface that is made up of about ten different types of soils at varying elevations across the site. Instead, Union Pacific has supplied cross sections like the ones below, which indicates that Union Pacific ignored the 2014 Fugro data:

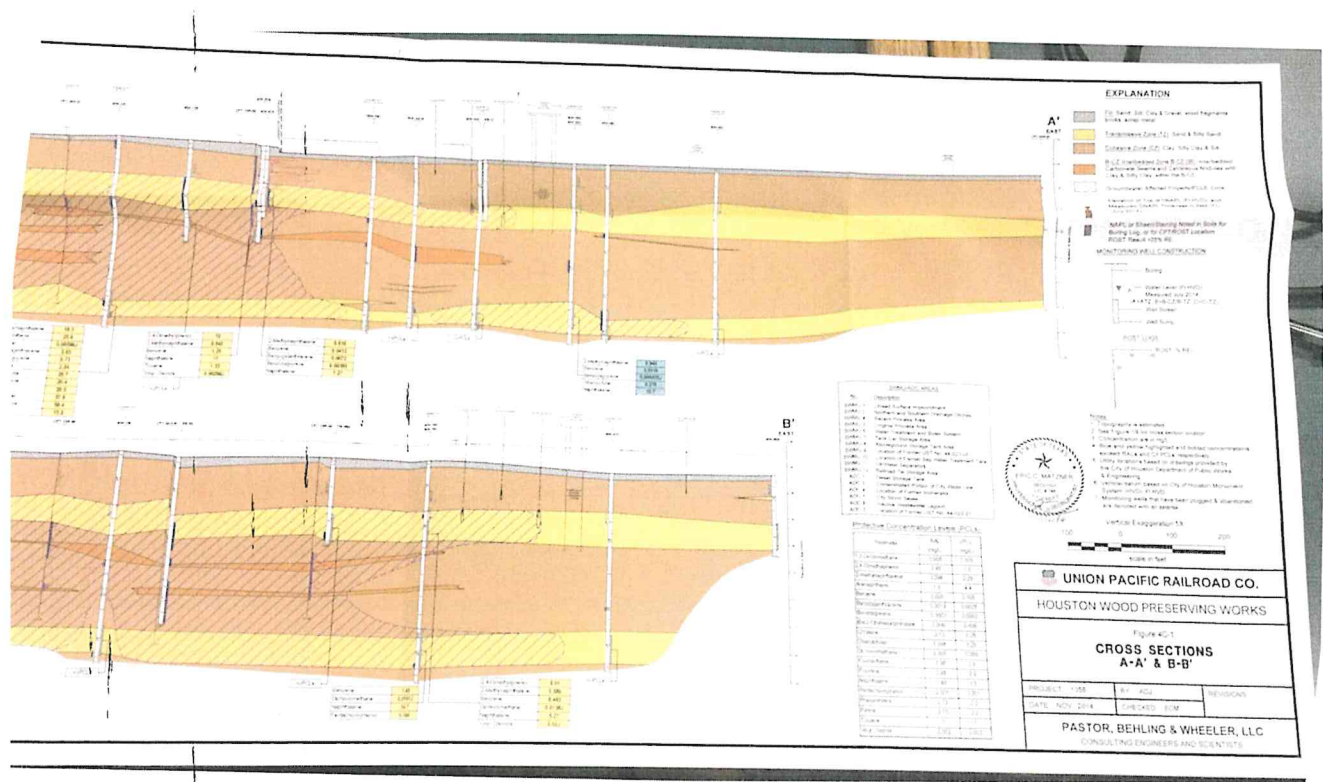


Figure 7 Cross Section A-A' & B-B', first half

³³ Appendix 2B, Soil and Groundwater Well Boring Logs.

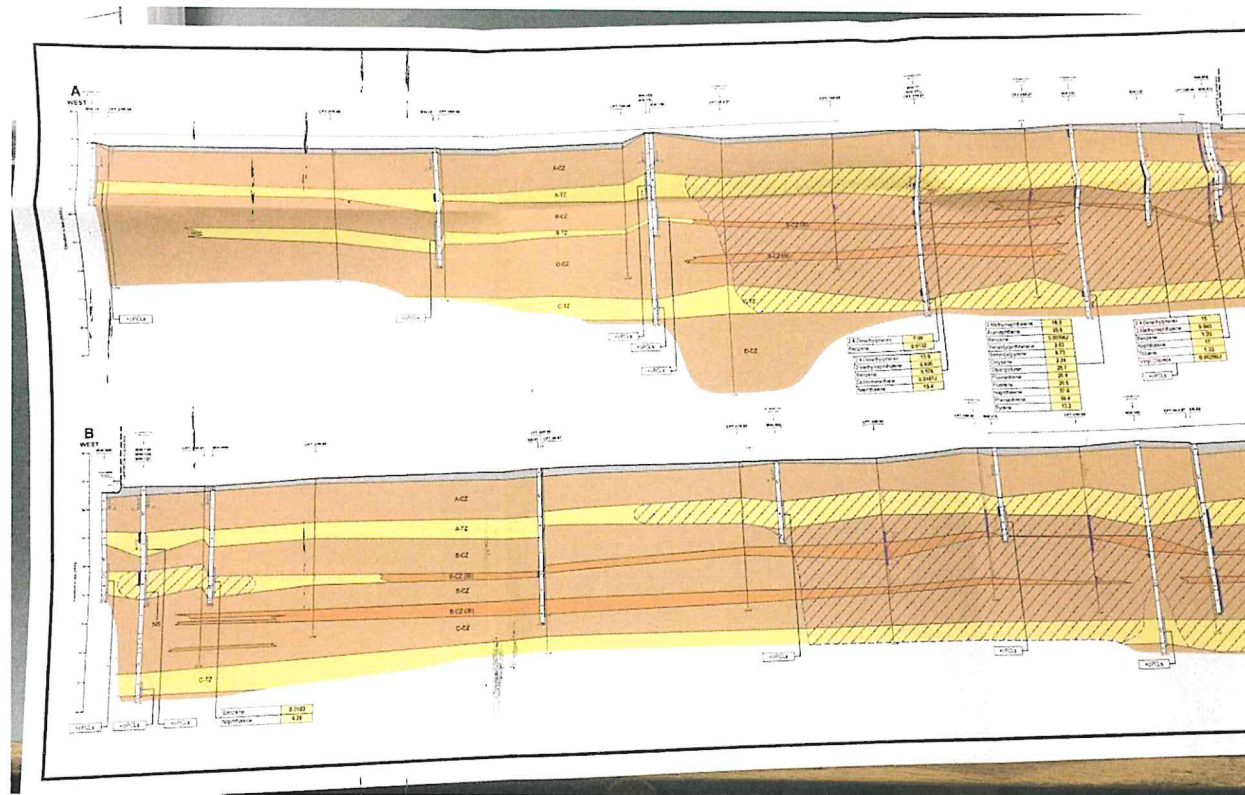


Figure 8 Cross Section A-A' & B-B', second half

As can be seen in Figures 7 and 8 above, Union Pacific oversimplified the subsurface conditions, which constitutes either a mischaracterization of the data that had been collected earlier, or its complete omission when making these cross sections. Union Pacific has instead chosen to present and argue that the subsurface conditions are layered, that the layers are not interconnected, and that any contamination plume found in any one layer is not influenced by, nor is capable of influencing, the contamination found in another layer. This is directly contrary to what is suggested by the Fugro that was collected in 2014. Therefore, any assumptions about the contamination plume that is based, even partially, on the oversimplified, layered, presentation of subsurface conditions are therefore poor assumptions are rebuttable. This includes the conclusion that the contamination plume is stable and not expanding.

Additionally, Union Pacific has recognized that its potentiometric maps indicate communication between the A-TZ and B-TZ, which are otherwise characterized as two distinct GWBUs.³⁴ Yet on the cross sections above, such connectivity is completely ignored and not otherwise demonstrated. Union Pacific must demonstrate this interconnectivity with cross section maps that more accurately demonstrate the subsurface hydrologic conditions.

³⁴ Revision 2 December 2015 pg. VI-11.

C. Poor Characterization Of The Extent Of DNAPL Plume Which Allows Union Pacific To Improperly Conclude That The Contamination Plume Is Stable:

Because Union Pacific has not yet characterized the extent of the DNAPL plume, any claim by the company that it has removed all of the readily recoverable DNAPL is in doubt. Poor characterization of the DNAPL plume also means that Union Pacific cannot state that the plume is stable and not expanding.

At the Site, the DNAPL plume consists of creosote and other extenders like styrene tar and diesel fuel. Creosote is known to be made up of more than 100 chemicals that are both man-made and naturally occurring. Creosote contains polycyclic aromatic hydrocarbons (PAHs, a known carcinogen), and it's possible that Pentachlorophenol (PCP) may have been used onsite during creosoting operations. The Chemicals of Concern (COC) include benzene; 2,4-dimethylphenal; 2-methylnaphthalene; dibenzofuran; and naphthalene; all of which have been found in groundwater both on and off-site in exceedance of the EPA Critical Protective Concentration Levels (cPCL). As PAH migrates through groundwater, its low water-solubility causes some of its constituents to dissolve into the water and/or volatilize, leaving behind a mass of sticky, tar like materials known as DNAPL. Creosote and Naphthalene are both PAH DNAPLs, meaning that they cling to soil particles and require excavation, incineration, and/or soil washing with solvents. As water moves through the soils, any DNAPL PAHs will continue to serve as sources of dissolved contaminants in the groundwater. Dissolved phase chemical constituents can and have leached out of the DNAPL mass and have absorbed into groundwater, the extent of which has now been mapped as the groundwater contamination plume that largely resembles what is thought to be the extent of the DNAPL mass itself.³⁵ Nevertheless, the stated extent of the DNAPL plume is deficient for several reasons.

The first has to do with DNAPL's transportation in subsurface conditions like those at the Site. DNAPL's movement is primarily influenced by gravity in the subsurface. Because it is heavy, it moves farther down and away from the surface when geological conditions allow it to do so. As was explained in *Part VI, Section 1, Subpart B* above, Union Pacific has largely oversimplified the subsurface conditions and misrepresented them as being several distinct layered units that have very little or no communication between each layer. This mischaracterization has likewise influenced Union Pacific's conclusion that it has characterized the extent of the DNAPL itself. The subsurface conditions are more accurately represented as one interconnected and saturated unit made up of distinct soil types with no one soil type being found uniformly over the whole Site. This means that the DNAPL continues to travel deeper into the subsurface while simultaneously moving horizontally, and is found at depths that Union Pacific has not yet reached. Essentially, Union Pacific has not explored deep enough across the Site to verify just how far down the DNAPL has migrated. It should undertake a DNAPL location strategy that recognizes the interconnected nature of the subsurface as well as DNAPL's continuous downward movement.

³⁵ RCRA Part B Application, Volume 1- Compliance Plan 2014, Section XI-pg. 29.

Second, two-inch diameter wells, like the ones being used by Union Pacific for DNAPL extraction, are not efficient for DNAPL recovery and would likely *under-report* DNAPL thickness. Relying on an estimation of the amount of DNAPL present in groundwater rather than a more precise methodology can lead to a mischaracterization of the extent of the DNAPL.

Finally, and as was touched on in *Part VI, Section 1, Subsection A*, Union Pacific's latest groundwater study likewise shows that higher concentrations of dissolved chemical constituents are encountered the deeper down one moves away from the surface.³⁶ This would suggest that these concentrations of dissolved chemicals in groundwater have the DNAPL mass as their source and that this mass is found farther below. Union Pacific should continue to install deeper wells, and/or extend the depth of currently installed wells, in order to reach this deeper DNAPL and remove it. The data likewise suggests that the DNAPL is volatilizing into the groundwater that lies above it, which means that the plume is not stable and is in fact expanding.

D. Internal Inconsistencies Regarding The Ability of Carbonate Seams To Keep DNAPL From Being Transmitted Between Groundwater Bearing Units:

Union Pacific has supplied conflicting data about the ability of carbonate seams in the subsurface to stop the downward movement of DNAPL. First, figures supplied by Union Pacific clearly show that DNAPL in the "A" layer and "C" layer are capable of penetrating or otherwise passing through the carbonate gravel seams that supposedly separate the "B" transmissive zone from the "C" cohesive zone. See Figures 9 and 10 below, both Conceptual Site Models.

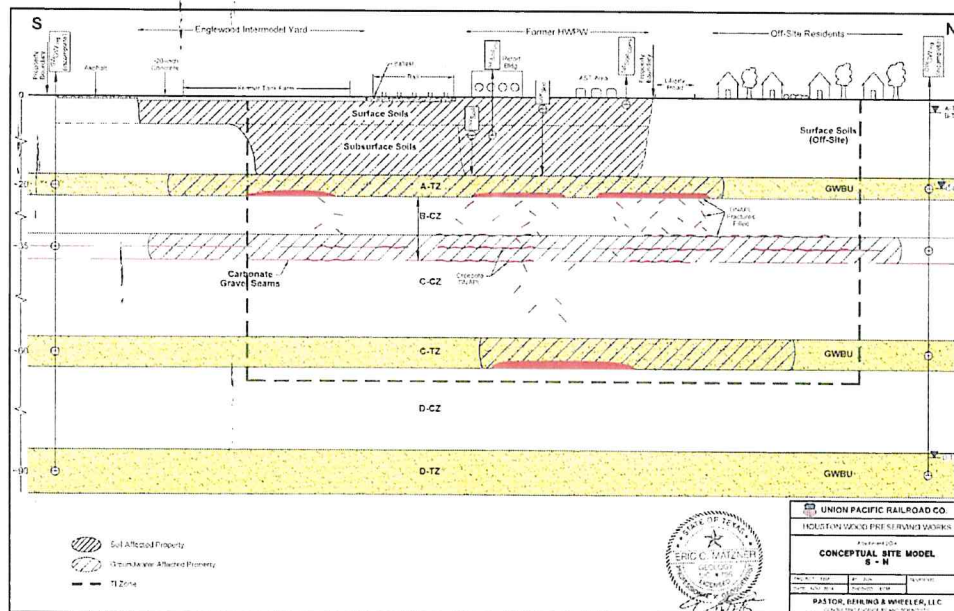


Figure 9 Conceptual Site Model S-N

³⁶ Response to TCEQ Letter dated November 28, 2017 UPRR Groundwater Monitoring Data, Golder, August 13, 2018, Attachment C Groundwater COC Concentration Maps.

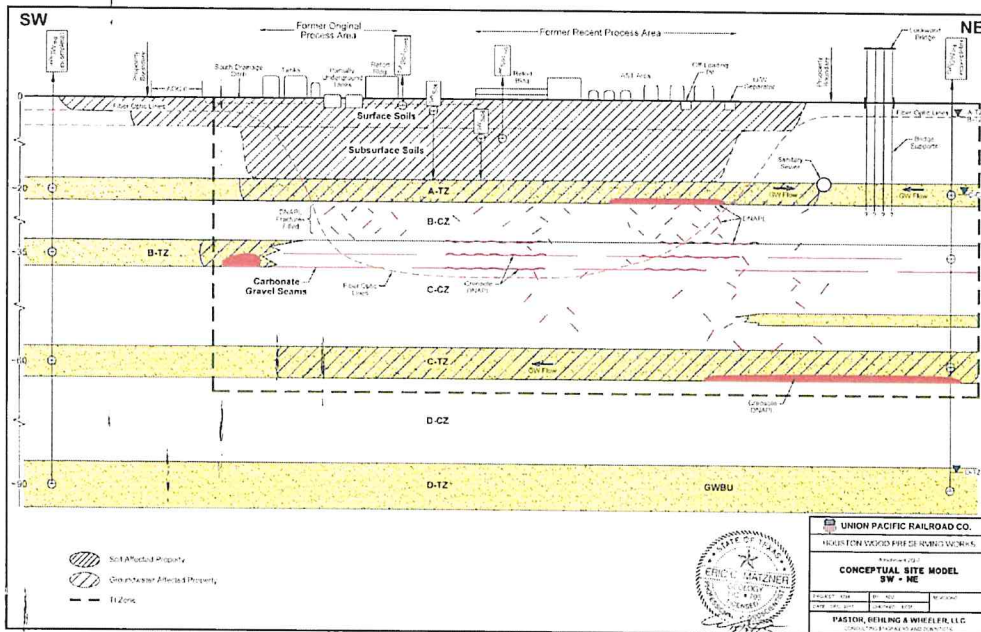


Figure 10 Conceptual Site Model SW - NE

Yet in its RAP worksheet, Union Pacific seems to suggest that the carbonate seams would prohibit the downward migration of DNAPL by stating the carbonate seams have an average hydraulic conductivity of 2×10^{-7} cm/sec.³⁷ This is internally inconsistent with the Conceptual Site Models which demonstrate that DNAPL has pooled below the carbonate seams in spite of their supposed ability to prohibit downward movement of DNAPL. The TCEQ should take this to mean that the carbonate seam is not at all capable of stopping the downward movement of DNAPL. Any representation or assertion by Union Pacific that it can control the DNAPL plume because of subsurface geology or that the plume is stable is therefore in doubt and controverted by Union Pacific's own documents.

E. Irregularities Concerning The Calculation of Hydraulic Conductivity:

The method by which Union Pacific's previous contractor, Pastor, Behling & Wheeler ("PBW"), has chosen to conduct hydraulic conductivity within the groundwater is not as accurate as it could be and is a misrepresentation of subsurface conditions. Water is known to flow more freely through transmissive zones (like sand and gravel) and less freely through clays and silts, like what is found in what Union Pacific calls cohesive zones. Most recently, PBW, when calculating the hydraulic conductivity for different water bearing units, has been calculating the value using only samples from the cohesive zone, whereas before, samples from the transmissive and the cohesive zone were both used. Recent calculations of hydraulic conductivity misrepresent subsurface conditions as they only considered those areas identified to be clay. Of twenty six samples that were selected for laboratory assessment of subsurface transport

³⁷ Plume Management Zone, RAP Worksheet 2.1, December 7, 2015, pg. 10 of 19.

characteristics, only five of these had their hydraulic conductivities tested, with each sample having been identified as a clay.³⁸ The hydraulic conductivities for these samples were all extremely low. None of the transmissive zones were tested for hydraulic conductivity, zones that would have yielded higher hydraulic conductivities. Earlier calculations of hydraulic conductivity done by ERM showed much higher hydraulic conductivity values. In one instance, a hydraulic conductivity of 1.10^{-3} cm/sec would suggest that the subsurface flow of contaminants dissolved in groundwater can flow across the Site and off-Site as much as 2.8 feet/day.³⁹ The effect of removing the transmissive zone when calculating the hydraulic conductivity is to make the groundwater bearing unit appear to be less conductive than it actually is. By doing so Union Pacific concludes that the groundwater plume is stable. A more accurate calculation would have included the transmissive zone. This would have had the potential to show that the plume is not stable, as Union Pacific would like the TCEQ to conclude.

F. Faulty Assumption By Union Pacific About The Existence Of A Permanent Groundwater Divide:

The RAP states that there is a groundwater divide on the east side of the Site, just west of the Lockwood Bridge.⁴⁰ Figure 11 below shows the groundwater divide which is also referred to as a groundwater boundary in other parts of the application materials. The RAP takes the position that this is a permanent feature yet there is no analysis that has been completed to uphold such an assumption. Groundwater divides can vary and change over time and are known to be seasonal. Without long-term data or groundwater hydrographs, the assumption regarding the divide's permanence is in doubt. In assuming that the groundwater divide is a permanent feature and justifying groundwater maps on its existence, Union Pacific is skirting its "continuing obligation to assess whether changes to local hydraulic gradients would increase the likelihood that COCs can migrate beyond the plume management zone at concentrations above the critical groundwater PCLs." 30 Tex. Admin. Code § 350.(f)(4)(F). Groundwater divides can change direction rapidly due to recharge events like hurricanes. Impact and Mrs. Ortiz would like to see Union Pacific verify the permanent existence of the groundwater divide, and account for any flow change that more than likely resulted as consequence of the historic rainfall observed during hurricane Harvey, especially as any change in groundwater flow influences the location and extent of the PMZ. Such verification will bring Union Pacific into compliance with its ongoing obligation to assess changes in local hydraulic gradients. Union Pacific should not be allowed to base any conclusion about the stability of the contamination plume on the assumption of the groundwater divide for the above stated reasons.

³⁸ Table VI.A.4 – Waste Management Area Subsurface Conditions, Part B Application. Response to Technical Notice of Deficiencies for the RCRA Permit Renewal Application. Union Pacific Railroad Company, Houston Wood Preserving Works, Houston, Texas Permit No. HW-50343, SWR No. 31547 December 2015. Prepared by Pastor, Behling & Wheeler, LLC, pg. 225 of 476 of PDF file.

³⁹ Revised Affected Property Assessment Report (APAR), Houston Wood Preserving Works, Houston, Texas. ERM (Environmental Resource Management Consulting Services) June 10, 2000, revised June 10, 2004.

⁴⁰ RCRA Part B Permit Renewal Application, Response Action Plan Revision No. 1, SWR No. 31547/ Permit No. 50343, December 2015, Attachment 2E, Attenuation Action Levels Determination, pg. 86.

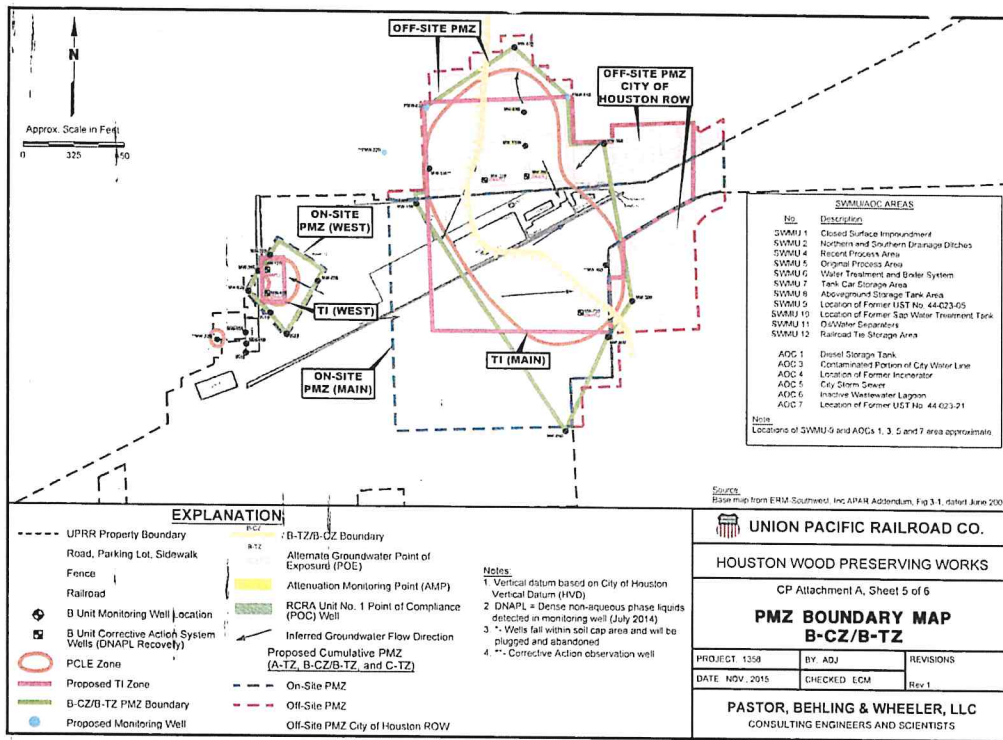


Figure 11 PMZ Boundary Map B-CZ/B-TZ

G. Union Pacific Has Represented Unlikely Flow In Groundwater:

Documents submitted to the TCEQ also demonstrate that Union Pacific represents groundwater flow directions as changing over very short distances. In Figure 11 above and in Figure 12 below, the arrows in the PMZ supposedly represent the flow of the groundwater. Groundwater is not known to flow in such distinct and disparate directions over such a small horizontal distance. For this reason Union Pacific’s conclusions about groundwater flow are in doubt as are any conclusions that the contamination plume has been properly delineated and that the contamination plume is stable. Additionally, such variation in groundwater flow should act as a signal to Union Pacific that the nature of the groundwater in the area is more dynamic than previously thought and might be due to changes in local hydraulic gradients. As such, Union Pacific should be required to investigate the possible reasons behind such varied groundwater flow in order for it to demonstrate compliance with its “continuing obligation to assess whether changes to local hydraulic gradients would increase the likelihood that COCs can migrate beyond the plume management zone at concentrations above the critical groundwater PCLs.” 30 Tex. Admin Code § 350.(f)(4)(F).

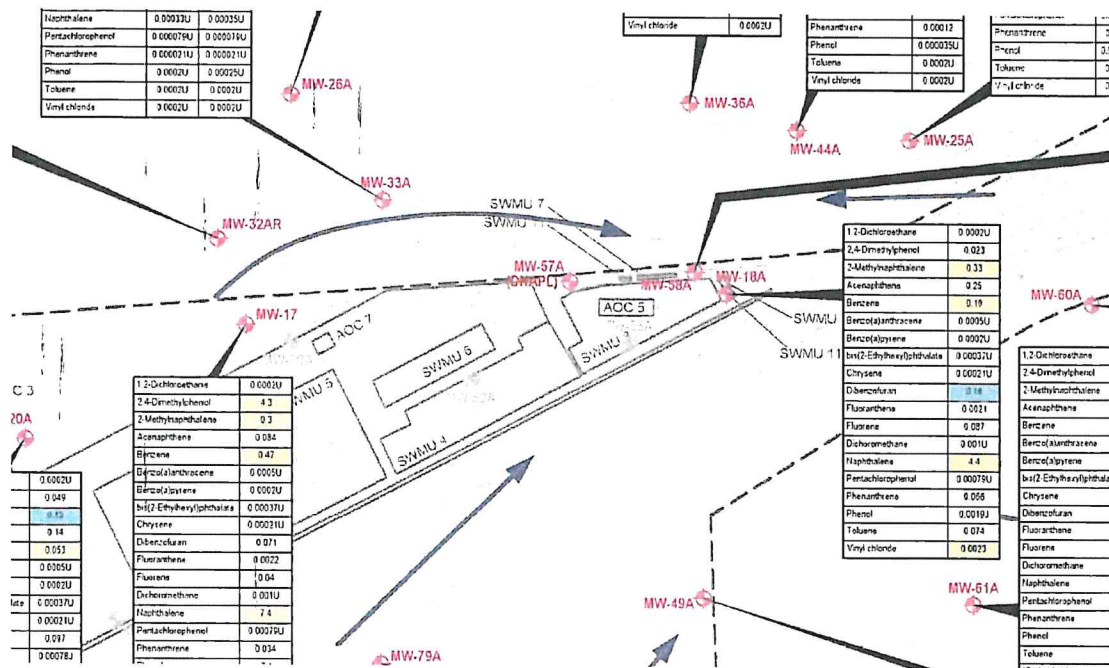


Figure 12 Groundwater COC Concentration Map of A-TZ, January/February 2018

Also, as can be seen in Figure 11, Union Pacific has represented that there is a geological boundary between the B transmissive and B cohesive zones. Union Pacific’s documents refer to this as a “lateral transitional boundary where the B-TZ pinches out and becomes the B-CZ.”⁴¹ Although the TCEQ has stated that it agrees with the existence of such a divide between the two GWBUs, there is no physical boundary at the depositional setting of which to speak.⁴² Instead, the lateral “boundary” is better thought of as a transitional area where the subsurface changes from one soil type to another, as referenced earlier in *Part VI, Section I, Subsection B*. As was stated earlier, the subsurface is correctly thought of as one saturated unit where water is capable of flowing vertically, either up or down. The boundary cannot be considered to impair the flow of water, as Union Pacific would have the TCEQ conclude.

H. Failure To Illustrate Vertical Gradients And Thereby Failing To Comply With Obligation To Assess Changes In Hydraulic Gradients:

In several documents there are mentions of vertical gradients in the groundwater (most recently in Union Pacific’s response to the Third Notice of Technical Deficiency from June of 2017), meaning that water is both bubbling up to the surface while also moving downwards through the gradient, while the groundwater moves horizontally.⁴³ Although Union Pacific has

⁴¹ RCRA Part B Application, Compliance Plan Attachment XI.D-Vol. 2, Response Action Plan, November 21, 2014, Attachment 1A, pg. 7.
⁴² 3rd Notice of Deficiency, Hazardous Waste Permit/Compliance Plan No. 50343, Industrial Solid Waste No. 31547, April 10, 2017; pg. 1 of 6
⁴³ Response to Notice of Deficiency for the RCRA Permit Renewal Application, Union Pacific Railroad Company, Houston Wood Preserving Works, Permit No. 50343, SWR 31547, Revision 2, December 2015; VI-11; Response to 3rd Technical Notice of Deficiency, June 23, 2017, pg. VI-11.

acknowledged this physical process, these vertical groundwater gradients have not been illustrated or otherwise demonstrated when designing the groundwater maps, which likely leads to errors. These errors put into doubt any representation by Union Pacific that the contamination plume is stable or that the contamination plume has been properly delineated. Similarly, by omitting any maps that delineate the extent and nature of the vertical gradients in the groundwater, Union Pacific is failing to comply with its, “continuing obligation to assess whether changes to local hydraulic gradients would increase the likelihood that COCs can migrate beyond the plume management zone at concentrations above the critical groundwater PCLs.” 30 Tex. Admin Code § 350.(f)(4)(F). The fact that an as of yet unidentified tar like substance is seeping up from out of the ground on Union Pacific’s property speaks to Union Pacific’s discounting the importance of the vertical gradient, especially given the fact that Union Pacific has not provided any detailed technical information about the vertical gradient in any of its maps. It is also demonstrative of the fact that the contamination plume is not stable.

I. Union Pacific Plans To Conduct Groundwater Testing Only After Obtaining A Restrictive Covenant:

Union Pacific’s proposal to conduct groundwater testing on private residential property only after obtaining a restrictive covenant on the property, delays the discovery of whether contamination below the residential property presents a risk to those who live above it.

2. Union Pacific Has Not Demonstrated That It Can Comply With The Institutional Control Requirements on Residential Properties

Lone Star notes that as of June 2017, Union Pacific had obtained only thirty restrictive covenants from private property owners of the required fifty-three. Of the remaining twenty-three property owners from whom Union Pacific is required to obtain restrictive covenants, nine have refused to sign the restrictive covenants, eleven cannot be located and three had apparently verbally agreed to sign, though had not yet done so.⁴⁴

As TCEQ noted in its Notice of Deficiency Number 3, Union Pacific is required to formulate a contingency plan for those same properties as part of its Response Action Plan.⁴⁵ Such a contingency plan might require that those properties for which the owners have not signed restrictive covenants be restored to residential PCLs using Remedy Standard A of the TRRP. As of today, it is known that the owners of 5009 Lelia Street, 5105 Liberty and 5109 Liberty have not signed restrictive covenants.

Assuming that Union Pacific will be unable to obtain all the necessary restrictive covenants because these landowners continue to withhold their consent, Union Pacific then has the following options:

⁴⁴ Union Pacific Response to 3rd Technical Notice of Deficiency, Permit Renewal/Compliance Plan with Major Amendment June 23, 2017, pg. 4.

⁴⁵ 3rd Notice of Deficiency, Hazardous Waste Permit/Compliance Plan 50343, pg. 5.

1. Demonstrate that the landowner cannot be located “after extensive and diligent inquiry;” which requires logs of attempted contacts, certified mail receipts, printouts from electronic landownership record search engines, etc. If a demonstration is made that the landowner is unavailable, a TCEQ-approved deed notice can be filed without landowner approval.⁴⁶
2. Demonstrate that removal/decontamination to the residential PCLs is Technically Impracticable (§ 350.33(f)(3)). If a TI determination is obtained from TCEQ, a deed notice can be filed without landowner consent if all of the following are met: (1) a court determines the appropriate level of compensation for the filing of the institutional control, (2) an amount equivalent to the devaluation determination is paid into the court registry, and (3) TCEQ is provided proof of the determination and payment.⁴⁷
3. Show there is an equivalent zoning or other ordinance. The ordinance must meet the following criteria:
 - a. By its terms be sufficient to provide the control that is required to be protective of human health and the environment (e.g. limit groundwater withdrawal),
 - b. provide notice of the COCs left in the place and that the ordinance is necessary to prevent exposure to the COCs,
 - c. the ordinance must apply to current and future uses of the land covered by the ordinance, and
 - d. there must be a Memorandum of Understanding or similar agreement with TCEQ that the ordinance will not be modified or rescinded without consent of the TCEQ.⁴⁸
4. Show that the entity conducting the cleanup is a governmental entity that is not a responsible party. In such case landowner consent is not required for the filing of a deed notice.

Regarding option number one above, nine of the landowners have refused to sign and three have yet to sign despite Union Pacific’s statements that they were going to do so. Union Pacific has not demonstrated compliance with this requirement. Union Pacific cannot comply with the second option as TCEQ has already denied Union Pacific’s Technical Impracticability.⁴⁹ Union Pacific might request an exception under an equivalent ordinance. Yet the TCEQ has already stated that the Houston Galveston Subsidence District permitting process for water wells is not a qualifying institutional control for off-site property, which means it is impossible for Union Pacific to qualify under option three above. Option four is not feasible as the entity that is conducting the cleanup, Union Pacific, is not a government entity.

⁴⁶ 30 Texas Admin. Code § 350.111(c)(3).

⁴⁷ 30 Texas Admin. Code § 350.111(c)(2) and (d)(2)-(3).

⁴⁸ 30 Texas Admin. Code § 350.111(b).

⁴⁹ 3rd Notice of Deficiency, Hazardous Waste Permit/Compliance Plan 50343, pg. 5.

Impact and Mrs. Ortiz assert that because of Union Pacific's inability to demonstrate compliance with the Institutional Control Requirements, the TCEQ must deny Union Pacific's requested Permit Renewal/Compliance Plan and the associated PMZ.

3. Union Pacific Does Not Qualify to Use Natural Attenuation as its Sole Remedy To Address Groundwater Contamination

Union Pacific has failed to show that its use of natural attenuation as its sole remedy will be protective of human health and the environment. It has also failed to show that natural attenuation for decontamination will meet the RAP's objectives of cleanup in a reasonable timeframe. For these reasons, Impact and Mrs. Ortiz encourage the TCEQ to deny Union Pacific its requested permit under the currently requested terms.

The TCEQ has defined the following terms:⁵⁰

Natural Attenuation (NA)—The reduction in mass or concentration of a chemical of concern over time or distance from the source of a chemical of concern due to naturally occurring physical, chemical and biological processes, such as: biodegradation, dispersion, dilution, adsorption, and volatilization [Texas Admin. Code §350.4(a) (56)].

Monitored Natural Attenuation (MNA)—The use of natural attenuation within the context of a carefully controlled and monitored response action to achieve protective concentration levels at the point of exposure [Texas Admin. Code §350.4(a) (55)].

NA can take place in several different ways including sorption (contaminants simply stick to soil particles meaning that their volume is not reduced, but is simply dispersed and distributed as the contaminants mass moves downward); dilution (rainwater, which acts as recharge for the groundwater, is simply mixing clean water with the contaminants); evaporation (volatile components of the COCs evaporate, and may leave behind daughter products that could be more toxic and volatile than the source product); and finally chemical reactions (naturally occurring biodegradation, such as subsurface bacteria, use the contaminants as nutrients, breaking down the complex chemicals into lower concentrations that are usually also less harmful).⁵¹

Response objectives for a PMZ can be achieved via any of the following: removal, decontamination, and/or controls, or by some combination of the three. When Union Pacific elects for removal/decontamination, as it has done when selecting Remedy Standard B, the cleanup it enacts must:

(1) remove/decontaminate the groundwater PCLE zone as necessary to assure that critical groundwater PCLs will not be exceeded at the POE and that attenuation action levels are not exceeded at their attenuation monitoring points and;

⁵⁰ Texas Admin. Code §350.4(a) (55)-(56). Monitored Natural Attenuation Demonstrations under TRRP. TCEQ Regulatory Guidance, Remediation Division. RG-366/TRRP-33. Revised September 2010, pg. 2.

⁵¹ Natural Attenuation Strategy for Groundwater Cleanup Focuses on Demonstrating Cause and Effect. B. A. Bekins, B.E. Rittmann, and J. A. MacDonald. Eos Transactions, AGU. January 30, 2001, 82,5, pp. 53, 57-58.

- (2) fulfill post-response action care requirements.⁵²

Monitored Natural Attenuation may be used as a decontamination process in situations where the PCLE zone extends beyond the limits of an institutional control and the POE is located within the existing limits of the groundwater PCLE, monitored natural attenuation can be used as a decontamination process only if:

- (1) The groundwater PCLE zone is not expanding; and
- (2) the critical groundwater PCL will be met at the POE within a reasonable timeframe given the circumstances of the affected property.⁵³

As was discussed earlier in *Part VI, Section 1, Subparts A, B, C, D, E, F, G & H*, the PCLE at the Site is understood to be unstable---that is, it has not reached “steady state.” Union Pacific has failed to demonstrate that the PCLE zone is not expanding. In other words, it has not demonstrated that it can prevent COC exceeding the PCLs from migrating beyond the PMZ boundary. Thusly, Union Pacific has not demonstrated compliance with requirement (1) above. Therefore a response action other than monitored natural attenuation must be used.⁵⁴

Additionally, Union Pacific’s proposed remedy lacks any kind of schedule for follow-up testing and/or monitoring that would verify whether natural attenuation is actually taking place, and for which contaminants. The proposed plan also lacks the inclusion of additional geochemical indicators which would help to evaluate the effectiveness of MNA by monitoring the COCs within the plume, as is recommended by the TCEQ’s own guidance.⁵⁵ In the event that the TCEQ is satisfied with Union Pacific’s proposal for the use of natural attenuation as an appropriate decontamination process, then the TCEQ should also require that Union Pacific verify the type of NA that is taking place, the nature of the chemical reactions that are degrading the COCs, the resulting daughter products, and how long it will take for NA to accomplish the clean up goals. Without such parameters, Union Pacific cannot state that it is complying with its duty to use Natural Attenuation “within the context of a carefully controlled and monitored response” as required by Tex. Admin. Code §350.4(a) (55).

4. Union Pacific Does Not Qualify to Use a PMZ

To use a PMZ, Union Pacific must demonstrate that COCs will not pose “a substantial present or potential hazard to human health or the environment” as long as the attenuation action levels are not exceeded at the respective attenuation monitoring points.⁵⁶ This determination

⁵² 30 Tex. Admin. Code § 350.33(f)(4)(F)(ii).

⁵³ 30 Tex. Admin. Code § 350.33(f)(4)(F)(i); 40 CFR 264.100(f).

⁵⁴ TCEQ Publication RG-366/TRRP, Monitored Natural Attenuation Demonstrations Under TRRP (Sept. 2010).

⁵⁵ *Id.*

⁵⁶ 30 Tex. Admin. Code § 350.33(f)(4)(A). Attenuation Action Level is defined as the maximum concentration of COC which can be present at an attenuation monitoring point and not exceed the applicable critical PCL at the point of exposure over time. 30 Tex. Admin Code 350.4(4). Attenuation monitoring point is defined as the location within the migration pathway of a COC used to verify that the critical PCL will not be exceeded at the point of exposure. 30 Tex. Admin. Code § 350.4(5).

must be based on consideration of potentially adverse effects on groundwater and hydraulically-connected surface water quality.⁵⁷

It is important to remember that a PMZ allows for the POE (the point where the groundwater must meet the established PCL), to be moved outside the physical limits of the PMZ. Within the PMZ, attenuation monitoring points are set and the levels of COC's at those same monitoring points must not exceed the established Attenuation Action Levels (AAL), which are site specific levels demonstrated to be sufficient so as to assure that the PCLs will not be exceeded downgradient at the POEs. The practical outcome of all this is that COCs that remain in the groundwater may exceed the PCLs as long as COCs will not migrate beyond the PMZ boundary at levels exceeding the PCLs. Union Pacific has stated that it has chosen to use a PMZ, "based on relatively low groundwater velocity, overall stable/declining COC concentrations, [and] the proposed institutional controls."⁵⁸

Additionally, to establish a PMZ, Union Pacific must demonstrate compliance with the following:⁵⁹

- (1) Comply with institutional control requirements (through deed restrictions, voluntary cleanup program certificate of completion, restrictive covenants, or ordinances). Union Pacific has stated it will make use of restrictive covenants;
- (2) Demonstrate through an appropriate technical presentation that COCs will not migrate beyond the downgradient boundary of the plume management zone at concentrations above the critical groundwater PCLs; and
- (3) Demonstrate through the performance of a field survey in the plume management zone that there are no artificial penetrations (e.g., abandoned wells or wells with open-hole completions) which can allow COCs at concentrations which exceed the critical groundwater PCLs to migrate from the groundwater PCLE zone to currently unaffected groundwater-bearing units.

First, as explained in *Part VI, Section 2*, Union Pacific cannot demonstrate compliance with requirement (1) regarding institutional controls. For this reason alone, Union Pacific does not qualify to use a PMZ, and its request to use one must be denied.

Second, Impact and Mrs. Ortiz assert that the characterization of the off-site PCLE is faulty and does not comply with requirement (2) above. Union Pacific has failed to demonstrate that the COCs will not migrate beyond the downgradient boundary of the PMZ at concentrations above the critical groundwater PCLs, necessitating the denial of a PMZ. As was previously discussed in *Part VI, Section 1, Subparts A, B, C, D, E, F, G & H*, the contamination plume is not stable and without better data on its extent, the TCEQ cannot be confident that Union Pacific has properly delineated the contamination plume. Without a proper delineation of the plume, the PMZ (which is determined only after the PCLE has been delineated) is likewise inaccurate. The TCEQ even noted this in its Second Notice of Deficiency that Union Pacific has not

⁵⁷ 30 Tex. Admin. Code § 350.33(f)(4)(A)(i) & (ii); 40 CFR 264.92-.94

⁵⁸ RAP Worksheet 2.1; Revision 2, July 2016.

⁵⁹ 30 Tex. Admin. Code § 350.33(f)(4)(C)(i)-(iii).

demonstrated that it can prevent COCs from migrating beyond the existing PCLE boundary off-site at concentrations that do not exceed the critical groundwater PCLs.⁶⁰ The failure to demonstrate this disqualifies Union Pacific for the use of its requested PMZ, and Lone Star urges that the TCEQ deny the Permit Renewal/Compliance Plan based on this disqualification.

Finally, Union Pacific has failed to adequately demonstrate the absence of artificial penetrations. One pathway that has been identified for groundwater migration is a set of fiber optic communication lines (shown on Figure 10) buried underground on the site. Additionally, there is a Sanitary Sewer Line that runs north-south along the eastern portion of the Site, roughly following the path of Lockwood Drive (see Figure 13 below). Union Pacific has not demonstrated that either of these penetrations will not serve as a mode through which COCs can migrate from the groundwater PCLE zone to currently unaffected groundwater bearing units. For this reason the TCEQ must deny Union Pacific's proposed PMZ and its Permit Renewal/Compliance Plan.

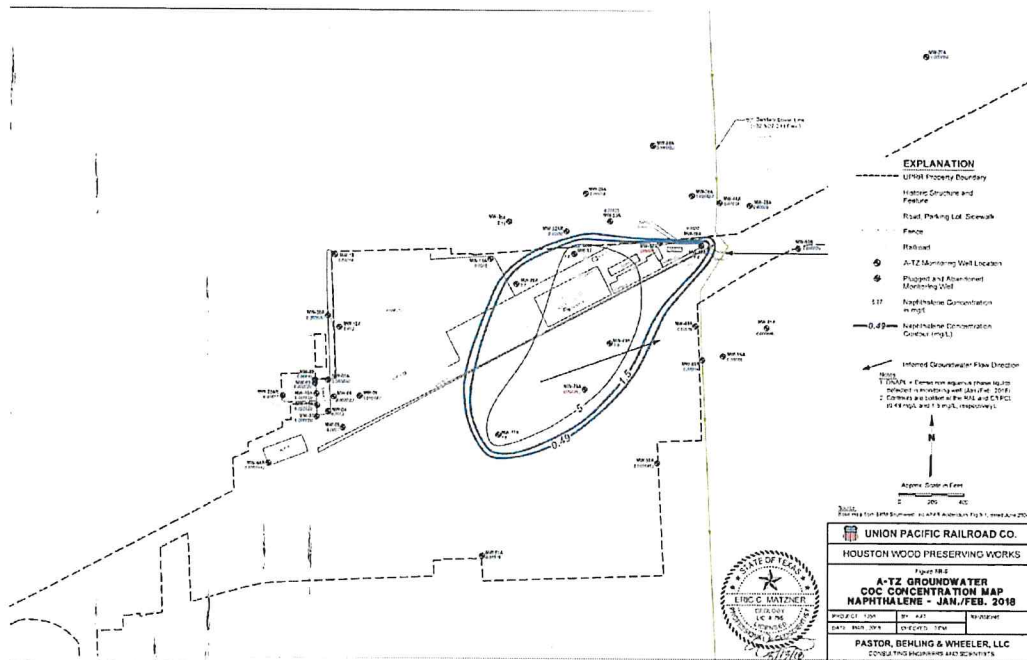


Figure 13 A-TZ Groundwater COC Map Showing Sanitary Sewer Line in Green

There are other reasons for which Union Pacific does not qualify for the use of a PMZ, namely its planned method of dealing with widespread DNAPL contamination. As stated earlier, Union Pacific has an obligation to reduce NAPLs which contain COCs in excess of the PCLs to the extent practicable. 30 Tex. Admin Code § 350.33(f)(4)(E). To determine whether adequate NAPL reduction has taken place, the Executive may consider whether Union Pacific can demonstrate conformance with the following criteria:⁶¹

⁶⁰ 2nd Notice of Deficiency, Union Pacific Railroad Company, Houston Wood Preserving Works, Hazardous Waste Permit/Compliance Plan No. 50343, June 2, 2016, pgs. 5-6.

⁶¹ 30 Tex. Admin. Code § 350.33(f)(4)(E).

- (1) Readily recoverable NAPLs has been recovered;
- (2) NAPLs will not generate explosive conditions;
- (3) NAPLs must not discharge to the ground surface, to surface waters, to structures, or to other groundwater bearing units;
- (4) the vertical and lateral extent of NAPLs must not increase under natural conditions, or sufficient NAPLs must have been recovered such that an active recovery system can be demonstrated to effectively control or contain migration of NAPLs so that there is no increased NAPL extent; and
- (5) the NAPL must not result in critical groundwater PCLs being exceeded at the downgradient boundary of the PMZ or in the critical PCLs for other environmental media being exceeded at the applicable POE.

Union Pacific has not conformed with the probative criteria in a way that adequately demonstrates it has reduced NAPLs to the extent practicable. For these reasons, the TCEQ should deny the Renewal Permit/Compliance Plan sought by Union Pacific.

Regarding criteria (1) above, although Union Pacific has undertaken a DNAPL recovery program, it could be more extensive and Union Pacific has not justified that more DNAPL cannot be recovered. Specifically, Union Pacific has not adequately characterized the extent of the DNAPL contamination. Similarly, Union Pacific could be going deeper in its extraction wells in order to remove more DNAPL. This was previously discussed in *Part VI, Section I, Subpart C*, and is directly linked to Union Pacific's failure to characterize the extent of the DNAPL plume.

Similarly, criteria (3) weighs against Union Pacific. As was previously discussed in *Part VI, Section I, Subpart B*, Union Pacific has oversimplified the subsurface of the Site by characterizing it as a layered system with each of the transmissive and cohesive zones being separated from one another and lacking communication between them. In actuality, the subsurface is one large, saturated system where groundwater flows freely between the depths that Union Pacific has tried to parse out as distinct zones. Therefore, Union Pacific cannot say that NAPLs will not discharge from one groundwater bearing unit to another.

Likewise, Union Pacific has failed to demonstrate that criteria (4) above weighs in its favor. As was stated earlier in *Part VI, Section I, C*, Union Pacific has not characterized the vertical and lateral extent of the DNAPL. DNAPL sinks deeper and deeper into the subsurface as time moves on, and it is precisely this characteristic that might explain why Union Pacific has been observing less and less measureable DNAPL in its removal activities. Although Union Pacific has stated that, "current recovery procedures are achieving the response action objective of removing readily recoverable DNAPL," its failure to model or otherwise demonstrate the vertical and lateral extents of the DNAPL disqualify it from demonstrating compliance with criterion number (4).⁶² Therefore, Union Pacific cannot correctly state that its recovery system can control or contain the migration of the DNAPLs. Union Pacific cannot state that there is no increase in the physical extent of these DNAPLs.

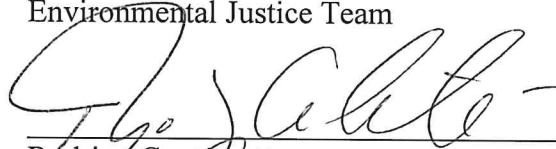
⁶² DNAPL Recovery Activities Quarterly Report-1st Quarter 2018, April 17, 2018, pg.3.

VII. Conclusion

Union Pacific has failed to demonstrate that its Permit Renewal/Modification No. 50343 will comply with the TRRP. The TCEQ should not award the Permit that Union Pacific seeks because of the risks that will be borne by the residential community that surround the Houston Wood Preserving Works Site as a result of the Permit/Compliance Plan. These risks are due to a host of deficiencies with the RAP as currently proposed by Union Pacific, the most important of these deficiencies being that Union Pacific has failed to adequately assess its site. This deficiency flows from a number of irregularities that include Union Pacific's failure to consider the existence of vapor intrusion, its failure to demonstrate that the contamination plume is stable, its oversimplification of subsurface conditions, and the failure to adequately demonstrate groundwater flow, including the existence of vertical gradients, just to name a few. Other deficiencies with the Permit/Compliance Plan are Union Pacific's failure to demonstrate it can comply with institutional control requirements on residential properties, its intent to use natural attenuation as its sole remedy, and its failure to demonstrate that it qualifies to use a PMZ. For these reasons, Impact and Mrs. Anna Ortiz request that the TCEQ grant a public meeting and contested case hearing in order to determine whether or not Permit Renewal/Compliance Plan No. 50343 should be denied or modified. Impact and Mrs. Ortiz also wish to reemphasize that the TCEQ should require Union Pacific to implement a number of actions enumerated in *Part V* of these comments to address the risks to the community and noted deficiencies.

Please feel free to contact the undersigned counsel with any questions.

Respectfully submitted,
LONE STAR LEGAL AID
Equitable Development Initiative
Environmental Justice Team



Rodrigo Cantu, Attorney
713.652.0077 ex 1270
Texas State Bar No. 24094581
rcantu@lonestarlegal.org