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August 31, 2020

Ms. Karen Scott
Industrial & Hazardous Waste Permits Section
Texas Commission on Environmental Quality
P.O. Box 13087, MC-130
Austin, Texas 78711-3087

Re: Response to 4th Technical Notice of Deficiency Letter Dated April 11, 2019
Permit Renewal/Compliance Plan with Major Amendment
Union Pacific Railroad Company – Houston Wood Preserving Works, Houston, Harris County, Texas
Hazardous Waste Permit/Compliance Plan No.: 50343, ISWR No. 31547
Tracking No. 18836453; CN600131098/RN100674613

Dear Ms. Scott:

Please find attached with this cover letter Union Pacific Railroad's (UPRR's) Response to the Texas Commission on Environmental Quality (TCEQ) 4th Technical Notice of Deficiency (TNOD) letter dated April 11, 2019 on the RCRA Permit Renewal/Compliance Plan with Major Amendments for the facility listed above (the Site). The TNOD letter listed several technical comments about the permit renewal application and requested that UPRR provide certain additional information to complete the application. UPRR submits this response to address the technical comments.

As you are aware, UPRR acquired the Site as part of the merger with Southern Pacific Railroad and never operated the Site. Since acquisition, UPRR has worked closely with the TCEQ to assess, remediate, and manage the Site in accordance with the current RCRA Permit and TCEQ environmental rules and regulations to ensure protection of human health and the environment. Throughout UPRR's stewardship of the Site and working with the TCEQ, there has never been a risk of an environmental exposure identified for the off-site properties. Recently, Harris County, elected officials and the local community have expressed a desire for UPRR to conduct additional work at the Site despite the fact that UPRR has satisfied the TCEQ's expectations and has adhered to TCEQ's regulations. UPRR wishes to partner with the stakeholders and community and is therefore amenable to undertaking additional work in response to their and TCEQ's comments even though there is not a risk to human health from the Site.

Enclosed with the response to the TNOD letter is the revised RCRA Permit Renewal/Compliance Plan with Major Amendments. The Compliance Plan includes the Revised Response Action Plan (RAP) Revision No. 5 (Revised RAP). UPRR developed the enclosed Revised RAP to achieve the response action objectives in accordance with Texas Risk Reduction Program (TRRP) and to partner with the TCEQ, community members, and elected officials. The Revised RAP proposes that this partnership include the following key critical components:

- **Installation of a Slurry Wall (TRRP Remedy Standard B)** – UPRR proposes to install a physical barrier using a low-permeability, slurry cut-off wall on the north side of the Site along

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Liberty Road and on the east side of the Site. The slurry wall will be constructed to impede groundwater flow from portions of the Site and establish a subsurface barrier separating the on-site contamination from the off-site areas to the north and east. This response action employs an effective technology that can be implemented in a relatively short period of time and is a commonly accepted remediation approach for complex environmental cleanup sites. In conjunction with the proposed slurry wall, Plume Management Zones (PMZs) are proposed for the on-Site area and the City of Houston Right of Way (ROW) surrounding north and east sides of the Site.

- **Creosote DNAPL Recovery and Management Activities** – One of the key elements of the groundwater response action objectives is to recover the creosote Dense Non-aqueous Phase Liquid (DNAPL) found in the groundwater bearing units (GWBU) even though the groundwater is not consumed or used in any manner. Using the TCEQ risk-based NAPL management guidance, UPRR proposes a NAPL recovery program using the following techniques:

  a. Multi-Phase Extraction (MPE) – Although UPRR regularly recovers creosote at and around the Site, UPRR proposes to implement an MPE approach in additional areas where recoverable creosote is present through the installation of dedicated recovery wells. The MPE approach will utilize a mobile, trailer-mounted system with the flexibility to move to different locations as necessary.

  b. Continued Creosote Recovery via Pneumatic Pumping – UPRR proposes to continue the creosote recovery actions on UPRR property through a combination of pneumatic pumping and MPE.

Details of the proposed response actions are provided in the enclosed Revised RCRA Permit Application and Compliance Plan. An original and three copies of the application revisions, including updated signature pages, are included as part of this submittal. These revisions have been prepared as replacement pages to be submitted in the original application with a revision number and date indicated on each page. In addition, a red-line strike out version of the revised permit sections is also enclosed.

If you have any questions or need additional information, please feel free to call me at 414-267-4164.

Sincerely,

Kevin Peterburs
Senior Manager, Environmental Site Remediation

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution	Response
General T35(4) T42(4) T44(4) T45(4)	B	XI.	XI.A. through XI.D.	30 TAC 335.167 & 350	Inconsistent / Incomplete	Based on our review of the following documents: • UPRR's June 21, 2017 Response to TCEQ's April 10, 2017 3rd Technical Notice of Deficiency (NOD) – Permit Renewal Application which includes the June 2017 Response Action Plan (RAP), Rev. 3; • UPRR's August 13, 2018 Response to TCEQ's November 29, 2017 letter (Monitoring Report); • UPRR's October 31, 2018 and January 9, 2019 Monthly Status Updates - Cap Repairs; • UPRR's December 18, 2018 "DNAPL Recovery Activities Quarterly Report – 3rd Quarter 2018" and March 12, 2019 "DNAPL Recovery Activities Quarterly Report – 4th Quarter 2018"; and, • UPRR's December 3, 2018 and February 12, 2019 "Off-site Notification Updates" The TCEQ notes the following concerns: • Review of the August 13, 2018 Monitoring Report indicates that the groundwater plume has migrated approximately 200 feet to the north/northeast affecting additional off-site properties. • Review of the December 3, 2018 and February 12, 2019, "Off-site Notification Updates" indicate the number of off-site properties impacted by the groundwater plume migration increased from 101 to 110 properties. • UPPR's current monitoring well system fails to monitor groundwater protective concentration level exceedance (PCLE) and dense non-aqueous phase liquid (DNAPL) zones throughout each of the four transmission zones, therefore, further assessment is needed which includes the installation of additional wells and monitoring data. Additional assessment is discussed in more detail in comment nos. T35(4), T42(4), T43(3), T44(4), T45(4) and T48(3). • The current assessment of the total petroleum hydrocarbon – non-aqueous phase liquid (TPH-NAPL) seep source(s) and extent is insufficient because only a limited soil assessment was performed. Additional soil and groundwater assessments is needed which shall include additional soil borings, well installation and monitoring. Additional assessment is discussed in more detail in comment nos. T35(4), T42(4), T43(3), T44(4), T45(4) and T48(3). • The RAP does not include the implemented TPH-NAPL interim response actions for the Englewood Intermodal Yard cap area. The RAP needs to be revised to include the installed system design, procedures and a schedule for evaluation of the effectiveness of the response action as outlined in comment nos. T35(4), T42(4), T43(3), T44(4), T45(4) and T48(3). • Evaluation of potential Vapor Intrusion (VI) is needed. • Since the plume has migrated, the proposed corrective action program consisting of plume management zones (PMZs) with monitored natural attenuation (MNA), and monthly DNAPL recovery contained in the RAP Rev. 3 is inadequate and does not control nor adequately monitor the extent of the plume. The corrective action program in RAP Rev.3 requires revision as outlined in comment nos. T35(4), T42(4), T43(3), T44(4), T45(4) and T48(3).	The responses provided to the comments listed below include information related to this comment.

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General Cont. T35(4) T42(4) T44(4) T45(4)	B	XI.A. - XI.D.	XI.A. - XI.D.2. & XI.D.6.	30 TAC 335.167 & §350	Inconsistent / Incomplete	UPPR has failed to obtain the necessary consent from off-site affected property owners for an off-site PMZ. In the April 10, 2017 3rd NOD, the TCEQ denied UPRR's request for the Technical Impracticability (TI) for DNAPL removal because UPRR did not make an adequate demonstration in accordance with 30 TAC §350.33(f)(3)(E) requirements of TRRP. Therefore, for the proposed PMZ boundary to extend off-site, UPRR must obtain written consent from all off-site affected property owners to file a restrictive covenant (RC) prohibiting the use of groundwater on their property. However, some off-site property owners have declined consent or cannot be located to obtain consent. Without the consent of the off- site property owner's the TCEQ cannot approve an off-site PMZ. There are other avenues which would allow an off-site PMZ without the consent of property owners, but UPPR has not satisfied those requirements as specified in 30 TAC 350.111(c)(2) and TCEQ Guidance TRRP-16 (TCEQ RG-366/TRRP-16 May 2010).	The Technical Impracticability (TI) demonstration, submitted in the Response Action Plan (RAP) (under Attachment 2G (PBW, 2014, and revised in 2016)), followed the requirements under 30 TAC §350.33(f)(3)(A) requiring the demonstration be prepared in accordance with the U.S. Environmental Protection Agency (EPA) "Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration" (Office of Solid Waste and Emergency Response Directive 9234.2-25 (EPA, 1993). The TI demonstration detailed the following categories that can lead to a finding of technical impracticability per the EPA guidance: 1) hydrogeologic factors, 2) contaminant factors, and 3) remediation technology factors. As referenced in the TCEQ comment, the TCEQ denied the TI since the demonstration did not satisfy 30 TAC §350.33(f)(3)(E) requirements of TRRP (TCEQ Interoffice Memorandum, TCEQ, December 13, 2016). However, the TCEQ did not appear to deny the TI on the technical merits detailed in the demonstration per 30 TAC §350.33(f)(3)(A) to *"demonstrate…that it is not feasible from a physical perspective using currently available remediation technologies due either to hydrogeologic or chemical-specific factors to reduce the concentration of COCs throughout all or a portion of the groundwater PCLE zone to the applicable critical groundwater PCLs within a reasonable time frame."* However, as requested in the comment below, references to the TI have been removed from the Revised RAP. UPRR will continue to evaluate the TI requirements under 30 TAC §350.33(f)(3) during implementation of the proposed response actions detailed in the attached Revised RAP.
Specific T35(4) T42(4) T43(3) T44(4) T45(4) T48(3)	B	XI.A. - XI.D.	XI.A. - XI.D.2. & XI.D.6.	30 TAC 335.167 & §350	Inconsistent / Incomplete	Based on the above concerns, UPRR will need to revise and resubmit a complete RAP that includes updated RAP worksheets, associated figures, tables, and appendices as outlined below to address any newly identified historical TPH-NAPL release to soils and groundwater, prevent contaminant migration, and remediate groundwater: • Remove all references to TI from the RAP and institutional controls. • If UPRR intends to pursue a PMZ in accordance with 30 TAC §350.33(f)(4) then the proposed West and Main PMZs should be limited to only the UPRR owned property, and the City of Houston owned property (which contains only the capped-sidewalk just north of the site). • UPRR's current response actions include the utilization of a cover/cap system to block exposure to surface soils and reduce rainwater infiltration, a Monitored Natural Attenuation (MNA) for dissolved phase constituent(s) of concern (COCs) within the PMZ, and removal of readily recoverable DNAPL from 13 selected monitoring wells to control the DNAPL source zone. As previously stated, the TCEQ does not concur with UPRR that the plume is stable nor has reached steady state condition. Therefore, the MNA, PMZ, and limited DNAPL recovery is insufficient and response actions should be reevaluated. Evaluation of plume stability should occur after active remediation systems (e.g. removing readily recoverable NAPL, pump and treat, etc.) have been discontinued. There are several factors the TCEQ evaluates to determine plume stability. These factors include: the groundwater PCLE zone is not expanding laterally and vertically, the presence of NAPL will not increase, and readily recoverable NAPL has been removed. Based on review of the RAP, one of UPRR's groundwater model scenarios (current conditions with constant DNAPL source throughout time) predicted a minor degree of naphthalene migration, approximately 250 feet after 100 years. UPRR provided another modeled scenario which showed source reduction assuming the naphthalene decay rate at one-half every five years. UPRR explained that the model also indicated some migration, but UPRR did not specify the rate of migration although the naphthalene concentrations within the PCLE zone were greatly reduced. Despite models indicating minimal migration of the plume, the monitoring data indicates that the groundwater plume has not reached steady-state conditions and has migrated approximately 200 feet affecting additional off- site properties to the north/northeast. A comparison of the groundwater monitoring data from the July/August 2014 sampling event to the	Attached with this response letter is the Revised Response Action Plan (RAP) Revision No. 5 (Revised RAP) submitted within the Revised Compliance Plan (Section XI.D, Attachment 1A of the RCRA Permit Renewal Application) that includes details on the proposed response actions for the Site. The Revised RAP addresses the specific comments noted, including removal of references to the Technical Impracticability (TI) and revisions to the proposed plume management zones (PMZ) along with the detailed items described below. Per a meeting on June 12, 2019 between the TCEQ, UPRR, and Golder, and the follow-up email from Golder, on behalf of UPRR, to the TCEQ dated June 18, 2019, the reference to monitoring well MW-82B having "*repeated fluctuations of benzene and naphthalene concentrations above the residential Tier 1 PCLs*" does not appear to be correct. After a review of the groundwater data from monitoring well MW-82B, no detections of benzene or naphthalene concentration above the residential Tier 1 PCLs have occurred. The TCEQ provided a clarification of the comment in an email dated July 3, 2019 stating that the reference should be for monitoring wells MW83B and MW-84B, not MW-82B. The TCEQ states that "*the plume migration is further confirmed by the installation of two more monitoring wells in the B-TZ/B-CZ (MW-89B and MW-90B) in June 2018.*" There is no groundwater data collected from the two wells referenced to support this conclusion. UPRR has never detected creosote-related COCs above applicable PCLs in these two wells and, in fact the creosote-related COC concentrations in these wells have been orders of magnitude below PCLs indicating that the plume has not migrated to the north in the B-TZ to these two wells. The TCEQ indicates that "*evaluation of plume stability should occur after active remediation systems (e.g. removing readily recoverable NAPL, pump and treat, etc.) have been discontinued.*" However, as detailed in EPA Guidance[1], evaluating the groundwater COC trends is important in understanding if the proposed response action is meeting the defined management objectives. Since on-going natural attenuation processes are occurring at the Site, evaluating groundwater COC trends and stability is an important data input on the overall response action objectives. Therefore, UPRR prepared a trend analysis evaluation of groundwater COC concentrations in the Site monitoring wells using data from 2009 (or well installation) to 2020, which is provided in Appendix 3 and Appendix 7 of the Revised RAP.

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution	Response
						most recent May/June 2018 sampling event shows an indication of increasing concentrations of Dimethylphenol, Benzene, Naphthalene, 2-Methylnapthalene and other COCs in monitoring wells MW-20A, MW-77A, MW-79A, MW-35B, MW-40B, MW-49B, MW-70B, MW-68B, MW-74B, MW-83B, MW-17C, and MW-18C. Benzo(a)pyrene was detected in DTZ monitoring well MW-36D above the Tier 1 residential protective concentration level (PCL) in the June 2018 sampling event. The plume migration is further confirmed by the installation of two more monitoring wells in the B-TZ/B-CZ (MW-89B and MW-90B) in June 2018, in addition to the three wells previously installed in the B-TZ/B-CZ (MW-82B, MW-83B and MW-84B) in January 2018 per RAP Rev. 3. The results of the 2018 groundwater monitoring events indicate repeated fluctuations of Benzene and Naphthalene concentrations above residential Tier 1 PCLs in MW-82B and MW-83B located on the leading edge of the plume. The plume now impacts 110 offsite properties.	Using the trend analysis and in response to the TCEQ's statement that there are "*increasing concentrations of Dimethylphenol, Benzene, Naphthalene, 2-Methylnapthalene and other COCs in monitoring wells MW-20A, MW-77A, MW-79A, MW-35B, MW-40B, MW-49B, MW-70B, MW-68B, MW-74B, MW-83B, MW-17C, and MW-18C*", those COCs in the referenced wells were evaluated for trends in concentrations over time. COCs dibenzofuran, 2,4-dimethylphenol, benzene, naphthalene, 2-methylnapthalene concentrations do not exhibit increasing trends in MW-20A, MW-77A, MW-79A, MW-40B, MW-68B, MW-74B, MW-17C, and MW-18C based on data from 2009 through 2020 (Appendix 7). 2,4-Dimethylphenol concentrations exhibit a probably increasing trend in MW-35B; however, 2,4-dimethylphenol concentrations have been multiple orders of magnitude lower than residential PCLs, with most of the datasets comprising of non-detects or estimates (J-flagged). Concentrations of COCs dibenzofuran, benzene, naphthalene, and 2-methylnapthalene in this well exhibit decreasing or stable trends. DNAPL is present in MW-49B and MW-70B and a few of the COCs do show increasing trends, which are not at all indicative of a migrating plume but rather from the variable dissolution of COCs from the DNAPL itself. UPRR will continue to evaluate the groundwater COC trends to evaluate the overall response actions. With regards to monitoring well MW-83B, benzene concentrations have been detected in MW-83B above the RAL of 0.005 mg/L since installation in 2018. Benzene concentrations have ranged from 0.018 mg/L to 0.032 mg/L with a standard deviation of 0.006 mg/L. The highest concentration was detected in January 2019 at 0.032 mg/L and decreased to 0.021 mg/L in July 2019 and January 2020. The trend analysis provided in Appendix 7 of the Revised RAP indicates that while the benzene concentrations did temporarily increase, the most recent three sampling events (2019-2020) show decreasing or stable results compared to the preceding sampling events. Also, other COCs in MW-83B including 2-methylnaphthalene, dibenzofuran, and naphthalene concentrations show either probably decreasing or decreasing trends from 2018 through 2020. Other trends are discussed in the Interim Groundwater Monitoring Report (2019-2020) dated April 30, 2020 and revised RAP. [1] EPA, 2004. Guidance for Monitoring at Hazardous Waste Sites: Framework for Monitoring Plan Development and Implementation. OSWER Directive No. 9355.4-28. January

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						Even though UPRR continues to remove readily recoverable creosote DNAPL monthly and DNAPL thickness has decreased in certain wells, the creosote DNAPL may be migrating away from the current recovery wells laterally to the north/northeast and vertically downward. Review of current well construction diagrams indicate the current DNAPL recovery system only consists of monitoring wells and are not designed as extraction wells to effectively and efficiently remove DNAPL. The monthly recovery frequency is also inadequate to capture and remove DNAPL. Secondly, based on review of boring logs, CPT logs, cross-sections and well construction details, an insufficient number of wells were installed at appropriate locations and screened at appropriate depths to remove and monitor where DNAPL has been observed. UPPR recently observed TPH-NAPL migrating upward into the Englewood Intermodal Yard cap area (the TPH-NAPL has not been fully delineated). Furthermore, the TCEQ reviewed the cross-sections, boring logs, and well construction specifications provided in the application, the 13 DNAPL pilot test recovery wells that are not provided in the application, the November 2014 Vadose Zone DNAPL Observations, and the ROST map provided in the January 9, 2019 Monthly Status Updates - Cap Repairs which indicate that additional wells should have been installed at locations where DNAPL is present or has been observed in the A-TZ, and B-TZ and C-TZ zones. For example; the TCEQ notes that no wells were installed at locations CPT-09R-95, CPT-28R-1, CPT-38-97/SB04, CPT-26R-95, nor CPT-33R-95 where NAPL is present in the A-TZ, B-TZ, and C-ZT. UPPR observed DNAPL which was noted in the boring logs and CPT logs at well locations MW-72B and MW-73B in the B-TZ/B-CZ zones, but UPRR did not install any wells to monitor or remove DNAPL in the A-TZ and CTZ where DNAPL was also observed.	UPRR addressed this comment with the increased frequency of DNAPL recovery activities to bi-monthly (twice a month) beginning in June 2019, additional investigation activities detailed in the Interim Non-Aqueous Phase Liquid (NAPL) and Total Petroleum Hydrocarbon (TPH)-NAPL Assessment Report dated May 29, 2020 (Appendix 3), and the evaluation of NAPL Triggers following TCEQ Guidance Document TRRP-32 in the Risk-Based NAPL Management Technical Memorandum dated August 20, 2020 (Appendix 3). The proposed response actions detailed in the Revised RAP will provide further information to address this deficiency. TCEQ states in the comment that no wells were installed at locations CPT-09R-95, CPT-28R-1, CPT-38-97/SB04, CPT-26R-95, nor CPT-33R-95 where NAPL is present in the A-TZ, B-TZ, and C-TZ. However, UPRR installed the following wells at nearby locations: • CPT-09R-95 – Monitoring well MW-55A approximately 100 ft, • CPT-28R-1 – Monitoring well MW-30A approximately 180 ft, • CPT-38-97/SB04 – Monitoring well MW-52A approximately 20 ft, • CPT-26R-95 – Monitoring well MW-16 approximately 120 ft, and • CPT-33R-95 – Monitoring wells MW-31A and MW-55A about 160 ft. Except for MW-16 during one gauging event, UPRR did not observe DNAPL in any of these wells (see Table 1 – Interim Groundwater Monitoring Report, April 30, 2020, I Appendix 3 of the Revised RAP). These data suggest that even though the CPT/ROST may indicate the presence of NAPL, the NAPL may be residual and not mobile. Of the wells listed above, MW-55A, MW-30A, MW-52A, MW-16, and MW-31A were plugged and abandoned as part of the soil cap activities. UPRR installed recovery well TW-56A (intended to be a recovery test well) in 2009 within one of the significant source areas at the Site, SWMU 8 – AST Area. The field geologist observed NAPL the lower portion of the A-TZ sand from 29.5 to 30.6 feet bgs. However, through July 2014, UPRR observed zero DNAPL in TW-56A, and it was plugged in 2016. UPRR has observed this phenomenon at numerous wells at the Site (MW-30A, MW-31A, MW-52A, MW-55A, MW-79A) where NAPL was noted in the boring log when the wells were installed, but UPRR observed no NAPL in the wells. This indicates that there are areas of DNAPL in the soil matrix that is not mobile, especially given the high viscosity of the DNAPL material. This is further discussed in the Risk-Based NAPL Management Technical Memorandum dated August 20, 2020 (Appendix 3).
						Since the TCEQ is requiring UPRR to conduct further assessment of TPH-NAPL in the Englewood Intermodal Yard cap area as directed in the TCEQ February 6, 2019 letter and a VI assessment as directed in Comment T59 of this NOD, the additional assessment should include a re-assessment of creosote DNAPL using cone penetrometer/ rapid optical screening tool (CPT/ROST). The assessment should also include further evaluation of the dissolved phase plume for benzene and naphthalene to the east, west, and south in the A- TZ, B-TZ/BCZ and CTZ. For arsenic, additional assessment is needed to the west and north of the site in the A-TZ and B-TZ/BCZ. Regarding Benzo(a)pyrene detected in the June 2018 sampling event, if results of the January 2019 sampling event indicate Benzo(a)pyrene continues to be detected in any of the D-TZ monitoring wells, then further assessment may be required in the D-TZ and deeper zone(s). Update the RAP implementation schedule to include the additional assessments requested above.	UPRR conducted multiple assessments as documented in the following reports to address this comment: • Interim Groundwater Monitoring Report (2019-2020) dated April 30, 2020 (IGMR) • Interim Non-Aqueous Phase Liquid (NAPL) and Total Petroleum Hydrocarbon (TPH)-NAPL Assessment Report dated May 29, 2020 • Soil Vapor Intrusion Assessment Interim Report dated March 31, 2020 and Updated Soil Vapor Intrusion Assessment Interim Report dated August 4, 2020 Copies of the reports listed above detailing these assessments are included in Appendix 3 of the Revised RAP.

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						• Based on results of the assessment as described above, UPRR must re-evaluate the current DNAPL recovery system and defer proposed MNA until the plume reaches steady-state conditions and readily recoverable DNAPL removal is completed. At that time, UPRR may propose designating new attenuation monitoring point (AMP) wells and attenuation action levels (AALs). Until the assessments are completed, the existing proposed designated AMP wells and their respective AALs should be removed from current RAP (Rev. 3) and re- designated as corrective action observation (CAO) wells. Furthermore, the TCEQ does not concur with the proposed AALs; the AALs are excessively high and would not be protective of the downgradient alternate point of exposure (APOE). • UPRR shall reevaluate the DNAPL recovery system configuration and consider the following factors to improve its effectiveness and efficiency. o UPRR needs to consider installing additional recovery wells in the A-TZ, B-TZ/B- CZ, C-TZ and, if necessary, any lower affected transmissive zones. This may include modifications in well design to optimize DNAPL recovery such as utilizing preferred larger diameter wells and deeper sumps where in-well DNAPL separation can be achieved. The existing wells that UPRR installed were designed as monitoring wells, not as extraction wells with associated engineered systems. o Re-evaluate removal optimization frequency by collecting more frequent DNAPL measurements and alternative removal methods. o Re-evaluate the current integrity of the recovery wells. o As an interim measure, UPRR must gauge for DNAPL in all the existing on-site and off-site monitoring wells, continue DNAPL recovery at the existing 13 wells and any other wells where measurable DNAPL is encountered. UPRR should consider more frequent removal of DNAPL from those wells continuing to have consistent DNAPL thicknesses including: MW- 78A, MW-32B, MW-41B, MW-23C, MW44C and MW-46 C. o UPRR must submit quarterly progress reports until the system is re-evaluated and all improvements are implemented. • The recovery system needs to be expanded to include a pump and treat system, or alternative method, to remove the dissolved phase COCs in the groundwater plume, to reduce concentrations, and address hot spots. As an interim measure, UPRR shall add the following monitoring wells to the groundwater recovery program (e.g. designated as corrective action system (CAS) wells): MW-17A, MW-18A, MW-20A MW-79A, NW-57B, MW- 68B, MW-72B, MW-74B, MW-17C and MW-18C. These wells were chosen based on the most recent May/June 2018 sampling. UPRR needs to further evaluate which wells continue to be utilized as CAS wells or if additional CAS wells need to be proposed based on assessment results. • The revised RAP shall include the installed interim revised response action system design detailed in the January 9, 2019 Monthly Status Update – Soil Cap and Concrete Repairs that address future seeping of the NAPL-TPH in the Englewood Intermodal Yard area. The revised RAP shall also include the monitoring system schedule and outlined procedures for evaluating the efficiency/effectiveness of the system in reducing NAPL-TPH seeps. UPRR is required to submit monthly status updates, until such a time an alternate schedule is approved by the TCEQ. The monitoring schedule should also be provided in CP Table VIII of the Permit Renewal application. Secondly, UPRR should also include a contingency plan for implementing additional measures to further prevent the seeping of NAPL such as in-situ chemical oxidation, thermal treatment, and/or other appropriate response actions. Be	---------- Details of the proposed Plume Management Zones (PMZs) and associated well designations including DNAPL recovery Corrective Action System (CAS) wells are provided in the Revised RAP. Designation of attenuation monitoring points (AMP) and attenuation action levels (AALs) will be proposed after UPRR completes readily recoverable DNAPL as requested by the TCEQ. ---------- UPRR currently conducts bi-monthly (twice a month) DNAPL recovery activities from wells with sufficient volumes of DNAPL for recovery. Details of these DNAPL recovery activities are provided to the TCEQ in the quarterly DNAPL recovery reports currently being submitted. Monthly to bimonthly DNAPL recovery in on-site and off-site wells has been effective at removing DNAPL from the Site. To address this comment, UPRR proposes to expand DNAPL recovery activities with the installation of additional recovery wells (larger diameter and with deeper sumps) and using mobile multi-phase extraction (MPE) techniques to further address the NAPL. Details of the response actions are provided in the Revised RAP. It is important to note that there are no potential or unprotected exposures to impacted groundwater where NAPL is present for the off-site receptors. ---------- As detailed in the Revised RAP, the primary response action to address the groundwater PCLE zones and NAPL response action endpoints at the Site is through the proposed installation of a slurry wall along the north and east sides of the Site. The objectives of that response are to reduce the future potential for migration of groundwater containing COC concentrations above the critical PCLs from the Site and to address mobile NAPL from the Site even though there is no potential for exposures to the off-site groundwater PCLE Zones. Figures showing the conceptual approach and alignment of the proposed slurry wall are presented in the Revised RAP. ---------- The Revised RAP includes the NAPL Collection System Design in Attachment 2A-1d provided in the Interim RACR dated March 26, 2019 (Golder, 2019b). As detailed in Worksheet 3.2 of the Revised RAP, UPRR conducts weekly inspections of the area as part of the operation and maintenance of the NAPL Collection System, which includes removal of any tar-like material that has accumulated in the Collection System and surfaced in areas outside of the system. The monitoring system schedule and reporting to the TCEQ are also included in the RAP. Regarding the request for developing a contingency plan for the surface NAPL seeps, UPRR conducted a test pit evaluation in July 2020 to assess where tar-like NAPL and water seeps have been observed outside of the NAPL Collection System. Details of the additional investigation activities will be presented in the

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution	Response
						advised that if the proposed response action design is not effective as interim measure, the TCEQ may require that UPRR evaluate and implement additional response actions as necessary including future revisions to the Response Action Plan. • The revised RAP shall include modified Appendix 4 - institutional control (ICs) for the UPRR owned property to include TPH-NAPL area, TPH-NAPL interim measures, and update the maintenance and monitoring to include the on-site PMZ, groundwater monitoring, and remediation measures. Also, revise Appendix 5 to include removal of the ICs for the off- site affected residential properties. Modifications of the existing monitoring well system configuration and designation are needed to reflect changes in the PMZs, to include: background wells, APOE wells, CAO wells, and CAS wells. This includes continued monitoring of the four wells screened in the D-TZ. Specific revisions to the CP Tables and CP Attachment A maps are noted in the following comments below.	Englewood IM Yard Test Pit Evaluation Assessment Report that will be submitted to the TCEQ as detailed in Worksheet 6.0 of the Revised RAP. ---------- UPRR revised the institutional controls for the UPRR-owned property to include the TPH-NAPL area and NAPL Collection System. Interim measures and updated maintenance and monitoring for the proposed PMZ, groundwater monitoring, and other remediation measures are included in the Revised RAP. Appendix 5 of the Conceptual RAP includes the signed institutional controls for the off-site City of Houston Right-of-Way (ROW). UPRR revised the existing monitoring well designations and provided them in the Revised RAP.
Specific T23(3)	B	XI.A.	XI.A.1, XI.A.2, & XI.A.3	30 TAC 335.167 & 350	Inconsistent / Incomplete	Since the proposed PMZ shall be limited to the on-site UPRR owned property, revise the CP Attachment A Figures to include the following: • CP Attachment A, Sheet 1 of 7, "Facility Site Map" is not legible. Provide a new map that clearly labels the facility name, facility property boundary, and nearby local roadway (e.g. interstate, highway, etc.,) with respect to the City of Houston. • CP Attachment A, Sheet 2 of 7, Solid Waste Management Units (SWMUs)/ Areas of Concern (AOC) Location Map. Revise this figure and legend by deleting all references to proposed on-site and off-site TI Zones, and the off-site PMZ boundary. The PMZ boundary should be limited to only the UPPR property. Also, the text in the legend and name of the specific SWMUs/AOCs is not legible. • CP Attachment 3 of 7, Compliance Monitoring Well Network. The point-of compliance (POC) wells and background wells should have different symbols so the wells are easily distinguished from one another. Also, the name of the RCRA Permitted Unit which is identified as "SWUM 1" needs to remain as "RCRA-Regulated Waste Management Unit 001" to be consistent with the facility Notice of Registration (NOR). • CP Attachment A, Sheet 4 of 7, PMZ Boundary Map, A-TZ. Remove all references to the off-site PMZ and TI. The title should be re-labeled to state, "PMZ Boundary and Well Location Map, A-TZ." Remove references to AMP wells in the figure. Revise the figure to reflect the following list of wells as designated below: <u>On-site Main PMZ:</u> o Alternate point of exposure (APOE) wells: MW-15A, MW-17, MW-18A, MW-49A, MW-50A. MW-57A, MW-58A, MW-60A, MW-69A. o Corrective Action Observation (CAO) wells: MW-18A, MW-20A, MW-51A, MW-77A, MW-78A, MW-79A. <u>On-site West PMZ:</u> o APOE wells: MW-38A. o CAO wells: MW-9, MW-12A, MW-13. <u>Off-site CAO wells:</u> MW-25A, MW-26A, MW-32AR, MW-33A, MW-35A, MW-36A, MW-44A, MW-59A, MW-61A. <u>Background well:</u> MW-51A. <u>Corrective Action System wells</u>: MW-17A, MW-18A, MW-20A, and MW-79A. • CP Attachment A, Sheet 5 of 7, PMZ Boundary Map, B-CZ/B-TZ. Remove all references to the off-site PMZ and TI. The title should be re-labeled to state, "PMZ Boundary and Well Location Map, B-CZ/B-TZ." Remove references to AMP wells in the figure. Revise the figure to reflect the following list of wells as designated below: <u>On-site Main PMZ:</u> o APOE wells: MW-15B, MW-47B, MW-49B, MW-57B, MW-72B, MW-80B, MW-81B.	UPRR revised the Compliance Plan (CP) Attachment A figures to reflect the proposed response actions detailed in the Revised RAP. As a result, some of the well designations suggested by the TCEQ are not applicable for the proposed response action. Please see Worksheet 2.1 in the Revised RAP and CP Attachment A for the proposed well designations. UPRR removed all references to proposed TI zones and off-site PMZ except for the proposed off-site PMZ within the City of Houston ROW.

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution	Response
						o CAO wells: MW-14, MW-74B, MW-75B. On-site West PMZ: o APOE wells: MW-38B, MW-39B, MW-42B, MW-62B. o CAO wells: MW-12B, MW-40B. Off-site CAO wells: PMW-28BA, MW-26A, MW-32B, MW-33BR, MW-35B, MW-36B, MW-44A, MW-59B, MW-63B, MW-67B MW-68B, MW-70B, MW-71B, MW-82B, MW-83B, MW-84B, MW-89B, MW-90B Corrective Action System wells: MW-57B, MW-68B, MW-72B, and MW-74B. • CP Attachment A, Sheet 6 of 7, PMZ Boundary Map, C-TZ. Remove all references to the off-site PMZ and TI. The title should be re-labeled to state, "PMZ Boundary and Well Location Map, C-TZ." Remove references to AMP wells in the figure. Revise the figure to reflect the following list of wells as designated below: On-site Main PMZ: o APOE wells: MW-15C, MW-17C, MW-18C, MW-47C, MW-48C, o CAO wells: MW-19C, MW-23C, MW-45C, MW-51C, MW-76C, MW-75B. On-site West PMZ: o APOE wells: MW-12C Off-site CAO wells: MW-25C, MW-27C, MW-34CR, MW-44C, MW-45C, MW-46C, and MW-54C MW-68C, MW-83C, MW-87C, Corrective Action System wells: MW-17C, and MW-18C • CP Attachment A, Sheet 7 of 7, Post-Response Action Care Well Location Map. Remove all references to off-site PMZ and TI. The title should be re-labeled to state, "Well Location Map, D-TZ" because the TCEQ shall require UPRR to continue monitoring the deeper transmissive zone to verify the groundwater PCLE zone is not migrating vertically. Include D-TZ wells MW-36D, MW-59D MW-65D and MW-66 D as CAO wells. Since all the above CP Attachment A figures will be included in the Final Draft Permit (FDP) as a black and white copies, each well designation (i.e., APOE, background well, CAO well, etc.) should have a separate symbol that is easily distinguished. The font may need to be enlarged and/or darkened on all the maps. For future reference, please note that CAO wells, CAS wells, and any future AMP wells should not be listed in CP Tables. These wells are only depicted in the CP Attachment A maps so that once wells meet their respective PCLs, UPRR may propose to discontinue monitoring for those wells in future Groundwater Monitoring Report submittals to account for changing environmental conditions and/or plume morphology without modification to the Permit.	

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution	Response
Specific T27(3) T41(4)	B	XI.A. & XI.D.	XI.A.3 & CP Tables I & II and XI.D. RACR	30 TAC §335.167 , §350, & §305.45 (a) (8)(C)3	Incomplete/ Inconsistent	On June 21, 2017, UPRR submitted revisions to the July 18, 2016, Response Action Completion Report (RACR) in response to the TCEQ April 10, 2017 3rd NOD. The RACR documents the completion of response action for the soil PCLE zones for SWMUs 2, 4, 5, 6, 7, 8, 9, 10, and 11; and AOCs 1, 4, 6, and 7. The response actions included soil excavation, consolidation, and capping. On September 27, 2017, UPRR submitted the first Post Response Action Report (PRACR) indicating several deficiencies were observed during the cap inspection which required necessary repairs to maintain the cap integrity. Many of the deficiencies were corrected by UPRR and verified by follow-up inspections documented in the PRACR - Monthly Status Reports, except for the seeps in the Englewood Intermodal Yard concrete cap. The TCEQ noted in the October 31, 2018; December 6, 2018; and February 6, 2019 letters that UPRR needed to implement interim response actions to address the TPH-NAPL seeps in Englewood Intermodal Yard cap. Furthermore, in the February 6, 2019 letter, the TCEQ directed UPRR to conduct additional assessment of the TPH-NAPL source(s) and extent of contamination. Since additional assessment and interim response action(s) are needed to address the TPH-NAPL, the TCEQ considers UPRR's July 18, 2016 RACR as an interim response action report. Based on the outcome of the TPH-NAPL assessment and implemented interim response action(s), UPRR may need to submit a revised RACR. Any interim response actions implemented for the UPRR HWPW facility can be incorporated as part of the final response action. Therefore, please revise the Permit application as follows: • Modify Section XI.D. with a revised RACR to include the following: o Retitle the document as, "Interim - Response Action Completion Report." o Either remove reference to groundwater in the Executive Summary since the interim response action only addresses soils or clarify that response actions for groundwater will be addressed in the revised RAP that will include alternative remedies for decontamination and removal in addition to the proposed on-site plume management zone and ICs. o Remove the ICs language from Appendix 3. Appendix 3 should be marked "reserved" and serve as a place holder. The TCEQ shall require revisions to the ICs to include the TPH-NAPL area and its associated response action(s). The revised ICs shall then be resubmitted with the final RACR. • Revise CP Table I, Item C. Remove the comment in right hand column. CP Table I is only for listing those units that are subject to groundwater monitoring. • Revise CP Table II as follows: o Add TPH-NAPL area as a new AOC because additional assessment and implementation of necessary interim response action(s). o o For SWMUs 2, 4, 5, 6, 7 8, 9, 10 and 11; and AOCs 1, 4, 6, and 7, UPRR may add a Foot Note # 4 at the bottom of the table to reflect implementation/completion of the soil interim response action.	The RACR referenced in Section XI.D of the Permit Application has been retitled "Interim - Response Action Completion Report" and requested language clarifying that the RACR only addresses soils was added. Appendix 3 is marked as "reserved"; IC controls will be resubmitted with the final RACR. CP Table I and II were revised as indicated in comment and included in the attached revised Permit Application.

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution	Response
Specific T31(3) T34(4), T55(4) T56(4)	B	XI.B & XI.D.	XI.B CP Tables III & IIIA, XI.D.6	30 TAC §335.167 & §350	Inconsistent / incomplete	Include the following revisions to CP Tables III and IIIA. • Revise the groundwater protection standard (GWPS) in CP Tables III and IIIA based on updated TRRP 2018 Tier 1 PCLs. • Since there are two proposed on-site PMZs (west and main-plant) CP Tables III and IIIA should include separate lists of COCs and GWPS to be achieved for each PMZ. • Since both PMZ boundaries shall be limited to the on-site UPRR HWPW property, remove all references to off-site PMZ in both CP Tables III and IIIA. • Revise column B. Remove reference to all attenuation monitoring point (AMP) wells and attenuation action levels (AALs) in CP Tables III and IIIA. The Permit application directions specify that any proposed AMP and their respective AALs only need to be depicted in the CP Attachment A maps. Each AMP well should be depicted in CP Attachment A Maps with their respective AAL for each contaminate in the text box next the AMP well. • To verify the contaminant plume does not migrate off the UPRR owned property at levels exceeding residential PCLs, revise Column B in CP Tables III and IIIA so the GWPS for each COC is based on commercial/industrial PCLs within the PMZ; and revise Column C in CP Tables III and IIIA to include the GWPS for each COC based on residential PCLs to be achieved at the POE. • Revise Column A in CP Tables III and IIIA to include the same. list of COCs for each groundwater transmissive zone. • Add Arsenic as a COC and its GWPS to both CP Tables III and IIIA, since the COC was reported above residential and commercial/industrial Tier 1 PCLs in the UPRR August 13, 2018 Monitoring Report. • Add the D-TZ transmissive unit with a proposed list of COCs and GWPS to CP Tables III and IIIA. The D-TZ should be part of the monitoring program since Benzo(a)pyrene has been detected in MW-36D during the March and June 2018 sampling events above residential and commercial/industrial Tier 1 PCLs as reported in the UPRR August 13, 2018 Monitoring Report. The list of COC for the D-TZ should include the same list of all COCs associated with the above transmissive zones. • Benzo(a)pyrene, Fluorene, Pyrene, and Phenanthrene should be added to CP Table IIIA because the March and June 2018 sampling events indicate concentrations in certain wells above residential and commercial/industrial Tier 1 PCLs in the UPRR August 13, 2018 Monitoring Report.	UPRR included revised CP Tables in Section XI.B and XI.D of the attached revised Permit Application.
Specific T30(3) T38(3)	B	XI.C	CP Tables IV & IVA	30 TAC §335.165	Inconsistent	Revise Columns A and B in CP Tables IV and IVA so the list of COCs and their respective concentration levels or GWPS are the same for each groundwater transmissive zone.	UPRR included revised CP Tables in Section XI.C of the revised Permit Application.
Specific T30(3)	B	XI.A & XI.C	CP Tables I, II, IV, IVA, V and VI	30 TAC §335.165	Inconsistent	Remove reference to “SWMU-1”and replace it with “RCRA- Regulated Waste Management Unit 001”	UPRR replaced the reference to “SWMU-1” with “RCRA- Regulated Waste Management Unit 001”.

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution	Response
Specific T47(3)	B	XI.D.	XI.D.3.a.(2).D. and CP Table V	30 TAC §335.165 & §350	Inconsistent / Incomplete	Please revise CP Table V to reflect the following list of wells as designated below: • Alternate Point of Exposure (APOE) wells On-site Main PMZ: A-TZ: MW-15A, MW-17A, MW-18A, MW-49A, MW-50A. MW-57A, MW-58A, MW-60A, and MW-69A. B-TZ/B-CZ MW-15B, MW-47B, MW-49B, MW-57B, MW-72B, MW-80B, MW-81B C-TZ: MW-15C, MW-17C, MW-18C, MW-47C, MW-48C On-site West PMZ: A-TZ: MW-38A B-TZ: MW-38B, MW-39B, MW-42B, MW-62B C-TZ: MW-12C • Add the following well to the current list of Background Wells: On-site Main PMZ: A-TZ: MW-51A • Since there is no off-site PMZ, remove the two (2) asterisks at the bottom of the page.	UPRR revised CP Table V that is provided in the revised Permit Application. APOE well designations are based on the proposed response actions (i.e., On-Site PMZ and Off-Site City of Houston ROW PMZ), and most recent groundwater monitoring data (January-March 2020) as detailed in the revised RAP.
Specific T58					Incomplete/ Inconsistent	In the current RAP (Rev. 3), UPRR explains that the groundwater-to-air ($^{Air}GW_{Ihn-V}$) PCL was evaluated for each COC and concluded that the potential for vapor migration from groundwater is low. For clarification, the TCEQ points out that the comparison of groundwater monitoring data to the $^{Air}GW_{Ihn-V}$ PCL is an evaluation of only the outdoor air exposure to vapors from affected groundwater. The Permit application failed to consider the on-site vapor intrusion (VI) exposure pathway completely by not including an evaluation for potential indoor-air VI pathway. Since there are no structures currently on the affected UPRR owned property currently, the TCEQ is not requiring that UPRR evaluate the potential for indoor-air VI pathway on-site. If UPRR intends to install any structure(s) on the UPRR-owned property, then the VI pathway may need to be evaluated prior to development. UPRR should evaluate the potential indoor-air VI pathway for the off-site affected properties for the reasons included in comment T59 of this NOD. Be advised that if assessment results indicate there is a VI concern for the off-site affected properties, then UPRR must evaluate and implement additional response actions as necessary which may require future revisions to the RAP.	Please see following response to Specific T59.
Specific T59	B	XI.D	XI.D.6.	30 TAC 335.167 & 350	Incomplete/Inconsistent	Based on review of the August 13, 2018 Monitoring Report, UPRR needs to conduct further assessment to evaluate the potential in-door air VI pathways into structures located north of the HWPW Facility near the intersection of Clementine and Wylie Street. The highest concentration of naphthalene in off-site wells screened in the second transmissive unit, B- CZ/B-TZ, was reported in monitoring well MW-68B (23 mg/l). Concentrations of COCs in off- site monitoring wells screened in the uppermost transmissive unit, A-TZ, were either non- detect or less than the residential Tier 1 PCLs for Class 1 groundwater. However, there are no wells near MW-68B that are screened in the ATZ to determine if the ATZ has been affected in this area. Considering that naphthalene is a petroleum hydrocarbon and the vertical separation distance between the ground surface and observed water table at well location MW-68B, if the uppermost transmissive zone (A-TZ) at MW-68B is not impacted, the VI pathway would be incomplete for the off-site affected properties. However, there are no wells near MW-68B that are screened in the A-TZ to determine if the groundwater in Zone A-TZ has been affected in this area. Therefore, UPRR should install additional monitoring wells screened in the ATZ at well location MW-68B. Please submit an interim assessment work plan and schedule that describes a proposed assessment strategy for the VI pathway.	UPRR previously responded to this comment in a letter dated July 3, 2019 detailing the groundwater investigation activities at MW-68A located near MW-68B to evaluate for the VI pathway per the TCEQ's request. The groundwater investigation concluded that "*groundwater COC concentrations at monitoring well MW-68A from the May 2019 sampling event are below the screening values estimated by EPA's VISL calculator (EPA, 2019) and indicate the VI pathway is incomplete.*" (Golder, 2019). The TCEQ acknowledged the July 3, 2019 letter and requested further evaluation of the VI pathway in a letter dated September 6, 2019. UPRR conducted an additional investigation and submitted the Soil Vapor Intrusion Assessment Interim Report dated March 31, 2020 and Updated Soil Vapor Intrusion Assessment Interim Report dated August 4, 2020 in response to the additional request from the TCEQ. As summarized in the updated report, the multiple lines of evidence support that the vapor intrusion pathway off-site is incomplete. The lines of evidence include the vertical separation distance, groundwater COC concentrations in the off-site A-TZ wells, lateral distribution of the soil gas sample locations, and benzene, ethylbenzene, xylenes, and naphthalene concentrations in soil gas samples collected for the VI evaluation. A copy of the updated report is provided in Appendix 3 of the revised RAP. Additional soil gas probe locations were proposed in a letter to TCEQ dated August 10, 2020 to confirm that the VI pathway is incomplete in areas where water had infiltrated the soil gas probes and soil gas samples could not be

ID[1]	App. Part	App. Section	Location[2]	Citation	Error Type[3]	Deficiency Description/Resolution	Response
							collected. An updated report will be submitted to the TCEQ following completion of the proposed additional activities.
Specific T52(3)	B	XI.D.	XI.D.8. CP Table VIII	30 TAC §335.167 and §350	Incomplete	The activities outlined in the revised RAP Implementation Schedule and as outlined in this 4th NOD should be included in a revised CP Table VIII. • Include activities for completing assessment for off-site VI, TPH-NAPL and creosote DNAPL and dissolved phase COCs as explained above. • Include a schedule and outline the activities for completing evaluation of NAPL and dissolved phase plume recovery system, and possible implementation of other measures and engineered response action system design. • Include a revised schedule for providing proof of filing of ICs for the proposed West and Main PMZs (shall be limited to only the UPRR owned property and the City of Houston owned property which contains only the capped-sidewalk just north of the site).	A revised schedule is provided in Worksheet 6.0 of the revised RAP and revised CP Table VIII.
Specific T60	B	XI.E	Tables XI.E.1- XI.E.3	30 TAC §335.167	Incomplete	Please revise the Financial Assurance calculations in Tables XI.E.1- XI.E.3 to include cost for changes to the corrective action monitoring as addressed in comments of this table.	The Financial Assurance calculations have been updated as part of the Revised RAP submittal.

[1]Deficiency ID – Key: A#=Administrative deficiency (ex. A12); T#=Technical deficiency (ex. T10); C#=Comment only (ex. C1); Number in parenthesis (*n*) = *n*th instance of same deficiency (ex. T1(2) is the second instance of deficiency T1 originally identified in previous NOD).
[2]Location of deficiency in submittal/application. Items in square brackets [ ] refer to applicant's supplemental information submitted as attachments to the application form.
[3]Possible Error Types, one of: Ambiguous, Incomplete, Inconsistent, Incorrect, Omitted, Typo, or Wrong Format.

I. GENERAL INFORMATION

Signature Page

I, Mark Lutz, AVP Fuel & Environmental
(Operator) *(Title)*

certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: Mark Lutz Date: 8/24/2020

To be completed by the Operator if the application is signed by an Authorized Representative for the Operator

I, _____, hereby designate _____
[Print or Type Name] *[Print or Type Name]*

as my representative and hereby authorize said representative to sign any application, submit additional information as may be requested by the Commission; and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a Texas Water Code or Texas Solid Waste Disposal Act permit. I further understand that I am responsible for the contents of this application, for oral statements given by my authorized representative in support of the application, and for compliance with the terms and conditions of any permit which might be issued based upon this application.

Mark Lutz
Printed or Typed Name of Operator or Principal Executive Officer

Mark Lutz
Signature

SUBSCRIBED AND SWORN to before me by the said

On this 24th day of August, 2020

My commission expires on the 28th day of June, 2021

GENERAL NOTARY - State of Nebraska
MICKI ZOUCHA
My Comm. Exp. June 28, 2021

Notary Public in and for Micki Zoucha Douglas County, Texas Nebraska
*[**Note:** Application Must Bear Signature & Seal of Notary Public]*

Attachment I.G

NOTIFICATION LIST AND MAP

Union Pacific Houston Wood Preserving Works
Houston, Texas

TABLE I-1
LANDOWNERS CROSS REFERENCED TO ADJACENT LANDOWNER MAP
UNION PACIFIC HOUSTON WOOD PRESERVING WORKS
HOUSTON, TEXAS

MAP ID[1]	HCAD ID[2]	PARCEL ADDRESS	PARCEL OWNER	OWNER MAILING ADDRESS		
				Street/PO #	City, State	Zip Code
1	0140410000022	5311 Liberty Rd	CRAWFORD PROPERTIES & STATES	6725 FAIRMOUNT PWKY UNIT 122	PASADENA, TX	77505
2	0140410000007	5301 Liberty Rd	SEAN JEFFERSON	3116 NANCE ST	HOUSTON, TX	77020
3	0141420000006	2809 Erastus St. #1	CHARITY BAPTIST CHURCH	2809 ERASTUS ST. #1	HOUSTON, TX	77026
4	0141420000008	5201 Liberty Rd	FULL GOSPEL CHRISTIAN ASSN	5201 LIBERTY RD.	HOUSTON, TX	77026
5	0141420000009	5201 Liberty Rd	FULL GOSPEL CHRISTIAN ASSN	5201 LIBERTY RD.	HOUSTON, TX	77026
6	0141430000006	5117 Liberty Rd	JORGE D RIVERA	5117 LIBERTY RD.	HOUSTON, TX	77026
7	0141430000011	5113 Liberty Rd	CLAUDIA ELIZABETH DELAPORTIL MEDINA	5117 LIBERTY RD.	HOUSTON, TX	77026
8	0141430000007	5109 Liberty Rd	JOE H MARTINEZ	5109 LIBERTY RD.	HOUSTON, TX	77026
9	0141430000008	5105 Liberty Rd	ALEJANDRO GONZALEZ	4088 PAMELA WAY	MONTGOMERY, T	77316
10	0141430000010	5101 Liberty Rd	WALLACE R & JANIE LONGORIA	6023 W 34TH ST	HOUSTON, TX	77092
11	0141440000004	5005 Liberty Rd.	GREATER MOUNT NEBO BAPTIST CHURCH	4511 EDDIE ST.	HOUSTON, TX	77026
12	0402660100001	2904 Lavender St.	GREATER MOUNT NEBO MISSIONARY BAPTIST	5005 LIBERTY RD.	HOUSTON, TX	77026
13	0402660100007	2909 Lavender St.	2013 COTTAGE LLC	PO BOX 74109	HOUSTON, TX	77274
14	0040580000001	2902 Wipprecht St. #18	2902 WIPPRECHT LLC	4110 RAND ST.	HOUSTON, TX	77026
15	0040570000005	4713 Liberty Rd.	EVAN HOWELL	9219 KATY FWY STE 155	HOUSTON, TX	77024
16	0040570000008	4705 Liberty Rd.	JOANNETTA HALL	12502 RIVER TRAIL DR.	HOUSTON, TX	77050
17	0040560000006	4615 Liberty Rd.	SHARON ANN BOLDEN	4102 KRESS ST	HOUSTON, TX	77026
18	0040560000007	4605 Liberty Rd.	ROY ONTIVEROS	4606 WYLIE ST.	HOUSTON, TX	77026
19	0040560000008	0 Liberty St.	ROY ONTIVEROS	4606 WYLIE ST.	HOUSTON, TX	77026
20	0040560000009	4603 Liberty Rd.	ROY ONTIVEROS	4606 WYLIE ST.	HOUSTON, TX	77026
21	0040560000010	4601 Liberty Rd.	OSCAR ZEPEDA	320 W. 34TH ST.	HOUSTON, TX	77018
22	0040550000006	4517 Liberty Rd. #1	ROBERTO REYES	4517 LIBERTY RD.	HOUSTON, TX	77026
23	0040590000022	0 Liberty Rd.	FIRST MACEDONIA MISSIONARY CHURCH	4511 EDDIE ST.	HOUSTON, TX	77026
24	0040590000005	4518 Liberty Rd.	CHAK R HSUI	2619 FORTUNA DR.	KATY, TX	77079
25	0040590000006	4519 Courtney St.	WILLIE MAE BOOKER	4519 COURTNEY ST.	HOUSTON, TX	77026
26	0040630000005	4518 Courtney St.	ANTHONY TYRONE ROSIGNON	4518 COURTNEY ST.	HOUSTON, TX	77026
27	0040630000006	2803 Kashmere St.	SHIRLEY A WHITEHEAD	PO BOX 51	THOMPSONS, TX	77481

TABLE I-1
LANDOWNERS CROSS REFERENCED TO ADJACENT LANDOWNER MAP
UNION PACIFIC HOUSTON WOOD PRESERVING WORKS
HOUSTON, TEXAS

MAP ID[1]	HCAD ID[2]	PARCEL ADDRESS	PARCEL OWNER	OWNER MAILING ADDRESS		
				Street/PO #	City, State	Zip Code
28	0141380000008	4508 Eddie St.	HESTER HENDERSON	4508 EDDIE ST.	HOUSTON, TX	77026
29	0141380000003	0 Ranch St.	JAMES A. PRINCE	2141 W. GOVERNORS CIR.	HOUSTON, TX	77092
30	0141380000004	2604 Amboy St.	JOEED DANIELS	2604 AMBOY ST.	HOUSTON, TX	77026
31	0402530000055	2603 Amboy St.	KATHY DANIELS	2617 AMBOY ST.	HOUSTON, TX	77026
32	0402530000056	2603 Amboy St.	ISRAEL VELEZ	8002 BURMAN ST.	HOUSTON, TX	77029
33	0402530000030	0 Quitman St.	MICHAEL L PROLER	4401 CLINTON DR.	HOUSTON, TX	77020
34	0082430000001	0 1st St.	CENTERPOINT ENERGY INTRASTATE PIPELINE INC. ATTN:	PO BOX 1475	HOUSTON, TX	77251
35	0402530000040	4428 Quitman St.	JUAN C ALLENDE-MOLINA	4428 QUITMAN ST.	HOUSTON, TX	77026
36	0402530000034	4424 Quitman St.	JAIME M LOPEZ	4424 QUITMAN ST.	HOUSTON, TX	77026
37	0402530000033	4422 Quitman St.	WALDIR ESTRADA	7918 PRESTWOOD DR.	HOUSTON, TX	77036
38	0402530000032	4420 Quitman St.	DIANE V. WILLIAMS	4420 QUITMAN ST.	HOUSTON, TX	77026
39	0402530000058	4416 Quitman St.	URVECO LLC	3422 BUSINESS CENTER DR. 1	PEARLAND, TX	77584
40	0402530000031	4414 Quitman St.	BETTY LOUISE WILLIAMS	4414 QUITMAN ST.	HOUSTON, TX	77026
41	0402530000189	2204 Kirk Aly	BENJAMIN JIMENEZ	2718 MULBERRY LN. APT. 4	PASADENA, TX	77502
42	0402530000020	2202 Kirk St.	HILDA MAE JENKINS	2202 KIRK ST.	HOUSTON, TX	77026
43	0402530000021	2200 Kirk St.	IFRAN A. CHOWDHURY	20314 ASPENWILDE DR.	CYPRESS, TX	77433
44	0402530000023	2120 Kirk St.	SIDNEY WILLIAMS	549 S. LUCERNE BLVD.	LOS ANGELES, CA	90020
45	0402530000022	2118 Kirk St.	LIGHT OF THE WORLD CDC	PO BOX 416	HUMBLE, TX	77347
46	0402530000024	2114 Kirk St.	UNDER FROM THE LEFT LLC	PO BOX 841009	HOUSTON, TX	77284
47	0402530000039	2114 Kirk St.	BEHZAD NASIZADEH	615 KELLEY ST.	HOUSTON, TX	77009
48	0402530000059	2115 Kirk St.	TUNG THANH MAI	12819 BONNIE LN.	STAFFORD, TX	77477
49	0402530000009	2316 Altoona St.	MRS. NANETTE C. LIPPER	735 E. 19TH ST.	HOUSTON, TX	77008
50	0720900040019	2316 Waco St.	ESTHER L. JONES	10618 WOODWICK ST.	HOUSTON, TX	77016
51	0720900040002	0 Lee	53 5TH WARD INVESTMENTS	14623 LISCOMB	HOUSTON, TX	77084
52	0720900040003	4410 Lee St.	ANTONIO HERNANDEZ	4410 LEE ST.	HOUSTON, TX	77020
53	0720900040004	4414 Lee St.	WELDON R. THOMAS JR.	5207 KINGSBURY ST.	HOUSTON, TX	77021
54	0720900040005	4418 Lee St.	RONY C AND GUADALUPE G RODR	4515 OATS ST	HOUSTON, TX	77020
55	0720900040006	4422 Lee St.	ESTATE OF IVORY J MCALPIN	4422 LEE ST.	HOUSTON, TX	77020
56	0720900040007	4434 Lee St.	JAMES AND DORIS MURPHY	8747 COWART ST.	HOUSTON, TX	77029

TABLE I-1
LANDOWNERS CROSS REFERENCED TO ADJACENT LANDOWNER MAP
UNION PACIFIC HOUSTON WOOD PRESERVING WORKS
HOUSTON, TEXAS

MAP ID[1]	HCAD ID[2]	PARCEL ADDRESS	PARCEL OWNER	OWNER MAILING ADDRESS		
				Street/PO #	City, State	Zip Code
57	0720900040008	4438 Lee St.	SOUTH BY NORTHWEST LIMITED PARTNERSHIP	1529 MARYLAND ST.	HOUSTON, TX	77006
58	0720900040009	4440 Lee St.	SOUTH BY NORTHWEST LTD	1529 MARYLAND ST.	HOUSTON, TX	77006
59	0720900040020	4448 Lee St.	SOUTH BY NORTHWEST LTD	1529 MARYLAND ST.	HOUSTON, TX	77006
60	0040910000001	2318 Dan St.	DANN HOOEY	24206 PARK GABLE DR.	SPRING, TX	77373
61	0040910000002	4506 Lee St.	DAVID SANCHEZ	2316 ERASTUS ST.	HOUSTON, TX	77020
62	0040910000003	4512 Lee St.	SOUTH BY NORTHWEST LP	1529 MARYLAND ST.	HOUSTON, TX	77006
63	0040910000004	4520 Lee St.	HOUSTON HABITAT FOR HUMANITY INC.	3750 N. MCCARTY ST.	HOUSTON, TX	77029
64	0040910000011	0 Lee St.	HOUSTON HABITAT FOR HUMANITY INC.	3750 N. MCCARTY ST.	HOUSTON, TX	77029
65	1408200010001	0 LeetSt.	SINGH REAL ESTATE MANAGEMEN	12515 SOUTH NANAKSAR DR.	HOUSTON, TX	77041
66	1408200010003	0 Lee St.	SINGH REAL ESTATE MANAGEMEN	12515 SOUTH NANAKSAR DR.	HOUSTON, TX	77041
67	1408200010004	0 Lee St.	SINGH REAL ESTATE MANAGEMEN	12515 SOUTH NANAKSAR DR.	HOUSTON, TX	77041
68	1408200010005	0 Lee St.	SINGH REAL ESTATE MANAGEMEN	12515 SOUTH NANAKSAR DR.	HOUSTON, TX	77041
69	1408200010006	0 Lee St.	SINGH REAL ESTATE MANAGEMEN	12515 SOUTH NANAKSAR DR.	HOUSTON, TX	77041
70	0040920000004	0 Lee	LYNN BOLING	410 AVENUE OF OAKS ST.	HOUSTON, TX	77009
71	1284110010001	2311 Schweikhardt St.	KINGDOM CAPITAL INVESTMENTS	11911 CHURCHILL COURT LN	HOUSTON, TX	77024
72	0040930000001	4700 Lee St.	SOUTH BY NORTHWEST LTD	1529 MARYLAND ST.	HOUSTON, TX	77006
73	0040930000002	4702 Lee St.	SOUTH BY NORTHWEST LIMITED P	1529 MARYLAND ST.	HOUSTON, TX	77006
74	0040930000003	4710 Lee St.	SOUTH BY NORTHWEST LTD	1529 MARYLAND ST.	HOUSTON, TX	77006
75	0040930000005	4722 Lee St.	GREAT MT. SHARON MISSIONARY BAPTIST CHURCH	4722 LEE ST.	HOUSTON, TX	77020
76	0040940000001	4800 Lee St.	GREGORY K. & KAREN D. RICHARD	4800 LEE ST.	HOUSTON, TX	77020
77	0040940000002	4806 Lee St.	SOUTH BY NORTHWEST LTD	1529 MARYLAND ST.	HOUSTON, TX	77006
78	1403450010003	0 Solo St.	FIFTH WARD URBAN HOMES	9 SANDLILIY CT SUITE 100	SPRING, TX	77380
79	0150640000011	4902 Lee St.	3 STRIPES MANAGEMENT LLC	9815 WILLOW CROSSING DR.	HOUSTON, TX	77064
80	0150640000012	4904 Lee St.	3 STRIPES MANAGEMENT LLC	9815 WILLOW CROSSING DR.	HOUSTON, TX	77064
81	0150640000014	4906 Lee St.	3 STRIPES MANAGEMENT LLC	9815 WILLOW CROSSING DR.	HOUSTON, TX	77064
82	0150640000015	4908 Lee St.	3 STRIPES MANAGEMENT LLC	9815 WILLOW CROSSING DR.	HOUSTON, TX	77064

TABLE I-1
LANDOWNERS CROSS REFERENCED TO ADJACENT LANDOWNER MAP
UNION PACIFIC HOUSTON WOOD PRESERVING WORKS
HOUSTON, TEXAS

MAP ID[1]	HCAD ID[2]	PARCEL ADDRESS	PARCEL OWNER	OWNER MAILING ADDRESS		
				Street/PO #	City, State	Zip Code
83	0150640000016	4910 Lee St.	3 STRIPES MANAGEMENT LLC	9815 WILLOW CROSSING DR.	HOUSTON, TX	77064
84	0150640000017	4912 Lee St.	3 STRIPES MANAGEMENT LLC	9815 WILLOW CROSSING DR.	HOUSTON, TX	77064
85	0150640000018	4914 Lee St.	3 STRIPES MANAGEMENT LLC	9815 WILLOW CROSSING DR.	HOUSTON, TX	77064
86	0150640000019	4916 Lee St.	3 STRIPES MANAGEMENT LLC	9815 WILLOW CROSSING DR.	HOUSTON, TX	77064
87	0150640000020	4918 Lee St.	3 STRIPES MANAGEMENT LLC	9815 WILLOW CROSSING DR.	HOUSTON, TX	77064
88	0150640000021	4920 Lee St.	3 STRIPES MANAGEMENT LLC	9815 WILLOW CROSSING DR.	HOUSTON, TX	77064
89	0150630000001	5002 Lee St.	SOUTH BY NORTHWEST LTD	1529 MARYLAND ST.	HOUSTON, TX	77006
90	0150630000002	5006 Lee St.	SOUTH BY NORTHWEST LTD	1529 MARYLAND ST.	HOUSTON, TX	77006
91	0150630000003	5010 Lee St.	ESTATE OF RENDIE EDWARDS ESTATE OF JEFF EDWARDS	5010 LEE ST.	HOUSTON, TX	77020
92	0150630000005	2111 Clementine St.	CORNELL HARRIS	6210 DARLINGHURST DR.	HOUSTON, TX	77085
93	0150620000001	5102 Lee St.	L. WHITAKER JR.	5102 LEE ST.	HOUSTON, TX	77020
94	0150620000003	5114 Lee St.	WILLIAM E. JOHNSON	4903 LEFFINGWELL ST.	HOUSTON, TX	77026
95	0150620000004	5118 Lee St.	RAMOS DEVELOPMENT LLC	1411 STORY ST	HOUSTON, TX	77055
96	0150620000005	5120 Lee St.	GEORGE ABDELMESSIH	4307 DELHI ST	HOUSTON, TX	77022
97	0150610000001	0 Lee St.	SOUTH BY NORTHWEST LTD	1529 MARYLAND ST.	HOUSTON, TX	77006
98	0150610000002	0 Lee St.	SOUTH BY NORTHWEST LTD	1529 MARYLAND ST.	HOUSTON, TX	77006
99	0150610000003	5210 Lee St.	DAVID SANCHEZ	2316 ERASTUS ST.	HOUSTON, TX	77020
100	1391030010001	0 Lee St.	SOUTH BY NORTHWEST LTD	1529 MARYLAND ST.	HOUSTON, TX	77006
101	1391030010002	0 Lee St.	SOUTH BY NORTHWEST LTD	1529 MARYLAND ST.	HOUSTON, TX	77006
102	0150610000005	2215 Erastus St.	SOUTH BY NORTHWEST LIMITED P	1529 MARYLAND ST.	HOUSTON, TX	77006
103	0131220000004	2222 Erastus St. #7	ALBERT J. ZARZANA	12322 KIMBERLEY LN.	HOUSTON, TX	77024
104	0131190000001	5301 Lee St.	GLORIA EATMON	5301 LEE ST.	HOUSTON, TX	77020
105	0131190000002	2308 Erastus St.	SOUTH BY NORTHWEST LIMITED P	1529 MARYLAND ST.	HOUSTON, TX	77006
106	0131190000003	2310 Erastus St.	EDISON A. BROOKS	7727 MILEY ST.	HOUSTON, TX	77028
107	0131190000004	2316 Erastus St.	FORTINO AND M. CONSUELO SALDANA	2316 ERASTUS ST.	HOUSTON, TX	77020
108	1403870010001	5302 Suez St.	MARISA S. KREITZ	5302 SUEZ ST.	HOUSTON, TX	77020
109	0131160000001	5301 Suez St.	SOUTH BY NORTHWEST LIMITED P	1529 MARYLAND ST.	HOUSTON, TX	77006

TABLE I-1
LANDOWNERS CROSS REFERENCED TO ADJACENT LANDOWNER MAP
UNION PACIFIC HOUSTON WOOD PRESERVING WORKS
HOUSTON, TEXAS

MAP ID[1]	HCAD ID[2]	PARCEL ADDRESS	PARCEL OWNER	OWNER MAILING ADDRESS		
				Street/PO #	City, State	Zip Code
110	0131160000004	2416 Erastus St.	LYRIC ENTERPRISES LLC	17515 SPRING CYPRESS RD ST	CYPRESS, TX	77429
111	0131160000005	2418 Erastus St.	MARCOS AND MIREYRA REYES	2418 ERASTUS ST.	HOUSTON, TX	77020
112	0131160000006	2420 Erastus St.	ISAAC CARTER REV ESTATE	5938 HYACINTH PATH WAY	HOUSTON, TX	77049
113	0131160000007	2423 Harlem St.	SOUTH BY NORTHWEST LTD	1529 MARYLAND ST.	HOUSTON, TX	77006
114	0131170000006	2426 Harlem St.	MANUEL ALFARO JR	2419 LOCKWOOD DR	HOUSTON, TX	77020
115	0131140000001	5401 Sudan St.	JOYCE M. BRYAN	10910 BRIDLEPARK CIR.	HOUSTON, TX	77016
116	0131140000002	2504 Harlem St.	SOUTH BY NORTHWEST LIMITED P	1529 MARYLAND ST.	HOUSTON, TX	77006
117	0131140000003	2506 Harlem St.	FELICITA RUBIO	119 JENKINS ST	HOUSTON, TX	77020
118	0131140000004	0 Harlem	GEORGE SAMUEL	4614 WIPPRECHT ST.	HOUSTON, TX	77026
119	0131140000005	2510 Harlem St.	HAROLD J HENRY	PO BOX 11715	HOUSTON, TX	77293
120	0131140000006	2522 Harlem St.	GEORGE SAMUEL	2522 HARLEM ST.	HOUSTON, TX	77020

Notes:

[1]Map ID numbers as shown on Figure I-1.

[2]Parcel locations, descriptions, addresses and owner information from Houston Central Appraisal District (http://www.hcad.org/records/default.asp), August 2020.

LEGEND

- UPRR PROPERTY BOUNDARY
- UPRR FACILITY BOUNDARY
- ROAD, PARKING LOT, SIDEWALK
- FENCE
- RAILROAD
- ADJACENT LANDOWNER PARCEL (SEE TABLE I-1 FOR PARCEL AND LANDOWNER INFORMATION)

REFERENCE(S)

BASE MAP FROM ERM-SOUTHWEST, INC APAR ADDENDUM, FIG 3-1. DATED JUNE 2004.

0 150 300

1" = 300' FEET

CLIENT

UNION PACIFIC RAILROAD CO.

PROJECT

HOUSTON WOOD PRESERVING WORKS

TITLE

ADJACENT LANDOWNERS MAP

CONSULTANT

GOLDER

YYYY-MM-DD	2020-08-26
DESIGNED	RS
PREPARED	RS
REVIEWED	MH
APPROVED	ECM

PROJECT NO.	REV.	FIGURE
19119232	0	I-1

Path: \\texarkana\data\Projects - Round Rock_2019\19119232 - HWPW\2020-8 RAP Revision | File Name: FIG I1 - Adjacent Landowners Map.dwg | Last Edited By: rsalazar Date: 2020-08-26 Time:3:46:49 PM | Printed By: RSalazar Date: 2020-08-26 Time:4:00:49 PM

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

CRAWFORD PROPERTIES & STATES
6725 FAIRMOUNT PWKY UNIT 122
PASADENA, TX 77505

SEAN JEFFERSON
3116 NANCE ST
HOUSTON, TX 77020

CHARITY BAPTIST CHURCH
2809 ERASTUS ST. #1
HOUSTON, TX 77026

FULL GOSPEL CHRISTIAN ASSN
5201 LIBERTY RD.
HOUSTON, TX 77026

FULL GOSPEL CHRISTIAN ASSN
5201 LIBERTY RD.
HOUSTON, TX 77026

JORGE D RIVERA
5117 LIBERTY RD.
HOUSTON, TX 77026

CLAUDIA ELIZABETH DELAPORTIL MEDINA
5117 LIBERTY RD.
HOUSTON, TX 77026

JOE H MARTINEZ
5109 LIBERTY RD.
HOUSTON, TX 77026

ALEJANDRO GONZALEZ
4088 PAMELA WAY
MONTGOMERY, TX 77316

WALLACE R & JANIE LONGORIA
6023 W 34TH ST
HOUSTON, TX 77092

GREATER MOUNT NEBO BAPTIST CHURCH
4511 EDDIE ST.
HOUSTON, TX 77026

GREATER MOUNT NEBO MISSIONARY BAPTIST
5005 LIBERTY RD.
HOUSTON, TX 77026

2013 COTTAGE LLC
PO BOX 74109
HOUSTON, TX 77274

2902 WIPPRECHT LLC
4110 RAND ST.
HOUSTON, TX 77026

EVAN HOWELL
9219 KATY FWY STE 155
HOUSTON, TX 77024

JOANNETTA HALL
12502 RIVER TRAIL DR.
HOUSTON, TX 77050

SHARON ANN BOLDEN
4102 KRESS ST
HOUSTON, TX 77026

ROY ONTIVEROS
4606 WYLIE ST.
HOUSTON, TX 77026

ROY ONTIVEROS
4606 WYLIE ST.
HOUSTON, TX 77026

ROY ONTIVEROS
4606 WYLIE ST.
HOUSTON, TX 77026

OSCAR ZEPEDA
320 W. 34TH ST.
HOUSTON, TX 77018

ROBERTO REYES
4517 LIBERTY RD.
HOUSTON, TX 77026

FIRST MACEDONIA MISSIONARY CHURCH
4511 EDDIE ST.
HOUSTON, TX 77026

CHAK R HSUI
2619 FORTUNA DR.
KATY, TX 77079

WILLIE MAE BOOKER
4519 COURTNEY ST.
HOUSTON, TX 77026

ANTHONY TYRONE ROSIGNON
4518 COURTNEY ST.
HOUSTON, TX 77026

SHIRLEY A WHITEHEAD
PO BOX 51
THOMPSONS, TX 77481

HESTER HENDERSON
4508 EDDIE ST.
HOUSTON, TX 77026

JAMES A. PRINCE
2141 W. GOVERNORS CIR.
HOUSTON, TX 77092

JOEED DANIELS
2604 AMBOY ST.
HOUSTON, TX 77026

KATHY DANIELS
2617 AMBOY ST.
HOUSTON, TX 77026

CENTERPOINT ENERGY ATTN: AD VALOREM TAX DEPT.
PO BOX 1475
HOUSTON, TX 77251

WALDIR ESTRADA
7918 PRESTWOOD DR.
HOUSTON, TX 77036

BETTY LOUISE WILLIAMS
4414 QUITMAN ST.
HOUSTON, TX 77026

IFRAN A. CHOWDHURY
20314 ASPENWILDE DR.
CYPRESS, TX 77433

UNDER FROM THE LEFT LLC
PO BOX 841009
HOUSTON, TX 77284

MRS. NANETTE C. LIPPER
735 E. 19TH ST.
HOUSTON, TX 77008

ANTONIO HERNANDEZ
4410 LEE ST.
HOUSTON, TX 77020

ESTATE OF IVORY J MCALPIN
4422 LEE ST.
HOUSTON, TX 77020

SOUTH BY NORTHWEST LTD
1529 MARYLAND ST.
HOUSTON, TX 77006

ISRAEL VELEZ
8002 BURMAN ST.
HOUSTON, TX 77029

JUAN C ALLENDE-MOLINA
4428 QUITMAN ST.
HOUSTON, TX 77026

DIANE V. WILLIAMS
4420 QUITMAN ST.
HOUSTON, TX 77026

BENJAMIN JIMENEZ
2718 MULBERRY LN. APT. 4
PASADENA, TX 77502

SIDNEY WILLIAMS
549 S. LUCERNE BLVD.
LOS ANGELES, CA 90020

BEHZAD NASIZADEH
615 KELLEY ST.
HOUSTON, TX 77009

ESTHER L. JONES
10618 WOODWICK ST.
HOUSTON, TX 77016

WELDON R. THOMAS JR.
5207 KINGSBURY ST.
HOUSTON, TX 77021

JAMES AND DORIS MURPHY
8747 COWART ST.
HOUSTON, TX 77029

SOUTH BY NORTHWEST LTD
1529 MARYLAND ST.
HOUSTON, TX 77006

MICHAEL L PROLER
4401 CLINTON DR.
HOUSTON, TX 77020

JAIME M LOPEZ
4424 QUITMAN ST.
HOUSTON, TX 77026

URVECO LLC
3422 BUSINESS CENTER DR. 1007
PEARLAND, TX 77584

HILDA MAE JENKINS
2202 KIRK ST.
HOUSTON, TX 77026

LIGHT OF THE WORLD CDC
PO BOX 416
HUMBLE, TX 77347

TUNG THANH MAI
12819 BONNIE LN.
STAFFORD, TX 77477

53 5TH WARD INVESTMENTS
14623 LISCOMB
HOUSTON, TX 77084

RONY C AND GUADALUPE G RODRIGUEZ
4515 OATS ST
HOUSTON, TX 77020

SOUTH BY NORTHWEST LIMITED PARTNERSHIP
1529 MARYLAND ST.
HOUSTON, TX 77006

DANN HOOEY
24206 PARK GABLE DR.
SPRING, TX 77373

DAVID SANCHEZ
2316 ERASTUS ST.
HOUSTON, TX 77020

SOUTH BY NORTHWEST LP
1529 MARYLAND ST.
HOUSTON, TX 77006

HOUSTON HABITAT FOR HUMANITY INC.
3750 N. MCCARTY ST.
HOUSTON, TX 77029

HOUSTON HABITAT FOR HUMANITY INC.
3750 N. MCCARTY ST.
HOUSTON, TX 77029

SINGH REAL ESTATE MANAGEMENT LLC
12515 SOUTH NANAKSAR DR.
HOUSTON, TX 77041

SINGH REAL ESTATE MANAGEMENT LLC
12515 SOUTH NANAKSAR DR.
HOUSTON, TX 77041

SINGH REAL ESTATE MANAGEMENT LLC
12515 SOUTH NANAKSAR DR.
HOUSTON, TX 77041

SINGH REAL ESTATE MANAGEMENT LLC
12515 SOUTH NANAKSAR DR.
HOUSTON, TX 77041

SINGH REAL ESTATE MANAGEMENT LLC
12515 SOUTH NANAKSAR DR.
HOUSTON, TX 77041

LYNN BOLING
410 AVENUE OF OAKS ST.
HOUSTON, TX 77009

KINGDOM CAPITAL INVESTMENTS LLC
11911 CHURCHILL COURT LN.
HOUSTON, TX 77024

SOUTH BY NORTHWEST LTD
1529 MARYLAND ST.
HOUSTON, TX 77006

SOUTH BY NORTHWEST LIMITED PARTNERSHIP
1529 MARYLAND ST.
HOUSTON, TX 77006

SOUTH BY NORTHWEST LTD
1529 MARYLAND ST.
HOUSTON, TX 77006

GREAT MT. SHARON MISSIONARY BAPTIST CHURCH
4722 LEE ST.
HOUSTON, TX 77020

GREGORY K. & KAREN D. RICHARD
4800 LEE ST.
HOUSTON, TX 77020

SOUTH BY NORTHWEST LTD
1529 MARYLAND ST.
HOUSTON, TX 77006

FIFTH WARD URBAN HOMES
9 SANDLILIY CT SUITE 100
SPRING, TX 77380

3 STRIPES MANAGEMENT LLC
9815 WILLOW CROSSING DR.
HOUSTON, TX 77064

3 STRIPES MANAGEMENT LLC
9815 WILLOW CROSSING DR.
HOUSTON, TX 77064

3 STRIPES MANAGEMENT LLC
9815 WILLOW CROSSING DR.
HOUSTON, TX 77064

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9815 WILLOW CROSSING DR.
HOUSTON, TX 77064

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9815 WILLOW CROSSING DR.
HOUSTON, TX 77064

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9815 WILLOW CROSSING DR.
HOUSTON, TX 77064

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9815 WILLOW CROSSING DR.
HOUSTON, TX 77064

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9815 WILLOW CROSSING DR.
HOUSTON, TX 77064

3 STRIPES MANAGEMENT LLC
9815 WILLOW CROSSING DR.
HOUSTON, TX 77064

3 STRIPES MANAGEMENT LLC
9815 WILLOW CROSSING DR.
HOUSTON, TX 77064

SOUTH BY NORTHWEST LTD
1529 MARYLAND ST.
HOUSTON, TX 77006

SOUTH BY NORTHWEST LTD
1529 MARYLAND ST.
HOUSTON, TX 77006

ESTATE OF RENDIE EDWARDS
ESTATE OF JEFF EDWARDS
5010 LEE ST.
HOUSTON, TX 77020

CORNELL HARRIS
6210 DARLINGHURST DR.
HOUSTON, TX 77085

L. WHITAKER JR.
5102 LEE ST.
HOUSTON, TX 77020

WILLIAM E. JOHNSON
4903 LEFFINGWELL ST.
HOUSTON, TX 77026

RAMOS DEVELOPMENT LLC
1411 STORY ST
HOUSTON, TX 77055

GEORGE ABDELMESSIH
4307 DELHI ST
HOUSTON, TX 77022

SOUTH BY NORTHWEST LTD
1529 MARYLAND ST.
HOUSTON, TX 77006

SOUTH BY NORTHWEST LTD
1529 MARYLAND ST.
HOUSTON, TX 77006

DAVID SANCHEZ
2316 ERASTUS ST.
HOUSTON, TX 77020

SOUTH BY NORTHWEST LTD
1529 MARYLAND ST.
HOUSTON, TX 77006

SOUTH BY NORTHWEST LTD
1529 MARYLAND ST.
HOUSTON, TX 77006

SOUTH BY NORTHWEST LIMITED PARTNERSHIP
1529 MARYLAND ST.
HOUSTON, TX 77006

ALBERT J. ZARZANA
12322 KIMBERLEY LN.
HOUSTON, TX 77024

GLORIA EATMON
5301 LEE ST.
HOUSTON, TX 77020

SOUTH BY NORTHWEST LIMITED PARTNERSHIP
1529 MARYLAND ST.
HOUSTON, TX 77006

EDISON A. BROOKS
7727 MILEY ST.
HOUSTON, TX 77028

FORTINO AND M. CONSUELO SALDANA
2316 ERASTUS ST.
HOUSTON, TX 77020

MARISA S. KREITZ
5302 SUEZ ST.
HOUSTON, TX 77020

SOUTH BY NORTHWEST LIMITED PARTNERSHIP
1529 MARYLAND ST.
HOUSTON, TX 77006

LYRIC ENTERPRISES LLC
17515 SPRING CYPRESS RD STE C702
CYPRESS, TX 77429

MARCOS AND MIREYRA REYES
2418 ERASTUS ST.
HOUSTON, TX 77020

ISAAC CARTER REV ESTATE
5938 HYACINTH PATH WAY
HOUSTON, TX 77049

SOUTH BY NORTHWEST LTD
1529 MARYLAND ST.
HOUSTON, TX 77006

MANUEL ALFARO JR
2419 LOCKWOOD DR
HOUSTON, TX 77020

JOYCE M. BRYAN
10910 BRIDLEPARK CIR.
HOUSTON, TX 77016

SOUTH BY NORTHWEST LIMITED PARTNERSHIP
1529 MARYLAND ST.
HOUSTON, TX 77006

FELICITA RUBIO
119 JENKINS ST
HOUSTON, TX 77020

GEORGE SAMUEL
4614 WIPPRECHT ST.
HOUSTON, TX 77026

HAROLD J HENRY
PO BOX 11715
HOUSTON, TX 77293

GEORGE SAMUEL
2522 HARLEM ST.
HOUSTON, TX 77020

recordation of the removal of the wastes from the surface impoundment in accordance with the closure plan approved by the Texas Department of Water Resources in 1984. A copy of that Deed Notice is included as Attachment II.G.6.

7. If a surface impoundment or landfill (including post-closure) is to be permitted, provide exposure information to accompany this application and in accordance with 30 TAC 305.50(a)(8) and 40 CFR 270.10(j). This information will be considered separately from the TCEQ application completeness determination.

   Not Applicable – Hazardous waste is not stored, treated or disposed in the closed surface impoundment. In 1984 surface impoundment was closed by excavating the soils and materials contained within. Groundwater at the SWMU No. 1 is in corrective action monitoring.

8. For a requested capacity expansion of an existing hazardous waste management facility, please provide in Section VI.A.1.a the requested fault delineation information. [30 TAC 305.50(a)(4)(F)]

   Not Applicable

II. FACILITY SITING CRITERIA

II.G. ADDITIONAL INFORMATION REQUIREMENTS

II.G.7. Exposure Information

Hazardous waste is not stored, treated or disposed in the closed surface impoundment. In 1984 the surface impoundment was closed by excavating the soils and materials previously placed in the unit. The facility then began investigating and monitoring the shallow ground water in the vicinity of the surface impoundment. Between 1984 and 1991, nine groundwater monitoring wells were installed in the upper zone, and three piezometers were installed in the lower permeable zone. Hydrogeological data collected from these wells and piezometers indicate hydraulic conductivity between the zones. Analytical data compiled from 1984 until 1991 indicated that benzene, toluene, naphthalene, 2,4-dimethylphenol, and phenol were the most frequently detected parameters and that naphthalene was the parameter detected at the highest concentrations.

The facility entered into post-closure care in 1994, updated in 2005, and groundwater monitoring has taken place on a semi-annual basis since that time. Constituent concentrations in groundwater at RCRA-Regulated Waste Management Unit 001 (SWMU 1) were below their respective groundwater protective standards (GWPS) between 2006 and 2019, compliant with the TCEQ Remedy Standard A requirements for groundwater protection. Naphthalene was detected above the GWPS at one of the point of compliance (POC) wells in July 2019 and verified in October 2019, but returned to below GWPS in January 2020. RCRA-Regulated Waste Management Unit 001 (SWMU 1) will remain in the corrective action program until concentrations in the POC wells are below respective GWPS for three consecutive years in accordance with Section IV.F.3 of the Compliance Plan.

III. FACILITY MANAGEMENT

III.A. COMPLIANCE HISTORY AND APPLICANT EXPERIENCE

Title 30 of the Texas Administrative Code (TAC) Chapter 305.50(2), and renewal application instructions require a listing of all solid waste management sites in Texas owned, operated or controlled by the applicant. The following is the only site owned by Union Pacific Railroad (UPRR) Company:

SWR #	Site Name	Location
31547	Union Pacific Railroad Houston Tie Plant	4910 Liberty Road, Houston, TX 77026

III.C. SECURITY

As required by 40 CFR 264.14, site access to the former Houston Wood Preserving Works (HWPW) facility is controlled by chain link fences approximately 6 feet in height with a 1-foot high top guard of barbed wire (3 horizontal wire lines). Warning signs of sufficient size to be legible from 25 feet were posted in sufficient number to be seen from any approach. The signs are labeled "Danger: Unauthorized Personnel Keep Out" and alternate between English and Spanish. Access is gained by an entry gate. The gate is locked and keys are held by UPRR personnel.

III.D. INSPECTION SCHEDULE

Specific components will be inspected and maintained at the facility during corrective action monitoring activities. Components to be inspected and maintained include the vegetative cover, the groundwater monitoring wells, and the fences surrounding the facility. No safety or emergency equipment is stored at the HWPW facility since it is not an active site. Inspections will occur semi-annually or following a major storm or flood event. The schedule of inspections is included in Table III.D.

III.D.1. Vegetative Cover

The cover of the closed unit will be inspected semi-annually for proper drainage, signs of erosion, and loss of vegetative cover.

IV. Wastes and Waste Analysis

(Sections IV.A, IV.C, and IV.D of the application do not apply to post closure applications.)

A. Waste Management Information

For a new hazardous waste management facility or for a facility hazardous waste management capacity expansion, complete Table IV.A. - Waste Management Information for each waste, source, and volume of waste to be stored, processed, or disposed of in the facility units to be permitted as required by 30 TAC 305.50(a)(9). For on-site facilities, list "on-site" for the waste source. For off-site facilities, list the source of the waste. If unknown, identify potential sources (e.g., industries/processes to be serviced).

Not Applicable. This facility is not a new commercial hazardous waste management facility or expansion of hazardous waste management facility. Table IV.A is not applicable.

B. Waste Managed In Permitted Units

For all hazardous waste management facilities and for inclusion into a permit, complete Table IV.B. - Wastes Managed In Permitted Units for each waste and debris to be managed in a permitted unit. Provide a description, EPA waste codes, and TCEQ waste form codes and classification codes. Guidelines for the Classification & Coding of Industrial Wastes and Hazardous Wastes, TCEQ publication RG-22, contains guidance for how to properly classify and code industrial waste and hazardous waste in accordance with 30 TAC 335.501-335.515 (Subchapter R).

Applicants need not specify the complete 8-digit waste code formulas for their wastes but only the 3-digit form codes and 1-digit classification codes. This allows the applicant to specify major categories of wastes in an overall manner without having to list all the specific waste streams as generated.

Not Applicable. The unit is closed. Table IV.B is attached.

C. Sampling and Analytical Methods

For inclusion into a permit, complete Table IV.C. - Sampling and Analytical Methods for each waste and debris proposed to be sampled and analyzed and include sampling location, sampling method, sample frequency, analytical method, and desired accuracy level for each waste and debris to be managed in a permitted, storage, processing, or disposal unit at the facility.

Not Applicable. The unit is closed. No waste management will be performed. Table IV.A is not applicable.

D. Waste Analysis Plan

The Waste Analysis Plan must address the requirements of 40 CFR 264.13 and 268.7. The Plan should include supplemental and coordinating information on how the facility will analyze wastes and debris (as listed in Table IV.B) to be managed in permitted units. The plan must address the determination of land disposal restrictions. Generators must determine and certify with the manifest the land disposal restriction status of a waste, even if the waste or debris is not intended for land disposal. Land disposal treatment facilities must identify the treatment process and analytical procedures to be used, and include them in the waste analysis plan. Land disposal restriction records must be maintained at the facility until closure of the facility [40 CFR 264.73(b)]. Landfill facilities must determine through the Paint Filter Liquids Test (SW-846 Method 9095) if there is free liquid in a bulk or containerized waste to be landfilled. If so, it must be stabilized; adding adsorbents alone is not acceptable, even for containerized waste.

For off-site facilities the waste analysis plan must specify procedures which will be used to inspect and, if necessary, analyze each movement of industrial and hazardous waste or hazardous debris received at the facility to ensure it matches the identity of the waste designated on the accompanying shipping ticket. The plan must describe methods which will be used to determine the identity of each movement of waste and debris managed at the facility and sampling method used if the identification method includes sampling in order to store, process, or dispose of the wastes and debris in accordance with 40 CFR Parts 264 and 268 and any abnormal characteristics which may upset further treatment or processing operations. Include rejection criteria for shipments of waste and debris received at the facility

For on-site facilities the waste analysis plan must specify the normal characteristics of the waste (including EPA hazardous waste codes, EPA hazard codes, and 40 CFR 261 Appendix VIII Hazardous Constituents) which must be known to store, process, or dispose of the wastes and debris in accordance with 40 CFR Parts 264 and 268 and any abnormal characteristics which may upset further treatment or processing operations.

The methods and equipment used for sampling waste materials will vary with the form and consistency of the waste materials to be sampled. Those sampling methods listed in 40 CFR 261 Appendix I, for sampling waste with properties similar to the indicated materials, or equivalent sampling methods approved by EPA under 40 CFR 260.20 and 260.22, will be considered by the TCEQ to be acceptable.

Not Applicable. The unit is closed. No waste management will be performed.

V. ENGINEERING REPORT

V.D. SURFACE IMPOUNDMENTS

V.D.5. SWMU No. 1

The surface impoundment SWMU No. 1 was not an engineered structure, nor was it designated to serve as a landfill. It was used from 1979 to 1982 for the disposal of contaminated surface soils containing K001 type wastes.

SWMU No. 1 is bordered on the southern side by an earthen berm, which is about 2 feet by 3 feet by about 80 to 100 feet long. The berm extends about 100 feet south of the southwest corner of the SWMU No. 1. A chain-link security fence is located along the northern and western margins of SWMU No. 1. The original dimensions of the unit were about 180 feet by 106 feet at the surface, extending to a depth of about 7 feet bgs (SPTCo, 1991). Based on these dimensions, SWMU No. 1 would have a capacity of 133,560 cubic feet (about 4,950 cubic yards). According to SPTCo facility representatives, a clay liner was installed during the original construction of SWMU No. 1. No information was available concerning the thickness and engineering properties of the liner.

The cross-sections prepared by Geo Associates and included in the original 1991 permit application are included in the Figures section as Exhibits 5, 6 and 7 (SPTCo, 1991).

In 1984 SWMU No. 1 was closed by excavating the soils and materials contained within the unit and SPTCo requested a clean closure for the unit. However, groundwater impacts above groundwater protective standards (GWPS) were detected and the unit entered corrective action monitoring in 1994. Constituent concentrations in groundwater were below their respective groundwater protective standards (GWPS) between 2006 and 2019, compliant with the TCEQ Remedy Standard A requirements for groundwater protection. Naphthalene was detected above the GWPS at one of the point of compliance (POC) wells in July 2019 and verified in October 2019, but returned to below GWPS in January 2020. RCRA-Regulated Waste Management Unit 001 (SWMU 1) will remain in the corrective action program until concentrations in the POC wells are below respective GWPS for three consecutive years in accordance with Section IV.F.3 of the Compliance Plan.

VII. CLOSURE AND POST-CLOSURE CARE PLANS

from the following zones: the surficial clay fill, between the clay fill and the uppermost sand, the uppermost sand, and below the uppermost sand unit. These samples were analyzed for benzene, toluene, ethylbenzene and xylene (BTEX), total petroleum hydrocarbons (TPH) and semi-volatiles.

Bis (2-ethylhexyl) phthalate was detected in two samples at concentrations well below the TCEQ Texas Risk Reduction Program (TRRP) Protective Concentration Limits (PCL). Xylene, ethylbenzene and toluene were also detected, but at concentrations well below the PCL. The 1991 soil sampling results indicated that the source of contamination had been removed by the 1984 closure activities (SPTCo, 1991).

In 1984, the facility then began investigating and monitoring the shallow ground water in the vicinity of SWMU No. 1. Between 1984 and 1991, nine groundwater monitoring wells were installed in the upper zone, and three piezometers were installed in the lower permeable zone. Hydrogeological data collected from these wells and piezometers indicate hydraulic conductivity between the zones. Analytical data compiled from 1984 until 1991 indicated that benzene, toluene, naphthalene, 2,4-dimethylphenol, and phenol were the most frequently detected parameters and that naphthalene was the parameter detected at the highest concentrations. Even though the SWMU was clean closed in 1984, a groundwater release was identified and the facility entered into post-closure care in 1994, updated in 2005, and groundwater monitoring has taken place on a semi-annual basis since that time.

Constituent concentrations in groundwater were below their respective groundwater protective standards (GWPS) between 2006 and 2019, compliant with the TCEQ Remedy Standard A requirements for groundwater protection. Naphthalene was detected above the GWPS at one of the point of compliance (POC) wells in July 2019 and verified in October 2019, but returned to below GWPS in January 2020. RCRA-Regulated Waste Management Unit 001 (SWMU 1) will remain in the corrective action program until concentrations in the POC wells are below respective GWPS for three consecutive years in accordance with Section IV.F.3 of the Compliance Plan (Section IX).

VII.C.1.e. Corrective Action

Corrective action will be taken within 30 days of discovering a problem at the site, facility unit and/or monitoring wells.

VII.C.2. Facility Contact

The facility contact is:

Kevin Peterburs
Manager, Environmental Site Remediation
Union Pacific Railroad Company
4823 N 119th Street
Milwaukee, WI 53225
Phone: 414-267-4164
kjpeterb@up.com

VII.C.2.a. Facility Records

All plans, reports, financial assurance information, correspondence, and related records will be maintained at the following location:

Union Pacific Railroad Company
1400 Douglas St., STOP 1030
Omaha, NE 68179
Phone: 402-544-5000

In accordance with 40 CFR 264.15(b)(2) and (d), copies of all inspection records will be maintained for at least three years from the date of inspection.

VII.C.2.b. Amendment of Plan

In accordance with 40 CFR 264.118(d), a written notification of or a request for a permit modification will be submitted to authorize a change in the post-closure plan. The request will be submitted at least 60 days prior to the proposed change in design or operation, or no later than 60 days after an unexpected event has occurred which has affected the post-closure plan. A copy of the amended post-closure plan will be included in the notification or request.

VII.C.2.c. Certification of Completion of Post-closure Care

The Site is currently in year 26 (2020) of the 30 years required for post-closure care. In accordance with 40 CFR 264.120, no later than 60 days after completion of the established post-closure care period for the closed hazardous waste disposal unit, UPRR will submit, by registered mail, a certification that the post-

closure care period was performed in accordance with the post-closure care plan. The certification will be signed by UPRR and an independent registered professional engineer.

VII.C.3. Proposed Post-Closure Use of Property

UPRR intends to maintain the Site as an open vegetated area with restricted access. The regulated unit will be part of the on-site Plume Management Zone (PMZ) discussed in detail in Section XI – Compliance Plan Attachment D of this Permit application. Any future use of the site would be contingent upon approval of the TCEQ.

VII.C.4. Closure Under Interim Status

The surface impoundment is not closed under interim status.

IX. RELEASES FROM SOLID WASTE UNITS AND CORRECTIVE ACTION

RELEASES FROM SOLID WASTE UNITS AND CORRECTIVE ACTION
PART B PERMIT APPLICATION
UNION PACIFIC RAILROAD COMPANY
HOUSTON WOOD PRESERVING WORKS
HOUSTON, TEXAS

TABLE OF CONTENTS

Unit No.	Description	Status
AOC 6	Inactive Wastewater Lagoon	Inactive
AOC 7	Location of Former UST No. 44-023-21	Closed
AOC 8	Former Fueling ASTs and Wastewater Lagoons	Inactive

II. Reviewed Documents:

1. RCRA: Part A X
Part B X
Permit X

2. Other Information:

Environmental Resources Management (ERM), 2000. *Affected Property Assessment Report (APAR), Union Pacific Railroad Houston Wood Preserving Works.* June 10.

ERM, 2003a. *RCRA Part A and Part B Permit Application, Renewal and Amendments, Union Pacific Railroad Houston Wood Preserving Works.* Prepared for Union Pacific Railroad Company, December 22.

ERM, 2003b. *Compliance Plan Application and Amendments, Union Pacific Railroad Houston Wood Preserving Works.* Prepared for Union Pacific Railroad Company, December 22.

ERM, 2004. *Revised Affected Property Assessment Report (APAR), Union Pacific Railroad Company, Houston Wood Preserving Works.* June 10.

Geo Associates, 1991. *Report of Soil Sampling, Closed Surface Impoundment, Southern Pacific Transportation Company.*

Pastor, Behling & Wheeler, LLC (PBW), 2009. *Affected Property Assessment Report Addendum, Union Pacific Railroad Company Houston Wood Preserving Works.* March 29.

Pastor, Behling & Wheeler, LLC (PBW), 2011. *Affected Property Assessment Report Addendum, Union Pacific Railroad Company Houston Wood Preserving Works.* March 25.

PRC Environmental Management, Inc. (PRC), 1993. *RCRA Facility Assessment Report, Southern Pacific Transportation Company, Houston, Texas, TXD 000820266.* October.

Rollins Environmental Services (FS) Inc., 1984. *Final Report on Closure Plan of RCRA Facility #31547.* April.

Southern Pacific Transportation Company (SPTCo), 1991. *Part B Permit Application – Post Closure Care and Compliance Plan for the Closed Surface Impoundment.* Volumes I-III. May 13.

SPTCo, 1993. *Response to PREC and the Environmental Protection Agency (EPA) Request for Information on SPTCo Liberty Road Facility, Houston, Texas.* September 9.

TCEQ, 2005. *Compliance Plan No. 50343.* June 10.

TCEQ, 2005. *Permit For Industrial Solid Waste Management Site, Permit No. 50343, Union Pacfic Railroad Company*. June 10.

IX.A.24 PRELIMINARY REVIEW UNIT CHECKLIST – AOC 8

Facility: Houston Wood Preserving Works City: Houston, Texas

ISW Reg No: 31547 Date: August 01, 2020

Permit No: 50343 Reviewer:

EPA ID No: TXD000820266

I. Waste Management Unit:

A. NOR No: AOC 8

B. Description: Former Fueling ASTs and Wastewater Lagoons

C. Dates of Operation: NA

II. Wastes Managed: Unknown

III. Evidence of Release: Analytical results of soil and groundwater samples indicate petroleum hydrocarbon levels greater than TRRP PCLs. Metals (lead and arsenic) have been detected in soils above TRRP PCLs. Tar-like NAPL in shallow soils and surfacing has been documented.

IV. Pollutant Dispersal Pathways: Soil, Groundwater

V. Summary: Wastewater lagoons were formerly located on the northern side of the present-day Englewood Intermodal Yard. Aboveground storage tanks (ASTs) used for fueling operations (fuel oil) were formerly located on the northeastern side of the present-day Englewood Intermodal Yard. Details concerning the construction activities and installation date are unknown. Contents stored in wastewater lagoon and ASTs are unknown. Concrete pavement currently covers the area.

VI. Recommended Action: No further action recommended. The AOC is addressed in the facility-wide corrective action detailed in the Compliance Plan.

APPENDIX II
SUMMARY OF WASTES MANAGED
UNION PACIFIC RAILROAD COMPANY
HOUSTON WOOD PRESERVING WORKS
HOUSTON, TEXAS

NOR	Waste Description	Class	TCEQ Waste Code	EPA Waste Code	Disposition	Health, Safety and Risk Information
001/SWMU 1	Surface Impoundment Area	NA	219, 301, 488, 609	K001, F034, U051, U188	Removed from site	See NOR 004
002/SWMU 7	Tank car	Unknown	Unknown	Unknown	No longer generated	--
003	Sub-surface Tank	Unknown	Unknown	Unknown	No longer generated	--
004	Container Storage Area (Corrective Action Remediation Wastes)	1	00029032	Non-haz	Inactive	--
		1	04003011	Non-haz	Active	--
		2	14773012	Non-haz	Active	--
		1	14781011	Non-haz	Active	--
		2	14791012	Non-haz	Active	--
		2	14804062	Non-haz	Active	--
		2	14841012	Non-haz	Inactive	--
		1	09163081	Non-haz	Inactive	--
		H	0001301H	F034, K001	Active	Avoid all contact. If inhaled, provide fresh air, respiratory support. If in contact with skin, wash with soap and water. Rinse with water if contact with eyes. Seek medical attention. **F034, K001, and U051 (Creosote)**: Carcinogen; respiratory tract irritation, mild skin irritation, eye irritation; skin cancer. TWA 0.2 mg/m3; LC50 (*Oncorhynchus mykiss* 96 hr) 0.57 mg/L (very toxic to aquatic life); LD50 (rat oral) 2197 mg/kg; LC50 rat inhalation 4 hr) > 5 mg/L; LD50 (rabbit skin) > 2500 mg/kg; Reference: Koppers Safety Data Sheet Rev 2.03000 dated March 27, 2015. **U188 (Phenol)**: Central nervous system impairment, upper respiratory tract irritation, lung damage; TWA 5 ppm (19 mg/m3); LC50 (golden orfe 48-hr) 14 - 25 mg/L; LD50 (rat oral) 317 mg/kg; LC50 (rat inhalation 8-hr) 900 mg/m3; LD50 (rabbit dermal) 630 mg/kg Reference: Sigma-Aldrich Safety Data Sheet Revision 5.7 June 17, 2015.
		H	0909101H	F034, K001	Active	
		H	0912489H	F034, K001	Active	
		H	0914101H	F034, K001	Active	
		H	0915301H	F034, K001	Active	
		H	0917406H	K001	Active	
		H	0918219H	F034, K001, U051	Active	
		H	1481514H	D002	Active	
		H	1482110H	D002	Active	
		2	14835142	Non-haz	Active	--
		1	14884891	Non-haz	Active	--
		2	14863902	Non-haz	Active	--
		2	14851022	Non-haz	Active	--

APPENDIX II
SUMMARY OF WASTES MANAGED
UNION PACIFIC RAILROAD COMPANY
HOUSTON WOOD PRESERVING WORKS
HOUSTON, TEXAS

NOR	Waste Description	Class	TCEQ Waste Code	EPA Waste Code	Disposition	Health, Safety and Risk Information
005	Waste Pile	2	09024882	Non-haz	No longer generated	--
		2	09103072	Non-haz	No longer generated	--
		2	09113072	Non-haz	No longer generated	--
006	Miscellaneous Storage Containers	1	2012061	Non-haz	No longer generated	--
SWMU 2	Northern and Southern Drainage Ditches	Unknown	Unknown	Unknown	No longer generated	--
SWMU 3	Oil Drum Storage (ODS) Building	Unknown	Unknown	Unknown	No longer generated	--
SWMU 4	Recent Process Area	Unknown	Unknown	Unknown	No longer generated	--
SWMU 5	Original Process Area	Unknown	Unknown	Unknown	No longer generated	--
SWMU 6	Water Treatment and Boiler System	Unknown	Unknown	Unknown	No longer generated	--
SWMU 8	Aboveground Storage Tank Area	Unknown	Unknown	Unknown	No longer generated	--
SWMU 9	Location of Former UST No. 44-023-05	Unknown	Unknown	Unknown	No longer generated	--
SWMU 10	Location of Former Sap Water Treatment Tank	Unknown	Unknown	Unknown	No longer generated	--
SWMU 11	Oil Water Separators	Unknown	Unknown	Unknown	No longer generated	--
SWMU 12	Railroad Tie Storage Area	Unknown	Unknown	Unknown	No longer generated	--
AOC 1	Diesel Storage Tank	Unknown	Unknown	Unknown	No longer generated	--
AOC 2	Hose House	Unknown	Unknown	Unknown	No longer generated	--
AOC 3	Contaminated Portion of City Water Line	Unknown	Unknown	Unknown	No longer generated	--
AOC 4	Location of Former Incinerator	Unknown	Unknown	Unknown	No longer generated	--
AOC 5	City Storm Sewer	Unknown	Unknown	Unknown	No longer generated	--
AOC 6	Inactive Wastewater Lagoon	Unknown	Unknown	Unknown	No longer generated	--
AOC 7	Location of Former UST No. 44-023-21	Unknown	Unknown	Unknown	No longer generated	--
AOC 8	Former Fueling ASTs and Wastewater Lagoons	Unknown	Unknown	Unknown	No longer generated	--

A. SITE SPECIFIC INFORMATION

1. General Site Information (provide the following information):

   a. An overall plan view map of the entire facility delineating the facility's property boundary, Facility Operations Area (FOA) boundaries, as applicable, and the plume management zone (PMZ) boundaries as applicable;

   See CP Attachment A, Sheet 2 of 7 – Solid Waste Management Units (SWMUs)/Area of Concern (AOCs) Location Map

   b. A 7.5 minute U.S.G.S. quadrangle topographic map showing the entire facility;

   See CP Attachment A, Sheet 1 of 7 – Facility Site Map

   c. All oversized (larger than 8.5" by 11") drawings submitted in accordance with a and b, above, should be accompanied with legible photocopies of the reduced drawing on 8.5" by 11" sheet(s) of paper which shall be used as "CP Attachment A" maps in the final draft Permit/Compliance Plan. The applicant should title the map(s) accordingly as "CP Attachment A, Sheet 1 of xx – Facility Site Map"; "CP Attachment A, Sheet xx of xx, FOA Lateral Boundary Map"; "CP Attachment A, Sheet xx of xx, PMZ Boundary Location Map"; and

   The following maps are provided with this revision:
   - ***CP Attachment A, Sheet 1 of 7 – Facility Site Map***
   - ***CP Attachment A, Sheet 2 of 7 – Solid Waste Management Units (SWMUs)/Area of Concern (AOCs) Location Map***
   - ***CP Attachment A, Sheet 3 of 7 – Compliance Monitoring Well Network***
   - ***CP Attachment A, Sheet 4 of 7 – PMZ Boundary Map, A-TZ***
   - ***CP Attachment A, Sheet 5 of 7 – PMZ Boundary Map, B-CZ/B-TZ***
   - ***CP Attachment A, Sheet 6 of 7 – PMZ Boundary Map, C-TZ***
   - ***CP Attachment A, Sheet 7 of 7 – Post Response Action Care Well Location Map***

   d. Aerial photographs through time depicting changes in the land use, if available.

   See Compliance Plan Figure XI.A.1.d (three years presented)

2. Waste Management

   Provide a complete list and a plan view drawing(s) locating and identifying the following waste management units at the scale of 2.5 centimeters (1 inch) equal to not more than 61.0 meters (200 feet). All oversized (larger than 8.5" by 11") drawings should be accompanied with legible photocopies of the reduced drawing on 8.5" by 11" sheet(s) of paper. Please provide information for each waste management unit listed below on Table XI.A.1. – Facility History for Waste Management Units.

   a. All hazardous waste management units regulated under the Industrial Solid Waste and Municipal Hazardous Waste Rules (Chapter 335) required to be monitored in accordance with 30 TAC 335.164 (Detection Monitoring), 335.165 (Compliance Monitoring Program) and 335.166 (Corrective Action Program);

See Table XI.A.1 – RCRA- Regulated Waste Management Unit 001 (SWMU 1) – Closed Surface Impoundment – all waste was removed in 1984 and the TCEQ granted no further action for the Corrective Action Monitoring for the unit in August 2015 (See Section VII and Response Action Plan (CP Attachment XI.D)). The regulated unit will continue to be monitored under the Corrective Action Program (335.166). Location of SWMU 1 shown on Compliance Plan Figure CP Attachment A, Sheet 1 of 5 – Facility Map, Figure CP Attachment A, Sheet 3of 6 - Compliance Monitoring Well Network, and Figure XI.A.2.1.

b. All solid waste management units (SWMUs) and Areas of Concern (AOCs) regulated under 335.167 which are recommended for further investigation and/or corrective action in the RCRA Facility Assessment (RFA) shall include those identified in accordance with the permit requirements subsequent to the initial RFA.

See Table XI.A.1 for list, SWMUs and AOCs shown on Figures XI.A.2, XI.A.2.1, XI.A.2.2, XI.A.2.3, and XI.A.2.4.

c. All on-site wastewater treatment units.

Not Applicable

3. Facility History

Based on the information provided in Table XI.A.1., complete CP Table I – Waste Management Units and Areas Subject to Groundwater Corrective Action and Compliance Monitoring accordingly in the format provided.

See Compliance Plan Table I (Waste Management Units and Areas Subject to Groundwater Corrective Action and Compliance Monitoring).

For the SWMUs or AOCs listed in Table XI.A.1. regulated under 30 TAC 335.167 which are recommended for further investigation and/or corrective action in the RCRA Facility Assessment (RFA), including those identified in accordance with permit requirements subsequent to the initial RFA, complete CP Table II – Solid Waste Management Units and Areas of Concern for which Corrective Action applies pursuant to 30 TAC 335.167. CP Table II will become part of the Compliance Plan.

See Compliance Plan Table II (Solid Waste Management Units and Areas of Concern for which Corrective Action Applies Pursuant to 30 TAC 335.167).

4. Site Geology, Hydrogeologic Conditions, and Relationship to Surface Water

For New, modified/amended Compliance Plan, please provide a Geology Report as required by Section VI.B of this application containing updated site geologic information including the following descriptions, maps and tables with appropriate supporting documentation [All maps should be at the scale of 1 inch equal to not more than 200 feet and legible when reduced to 8.5" by 11" letter size paper]:

a. A description of the site geology for the facility. The geologic description should include a site geology map and sufficient cross sections (see Item h. below) to describe the uppermost aquifer and any confining stratigraphic unit(s) beneath the site.

See Permit Section VI. Geology Report and Revised Response Action Plan (RAP) in CP Attachment XI.D – Attachment 1A.

b. A description of the site soils and subsurface lithologies using the Unified Soil Classification System. For those soil units which do not extend beneath the entire site area, the soil description should include a plan view map designating the soil's areal extent;

See Permit Section VI. Geology Report

c. Where a soil remedy is required in a corrective action program of Section XI.D.1. of this application for a Regulated Unit, SWMU and/or AOC, the applicant shall submit a description of contamination in soils of the vadose zone (unsaturated zone above the uppermost aquifer). The soil description should include maps indicating lateral and vertical extent of contamination;

See CP Attachment XI.D – Response Action Plan – Attachment 1A

d. A description and designation of the uppermost saturated zone or uppermost aquifer including the name, the type of unit (e.g. perched, confined, etc.,), and groundwater characteristics (flow rates, directions, hydraulic conductivity, etc.). As defined in 40 CFR 260.10, an aquifer is a geologic formation, group of formation, or part of a formation, capable of yielding significant amount of groundwater to wells or springs. Persons using Texas Risk Reduction Program (TRRP) should also consider the definition of a groundwater bearing unit as a saturated geologic formation, group of formations, or part of a formation with a hydraulic conductivity of equal to or greater than 1 x 10 -5 centimeters/second (30 TAC 350.4(a)40).

See Permit Section VI. Geology Report and CP Attachment XI.D – Response Action Plan – Attachment 1A

e. Present the geologic, stratigraphic and hydrogeological information; and
f. ***See Permit Section VI. Geology Report and CP Attachment XI.D – Response Action Plan – Attachment 1A***Maps indicating the lateral and vertical extent of the contamination for each stratigraphic unit affected, with supporting documentation.

See CP Attachment XI.D - Response Action Plan - Attachment 1A

g. Current Contaminant Plume Map(s) - Locating and identifying the extent of contamination as determined from previous monitoring on a separate facility base map(s). Locate and identify all monitor wells and waste management units/areas.

See CP Attachment XI.D - Response Action Plan - Attachment 1A

h. Cross section - Cross section transect lines should be indicated on the Contaminant Plume Map. The applicant, at a minimum, must submit two (2) stratigraphic cross sections for each waste management unit/area. One cross section should be drawn through all the point of compliance wells and the second cross section should be drawn along the direction of the movement of the contaminant plume released from the unit/area. Cross sections should follow the requirements outlined in the Geologic and Hydrogeologic Report of Parts IV and V of this application. At a minimum, the cross sections should include the following information:

   i. the stratigraphic interpretation (e.g., surface grade, uppermost aquifer, aquiclude);
   ii. lithology/geologic description of the uppermost aquifer and aquiclude;
   iii. the potentiometric surface;
   iv. detected non-aqueous phase liquids (NAPLs) and hazardous constituents; and
   v. screen length and screen depth for each well in the cross section.

See CP Attachment XI.D – Response Action Plan – Attachment 1A

i. Well Construction diagram - The report should include a well construction diagram for all wells used in the cross section. The well construction diagram should include the information in "Attachment B" of this (Compliance Plan) application. The well construction diagram information may be included on the geologic cross-section(s).

See Permit Section VI, Appendix VI.B for Well Completion Records and CP Attachment XI.D – Response Action Plan – Appendix 2

j. Describe the potential for any surface water bodies to be hydraulically connected to groundwater containing hazardous constituents. Apply the guidance provided in Determining PCLs for Surface Water and Sediment, RG-366/TRRP-24 Revised, December 2002, in order to determine the water body type and applicable surface water criteria for human health, aquatic life and wildlife, as applicable.

See CP Attachment XI.D – Response Action Plan. The nearest surface water body is Buffalo Bayou, located approximately 1.6 miles southwest of the Site. The potential for lateral migration of groundwater from the Site to the southwest approximately 1.6 miles to Buffalo Bayou is not likely.

B. HAZARDOUS CONSTITUENTS IN GROUNDWATER AND GROUNDWATER PROTECTION STANDARDS (GWPSS)

Hazardous Constituents in Groundwater

For each contaminated hydrogeologic unit beneath a waste management unit/area (40 CFR 264.95), provide a list of all 40 CFR Part 264 Appendix IX hazardous constituents that have been detected in groundwater samples above background values, Practical Quantitation Limits (PQLs), or Method Quantitation Limits (MQLs). Please submit for each unit/area the most recent Appendix IX laboratory analysis results showing the constituents, constituent concentrations, methods used for analysis and associated laboratory QA/QC.

The groundwater samples (collected for the purpose of determining whether constituents listed in Appendix IX are present) shall be from each waste management unit/area monitoring well system as required by 30 Texas Administrative Code (TAC) 335.164 (detection monitoring program).

The only RCRA Permitted Unit is the Closed Surface Impoundment (Waste Unit 001 (SWMU 1)), which will be monitored under the Corrective Action Program detailed in Section XI.D. The remainder of the units will be addressed using a facility-wide corrective action approach with Corrective Action Monitoring as specified in Compliance Plan Tables III, IIIA, and V.

If the waste management unit/area is subject to Corrective Action Program required by 30 TAC 335.166 or 335.167 and/or Compliance Monitoring required by 30 TAC 335.165, then list the unit/area and include the list of hazardous constituents and their principal degradation constituents in:

- CP Table III – Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard; and

See Compliance Plan Table III (Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard) for the hazardous constituents subject to the Corrective Action Program.

- CP Table IV – Compliance Monitoring Program Table of Hazardous and Solid Waste Constituents and Practical Quantitation Limits or Method Quantitation Limits for Compliance Monitoring.

Reserved.

Groundwater Protection Standards (GWPSs)

The GWPS (30 TAC 335.158) is designed to ensure that hazardous constituents (30 TAC 335.159) identified in groundwater and their principal degradational constituents do not exceed concentrations that pose a present or potential hazard to human health and the environment. Compliance monitoring and corrective action programs for a Regulated Unit (30 TAC 335.165 and 335.166) and a corrective action program for a solid waste management unit (SWMU) (30 TAC 335.167) require human health and the environment to be protected from all releases of hazardous wastes and constituents. These corrective action and monitoring programs are evaluated using the GWPS. The GWPS is based on the following criteria.

a. Background Levels - Background levels authorized under 30 TAC 335.160(a)(1) are defined as constituent concentration values that are naturally occurring or are not influenced by contamination coming from the waste management unit. These values are established by statistical analysis of upgradient well sampling data. Analytical results from a sufficient number of independent samples are required to be utilized with an approved

and appropriate statistical method. For guidance on the statistical methods consult, Statistical Analysis of Groundwater Data at RCRA Facilities-Unified Guidance, U.S. EPA, March 2009, and any subsequent updates to this document.

Not applicable.

Practical Quantitation Limits (PQLs) or Method Quantitation Limits (MQLs) are utilized in lieu of background values unless a background demonstration establishes concentrations for naturally occurring constituents. The PQL or MQL is defined in the footnote of CP Tables III and IV.

No PQLs or MQLs are used on CP Table III except for constituents that have GWPSs below the typical laboratory MQL using the appropriate analytical method.

b. Primary and Secondary Maximum Contaminant Levels (MCLs) - Maximum permissible level of a contaminant in water which is delivered to any user of a public water system (40 CFR Part 141 and 143, Federal Safe Drinking Water Act).

See Compliance Plan Table III (Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard) and associated footnotes.

c. Alternate Concentration Limits (ACLs) determined in accordance with 30 TAC 335.160(b) and are defined in footnote of CP Tables III and IV.

As discussed in the RAP (Attachment XI.D), TCEQ Protective Concentration Levels (PCLs) are the regulatory standards that apply at groundwater alternate points of exposure (POEs) for a particular groundwater exposure pathway, as set in the Title 30 Texas Administrative Code Chapter 350 Texas Risk Reduction Program (TRRP). Therefore, for this compliance plan, the proposed ACLs shall be based on TRRP PCLs ($^{GW}GW_{Ing}$). The PCLs may change as updates to the TRRP Rule are promulgated.

See Compliance Plan Table III (Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard) for the list of constituents and groundwater ACLs, and associated footnotes.

1. Establishing the Groundwater Protection Standard (GWPS)
   a. If background, PQL or MQLs are proposed for the GWPS, the applicant must list all constituents (i.e., detected and degradational constituents) for which a GWPS is being applied for and the appropriate concentration limits. This information shall be submitted in the format of CP Tables III, and IV.

The GWPS are the regulatory groundwater standard(s) for a COC that establish compliance and apply at POE wells as part of the PMZ. In the cases of PMZs and POEs, PCLs will be used to verify compliance.

See Compliance Plan Table III (Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard) for the GWPS (PCLs).

   b. Alternate Concentration Limits (ACLs) - ACLs are established at the point of compliance (POC) for a regulated or solid waste management unit (SWMU). All concentration values or limits listed in Section XI.B.1.c. are considered ACLs. ACLs are evaluated in accordance with the provisions of 30 TAC 335.160(b) and other regulations acceptable to the executive director. If an ACL is requested on the basis of Section XI.B.1.c. (MCLs), then no ACL demonstration

is necessary. The ACL demonstration must establish constituent concentrations in groundwater in accordance with regulations acceptable to the executive director. This information shall be submitted in the format of CP Tables III and IV. Note that depending upon the rule employed [i.e., 30 TAC 335 Subchapter S – Risk Reduction Rules (RRR) or 30 TAC 350 – Texas Risk Reduction Program (TRRP)], the applicant should determine the GWPS for the point of compliance and point of exposure, as applicable, in accordance with the remedy standard being utilized.

If the contaminant plume discharges or has a potential to discharge into surface water, then the facility must also comply with 30 TAC Chapter 307 (Texas Surface Water Quality Standards) unless other regulatory requirements acceptable to the executive director are requested.

See Compliance Plan Table III (Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard) for list of ACLs.

"Attachment A" of this Compliance Plan Application provides a summary of regulatory requirements for an ACL demonstration in accordance with 30 TAC 335.160(b).

Proposed ACLs are based on the TRRP PCLs as described above in XI.B.1.c. Where the POE is at a distance from the POC (i.e., edge of the groundwater PCLE Zone), TRRP PCLs directly apply at the POE. See CP Attachment XI.A (Alternate Concentration Levels) for additional discussion (Revision 4 – July 2017).

C. COMPLIANCE MONITORING PROGRAM

As required by 30 TAC 335.165, an owner or operator must monitor the groundwater to determine whether Regulated Units are in compliance with the Groundwater Protection Standard (GWPS) under 30 TAC 335.158. The applicant must provide the following information when proposing a compliance monitoring program.

RESERVED - The one regulated unit, Closed Surface Impoundment (SWMU 1), received a "no further action" from the TCEQ Corrective Action Division in a letter dated August 5, 2015. However, concentrations in one of the point-of-compliance (POC) wells exceeded the GWPS for naphthalene in July 2019 but returned to below GWPSs in January 2020. SWMU 001 will remain in the Corrective Action Program until concentrations in POC wells are below the GWPS for three consecutive years. Following that period, the Compliance Monitoring Program will be established through a permit revision.

The other SWMUs and AOCs will be addressed through the facility-wide Corrective Action Monitoring Program (see Section XI.D).

a. Groundwater Monitoring Program Description

Describe the proposed groundwater monitoring system to be used to monitor compliance with the GWPS which includes the following information.

(1) Changes, if applicable, from the current detection monitoring system or compliance monitoring system groundwater monitoring program at the waste management unit that will be required to comply with the compliance monitoring program described in 30 TAC 335.165. This description should address changes concerning:

Not applicable

(a) Geological and/or hydrogeological information differences since the submittal of the previous application [must submit an updated Geologic and Hydrogeologic Report required by Section XI.A.4];

(b) Waste management areas/units;

(c) Construction details for monitor wells to evaluate compliance with "Attachment B" well specification requirements;

(d) The number and locations of additional monitor wells [also see Section XI.C.1.b.(2)];

(e) Sample handling, chain of custody, and analytical procedures (also see "Attachment C");

(f) Frequency of monitoring;

(g) Monitoring parameters;

(h) Evaluation of compliance with GWPS (Statistical Methods);

(i) Other Sampling and Analysis Plan information to be compliant with "Attachment C";

(j) Compliance period as defined in Section XI.E.1.c. of the application;

(k) Financial assurance (see Section XI.E.); and

(l) An ACL variance under 30 TAC 335.160(b), if applicable (also see "Attachment A").

(2) The number, depth and location of all monitor wells (Background Wells, Point of Compliance Wells, Observation Wells, Piezometers, etc.). Complete CP Table V – Designation of Wells by Function and make changes as applicable to plans referenced in Section XI.C.1.b.

Not applicable.

(3) The proposed hazardous constituent monitoring list which is based on constituents that were monitored during detection monitoring (if applicable), constituents detected in accordance with 30 TAC 335.164, and degradational constituents identified in Table CP IV accordingly to develop the constituent list for the Compliance Monitoring Program. Also, list the PQL, MQL, or background concentration for each constituent in CP Table IV. CP Table IV shall become part of the final Compliance Plan to be analyzed at least annually as required by 30 TAC 335.165(7).

Not applicable.

(4) The proposed indicator parameter monitoring list. From the list of constituents and GWPS identified in CP Table IV., complete CP Table IVA – Compliance Monitoring Program, Table of Detected Hazardous Constituents and the Groundwater Protection Standard for Compliance Monitoring, accordingly. CP Table IVA shall become part of the final Compliance Plan to be analyzed at least semiannually as required by 30 TAC 335.165(6).

Not applicable.

(5) Monitoring frequency.

Not applicable.

(6) Provisions for reporting of groundwater data at least on an annual basis.
Not applicable.

(7) Annual determination of contamination plume rate and direction of migration.
Not applicable.

(8) Compliance period. Calculate the compliance period as required by 30 TAC 335.162 and 335.165(1)(d). Include calculations and complete CP Table VI – Compliance Period for RCRA-Regulated Units which shall become part of the final Compliance Plan.

Not applicable.

b. Submit the following plans and reports.

(1) Current Sampling and Analysis Plan - The Sampling and Analysis Plan must include information required by 30 TAC 335.163(4) and 335.163(5) and 40 CFR Subpart 270.30(j). For guidance, please see "Attachment C" to the application.

Not applicable.

(2) Monitoring System Plan - If the applicant is proposing a monitoring well or a monitoring system in the application, the applicable well installation specifications outlined in "Attachment B" of this application should be followed. All new monitoring wells must be installed in accordance with the specifications outlined in "Attachment B", unless an alternative design is approved by the agency prior to installation. If the applicant proposes as part of the monitoring system, any well (existing or proposed) that does not meet or exceed the requirements outlined in "Attachment B", then the proposed alternative design must be described in detail in the Monitoring System Plan and must be submitted with this application. The Monitoring System Plan must include:

(a) Monitoring System Design and Specifications - Certified by a qualified engineer and/or geologist which provides detailed plans and specifications on the monitoring system design; and

(b) Well Drilling and Well Casing Specifications - Certified by a qualified engineer and/or geologist which provides details on well casing specification, drilling logs and reports.

Not applicable.

(3) Current Geologic and Hydrogeologic Report - Provide a report per Section X.I.A.4 of this application discussing the geologic and hydrogeologic conditions of the facility and the specific area affected by the waste management areas. This report should include the most up-to-date information from which the design of the groundwater monitoring system was

based.

Not applicable.

1. Waste Management Units Monitored
   a. Delineate and identify the following for each waste management unit in the proposed groundwater monitoring program.

      (1) Boundary of the waste management unit and, if applicable, the proposed waste management area which includes more than one waste management unit (identify all waste management units which are included in the waste management area). These waste management units subject to compliance monitoring should be listed in CP Table I – Waste Management Units and Areas Subject to Groundwater Corrective Action and Compliance Monitoring which shall become part of the final Compliance Plan.

      Not Applicable

      (2) The proposed point of compliance (30 TAC 335.161) and point of exposure wells.
      Not Applicable

      (3) Any other proposed monitor wells such as supplemental wells, observation wells, background wells, etc. If appropriate the groundwater monitoring system should have a sufficient number of wells be designated to monitor the downgradient extent of the plume.
      Not Applicable

      (4) Features which may serve as conduits for subsurface contamination.

      Not Applicable

   b. For each waste management unit/area in the proposed groundwater monitoring system, submit the locations of individual waste management unit/area monitor wells (existing or proposed) and any soil borings (plugged and unplugged) specifically drilled for assessment of contamination. These individual monitor wells shall be identified by respective well number on a plan view drawing and only the background, point of compliance and/or point of exposure wells should be indicated in CP Table V – Designation of Wells by Function. The plan view map depicting the location of individual monitoring wells for compliance monitoring should be labeled as "CP Attachment A, sheet xx of xx" in the text box. The title box should also include reference to the facility name, Permit/Compliance Plan Number, Solid Waste Registration Number, Unit Description or name with Notice of Registration (NOR) Unit No. 0000. The "CP Attachment A" map(s) and CP Table V shall also become part of the final Compliance Plan.

      Not Applicable.

2. Implementation Schedule

   Itemize and discuss, in detail, the estimated time schedule necessary for any testing and assessments, system design, construction and installation, and final implementation of the groundwater monitoring program for each Regulated Unit and solid waste management unit. If the

schedule of implementation for items are not completed at the time of the application, or are not completed at the time of issuance of the final draft Permit/Compliance Plan, then the items should be added to the CP Table VIII - Compliance Schedule of the application.

Not Applicable.

D. CORRECTIVE ACTION PROGRAM

As required by 30 TAC 335.166, the owner or operator must take corrective action to ensure that Regulated Units are in compliance with the Groundwater Protection Standards (GWPS) under 30 TAC 335.158. As required under 30 TAC 335.167, all releases of hazardous constituents from any solid waste management unit at the facility must also be addressed. For existing corrective action programs which have been approved by the TCEQ, the applicant shall provide a copy of the TCEQ corrective action system approval letter, design system specifications and any updates as requested in Section XI.D.3.a.(1) of this section. The applicant must provide the information requested below when proposing a corrective action program which has not been previously approved by the TCEQ including a detailed description of a corrective action or a combination of corrective actions that will remedy the groundwater contamination at the waste management unit and a proposed plan for a monitoring program that will demonstrate the effectiveness of the corrective action.

The owner or operator may also apply for a the Facility Operations Area (FOA) pursuant to the requirements of 30 TAC 350.131 - 350.135 of the Texas Risk Reduction Program (TRRP) rules, provided the applicant meets the FOA pre-approval process steps 1 through 3 approved by the Commission.

Also, the owner or operator may apply for alternative groundwater Corrective Action Program pursuant 30 TAC 335.151, 335.156 and 30 TAC 350, where there are commingled releases from RCRA-regulated unit from one or more SWMUs, PCO, and/or AOC.

RCRA Regulated Waste Management Unit 001: The existing corrective action program previously approved by the TCEQ applies to the RCRA-Regulated Waste Management Unit 001 (SWMU 1).

Other SWMUs and AOCs: As detailed in the RAP (CP Attachment XI.D) , to address the PCLE Zone in groundwater on-site and within a portion of the COH ROW will be through Remedy Standard B control using the following response actions:

- ***A modified groundwater response objective through a plume management zone (PMZ);***
- ***Installation of a physical control through a slurry wall.***

The proposed cumulative PMZ (for all three GWBUs) consists of the following:

1) On-Site PMZ – The On-Site PMZ will include the cumulative groundwater PCLE Zone within the UPRR-owned property consisting of the center to the east portion of the Site and western portion of the Site (includes the On-Site PMZ (West) area for the B-CZ/B-TZ GWBU). The proposed PMZ includes the groundwater PCLE Zones for the creosote-related COCs and arsenic.

2) Off-Site PMZ (COH ROW) - The off-site PMZ includes the cumulative groundwater PCLE Zone that extends off-site to the north, east, and west of the Site within the City of Houston ROW.

A physical control consisting of a slurry wall barrier is proposed to be installed at the Site. The slurry wall will be constructed to impede groundwater flow from portions of the Site and establish a subsurface barrier separating the on-site contamination from the off-site areas to the north and east. This will reduce the risk of potential future migration of groundwater COC concentrations above the critical PCLs from the Site, and similarly reduce the potential for migration of mobile NAPL at the Site. However, creosote NAPL is present

off-site beyond where the proposed slurry wall is to be constructed and this NAPL represents potential source mass for the off-site groundwater PCLE Zones.

For the off-site groundwater PCLE Zones that extend off-site outside of the proposed PMZs, the response action objective is groundwater decontamination as defined in TRRP to the applicable critical PCLs under Remedy Standard B (Remedy Standard A equivalent). Pursuant to TRRP-32 guidance for NAPL Management, the off-site groundwater PCLE Zone where NAPL is in contact with B-CZ/B-TZ groundwater the NAPL response endpoint is to recover soluble NAPL fraction sufficient to eliminate source contributions to the groundwater PCLE zone. Two major aspects, which are functions of the generally low mobility physical properties of creosote and its components, and the significant and unfavorable hydrogeologic complexity of the Site, greatly hinder recoverability of the soluble DNAPL fraction from the subsurface. Therefore, the response actions related to this objective will be conducted in a phased approach as described below.

First, the construction of the slurry wall on-site will impede groundwater flow from areas where NAPL has been observed in monitoring wells on Site, thereby separating the on-site contamination from the off-site areas. Next, the mobile NAPL within the saturated soil matrix in certain areas of off-site hydrostratigraphic units will be addressed. The proposed remedial action objectives (functional objectives) for this NAPL as part of the effort to meet the absolute objective of decontamination for the off-site groundwater PCLE Zone will be to:

- ***Reduce the apparent thickness of in-well DNAPL in existing and proposed recovery wells over a reasonable time frame; and***
- ***Reduce the occurrence of DNAPL (i.e. the number of wells exhibiting measurable DNAPL) in those wells over a reasonable time frame.***

UPRR proposes to implement multi-phase extraction (MPE) events to recover DNAPL from existing and proposed wells as the response action to address the functional objectives listed above. Additional Corrective Action System Wells in the A-TZ, B-CZ/B-TZ, and C-TZ will be installed off-site to increase the potential for DNAPL recovery with the absolute objective of recovering the soluble NAPL fraction sufficient to eliminate source contributions to groundwater PCLE zone.

Given the inherent complex and unfavorable site geologic conditions and generally limited mobility characteristics of creosote DNAPL, it is anticipated that achieving the response objective of reducing COCs in groundwater to the applicable critical PCLs off-site within a reasonable timeframe will be challenging based on the physical characteristics and complex geology at the Site. In fact, it has been shown at numerous creosote DNAPL sites that complete removal of creosote DNAPL is not technically practicable. However, regular physical NAPL removal through MPE events will aid in advancing toward the response objective. Once the MPE achieves the functional objectives, passive remedial options such as monitored natural attenuation (MNA) will be evaluated for addressing the residual off-site groundwater PCLE Zones.

In terms of unprotective conditions for receptors during the remedial period, there are no potential or unprotected exposures to impacted groundwater for the off-site residents since none of the properties in the area use groundwater for drinking or any other purposes; and the properties are provided drinking water by the City of Houston. No groundwater drinking wells have been identified in the area and anticipated future use of the shallow groundwater as a resource is unlikely. In addition, soil gas assessments in conjunction with groundwater monitoring have indicated through multiple lines of evidence that the vapor intrusion pathway is not complete for the off-site properties.

1. Type of Corrective Action Proposed

   From the list below, indicate the type of groundwater corrective action proposed for each hazardous waste unit/area. Discuss in detail if more than one corrective action is to be used in a waste management area. Submit the discussion and descriptions as an attachment to the application.

a. Groundwater well recovery with surface treatment

b. Groundwater well recovery/surface treatment/re-injection
c. Groundwater well recovery and disposal
d. Vapor extraction system
e. Interceptor trench recovery and disposal
f. Interceptor trench recovery and surface treatment
g. In-situ treatment – bioreclamation
h. In-situ treatment – chemical reaction
i. Barrier walls/encapsulation
j. Permeable treatment beds
k. Other, please describe

See CP Attachment XI.D (RAP) for the discussion and description of proposed types of corrective actions. As detailed in the RAP, the type of corrective action proposed includes:

- ***(i.) Barrier walls/encapsulation – Slurry wall; and***
- ***(k.) Other - NAPL recovery activities.***

2. Program Description

Attach a technical report providing a detailed description of a complete corrective action system including above and below ground equipment/facilities. Include discussions on the following concerns for each type of corrective action as applicable.

See RAP (CP Attachment XI.D).

a. Recovery Wells
See RAP (CP Attachment XI.D) and CP Attachment A Sheet 7 of 7

(1) Indicate on a plan view of the waste management area the anticipated location of Recovery Well(s) which would optimize the extraction of the groundwater contaminants.
(2) Indicate on a plan view the estimated radius of influence of each Recovery Well.
(3) Indicate the optimum pumping rate of each Recovery Well determined from the aquifer pump test.
(4) Describe the design of the Recovery Wells and pump system including diameter, construction material, gravel packing, screen slot sizes and patterns, type of pumps and maintenance requirements.
(5) Describe the collection and storage of the contaminated groundwater which is classified hazardous waste (on-site storage of hazardous waste shall require compliance with the applicable regulations):
    (a) Less than 90-day tanks (see 40 CFR 262.34/40 CFR 265 Subpart J);
    (b) Permitted Tanks (see 40 CFR 264 Subpart J);
    (c) Less than 90-day Container Storage Area (see 40 CFR 262.34/40 CFR 265 Subpart I);
    (d) Permitted Container Storage Area (see 40 CFR 264 Subpart I); and
    (e) Temporary Units (see CFR 264.553).
(6) Describe the treatment and/or final disposition of the hazardous and nonhazardous contaminated groundwater.

b. Vapor Extraction System

Not Applicable

(1) Indicate on a plan view of the waste management area the anticipated location of the vapor extraction system which would optimize the extraction of hazardous constituents from the vadose zone.
(2) Describe the construction design of the vapor extraction system in detail, including all diagrams and drawings.
(3) Describe the emission control equipment used to comply with air quality regulations.
(4) Provide the anticipated volatile contaminants to be remediated along with information on the expected effectiveness of the vapor extraction system at the waste management unit.
(5) Provide established treatability data for the proposed design.
(6) Specify the hazardous constituents affected by this type of treatment.

c. Interceptor Trenches

Not Applicable

(1) Indicate on a plan view of the waste management area the anticipated location of the interceptor trench.
(2) Provide the construction design.
(3) Describe the procedure for construction.
(4) Describe the liquid removal and collection system.
(5) Describe the surface storage and/or treatment of the contaminated groundwater.
(6) Describe the final disposition of the contaminated groundwater.

d. In-situ Treatment – Chemical Reaction

Not Applicable

(1) Characterize the chemical agents to treat the contaminated groundwater and/or soils in the vadose zone.

(2) Provide laboratory treatability data.
(3) Specify the hazardous constituents affected by this type of treatment.
(4) Specify the reaction by-products produced during the chemical reactions.
(5) Indicate degradation time for each treated hazardous constituent and any resulting chemical reaction by-products.
(6) Describe the potential health risks caused by human exposure to the reaction by-products.
(7) Describe potential damage to wildlife, crops, vegetation and physical structures caused by exposure to reaction by-products.
(8) Describe the persistence and permanence of the potential effects of the reaction by-products.
(9) Describe the method of chemical reactant injection and other important aspects of the system design.

e. In-situ Treatment – Bioreclamation

Not Applicable

(1) Describe the type of bacteria most appropriate for the degradation of the hazardous constituents present in the groundwater and/or soil in the vadose zone.
(2) Describe the nutrients necessary and application frequency to encourage effective bioreclamation.
(3) Provide laboratory data from treatability studies utilizing the contaminated groundwater and describe any potential hazardous by-products.
(4) Indicate the degradation time for each hazardous constituent affected by this treatment.
(5) Describe the method of injecting the bacteria and nutrients and describe the delivery system design.

f. Barrier Walls

See RAP (CP Attachment XI.D), Worksheet 2.0.

(1) Provide laboratory permeability data using the actual contaminated groundwater.

(2) Describe the barrier wall materials.
(3) Summarize construction design and installation procedures.

g. Permeable Treatment Beds

Not Applicable

(1) Provide laboratory data of treatability simulations using actual contaminated groundwater in combination with the material proposed to be used in treatment beds.

(2) Discuss the properties of the treatment material which would make it effective for use at this site.
(3) Indicate which hazardous constituents will be affected by this treatment. Indicate the reactions which will take place and the resulting reactant by-products. Discuss the anticipated lifetime of the permeable treatment beds.
(4) Provide the construction design and installation procedures.

h. Other

Discuss in detail, any other corrective action (soils and groundwater) not included above which is proposed for use at the affected waste management area(s).

See RAP (CP Attachment XI.D), Worksheet 2.0.

<u>Soils</u>

The surface/subsurface soil PCLE Zones at the Site have been addressed as follows:

1) <u>Former HWPW Area</u>: Remedy Standard B closure through consolidating impacted soils within the Area of Contamination (AOC) and implementing Physical Control through an engineered soil cap and asphalt roadway. This response was completed in 2016 as detailed in the Response Action Completion Report (RACR) dated July 2016 (PBW, 2016) and Revised RACR dated June 2017 (PBW, 2017). Pursuant to the post-closure care detailed in the RAP, quarterly inspections and maintenance of the cap and roadway have been implemented;

2) <u>Englewood Intermodal Yard</u>: Remedy Standard B closure by implementing Physical Control using the existing concrete pavement as a cap as detailed in the RACR dated July 2016 (PBW, 2016) and Revised RACR dated June 2017 (PBW, 2017). In 2019, a NAPL Collection System was constructed as part of an interim response action consisting of two shallow collection trenches to address tar-like NAPL seeps identified in the Englewood Intermodal Yard. Details of the construction activities were provided in the Interim RACR dated March 29, 2019 (Golder, 2019b). The NAPL Collection System is being evaluated and additional response action activities will be proposed following additional assessment activities (i.e., test pits conducted in July 2020, potentially impacted underground utilities). As summarized in the Interim NAPL and TPH-NAPL Assessment Report (Appendix 3; Golder, 2020d), there is no Total TPH PCLE zone for soils at the Site, but the NAPL response action objectives are applicable for the NAPL found in the vadose zone at the Englewood Intermodal Yard. Pursuant to the post-closure care detailed in the RAP, quarterly inspections and maintenance of the cap have been implemented;

3) <u>Railroad mainlines and siding tracks</u>: The response action for the operational area between the Former HWPW area and the Englewood Intermodal Yard has followed a Remedy Standard B closure using the existing railroad ballast as a protective barrier as detailed in the RACR dated July 2016 (PBW, 2016) and Revised RACR dated June 2017 (PBW, 2017). Quarterly inspections and maintenance of the ballast area have been implemented;

4) <u>City of Houston ROW along Liberty Road</u>: Remedy Standard B closure through limited excavation of surface soils, consolidating impacted soils within the AOC, and implementing Physical Control through an engineered concrete sidewalk as detailed in the RACR dated July 2016 (PBW, 2016) and Revised RACR dated June 2017 (PBW, 2017). Quarterly inspections and maintenance of the cap and roadway have been implemented.

As detailed in the RACRs (PBW, 2016; PBW, 2017; Golder, 2019b), the surface and subsurface PCLE Zones have been addressed through the various caps constructed or implemented at the Site and are inspected as part of the post-response action completion requirements.

<u>Groundwater</u>
The response action objectives for groundwater are detailed in the RAP (CP Attachment XI.D).

3. <u>Groundwater Monitoring and Corrective Action Program Description</u>

   a. Describe the proposed groundwater monitoring system to be used to monitor corrective action and compliance with the GWPS which includes the following information.

   (1) Changes, if applicable, from the current groundwater monitoring program at the waste management unit that will be required to comply with the corrective action monitoring program described in 30 TAC 335.166. This description should address changes concerning:

      (a) Geological and/or hydrogeological information differences since the submittal of the previous application [must submit a Geologic and Hydrogeologic Report in accordance with Section XI.A.4;

   See Permit Section VI. Geology Report and CP Attachment XI.D – Response Action Plan – Attachment 1A for additional geologic and hydrogeologic information since previous permit application.

      (b) Waste management areas/units;

   The regulated unit SWMU 1 (Waste Management Unit 001) will continue to be

monitored under the Corrective Action Program. For the other SWMUs and AOCs, groundwater monitoring and corrective action program was designed for the facility-wide corrective action as detailed in the RAP (CP Attachment XI.D).

(c) Construction details for monitor wells to evaluate compliance with "Attachment B" well specification requirements;

See RAP, Worksheet 3.1, Attachment 3A – Table 1 (CP Attachment XI.D) for list of alternate point of exposure (APOE) wells, corrective action observation (CAO)wells, and corrective action system (CAS) wells to be incorporated into the Corrective Action Monitoring through the Plume Management Zone (PMZ). Some of the wells listed in the RAP, Worksheet 3.1, Attachment 3A – Table 1 (CP Attachment XI.D) pre-date the well specification requirements or were RFI investigation wells and may not be in compliance with Attachment B of Section XI. Well completion logs for the POE, CAO, and CAS wells are provided in Section VI, Appendix VI.B and CP Attachment XI.D Appendix 2. Any wells constructed after issuance of the Compliance Plan will meet the requirements of the CP Attachment B, unless an alternate well design is approved by the Executive Director.

(d) The number and locations of additional monitor wells [must submit the Monitoring System Plan/Report required by Section XI.D.3.c.(2);

See RAP, Worksheet 3.1, Attachment 3A (CP Attachment XI.D) for the list of monitoring wells

(e) Sample handling, chain of custody, and analytical procedures (also see "Attachment C");

See CP Attachment XI.C (Sampling and Analysis Plan).

(f) Frequency of monitoring;

The APOE, CAO and CAS wells will be monitored semiannually. UPRR will evaluate the sampling frequency annually as part of the Annual Groundwater Monitoring Reporting and recommended changes if needed.

(g) Monitoring parameters;

The parameters listed in Compliance Plan Tables IIIA (Table of Indicator Parameters and the Groundwater Protection Standard) will be monitored. As indicated on CP Table III, selected monitoring wells will also be evaluated for vinyl chloride based on sampling results from the Affected Property Assessment Report (APAR). The source of the vinyl chloride is not from a degradation of a parent chlorinated hydrocarbon, but rather it is likely from a contaminant in a creosote extender used in the late 1970s based on historical records for the Site.

(h) Evaluation of compliance with GWPS (statistical methods);

Evaluation of compliance with GWPS or other ACLs will include assessing the groundwater monitoring data from Alternate Point of Exposure (APOE) wells and Corrective Action Observation (CAO) wells as detailed in the Revised RAP.

Groundwater data will be either directly compared to the GWPS listed on CP Table IIIA or using statistical procedures, as discussed below:

- ***Directly compare the value of each constituent to the respective concentration limit of CP Table IIIA and determine if it is less than, equal to, or greater than the listed value . If the values for all the constituents are less than or equal to the respective concentration limits of CP Table IIIA (or CP Attachment D, RAP, Attachment 2E), then the well shall be considered compliant with the GWPS for the sampling event. If one or more constituent values (after verification resampling) are greater than the respective concentration limit, then the well will be considered non-compliant with the GWPS for the sampling event. However, it is important to note that this method is susceptible to a high rate of false positives.***

- ***Statistical approach using the Confidence Interval Procedure for the mean concentration based on a normal, log-normal, or non-parametric distribution. The 95 percent confidence coefficient of the t-distribution will be used in constructing the confidence interval (Chapter 21 of Statistical Analysis of Groundwater Data at RCRA Facilities-Unified Guidance, U.S. EPA, March 2009), and subsequent updates acceptable to the Executive Director. The confidence interval upper limit (UCL) for each constituent will be compared with the corresponding concentration limit in CP Table IIIA. To be considered in compliance, the confidence interval upper limit for a well in question must not exceed the table concentration limit depending on the objective of the well. A verified (after resampling) confidence interval upper limit above the table concentration limit shall be considered as evidence of statistically significant contamination and the well will be considered non-compliant with the GWPS for the sampling event.***

- ***As part of the evaluation of compliance with the GWPS, a verification resampling procedure will also be employed at the facility whenever an unverified, initial exceedance is detected either through direct comparison or through statistics. The verification resampling will follow a "pass 1 of 2" resamples to verify an initial exceedance of the GWPS.***

- ***Groundwater data will also be evaluated using trend analysis. See RAP, Appendix 7 Statistical Methodology regarding trend analysis (CP Attachment XI.D).***

(i) Other Sampling and Analysis Plan information to be in compliant with "Attachment C";

See CP Attachment XI.C (Sampling and Analysis Plan).

(j) Compliance period as defined in Section XI.E.1.c. of the application;

See Section XI.E.1.c.

(k) Financial assurance; and

See Section XI.E (Cost Estimates for Financial Assurance).

(l) An ACL variance under 30 TAC 335.160(b), if applicable (also see "Attachment A").

See Section XI Attachment A (Alternate Concentration Levels).

(2) The number, depth and location of all monitor wells (Background Wells, Point of Compliance Wells, Corrective Action Observation Wells, Supplemental Wells, piezometers, etc.) and all Recovery Wells and complete CP Table V – Designation of Wells by Function. Also, make revisions as applicable to plans referenced in Section XI.D.3.c.

See the following tables for monitoring wells at the facility to be incorporated into the Corrective Action Monitoring Program:

- ***RAP, Worksheet 3.1, Attachment 3A – Table 1 (CP Attachment XI.D) for the list of PMZ Monitoring Well Network (i.e., APOE, CAO and CAS Wells).***

See Compliance Plan Table V (Designation of Wells by Function) and associated sheets.

(3) The proposed hazardous constituent monitoring list which is based on constituents that were monitored during detection monitoring (if applicable), constituents detected in accordance with 30 TAC 335.164, and degradational constituents identified in CP Table III accordingly to develop the constituent list for the Corrective Action Monitoring Program. CP Table III shall become part of the final Compliance Plan.

See Compliance Plan Table III (Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard).

(4) The proposed indicator parameter monitoring list. From the list of constituents and GWPS identified in CP Table III complete CP Table IIIA – Corrective Action Program Table of Indicator Parameters and the Groundwater Protection Standard, accordingly. CP Table IIIA shall become part of the Compliance Plan to be analyzed at least semiannually as required by 30 TAC 335.166(7).

See Compliance Plan Table IIIA (Table of Indicator Parameters and the Groundwater Protection Standard).

(5) Monitoring frequency.

The parameters listed in Compliance Plan Table IIIA (Table of Indicator Parameters and the Groundwater Protection Standard) will be monitored semiannually.

(6) Provisions for semiannual reporting of groundwater data.

As detailed in the RAP (CP Attachment XI.D), the parameters listed in Compliance Plan Tables III (Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard) or Table IIIA (Table of Indicator Parameters and the Groundwater Protection Standard) will be reported annually in the Annual Groundwater Corrective Action Monitoring Report (details provided in the RAP, Worksheet 6.0 of the CP Attachment XI.D.)

(7) Annual determination of contamination plume rate and direction of migration.

As will be presented in the Annual Groundwater Corrective Action Monitoring Report, contaminant plume rate and direction of migration will be evaluated at a minimum annually and will be discussed in the annual reports for groundwater data.

(8) Compliance period. Calculate the compliance period as required by 30 TAC 335.162 and 335.165(1)(d). Include calculations and complete CP Table VI – Compliance Period for RCRA-Regulated Units which shall become part of the final Compliance Plan.

The only Regulated Unit, Waste Management Unit 001 (SWMU 1), was certified closed by a Registered Texas Professional Engineer in the closure letter dated April 1984. Groundwater monitoring of the SWMU 1 was initiated in August 1984 (quarterly), and entered Corrective Action Monitoring when the initial RCRA Permit was issued in 1994 and renewed in 2005. The SWMU 1 groundwater (in the A-TZ and B-TZ) had achieved Remedy Standard A RAOs and the TCEQ issued a No Further Action letter for corrective action in August 2015. However, the naphthalene concentration in a point-of-compliance (POC) well, MW-11B, was greater than the GWPS in July 2019, but concentrations reduced to below GWPS in January 2020. SWMU 1 will continue to be monitored under the Corrective Action Monitoring Program until compliance monitoring objectives are met.

b. Proposed methods of evaluating the effectiveness of the corrective action in the saturated and vadose zone.

The effectiveness of the corrective action in the saturated zone will ultimately be evaluated by compliance with the TRRP-based GWPS at the alternate POE wells as part of the PMZ. The GWPS and PCLs are listed in Compliance Plan Tables III (Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard) or Table IIIA (Table of Indicator Parameters and the Groundwater Protection Standard).

c. Submit the following plans and reports.

(1) Current Sampling and Analysis Plan - The Sampling and Analysis Plan must include information required by 30 TAC 335.163(4) and 335.163(5) and 40 CFR Subpart 270.30(j). For guidance, please see "Attachment C" to the application.

See CP Attachment XI.C (Sampling and Analysis Plan).

(2) Groundwater Recovery and Monitoring System Plan - At a minimum, the plan must include:

(a) Recovery System Plan - The applicant should propose a recovery system design that will achieve the performance requirement to protect human health and the environment. The plan should provide detailed plans, information and specifications on the recovery system's design and well installation specifications. All new recovery wells must be installed in accordance with applicable specifications outlined in "Attachment B", unless an alternative well design is approved by the agency prior to installation of the well. The Recovery System Plan must include Recovery System Design and Specifications - Certified by a Texas Registered Professional Engineer. The certification must be sealed by a licensed Professional Engineer, with current license, along with the Registered Engineering Firm's name and Registration Number as required by the Texas Engineering Practice Act.;

See CP Attachment XI.D – Response Action Plan (Worksheet 2.0 and Attachment 2B).

(b) Monitoring System Plan - If the applicant is proposing a monitoring well or a monitoring system in the application, the applicable well installation specifications outlined in "Attachment B" of this application should be followed. All new monitoring wells must be installed in accordance with the specifications outlined in "Attachment B", unless an alternative design is approved by the agency prior to installation. If the applicant proposes as part of the monitoring system, any well (existing or proposed) that does not meet or exceed the requirements outlined in "Attachment B", then the proposed alternative design must be described in detail in the Monitoring System Plan and must be submitted with this application. The Monitoring System Plan must include:

i. Monitoring System Design and Specifications - Certified by a qualified engineer and/or geologist which provides detailed plans and specifications on the monitoring system design; and

ii. Well Drilling and Well Casing Specifications - Certified by a qualified engineer and/or geologist which provides details on well casing specification, drilling logs and reports.

See CP Attachment XI.B (Well Design and Construction Specifications). No alternative designs are proposed as part of this application.

(3) Current Geologic and Hydrogeologic Report - Provide a report per Section XI.A.4 of this application discussing the geologic and hydrogeologic conditions of the facility and the specific area affected by the waste management areas. This report should include the most up-to-date information from which the design of the groundwater monitoring system was based.

See CP Attachment XI.D – Response Action Plan – Attachment 1A for up-to-date geologic and hydrogeologic information.

4. Waste Management Units/Areas Monitored Under Corrective Action Programs

a. Delineate and identify the following for each waste management unit/area in the proposed groundwater monitoring and corrective action programs.

(1) Boundary of the waste management unit and, if applicable, the proposed waste management area which includes more than one waste management unit (identify all waste management units which are included in the waste management area). These waste management units/areas subject to corrective action pursuant to 30 TAC 335.166 and 335.167 should be listed in CP Table I – Waste Management Units and Areas Subject to Groundwater Corrective Action and Compliance Monitoring. CP Table I shall become part of the final Compliance Plan.

The corrective action program covers a facility-wide approach with the soil Affected Property or the PCLE zone defining the Area of Contamination and the PCLE Zones defining the areas subject to corrective actions. See CP Attachment A, Sheet 1 of 5, Figures XI.A.2.1, XI.A.2.2, XI.A.2.3, and XI.A.2.4 for maps showing the SWMUs and AOCs under the Corrective Action Program.

(2) The proposed point of compliance (30 TAC 335.161), point of exposure wells, or alternate point of exposure wells.

As part of the facility-wide corrective action program that incorporates the Plume Management Zone (PMZ) for the GWBUs, see Section XI.D.6 and Compliance Plan Table V (Designation of Wells by Function) and associated sheets for the list of APOE wells.

(3) Any proposed monitor wells such as supplemental wells, observation wells, background wells, etc. If appropriate the groundwater monitoring system should have a sufficient number of wells to monitor the downgradient extent of the plume.

See the following tables for monitoring wells at the facility to be incorporated into the Corrective Action Monitoring Program as part of the PMZ (see Section XI.D.6): RAP, Worksheet 3.1, Attachment 3A – Table 1 (CP Attachment XI.D)

(4) Features which may serve as conduits for subsurface contamination.

As discussed in the RAP, Worksheet 2.1 (A-TZ) (see CP Attachment XI.D), an on-site field survey and water-well data search was conducted, indicating no potential water wells were located that could act as a conduit for migration of shallow groundwater into the underlying groundwater formation. However, as discussed in the APAR Addendum (PBW, 2009), two sets of fiber optic lines, Level 3 Communications and Qwest, run along the north side of the rail main lines across the entire length of the Site. Based on conversations with both Level 3 Communications and Qwest representatives, the fiber lines run underneath SWMUs 2, 5, 4, 8, and 10/11. The fiber lines run directly underneath the drainage ditch southwest of the Site and under the southern drainage ditch (SDD) about 3 to 5 feet bgs. The Level 3 Communications line reportedly was directionally bored to a depth of 40 to 45 feet bgs underneath the Original and Recent Process Areas (SWMU Nos. 5 and 4, respectively) and under the aboveground storage tank (AST) Area (SWMU No. 8). The Qwest fiber line reportedly runs 10 to 15 feet northwest and parallel of the main rail line, and is about 5 to 10 feet bgs through the Site. Just east of SWMU No. 8, both fiber lines return to approximately 4 to 6 feet below grade an continue running northeast parallel to the rail main line. The Level 3 Communications line may act as an artificial penetration since the reported depths of the line go through both the A-TZ and into the B-CZ immediately below the primary source areas. Given the depth of the fiber optic line is below the A-TZ and likely below the B-TZ (or carbonate seams within the B-CZ), monitoring well MW-19C will continue to be monitored as a Corrective Action Observation Well to evaluate if the directional bored fiber optic lines are creating a preferential pathway for COCs to migrate to the C-TZ GWBU.

In addition to the fiber lines, three City of Houston utilities were identified in the previous APAR (PBW, 2009) that cut across the Site oriented north-south just west of the Lockwood Street Bridge: 1) 60-in wastewater line, 2) 84-in water line, and 3) a 42-in storm sewer line (PBW, 2009). Through a review of the utility drawing files obtained from the City of Houston Public Works Survey Department, two of the underground utility lines (the 60-in sanitary sewer line and the 84-in water line) appear to be at depths that potentially intersect the uppermost GWBU A-TZ. The estimated depths of the utilities based on the city drawings are shown on the Geologic Cross Sections A-A', B-B', and C-C' (CP Attachment XI.D, RAP, Attachment 1A, Figure 4C-1 and 4C-2). The estimated base depth of the 60-in wastewater line and the 84-in water line where Cross Section B-B' crosses the utility lines is approximately 23 feet bgs (approximate elevation of 26 feet HVD). It is highly unlikely that A-TZ groundwater is seeping into the 84-in water line, given the line is under pressure (flow is south to north), constructed with welded steel pipe, and is relatively new (constructed in 2000). Sampling of the 60-in sanitary sewer line was conducted in 2010. Of the three samples collected in 2010, the only sample with concentrations greater than PCLs was the

upgradient sample SSW1 that had a detection of bis(2-ethylhexl)phthalate (0.0092 mg/L) above the $^{GW}GW_{ing}$ PCL of 0.006 mg/L; however, bis(2-ethylhexyl)phthalate is a common laboratory contaminant (as cited in 30 TAC§350.71(k)(2)(B)). The sanitary sewer sample analytical results suggest that there is not a significant mass loading of COCs from groundwater into the sanitary sewer.

(5) Corrective action system.

See RAP, Worksheet 2.0 (CP Attachment XI.D). UPRR will install additional recovery wells and continue DNAPL recovery activities from the wells where DNAPL has been detected and recovered (see RAP, Worksheet 3.1, Attachment 3A – Table 1 (CP Attachment XI.D) for the list of existing and proposed DNAPL recovery wells (i.e., Corrective Action System Wells)).

b. For each waste management unit/area in the proposed groundwater monitoring system, submit the locations of individual waste management unit/area monitor wells (existing or proposed) and any soil borings (plugged and unplugged) specifically drilled for assessment of contamination. These individual monitor wells shall be identified by respective well number on a plan view drawing and only the background, point of compliance, point of exposure wells and/or alternate point of exposure wells should be indicated in CP Table V – Designation of Wells by Function. The plan view map depicting the location of individual monitoring wells for corrective action monitoring should be labeled as "CP Attachment A, sheet xx of xx" in the text box. The title box should also include reference to the facility name, Permit/Compliance Plan Number, Solid Waste Registration Number, Unit Description or name with Notice of Registration (NoR) Unit No. 0000. The "CP Attachment A" map(s) and CP Table V shall also become part of the final Permit/Compliance Plan.

The following maps show the monitoring wells proposed as part of the Corrective Action Monitoring Program for the facility-wide approach using PMZs:

- ***CP Attachment A, Sheet 4 of 7 – PMZ Boundary Map, A-TZ***
- ***CP Attachment A, Sheet 5 of 7 – PMZ Boundary Map, B-CZ/B-TZ***
- ***CP Attachment A, Sheet 6 of 7 – PMZ Boundary Map, C-TZ***

See Compliance Plan Table V (Designation of Wells by Function) and associated sheets.

5. Waste Management Units/Areas Addressed Under Other Corrective Action Programs -Facility Operations Area (FOA), specific to the requirements of 30 TAC 350.131 - 350.135. The Permittee should also complete Sections XI.D.4. for other units not addressed by the FOA that may require corrective action outside the FOA boundary. For other units not addressed by the FOA, either within the FOA or outside the FOA which may require compliance monitoring, the Permittee should complete Section XI.C. of this application accordingly.

Not Applicable

a. Provide an approved version of the FOA Qualifying Criteria Checklist and evidence that Steps 1 through 3 of the FOA pre-approval process has been approved by the Commission.
b. Provide a discussion on exceptions to the TRRP rule requested.
c. Provide a summary of the SWMUs/AOCs that will be addressed within the FOA boundary and a discussion of the multiple sources of COCs present and how FOA will better address these sources.
d. Provide maps of appropriate scale depicting the following (maps may be combined where

appropriate):

(1) The number, location and type of monitoring points in each stratigraphic unit to be monitored individual monitoring wells should be identified by respective well number on a plan view drawing, to include the background, Point of Compliance (POC), Point of Exposure (POE), FOA Boundary of Compliance wells, FOA piezometers or supplemental wells, Corrective Action Observation ((CAO), Corrective Action System (CAS) wells that are applicable for FOA monitoring program should be labeled as "CP Attachment A, sheet no xx of xx" in the title box. The title box should also include reference to the facility name, Permit/Compliance Plan Number (00000), TCEQ Solid Waste Registration Number and Unit Description or Name. The "CP Attachment A" map(s) shall become part of the final Permit/Compliance Plan.

(2) HWMUs/SWMUs/AOCs addressed
(3) Surrounding land use
(4) FOA lateral boundaries
(5) Potential source areas
(6) Potentiometric surface of all relevant transmissive units
(7) Surrounding water wells
(8) Extent of known contamination in each transmissive unit
(9) Areas of potential ecological impact
(10) Known occurrences of NAPL or DNAPL in each transmissive units
(11) FOA access control components

e. Provide cross-sections in accordance with Section XI.A.4. depicting the following (maps may be combined where appropriate);

(1) The vertical boundaries of the FOA;
(2) The vertical extent of contamination;
(3) Groundwater level elevations for each transmissive unit.

f. Provide tabulated information for;

(1) Results of Appendix IX GW sampling.
(2) Proposed PCLs for each hazardous constituent and principal degradational constituent for each monitoring point with supporting documentation (including a discussion of exposure pathways) should be listed in CP Table III – CORRECTIVE ACTION PROGRAM Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard. CP Table III shall become part of the final Compliance Plan.
(3) The proposed indicator parameter monitoring list. From the list of constituents and GWPS identified in CP Table IIIA. CP Table IIIA shall become part of the Compliance Plan to be analyzed at least semiannually as required by 30 TAC 335.166(7).
(4) Only the background, POC, POE, FOA Boundary of Compliance wells should be listed in CP Table V which shall become part of the final Permit/Compliance Plan.

g. Provide a discussion of the types of corrective action that will be employed to address contaminated media.

h. Provide detailed descriptions of GW recovery and other remedial technologies such as vapor extraction, interceptor trenches, hydraulic containment, barrier walls, etc., including radius of influence, estimated optimum recovery rates, location of collection, storage or disposal facilities.

i. Provide a detailed description of the ground water monitoring system including placement of monitoring wells, hydrogeologic characteristics of monitored units and well completion details.

j. Provide a Sampling and Analysis plan for the proposed FOA that includes development of

COCs to be monitored, sampling methodology, sample handling procedures, sampling frequency and statistical procedures for evaluating analytical results (Appendix C).

k. Propose a methodology for evaluating the effectiveness of remedial measures and potential remedial system enhancements.

l. Propose a reporting schedule to provide updated information on the installation and operation of remedial and monitoring systems.

m. Provide Financial Assurance in accordance with Section XI.E.

n. Provide draft language intended to comply with the deed notification requirements of 30 TAC 350.111 and 350.135(a)(11).

o. Provide a summary of the approved workers protection plan.

p. Provide a discussion of areas of ecological impact, if any, and development of associated Protective Concentration Limits (PCLs).

q. Provide a discussion of how NAPL occurrences, if any, will be addressed inside and outside the FOA.

r. Provide a schedule of implementation for items not completed at the time of application See also Section XI.D.8.

6. Waste Management Units/Areas Monitored Under Corrective Action Programs - Plume Management Zone (PMZ)

a. Please provide a summary of the HWMUs and SWMUs/AOCs that will be addressed within the PMZ boundary.

See RAP in CP Attachment XI.D, and see response to XI.6.b below.

b. Please provide a discussion of the multiple sources of COCs present and how PMZ will better address these sources.

See RAP in CP Attachment XI.D. The former HWPW facility was used for creosoting operations from 1899 to 1984 with numerous operations at the Site over that time period. Historical material and waste handling practices have resulted in releases to soil and groundwater. These releases have resulted in commingled creosote-derived COC PCLE zones and creosote non-aqueous phase liquid (NAPL) that are not attributable to specific waste management units or areas of concern. Former fueling aboveground storage tanks (ASTs) and wastewater lagoons previously occupied the present-day Englewood Intermodal Yard (south of the rail) portion of the Site (see Figure XI.A-2.4).

In order to effectively manage the corrective action process at the Site, a comprehensive site-wide approach to corrective action is proposed. The cumulative PMZ will include all or portions of the SWMUs and AOCs, except for AOC 4 and 6. Portions of AOC 4 and 6 were closed as detailed in the Response Action Completion Report (PBW, 2017)). No groundwater impacts were noted for the shallow groundwater near AOC 6.

c. Please provide maps of appropriate scale depicting the following (maps may be combined where appropriate);
(1) HWMUs/SWMUs/AOCs addressed

See Figures XI.A.2, XI.A.2.1, XI.A.2.2, XI.A.2.3, and XI.A.2.4 – Locations of Former Waste Management Units and SWMUs/AOCs Under Corrective Action..

(2) surrounding land use

See CP Attachment A, Sheet 1 of 7 - Facility Site Map.

(3) PMZ lateral boundaries

See the following maps for PMZ lateral boundaries proposed as part of the Corrective Action Monitoring Program for the facility-wide approach:

- ***CP Attachment A, Sheet 4 of 7 – PMZ Boundary Map, A-TZ***
- ***CP Attachment A, Sheet 5 of 7 – PMZ Boundary Map, B-CZ/B-TZ***
- ***CP Attachment A, Sheet 6 of 7 – PMZ Boundary Map, C-TZ***

UPRR proposes to monitor groundwater in wells within and around the Off-Site PMZ (City of Houston ROW) as part of the corrective action groundwater monitoring program. Data collected from the monitoring wells off-Site will be used to evaluate response actions to address the groundwater PCLE Zone.

(4) potential source areas

See RAP in CP Attachment XI.D, Attachment 1A (Figure 1A) and Figure XI.A.2.

(5) Potentiometric surface of all relevant transmissive units

See RAP in CP Attachment XI.D, Appendix 3C (Interim Groundwater Monitoring Report (2019-2020)).

(6) Surrounding water wells

See Permit Section VI. Geology Report – Figure VI.H

(7) extent of known contamination in each transmissive unit

See RAP in CP Attachment XI.D, Appendix 3C (Interim Groundwater Monitoring Report (2019-2020))

(8) number, location and type of monitoring points in each stratigraphic unit to be monitored

See RAP in CP Attachment XI.D, Worksheet 3.0 and Attachment 3A, Tables 1.

(9) Areas of potential ecological impact

None, no potential ecological impacts as discussed in the APAR (PBW, 2009).

(10) known occurrences of LNAPL or DNAPL in each transmissive unit

See RAP in CP Attachment XI.D, Appendix 3 (Interim NAPL and TPH-NAPL Report and DNAPL Recovery Activities Quarterly Report – 2nd Quarter 2020)

d. Please provide sufficient cross-sections depicting the following (maps may be combined where appropriate);
   (1) The vertical boundaries of the PMZ;
   (2) The vertical extent of contamination;
   (3) potentiometric surfaces for each transmissive unit.

See RAP in CP Attachment XI.D, Attachment 1A (Figures 4C-1 through 4C-6)), and Permit Section VI. Geology Report – Figures VI.E.1 through VI.E.5.

e. Please provide tabulated information for;
(1) history of all relevant units or AOCs;

See CP Table XI.A.1. – Facility History for Waste Management Units.

(2) summary of hydrogeologic data for each affected transmissive unit;

See RAP in CP Attachment XI.D, Attachment 1A and Permit Section VI. Geology Report

(3) results of Appendix IX GW sampling;

Appendix IX Groundwater sampling results are not available. The list of potential contaminants of concern was established in the RCRA Facility Investigation (RFI) Work Plan dated October 1994. The list of chemicals of concern (COCs) for the Site were developed by reviewing current and historical process operations, a list of standard chemicals associated with creosote operations, and groundwater monitoring results.

(4) proposed PCLs for each constituent for each monitoring point (Point of Exposure wells, alternate point of exposure wells, etc) with supporting documentation (including a discussion of exposure pathways). This should also include the designation/establishment of sufficient number of Attenuation Monitoring Points (AMPs) beginning at an appropriate hydraulically upgradient location within the groundwater protective concentration level exceedence (PLCE) zone and continuing down the approximate central flow path of the constituent of concern (COC) in the downgradient extent of the Plume Management Zone(s) in accordance with 30 TAC 350.33(f)(4)(D).

See Compliance Plan Table III (Table of Detection Hazardous and Solid Waste Constituents and the Groundwater Protection Standard) for list of PCLs for the alternate POE wells. See Compliance Plan Table IIIA (Corrective Action Program Table of Indicator Parameters and Groundwater Protection Standard) and associated footnotes. Attenuation Monitoring Points (AMPs) will be established after readily recoverable DNAPL removal is completed (as requested in the 4th Technical Notice of Deficiency Letter (TNOD) from TCEQ dated April 11, 2019).

(5) Establish/Calculate Attenuation Action Levels (AALs) (critical PCLs) for each attenuation monitoring point in accordance with 30 TAC 350.33(f)(4)(D)(ii). The established AALs (critical PCLs) for each AMP well should be graphically presented in table format on the plan view map depicting the location of individual monitoring wells (including AMP wells) for corrective action monitoring labeled "CP Attachment A, Sheet xx of xx", referenced in XI.D.4.b.

Attenuation Monitoring Points (AMPs) will be established after readily recoverable DNAPL removal is completed (as requested in the 4th TNOD from TCEQ).

f. Please provide a discussion of the types of corrective action that will be employed to address contaminated media.

See RAP in CP Attachment XI.D, Executive Summary:

The objective of this RAP is to develop response objectives and actions in accordance with TRRP to address the PCLE Zones at the Site. The primary response objective is to address potential exposure pathways to the PCLE Zones in surface soil, subsurface soil, and groundwater. Complete exposure pathways of onsite soil have been addressed through previous remedial actions. No complete exposure pathways for the off-site receptors exist (off-site residents) for groundwater and soil (except for the City of Houston ROW that was addressed with the concrete cap discussed below), and therefore there are no unacceptable risks to the off-site properties.

Below are the following response actions that are either proposed or have been completed at the Site to achieve the response objective:

- ***Surface/subsurface soil – The surface/subsurface soil PCLE Zones at the Site have been addressed as follows:***
    - ***<u>Former HWPW Area</u>: Remedy Standard B closure through consolidating impacted soils within the Area of Contamination (AOC) and implementing Physical Control through an engineered soil cap and asphalt roadway. This response was completed in 2016 as detailed in the Response Action Completion Report (RACR) dated July 2016 (PBW, 2016) and Revised RACR dated June 2017 (PBW, 2017). Pursuant to the post-closure care detailed in the RAP, quarterly inspections and maintenance of the cap and roadway have been implemented;***
    - ***<u>Englewood Intermodal Yard</u>: Remedy Standard B closure by implementing Physical Control using the existing concrete pavement as a cap as detailed in the RACR dated July 2016 (PBW, 2016) and Revised RACR dated June 2017 (PBW, 2017). In 2019, a NAPL Collection System was constructed as part of an interim response action consisting of two shallow collection trenches to address tar-like NAPL seeps identified in the Englewood Intermodal Yard. Details of the construction activities were provided in the Interim RACR dated March 29, 2019 (Golder, 2019b). The NAPL Collection System is being evaluated and additional response action activities will be proposed following additional assessment activities (i.e., test pits conducted in July 2020, potentially impacted underground utilities). As summarized in the Interim NAPL and TPH-NAPL Assessment Report (Appendix 3; Golder, 2020d), there is no Total TPH PCLE zone for soils at the Site, but the NAPL response action objectives are applicable for the NAPL found in the vadose zone at the Englewood Intermodal Yard. Pursuant to the post-closure care detailed in the RAP, quarterly inspections and maintenance of the cap have been implemented;***
    - ***<u>Railroad mainlines and siding tracks</u>: The response action for the operational area between the Former HWPW area and the Englewood Intermodal Yard has followed a Remedy Standard B closure using the existing railroad ballast as a protective barrier as detailed in the RACR dated July 2016 (PBW, 2016) and Revised RACR dated June 2017 (PBW, 2017). Quarterly inspections and maintenance of the ballast area have been implemented;***
    - ***<u>City of Houston ROW along Liberty Road</u>: Remedy Standard B closure through limited excavation of surface soils, consolidating impacted soils within the AOC, and implementing Physical Control through an engineered concrete sidewalk as detailed in the RACR dated July 2016 (PBW, 2016) and Revised RACR dated June 2017 (PBW, 2017). Quarterly inspections and maintenance of the cap and roadway have been implemented.***

As detailed in the RACRs (PBW, 2016; PBW, 2017; Golder, 2019b), the surface and subsurface PCLE Zones have been addressed through the various caps constructed or implemented at the Site and are inspected as part of the post-response action completion requirements.

- ***Groundwater – The response objectives for the on-site groundwater PCLE Zone and portion of the off-site groundwater PCLE Zone within the City of Houston right-of-way (COH ROW) will be addressed under Remedy Standard B (physical control) and modified Remedy Standard B PMZ through control measures and institutional controls.***

  To address the PCLE Zone in groundwater on-site and within a portion of the COH ROW will be through Remedy Standard B control using the following response actions:

  - ***A modified groundwater response objective through a plume management zone (PMZ);***
  - ***Installation of a physical control through a slurry wall.***

  The proposed cumulative PMZ (for all three GWBUs) consists of the following:

  1) ***On-Site PMZ – The On-Site PMZ will include the cumulative groundwater PCLE Zone within the UPRR-owned property consisting of the center to the east portion of the Site and western portion of the Site (includes the On-Site PMZ (West) area for the B-CZ/B-TZ GWBU). The proposed PMZ includes the groundwater PCLE Zones for the creosote-related COCs and arsenic.***
  2) ***Off-Site PMZ (COH ROW) - The off-site PMZ includes the cumulative groundwater PCLE Zone that extends off-site to the north, east, and west of the Site within the City of Houston ROW.***

  A physical control consisting of a slurry wall barrier is proposed to be installed at the Site. The slurry wall will be constructed to impede groundwater flow from portions of the Site and establish a subsurface barrier separating the on-site contamination from the off-site areas to the north and east. This will reduce the risk of potential future migration of groundwater COC concentrations above the critical PCLs from the Site, and similarly reduce the potential for migration of mobile NAPL at the Site. However, creosote NAPL is present off-site beyond where the proposed slurry wall is to be constructed and this NAPL represents potential source mass for the off-site groundwater PCLE Zones.

  For the off-site groundwater PCLE Zones that extend off-site outside of the proposed PMZs, the response action objective is groundwater decontamination as defined in TRRP to the applicable critical PCLs under Remedy Standard B (Remedy Standard A equivalent). Pursuant to TRRP-32 guidance for NAPL Management, the off-site groundwater PCLE Zone where NAPL is in contact with B-CZ/B-TZ groundwater the NAPL response endpoint is to recover soluble NAPL fraction sufficient to eliminate source contributions to the groundwater PCLE zone. Two major aspects, which are functions of the generally low mobility physical properties of creosote and its components, and the significant and unfavorable hydrogeologic complexity of the Site, greatly hinder recoverability of the soluble DNAPL fraction from the subsurface. Therefore, the response actions related to this objective will be conducted in a phased approach as described below.

  First, the construction of the slurry wall on-site will impede groundwater flow from areas where NAPL has been observed in monitoring wells on Site, thereby separating the on-site contamination from the off-site areas. Next, the mobile NAPL within the saturated soil matrix

in certain areas of off-site hydrostratigraphic units will be addressed. The proposed remedial action objectives (functional objectives) for this NAPL as part of the effort to meet the absolute objective of decontamination for the off-site groundwater PCLE Zone will be to:

- ***Reduce the apparent thickness of in-well DNAPL in existing and proposed recovery wells over a reasonable time frame; and***
- ***Reduce the occurrence of DNAPL (i.e. the number of wells exhibiting measurable DNAPL) in those wells over a reasonable time frame.***

UPRR proposes to implement multi-phase extraction (MPE) events to recover DNAPL from existing and proposed wells as the response action to address the functional objectives listed above. Additional Corrective Action System Wells in the A-TZ, B-CZ/B-TZ, and C-TZ will be installed off-site to increase the potential for DNAPL recovery with the absolute objective of recovering the soluble NAPL fraction sufficient to eliminate source contributions to groundwater PCLE zone.

Given the inherent complex and unfavorable site geologic conditions and generally limited mobility characteristics of creosote DNAPL, it is anticipated that achieving the response objective of reducing COCs in groundwater to the applicable critical PCLs off-site within a reasonable timeframe will be challenging based on the physical characteristics and complex geology at the Site. In fact, it has been shown at numerous creosote DNAPL sites that complete removal of creosote DNAPL is not technically practicable. However, regular physical NAPL removal through MPE events will aid in advancing toward the response objective. Once the MPE achieves the functional objectives, passive remedial options such as monitored natural attenuation (MNA) will be evaluated for addressing the residual off-site groundwater PCLE Zones.

In terms of unprotective conditions for receptors during the remedial period, there are no potential or unprotected exposures to impacted groundwater for the off-site residents since none of the properties in the area use groundwater for drinking or any other purposes; and the properties are provided drinking water by the City of Houston. No groundwater drinking wells have been identified in the area and anticipated future use of the shallow groundwater as a resource is unlikely. In addition, soil gas assessments in conjunction with groundwater monitoring have indicated through multiple lines of evidence that the vapor intrusion pathway is not complete for the off-site properties.

g. Please provide detailed descriptions of GW recovery and other remedial technologies such as vapor extraction, interceptor trenches, hydraulic containment, barrier walls, etc., including radius of influence, estimated optimum recovery rates, location of collection, storage or disposal facilities.

As discussed in the RAP, Worksheet 2.0 (CP Attachment XI.D), UPRR proposes the following:

To address the PCLE Zone in groundwater on-site and within a portion of the COH ROW will be through Remedy Standard B control using the following response actions:

- ***A modified groundwater response objective through a plume management zone (PMZ);***
- ***Installation of a physical control through a slurry wall.***

The proposed cumulative PMZ (for all three GWBUs) consists of the following:

1) On-Site PMZ – The On-Site PMZ will include the cumulative groundwater PCLE Zone within the UPRR-owned property consisting of the center to the east portion of the Site and western portion of the Site (includes the On-Site PMZ (West) area for the B-CZ/B-TZ GWBU). The proposed PMZ includes the groundwater PCLE Zones for the creosote-related COCs and arsenic.

2) Off-Site PMZ (COH ROW) - The off-site PMZ includes the cumulative groundwater PCLE Zone that extends off-site to the north, east, and west of the Site within the City of Houston ROW.

A physical control consisting of a slurry wall barrier is proposed to be installed at the Site. The slurry wall will be constructed to impede groundwater flow from portions of the Site and establish a subsurface barrier separating the on-site contamination from the off-site areas to the north and east. This will reduce the risk of potential future migration of groundwater COC concentrations above the critical PCLs from the Site, and similarly reduce the potential for migration of mobile NAPL at the Site. However, creosote NAPL is present off-site beyond where the proposed slurry wall is to be constructed and this NAPL represents potential source mass for the off-site groundwater PCLE Zones.

For the off-site groundwater PCLE Zones that extend off-site outside of the proposed PMZs, the response action objective is groundwater decontamination as defined in TRRP to the applicable critical PCLs under Remedy Standard B (Remedy Standard A equivalent). Pursuant to TRRP-32 guidance for NAPL Management, the off-site groundwater PCLE Zone where NAPL is in contact with B-CZ/B-TZ groundwater the NAPL response endpoint is to recover soluble NAPL fraction sufficient to eliminate source contributions to the groundwater PCLE zone. Two major aspects, which are functions of the generally low mobility physical properties of creosote and its components, and the significant and unfavorable hydrogeologic complexity of the Site, greatly hinder recoverability of the soluble DNAPL fraction from the subsurface. Therefore, the response actions related to this objective will be conducted in a phased approach as described below.

First, the construction of the slurry wall on-site will impede groundwater flow from areas where NAPL has been observed in monitoring wells on Site, thereby separating the on-site contamination from the off-site areas. Next, the mobile NAPL within the saturated soil matrix in certain areas of off-site hydrostratigraphic units will be addressed. The proposed remedial action objectives (functional objectives) for this NAPL as part of the effort to meet the absolute objective of decontamination for the off-site groundwater PCLE Zone will be to:

- ***Reduce the apparent thickness of in-well DNAPL in existing and proposed recovery wells over a reasonable time frame; and***
- ***Reduce the occurrence of DNAPL (i.e. the number of wells exhibiting measurable DNAPL) in those wells over a reasonable time frame.***

UPRR proposes to implement multi-phase extraction (MPE) events to recover DNAPL from existing and proposed wells as the response action to address the functional objectives listed above. Additional Corrective Action System Wells in the A-TZ, B-CZ/B-TZ, and C-TZ will be installed off-site to increase the potential for DNAPL recovery with the absolute objective of recovering the soluble NAPL fraction sufficient to eliminate source contributions to groundwater PCLE zone.

Given the inherent complex and unfavorable site geologic conditions and generally limited mobility characteristics of creosote DNAPL, it is anticipated that achieving the response objective of reducing COCs in groundwater to the applicable critical PCLs off-site within a

reasonable timeframe will be challenging based on the physical characteristics and complex geology at the Site. In fact, it has been shown at numerous creosote DNAPL sites that complete removal of creosote DNAPL is not technically practicable. However, regular physical NAPL removal through MPE events will aid in advancing toward the response objective. Once the MPE achieves the functional objectives, passive remedial options such as monitored natural attenuation (MNA) will be evaluated for addressing the residual off-site groundwater PCLE Zones.

In terms of unprotective conditions for receptors during the remedial period, there are no potential or unprotected exposures to impacted groundwater for the off-site residents since none of the properties in the area use groundwater for drinking or any other purposes; and the properties are provided drinking water by the City of Houston. No groundwater drinking wells have been identified in the area and anticipated future use of the shallow groundwater as a resource is unlikely. In addition, soil gas assessments in conjunction with groundwater monitoring have indicated through multiple lines of evidence that the vapor intrusion pathway is not complete for the off-site properties.

Details are provided in the RAP (CP Attachment XI.D).

h. Please provide a detailed description of the groundwater monitoring system including placement of monitoring wells, hydrogeologic characteristics of monitored units and well completion details.

See RAP in CP Attachment XI.D, Worksheet 2.1 and Attachment 3A – Table 1.

i. Please provide a Sampling and Analysis plan for the proposed PMZ that includes development of COCs to be monitored, sampling methodology, sample handling procedures, sampling frequency and statistical procedures for evaluating analytical results.

See the Sampling and Analysis Plan (SAP) in CP Attachment XI.C, RAP in CP Attachment XI.D, Worksheet 3.1 and Attachment 3A, and Appendix 7 (Statistical Methodology).

j. Please propose a methodology for evaluating the effectiveness of remedial measures and potential remedial system enhancements.

See RAP in CP Attachment XI.D, Worksheet 3.0 for additional details:

<u>Surface/Subsurface Soils</u>

See Response Action Completion Reports (RACR) (PBW, 2016; PBW, 2017; Golder, 2019).

<u>Cut-Off Slurry Wall</u>

Performance monitoring for the slurry wall will focus on evaluating if the containment system meets the design objective of reducing the risk of potential future migration of the on-site groundwater PCLE Zone and NAPL from the Site. The primary performance measure is to evaluate if the slurry wall has established cutoff of outflow from the source area. Therefore, the proposed performance monitoring will measure the following:

- ***Groundwater quality in the three transmissive zones to evaluate groundwater COC concentrations inside and outside of the slurry wall area, and***

- ***Hydraulic head in monitoring wells to evaluate water levels or piezometric readings inside and/or outside the barrier.***

It is anticipated that the groundwater COC concentrations in the wells downgradient of the slurry wall will eventually show decreasing concentrations over time. However, many of the areas, especially in the B-CZ/B-TZ and C-TZ GWMUs, creosote DNAPL is present in areas off-site outside of the proposed containment. Therefore, decreasing COC concentrations in those areas will be more contingent on NAPL removal in those areas (further detailed in the RAP (CP Attachment XI.D)). Groundwater monitoring results will be included in the RAER.

DNAPL

The performance measures for addressing the NAPL Triggers at the Site are dependent on the areas where the NAPL site conditions are present, as detailed in the Risk-Based NAPL Management Assessment (Appendix 3 of RAP in CP Attachment XI.D). The performance measures for each area are described below.

Englewood IM Yard

As discussed in Worksheet 2.0 of the RAP in CP Attachment XI.D, UPRR has implemented the following two responses in the Englewood IM Yard to address the migrating NAPL Trigger NAPL Response Endpoints (based on NAPL in vadose zone ≤ 15 ft below ground surface/ NAPL discharge to ground surface) from the tar-like NAPL that has been observed in the top 5 feet bgs with NAPL surface seeps noted in the Englewood IM Yard:

1. ***Installation of the NAPL Collection System as an interim response (detailed in the RACR dated March 2019 (Golder, 2019b)); and***
2. ***Conducting weekly site inspections of the tar-like NAPL seep areas and recovering any NAPL that has seeped to the ground surface.***

The primary performance measure for the NAPL Collection System in the Englewood IM Yard is the reduction of NAPL surface seeps within the area of the collection trench. To date, the system is operating as intended, however, a limited amount of NAPL is flowing into the collection trench. For the areas where NAPL seeps have been observed outside of the NAPL Collection System addressed through the weekly inspections, UPRR recently (July 2020) conducted test pits to conduct limited NAPL removal activities to eliminate NAPL discharge per achieve the NAPL response endpoint (TRRP-32 Guidance). During test pit construction, NAPL mass was removed from the area of where the NAPL seeps have been observed, and the test pits were backfilled, and the concrete pavement replaced. The plan is to monitor the test pit areas to assess if the NAPL seep areas return. Details of the additional investigation activities will be presented in the Englewood IM Yard Test Pit Evaluation Report.

HWPW/Englewood IM Yard Area

For the on-site areas where NAPL has been documented within the UPRR property boundary or within the City of Houston ROW, the resulting impacted GWBUs will be included within the proposed cumulative On-Site PMZ and off-site COH ROW PMZ as detailed in Worksheet 2.1 of the RAP (CP Attachment XI.D). Therefore, the TCEQ TRRP-32 Guidance provides two NAPL response endpoints under this site condition within the PMZ:

1. ***Recovery Endpoint – NAPL recovery sufficient to arrest NAPL migration; and***

2. ***Control Endpoint – NAPL zone migration arrested with physical control or natural methods.***

UPRR is proposing to address both NAPL Response Endpoints through DNAPL recovery from recovery wells on Site and installing a physical control (i.e. slurry wall) along the north and east sides of the Site as a Control Endpoint. The proposed response actions are aimed at establishing a subsurface barrier separating the on-site contamination from the off-site areas to the north and east and removing readily recoverable DNAPL on- and off-Site by MPE and total fluid pumps (On-Site PMZ (West)). Performance metrics to evaluate if reasonable progress is being made include the following:

- ***Reduction in the occurrence of DNAPL (i.e. the number of wells exhibiting measurable DNAPL) in existing wells as well as proposed recovery wells; and,***
- ***Reduction in the apparent thickness of in-well DNAPL within those wells.***
- ***Reduction in COC concentrations (source removal)***

Measurements of depth-to-water, depth-to-product, and total well depth over time will be conducted using an oil-water interface probe. The volume of recovered DNAPL will be recorded during each recovery event and is expected to become asymptotic over time as readily recoverable NAPL is depleted. Data including recovered volumes and associated graphs will be provided in quarterly reports as required by TCEQ.

Off-Site Groundwater PCLE Zone

With NAPL observed in contact with groundwater off-Site in the Class 3 B-CZ and Class 2 B-TZ GWBU outside the PMZs, the current NAPL response endpoint is Recovery Only – Recover soluble NAPL fraction sufficient to eliminate source contributions to groundwater PCLE zone. UPRR has developed a response action to more aggressively recover NAPL by installing additional recovery wells and using MPE in the off-site areas within the groundwater PCLE Zones, as detailed in Worksheet 2.0. Performance metrics to evaluate if reasonable progress is being made include the following:

- ***Reduction in the occurrence of DNAPL (i.e. the number of wells exhibiting measurable DNAPL) in existing wells as well as proposed recovery wells; and,***
- ***Reduction in the apparent thickness of in-well DNAPL within those wells.***

Measurements of depth-to-water, depth-to-product, and total well depth over time will be conducted using an oil-water interface probe. The volume of recovered DNAPL will be recorded during each recovery event and is expected to become asymptotic over time as readily recoverable NAPL is depleted. Data including recovered volumes and associated graphs will be provided in quarterly reports as required by TCEQ.

Groundwater

On-Site PMZ and Off-Site COH ROW PMZ

Groundwater monitoring will be performed in conjunction with the PMZ (Remedy Standard B) response action proposed for the groundwater PCLE zones on-site and off-site in the COH ROW. The groundwater data will be evaluated to assess if COC concentrations in the PCLE Zones show stable or decreasing concentrations at the downgradient boundaries of the On-Site and Off-Site COH ROW PMZs by comparing concentrations of these COCs to the cPCLs at each APOE well as specified in Worksheet 2.1 of the RAP (CP Attachment XI.D). However, as previously discussed, the

groundwater PCLE Zone currently extends beyond the proposed off-Site COH ROW PMZ boundaries and is anticipated to remain in this area until the DNAPL is fully recovered from the GWBUs outside the PMZs. It is anticipated that the groundwater COC concentrations in the wells downgradient of the slurry wall within the Off-Site COH ROW PMZ area will eventually show decreasing concentrations over time. However, in many of the areas, especially in the B-CZ/B-TZ and C-TZ GWMUs, creosote DNAPL is present in areas off-site outside of the proposed containment. Therefore, decreasing COC concentrations in those areas will be more contingent on NAPL removal in those areas. Groundwater monitoring results will be included in the RAER.

<u>Off-Site (not within a PMZ)</u>

The proposed slurry cutoff wall is designed to impede groundwater flow from portions of the Site and reduce the risk of potential future migration of groundwater COC concentrations above the critical PCLs from the Site, and similarly reduce the potential for migration of mobile NAPL from the Site. These response actions are expected to enhance natural attenuation of dissolved phase COCs off-site. However, as detailed in Worksheet 1.0, there are significant challenges to achieve the NAPL response objective of groundwater restoration with the presence of DNAPL within the GWBUs. As a result, unless both the mobile and residual DNAPL can be completely removed from the soil and GWBUs, groundwater response actions will not be able to attain the NAPL response objective of groundwater restoration within the PCLE Zones in a reasonable time frame. Therefore, the performance measures for the off-site groundwater PCLE Zones will be closely tied to the functional objective of recovering creosote DNAPL to reduce the extent of DNAPL and related groundwater PCLE Zone off-site.

For both on-site and off-site areas, routine groundwater monitoring, combined with graphical and statistical analysis, will be used to evaluate the effectiveness of the proposed response actions to address the COC concentrations in groundwater.

k. Please propose a reporting schedule to provide updated information on the installation and operation of remedial and monitoring systems.

See RAP in CP Attachment XI.D, Worksheet 6.0.

l. Please provide a thorough detailed description of an estimate of all costs that will be incurred by implementing, operating, and maintaining the corrective action and monitoring systems addressed by the compliance plan.

See Section XI.E (Cost Estimates for Financial Assurance).

m. Please provide draft language intended to comply with the deed notification requirements of 350.111, and schedule to verify compliance with institutional control requirements in accordance with 30 TAC 350.31(g) which provides notice of the existence and location of the PMZ and which prevents exposure to groundwater from this zone until such a time as constituents of concern may be reduced to below the GWPS.

See RAP in CP Attachment XI.D Appendix 4.

n. Schedule for notification requirements if an unexpected event occurs, or a condition is detected, during post-response action care period which indicates that additional response actions will be required at an affected property pursuant to 30 TAC 350.33(k).

See RAP in CP Attachment XI.D, Worksheet 6.0.

o. Please provide a summary of the approved soil response action plan.

Details of the soil response are provided in the RAP (CP Attachment XI.D) and Response Action Completion Reports (RACRs) (PBW, 2016; PBW, 2017; Golder, 2019b.

p. Please provide a discussion of areas of ecological impact, if any, and development of associated PCLs.

As discussed in the APAR Addendum (dated July 2009 (PBW, 2009)), no areas of ecological impact were identified, except at AOC 6.

q. Please provide a discussion of how NAPL occurrences, if any, will be addressed inside the PMZ.

See RAP in CP Attachment XI.D, Worksheet 2.1:

For the PMZ area, the NAPL response action objective will be to "ensure compliance of NAPL zone in the PMZ" to address the NAPL within the PMZs for each GWBU (see Risk-Based NAPL Assessment in Appendix 3 of CP Attachment XI.D). The TCEQ TRRP-32 Guidance provides only one NAPL response endpoint: Recovery Endpoint – Recover readily recoverable NAPL fraction.

The response objectives will include compliance with PMZ performance criteria at the NAPL zone and control through institutional controls on groundwater use to protect exposure to residual NAPL in the GWBUs. As part of the evaluation for compliance with PMZ performance criteria, the on-going DNAPL recovery activities in addition to the proposed mobile multi-phase extraction (MPE) recovery activities will be used to assess if the DNAPL in the GWBUs is considered readily recoverable and if other conventional or alternative NAPL recovery technologies should be considered. Methods to meet the response action objective for the creosote DNAPL will include recovery (recover readily recoverable creosote DNAPL from wells with DNAPL present) at the NAPL source zone so that the dissolved-phase groundwater PCLE zone is stable (or shrinking) and the PCLE performance objectives for the PMZ can be met, including the goal of no cPCL exceedances at the alternate POE wells.

r. Please provide a schedule of implementation for items not completed at the time of application {See also Section XI.D.8.}

See RAP in CP Attachment XI.D, Worksheet 6.0 and Section XI.D.8.

7. Waste Management Units/Areas Monitored Under Alternative Corrective Action Program for Co-

mingled plumes Alternative groundwater Corrective Action Program apply, pursuant 30 TAC 335.151, 335.156 and 350, for commingled release from RCRA-regulated unit and from one or more SWMUs and/or AOC.

Not Applicable

a. Complete Sections XI.D.1. through 4.;

b. In addition to the CP Attachment A maps in Section XI.D.4.b., CP Attachment A maps should clearly depict those waste management unit or areas of the facility which have commingled plumes and the alternative corrective action applies.

c. Please provide a schedule of implementation for items not completed at the time of application {See also Section XI.D.8.}

8. Implementation Schedule

Itemize and discuss, in detail, the estimated time schedule necessary for any testing and assessments, system design, construction and installation, and final implementation of the groundwater monitoring program for each Regulated Unit and solid waste management unit. If the schedule of implementation for items are not completed at the time of the application, or are not completed at the time of issuance of the final draft Compliance Plan, then the items should be added to the CP Table VIII - (Compliance Schedule) of the application.

See RAP in CP Attachment XI.D and Compliance Plan Table VIII (Compliance Schedule).

E. COST ESTIMATES FOR FINANCIAL ASSURANCE

As required by 30 TAC 335.156 and 335.167, the applicant must provide cost estimates for groundwater monitoring and corrective action to determine the amount of financial assurance. Please complete the applicable parts of this form. Cost estimates should be filled out for each proposed corrective action/monitoring system at the site; or any additional corrective action system not covered in this Part. Please note, the Executive Director may request from the applicant documentary evidence for cost estimates.

If an item is not applicable, please mark it NA.

General Information

1. For each Waste Management Area (WMA) list the following:

a. A description of the waste management unit(s) in the WMA (e.g., landfill, surface impoundment, land treatment);

See Compliance Plan Table I Waste Management Units Subject to Groundwater Corrective Action and Compliance Monitoring. However, the Corrective Action will be conducted on a facility-wide approach, not WMA by WMA.

b. The NoR unit number(s) in the WMA; and

See Compliance Plan Table I Waste Management Units Subject to Groundwater Corrective Action and Compliance Monitoring

c. The compliance period for the WMA listed above: Year(s) = 30

(The compliance period is the number of years equal to the active life of the waste management area as defined in 30 TAC 335.162).

d. In instances where the compliance period is equal to or exceeds 30 years, the maximum amount of financial assurance required will be based on 30 years because the required post-closure care period to perform corrective action and groundwater monitoring is 30 years. In instances where the compliance period is less than 30 years, the financial assurance for corrective action or compliance monitoring will be based on the longest time frame established by one of the following criteria:

(1) the duration of your compliance plan;

(2) the time frame for clean-up based on model projections and historical data as approved by the Executive Director; or

(3) the compliance period for the unit/area.

TOTAL YEARS USED TO CALCULATE THE FINANCIAL ASSURANCE FOR THE CORRECTIVE ACTION AND/OR COMPLIANCE MONITORING PROGRAM

YEAR(S) = 30

2. Please complete Table XI.E.1. – Corrective Action Program Cost Estimate.

3. Please complete Table XI.E.2. – Groundwater Monitoring Cost Estimate.

4. Please complete Table XI.E.3. – Financial Assurance Summary

XI. COMPLIANCE PLAN

TABLES

Table XI.A.1. - Facility History for Waste Management Units

Name of Waste Management Unit[1]	Type of Waste Management Unit	Notice of Registration Unit Number	Date Waste Was *First* Placed in Unit	EPA Waste Code	Estimated Capacity of Unit	Quantity of Waste Left in Place	Date Waste Was *Last* Placed in Unit[2]	Date of Unit Closure Or Projected Closure	Date Unit Certified Closed[3]	Is There Evidence of a Release of Hazardous Constituent(s)[4] to Groundwater? (Yes, No, or Unknown)
13. Location of Former SAP Water Treatment Tank	Storage Tank	NA	Unknown	Unknown	Unknown	NA	Unknown	2004	Unknown	Unknown
14. Oil Water Separators		NA	Unknown	Unknown	Unknown	NA	Unknown	2004	Unknown	Unknown
15. Railroad Tie Storage Area		NA	1911	Unknown	Unknown	NA	Mid 1980s	2004	Unknown	Unknown
16. Diesel Storage Tank		NA	Unknown	Unknown	Unknown	NA	Unknown	Unknown	Unknown	Unknown
17. Contaminated Portion of City Water Line		NA	Mid 1980s	Unknown	Unknown	NA	Unknown	December 1980	Unknown	No
18. Location of Former Incinerator		NA	Unknown	Unknown	Unknown	NA	Dismantled Between 1955 and 1960	Between 1955 and 1960	Unknown	Unknown
19. City Storm Sewer		NA	1979	Unknown	Unknown	NA	1982	NA	Unknown	Unknown
20. Inactive Wastewater Lagoon		NA	Unknown	Unknown	Unknown	NA	Unknown	Unknown	Unknown	Unknown
21. Location of Former UST No. 44-023-21		NA	Unknown	Unknown	Unknown	NA	Unknown	1990	1990	No
22. Former Fueling ASTs and Wastewater Lagoons		NA	Unknown	Unknown	Unknown	NA	Unknown	Unknown	Unknown	Unknown

1. Indicate by asterisk (*) those waste management units that have received any hazardous waste constituent listed in Appendix VIII of 40 CFR Part 261.
2. For the purposes of this Compliance Plan Application, a waste management unit receiving hazardous waste after July 26, 1982 shall be considered a Regulated Unit. A waste management unit that ceased receiving hazardous waste on or before that date shall be considered a Solid Waste Management Unit (SWMU).
3. Date the applicant submitted certification of closure to the Commission.
4. Hazardous constituents are those hazardous constituents listed in Appendix IX of 40 CFR Part 264.

TABLE XI.E.1 - CORRECTIVE ACTION PROGRAM COST ESTIMATE
HWPW - DNAPL RECOVERY AND CAP INSPECTIONS

1.	**Pumping Capacity Per Year:**		
A.	Daily average system pumping rate		gal/day
B.	Annual groundwater volume recovered **(est. purge water plus recovered creosote DNAPL)**	4000	gal/yr
2.	**Off-Site Liquid Treatment / Disposal Cost:**		
A.	Volume of treated contaminated water to be disposed of off-site yearly	4000	gal/yr
B.	Transportation of liquid waste disposed of off-site yearly		
	(1) Transportation cost per gallon		$/gal
	(2) Gallons of contaminated water shipped per year		gal/yr
	(3) Annual cost of transportation (1 x 2)	$ 3,400.00	$/yr
C.	On-site yearly storage cost prior to off-site disposal		$/yr
D.	Off-site yearly treatment cost of liquid waste		
	(1) Treatment charge per gallon		$/gal
	(2) Total volume to be treated per year		gal/yr
	(3) Annual treatment cost (1 x 2)		$/yr
E.	Off-site disposal cost of liquid waste per year		
	(1) Disposal charge per gallon	$ 10.00	$/gal
	(2) Total volume to be disposed per year	3400	gal/yr
	(3) Annual disposal cost (1 x 2)	$ 34,000	$/yr
***Annual Off-Site Liquid Treatment / Disposal Cost (2B3 + 2C +2D3 + 2E3)**		$ 37,400	**$**

3. On-site Waste Water Treatment System Cost and On-site Treatment / Disposal Cost:

Submit a cost estimate for a treatment system specifically designed and used exclusively for the groundwater corrective action program and operational after some start up maintenance. Estimates to clean out the system should also be included in the following cost.

A.	Initial capital expenditure for treatment system including start up maintenance		$
***On-Site Waste Water Treatment System Capital Cost (3A)**		$ -	**$**
B.	Gallons of contaminated water to be treated on-site per year		gal/yr
C.	Cost of on-site treatment per gallon		$/gal
D.	Cost of sludge, or solids disposal per year		$/yr
E.	Cost per year of maintenance on treatment system and recovery system, along with any additional equipment and repairs needed for the systems		$/yr
F.	Cost of on-site disposal per year		$/yr
***Annual On-Site Treatment / Disposal Cost [(3B x 3C) + 3D + 3E + 3F]**		$ -	**$**

4. Inspections, Maintenance and Operation Cost for the Corrective Action Program: (Soil Cap, Asphalt Roadway, Concrete Sidewalk, Concrete Cap, and Railroad Ballast Inspections)

A.	Operator's time on-site for inspections and maintenance per year	40	hour/yr
B.	Charge of salary per hour	$ 100.00	$/hr
C.	Annual cost of labor (4A x 4B)	$ 4,000	$/yr
D.	Replacement of parts and equipment per year (includes mowing and fence repairs)	$ 43,000	$/yr
E.	Electricity cost per year		$/yr
***Annual Inspections / Maintenance / Operation Cost for the Corrective Action Program (4C + 4D + 4E)**		$ 47,000	**$**

TABLE XI.E.2. – GROUNDWATER MONITORING COST ESTIMATE

1. Annual Sampling and Analysis Cost		
A. Background Wells		
(1) Number of wells	2	
(2) Sample analysis cost per well	$ 150.00	$/well
(3) Number of sampling events per year	2	/yr
(4) Sampling cost (1 x 2 x 3)	$ 600.00	$
B. Point of Compliance Wells (SWMU 1 Wells only)		
(1) Number of wells	8	
(2) Sample analysis cost per well	$ 150.00	$/well
(3) Number of sampling events per year	2	/yr
(4) Sampling cost (1 x 2 x 3)	$ 2,400.00	$
C. Recovery Wells		
(1) Number of wells		
(2) Sample analysis cost per well		$/well
(3) Number of sampling events per year		/yr
(4) Sampling cost (1 x 2 x 3)	$ -	$
D. Corrective Action Observation Wells		
(1) Number of wells	51	
(2) Sample analysis cost per well	$ 250.00	$/well
(3) Number of sampling events per year	2	/yr
(4) Sampling cost (1 x 2 x 3)	$ 25,500	$
E. Point of Exposure Wells		
(1) Number of wells	47	
(2) Sample analysis cost per well	$ 250.00	$/well
(3) Number of sampling events per year	2	/yr
(4) Sampling cost (1 x 2 x 3)	$ 23,500	$
F. Supplemental Wells		
(1) Number of wells	3	
(2) Sample analysis cost per well	$ 250.00	$/well
(3) Number of sampling events per year	2	/yr
(4) Sampling cost (1 x 2 x 3)	$ 1,500	$

TABLE XI.E.2. – GROUNDWATER MONITORING COST ESTIMATE

G. Field Quality Control Sampling		
(1) Number of wells		
(2) Sample analysis cost per well		$/well
(3) Number of sampling events per year		/yr
(4) Sampling cost (1 x 2 x 3)	$ -	$
2. Sampling Labor Cost:		
A. Hours of sampling per well	2	hrs/well
B. Number of sampling technicians per well	1	
C. Charge per hour	$ 95.00	$/hr
D. Total number of wells to be sampled annually		Wells
E. Total number of wells sampled semi-annually	101	Wells
F. Total number of wells sampled quarterly		Wells
G. Total number of wells sampled monthly		Wells
H. Total number of wells sampled per year (2D) + (2E x 2) + (2F x 4) + (2G x 12)	202	total wells sampled/yr
I. Sampling Labor Cost (2A x 2B x 2C x 2H)	$ 38,380	$
***Annual Groundwater Monitoring Cost**	$ 91,880	**$**
3. Well Installation (typical cost):		
A. Monitor well installation cost per well	$ 15,000	$/well
B. Number of monitor wells to be installed	6	Wells
C. Cost of monitor well system (A x B)	$ 90,000	$
D. Recovery well installation cost per well	$ 16,700	$/well
E. Number of Recovery Wells to be installed	18	Wells
F. Cost of Recovery well system (D x E)	$ 300,600	$
***Total Well Installation Cost (3C + 3F)**	$ 390,600	**$**
4. Administrative Cost:		
A. Annual cost for record-keeping and report preparation	$ 33,350	$
***Annual Administrative Cost (4A)**	$ 33,350	**$**
5. Inspection and Maintenance Cost for the Monitoring Program:		
A. Operator's time (hours) on-site for inspections and maintenance per year	20	hour/yr
B. Charge or salary per hour	$ 90.00	$/hr
C. Annual cost of labor (5A x 4B)	$ 1,800	$/yr
D. Replacement of parts and equipment per year	$ 7,700.00	$/yr
***Annual Inspections / Maintenance Cost for the Groundwater Monitoring Program (5C + 5D)**	$ 9,500	**$**

TABLE XI.E.3. – FINANCIAL ASSURANCE SUMMARY

Annual Off-Site Liquid Treatment / Disposal Cost	**$**	**37,400**
Annual On-Site Treatment / Disposal Cost		
Annual Inspection / Maintenance / Operation Cost For The Corrective Action Program	**$**	**47,000**
Annual Groundwater Monitoring Cost	**$**	**91,880**
Annual Administrative Cost	**$**	**33,350**
Annual Inspection And Maintenance Cost For The Groundwater Monitoring Program	**$**	**9,500**
Annual DNAPL Recovery Costs (MPE)	**$**	**106,110**
Annual Sub Total	**$**	**325,240**
Total Years Used For Calculating Financial Assurance	**$**	**30** Yrs
Remediation Cost (Annual Sub Total x Total Years Used)	**$**	**9,757,200**
Physical Control - Slurry Wall Construction (HWPW)		
1. Pre-Design Work	*$*	*294,500*
2. Engineering Design	*$*	*125,900*
3. Slurry Wall Install (Mobilization/Site Prep/Construction/QA)	*$*	*7,007,000*
SLURRY WALL CONSTRUCTION TOTAL	**$**	**7,427,400**
NAPL Recovery- MPE System		
1. Pre-Design Work (Pilot Test)	*$*	*22,000*
2. Engineering Design	*$*	*21,625*
3. MPE System Construction	*$*	*220,675*
MPE SYSTEM TOTAL	**$**	**264,300**
Total Well Costs (Recovery & Monitoring)	$	390,600
10% Contingency	$	769,170
Grand Total Cost (nearest $1000)	**$**	**18,609,000**

CP Table I: Waste Management Units and Areas Subject to Groundwater Corrective Action and Compliance Monitoring

A. Corrective Action[1] (30 TAC §335.166)

Unit Type[5]	Unit Name	Notice of Registration (NOR) Number, if applicable	Date Program Requirement and Remedy Standard Completed[5]
RCRA-Regulated Waste Management Unit 001 (SWMU 1)	Closed Surface Impoundment	NOR 001	

B. Compliance Monitoring[1] (30 TAC §335.165)

RESERVED

Unit Type[5]	Unit Name	Notice of Registration (NOR) Number, if applicable	Date Program Requirement and Remedy Standard Completed[5]

C. Corrective Action[2] (30 TAC §335.167)

Unit Type[5]	Unit Name	Notice of Registration (NOR) Number, if applicable	Date Program Requirement and Remedy Standard Completed[5]
SWMU 7 (On-site PMZ)	Tank Car Storage Area	002	
(On-site PMZ)	Sub-surface Tank	003	
(On-site PMZ)	Container Storage Area	004	
(On-site PMZ)	Waste Pile	005	
(On-site PMZ)	Miscellaneous Storage Containers	006	
SWMU 2 (On-site PMZ)	Northern and Southern Drainage Ditches		
SWMU 3 (On-site PMZ)	Oil Drum Storage (ODS) Building		
SWMU 4 (On-site PMZ)	Recent Process Area		
SWMU 5 (On-site PMZ)	Original Process Area		
SWMU 6 (On-site PMZ)	Water Treatment and Boiler System		
SWMU 8 (On-site PMZ)	Aboveground Storage Tank Area		
SWMU 9 (On-site PMZ)	Location of Former UST No. 44-023-05		
SWMU 10 (On-site PMZ)	Location of Former Sap Water Treatment Tank		
SWMU 11 (On-site PMZ)	Oil Water Separators		
SWMU 12 (On-site PMZ)	Railroad Tie Storage Area		

Unit Type[5]	Unit Name	Notice of Registration (NOR) Number, if applicable	Date Program Requirement and Remedy Standard Completed[5]
AOC 1 (On-site PMZ)	Diesel Storage Tank		
AOC 2 (On-site PMZ)	Hose House		
AOC 3 (On-site PMZ)	Contaminated Portion of City Water Line		
AOC 4 (On-site PMZ)	Location of Former Incinerator		
AOC 5 (On-site PMZ)	City Storm Sewer		
AOC 6 (On-site PMZ)	Inactive Wastewater Lagoon		
AOC 7 (On-site PMZ)	Location of Former UST No. 44-023-21		
AOC 8 (On-site PMZ)	Former Fueling ASTs and Wastewater Lagoons		

D. Alternative Corrective Action[3] (30 TAC §335.151)

Unit Type[5]	Unit Name	Notice of Registration (NOR) Number, if applicable	Date Program Requirement and Remedy Standard Completed[5]
RESERVED			

E. Facility Operations Area (FOA)[4] (30 TAC §335.156 and Chapter 350)

Unit Type[5]	Unit Name	Notice of Registration (NOR) Number, if applicable	Date Program Requirement and Remedy Standard Completed[5]
RESERVED			

Note: "Reserved" if a specific program (referenced in CP Table I.A., I.B., I.C., I.D., and/or I.E.) is not applicable. More than one program may apply to a facility.

Foot Note:

1. Program applies to RCRA-regulated units only.
2. Program applies to releases from solid waste management units (SWMUs) and/or areas of concern (AOCs).
3. Program applies to commingled releases from RCRA-regulated unit and from one or more SWMUs and/or AOCs.
4. List SWMUs, additional units/areas of Investigation, AOCs, RCRA-regulated units within the FOA that are subject to corrective action. For RCRA units, SWMUs and/ or AOC outside the FOA boundary for which compliance monitoring and/ or corrective action applies should be listed separately in Items A, B or C as appropriate.
5. Specify the date of Commissions No Further Action approval letter for program requirement and remedy standard completed for all media of concern.

CP Table II: Solid Waste Management Units and/or Areas of Concern for which Corrective Action applies pursuant to 30 TAC 335.167

Unit Number [1]	Unit Name	Notice of Registration (NOR) Number, if applicable	SWMU or AOC	Media Affected[2]	Date Program Requirement and Remedy Standard Completed [3]
1.	Closed Surface Impoundment	001	SWMU 1 (RCRA-Regulated Waste Management Unit 001)	Groundwater	
2.	Tank Car Storage Area	002	SWMU 7	Soil, Groundwater	See footnote 4
3.	Sub-surface Tank	003		None	
4.	Container Storage Area	004		None	
5.	Waste Pile	005		None	
6.	Miscellaneous Storage Containers	006		None	
7.	Northern (NDD) and Southern Drainage Ditches (SDD)		SWMU 2	SDD-Soil, Groundwater	See footnote 4
8.	Oil Drum Storage (ODS) Building		SWMU 3	None	
9.	Recent Process Area		SWMU 4	Soil, Groundwater	See footnote 4
10.	Original Process Area		SWMU 5	Soil, Groundwater	See footnote 4
11.	Water Treatment and Boiler System		SWMU 6	Soil, Groundwater	See footnote 4
12.	Aboveground Storage Tank Area		SWMU 8	Soil, Groundwater	See footnote 4
13.	Location of Former UST No. 44-023-05		SWMU 9	Soil, Groundwater	See footnote 4
14.	Location of Former Sap Water Treatment Tank		SWMU 10	Soil, Groundwater	See footnote 4
15.	Oil Water Separators		SWMU 11	Soil, Groundwater	See footnote 4
16.	Railroad Tie Storage Area		SWMU 12	Groundwater	
17.	Diesel Storage Tank		AOC 1	Soil, Groundwater	See footnote 4
18.	Hose House		AOC 2	Soil, Groundwater	
19.	Contaminated Portion of City Water Line		AOC 3	None	
20.	Location of Former Incinerator		AOC 4	None	
21.	City Storm Sewer		AOC 5	None	
22.	Inactive Wastewater Lagoon		AOC 6	Soil, Groundwater	See footnote 4
23.	Location of Former UST No. 44-023-21		AOC 7	Soil, Groundwater	See footnote 4
24.	Former Fueling AST and Wastewater Lagoons		AOC 8	Soil, Groundwater	

Foot Note:
SWMU = Solid Waste Management Unit
AOC = Area of Concern

1. For sites with FOA Authorization, list SWMUs and/or AOCs that were not included in the FOA, and are subject to corrective action.
2. Specify affected media groundwater, soils, etc.
3. Specify the date of Commissions No Further Action approval letter for program requirement and remedy standard completed for all media of concern.
4. Completion of interim soil response action activities are documented in Interim RACR (2016, revised 2017).

CP Table III: Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard

Solid Waste Management Unit (SWMU) 1 – RCRA-Regulated Waste Management Unit 001

Unit Name	COLUMN A Hazardous Constituents	COLUMN B Groundwater Protection Standard ($^{GW}GW_{Ing}$) (mg/l)
RCRA-Regulated Waste Management Unit 001 A-TZ	Acenaphthene	1.5 PCL
	Acenaphthylene	1.5 PCL
	Anthracene	7.3 PCL
	bis(2-ethylhexyl)phthalate	0.006 MCL/PCL
	Dibenzofuran	0.098 PCL
	Di-n-butyl phthalate	2.4 PCL
	Fluoranthene	0.98 PCL
	Fluorene	0.98 PCL
	2-Methylnaphthalene	0.098 PCL
	Naphthalene	0.49 PCL
	Phenanthrene	0.73 PCL
	Phenol	7.3 PCL
	Pyrene	0.73 PCL
RCRA-Regulated Waste Management Unit 001 B-TZ	Acenaphthene	1.5 PCL
	Acenaphthylene	1.5 PCL
	Anthracene	7.3 PCL
	bis(2-ethylhexyl)phthalate	0.006 MCL/PCL
	Dibenzofuran	0.098 PCL
	Di-n-butyl phthalate	2.4 PCL
	Fluoranthene	0.98 PCL
	Fluorene	0.98 PCL
	2-Methylnaphthalene	0.098 PCL
	Naphthalene	0.49 PCL
	Phenanthrene	0.73 PCL
	Phenol	7.3 PCL
	Pyrene	0.73 PCL

Note: $^{GW}GW_{Ing}$ Protective Concentration Levels (PCLs), Commercial/Industrial land use assuming Class 2 Groundwater, November 8, 2019; Table 3.

CP Table III: Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard

On-Site PMZ

Unit Name	COLUMN A Hazardous Constituents	COLUMN B Groundwater Protection Standards (GWPS) at Alternate Point of Exposure (APOE) $^{GW}GW_{Ing}$ (mg/l) (C/I)	COLUMN C Groundwater Protection Standards (GWPS) at Alternate Point of Exposure (APOE) $^{GW}GW_{Ing}$ (mg/l) (Residential)
On Site – Site Wide PMZ	1,2-Dichloroethane	A-TZ/B-TZ/C-TZ/D-TZ[1] - 5.0E-03 MCL/PCL B-CZ- 5.0E-01 MCL/PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 5.0E-03 MCL/PCL B-CZ- 5.0E-01 MCL/PCL
	Benzene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 5.0E-03 MCL/PCL B-CZ - 5.0E-01 MCL/PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 5.0E-03 MCL/PCL B-CZ – 5.0E-01 MCL/PCL
	Chlorobenzene	A-TZ/B-TZ/C-TZ/ D-TZ[1]- 1.0E-01 MCL/PCL B-CZ - 1.0E+01 MCL/PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 1.0E-01 MCL/PCL B-CZ – 1.0E+01 MCL/PCL
	Ethylbenzene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 7.0E-01 MCL/PCL B-CZ - 7.0E-01 MCL/PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 7.0E-01 MCL/PCL B-CZ – 7.0E-01 MCL/PCL
	Methylene Chloride	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 5.0E-03 MCL/PCL B-CZ - 5.0E-01 MCL/PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 5.0E-03 MCL/PCL B-CZ – 5.0E-01 MCL/PCL
	Toluene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 1.0E+00 MCL/PCL B-CZ - 1.0E+02 MCL/PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 1.0E+00 MCL/PCL B-CZ – 1.0E+02 MCL/PCL
	Xylenes (total)	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 1.0E+01 MCL/PCL B-CZ - 1.0E+03 MCL/PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 1.0E+01 MCL/PCL B-CZ – 1.0E+03 MCL/PCL
	Vinyl Chloride (selected well)*	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 2.0E-03 MCL/PCL B-CZ - 2.0E-01 MCL/PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 2.0E-03 MCL/PCL B-CZ – 2.0E-01 MCL/PCL
	1,2-Diphenylhydrazine	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 2.6E-03 PCL B-CZ - 2.6E-01 PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 1.1E-03 PCL B-CZ -
	2,4-Dimethylphenol	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 1.5E+00 PCL B-CZ - 1.5E+02 PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 4.9E-01 PCL B-CZ -4.9E+01 PCL
	2,4-Dinitrotoluene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 3.0E-03 PCL B-CZ - 3.0E-01 PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 1.3E-03 PCL B-CZ – 1.3E-01 PCL
	2,6-Dinitrotoluene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 3.0E-03 PCL B-CZ - 3.0E-01 PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 1.3E-03 PCL B-CZ -1.3E-01 PCL
	2-Chloronaphthalene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 5.8E+00 PCL B-CZ - 5.8E+02 PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 2.0E+00 PCL B-CZ -2.0E+02 PCL
	2-Methyl-4,6-dinitrophenol	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 7.3E-03 PCL B-CZ - 7.3E-01 PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 2.4E-03 PCL B-CZ – 2.4E-01 PCL
	2-Methylnaphthalene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 2.9E-01 PCL B-CZ - 2.9E+01 PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 9.8E-02 PCL B-CZ -9.8E+00 PCL
	4-Nitrophenol	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 1.5E-01 PCL B-CZ - 1.5E+01 PCL	A-TZ/B-TZ/C-TZ/ D-TZ[1]- 4.9E-02 PCL B-CZ -4.9E+00 PCL

CP Table III: Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard

On-Site PMZ (cont.)

Unit Name	COLUMN A Hazardous Constituents	COLUMN B Groundwater Protection Standards (GWPS) at Alternate Point of Exposure (APOE) $^{GW}GW_{Ing}$ (mg/l) (C/I)	COLUMN C Groundwater Protection Standards (GWPS) at Alternate Point of Exposure (APOE) $^{GW}GW_{Ing}$ (mg/l) (Residential)
	Acenaphthene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 4.4E+00 [PCL] B-CZ - 4.4E+02 [PCL]	A-TZ/B-TZ/C-TZ/D-TZ[1] - 1.5E+00 [PCL] B-CZ - 1.5E+02 [PCL]
	Acenaphthylene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 4.4E+00 [PCL] B-CZ - 4.4E+02 [PCL]	A-TZ/B-TZ/C-TZ/D-TZ[1] - 1.5E+00 [PCL] B-CZ -1.5E+02 [PCL]
	Anthracene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 2.2E+01 [PCL] B-CZ - 2.2E+03 [PCL]	A-TZ/B-TZ/C-TZ/D-TZ[1] - 7.3E+00 [PCL] B-CZ -7.3E+02 [PCL]
	Benzo(a)anthracene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 2.8E-03 [PCL] B-CZ - 2.8E-01 [PCL]	A-TZ/B-TZ/C-TZ/D-TZ[1] - 1.3E-03 [PCL] B-CZ -1.3E-01 [PCL]
	Benzo(a)pyrene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 2.0E-04 [MCL/PCL] B-CZ - 2.0E-02 [MCL/PCL]	A-TZ/B-TZ/C-TZ/D-TZ[1] - 2.0E-04 [MCL/PCL] B-CZ -2.0E-02 [MCL/PCL]
	bis(2-chloroethoxy)methane	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 1.9E-03 [PCL] B-CZ - 1.9E-01 [PCL]	A-TZ/B-TZ/C-TZ/D-TZ[1] - 8.3E-04 [PCL] B-CZ - 8.3E-02 [PCL]
	bis(2-ethylhexyl)phthalate	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 6.0E-03 [MCL/PCL] B-CZ - 6.0E-01 [MCL/PCL]	A-TZ/B-TZ/C-TZ/D-TZ[1] - 6.0E-03 [MCL/PCL] B-CZ - 6.0E-01 [MCL/PCL]
	Chrysene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 2.8E-01 [PCL] B-CZ - 2.8E+01 [PCL]	A-TZ/B-TZ/C-TZ/D-TZ[1] - 1.3E-01 [PCL] B-CZ - 1.3E+01 [PCL]
	Dibenzofuran	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 2.9E-01 [PCL] B-CZ - 2.9E+01 [PCL]	A-TZ/B-TZ/C-TZ/D-TZ[1] - 9.8E-02 [PCL] B-CZ - 9.8E-00 [PCL]
	Di-n-butyl Phthalate	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 7.3E+00 [PCL] B-CZ - 7.3E+02 [PCL]	A-TZ/B-TZ/C-TZ/D-TZ[1] - 2.4E+00 [PCL] B-CZ -2.4E+02 [PCL]
	Fluoranthene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 2.9E+00 [PCL] B-CZ - 2.9E+02 [PCL]	A-TZ/B-TZ/C-TZ/D-TZ[1] - 9.8E-01 [PCL] B-CZ -9.8E+01 [PCL]
	Fluorene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 2.9E+00 [PCL] B-CZ - 2.9E+02 [PCL]	A-TZ/B-TZ/C-TZ/D-TZ[1] - 9.8E-01 [PCL] B-CZ - 9.8E+01 [PCL]
	Naphthalene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 1.5E+00 [PCL] B-CZ - 1.5E+02 [PCL]	A-TZ/B-TZ/C-TZ/D-TZ[1] - 4.9E-01 [PCL] B-CZ - 4.9E+01 [PCL]
	Nitrobenzene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 1.5E-01 [PCL] B-CZ - 1.5E+01 [PCL]	A-TZ/B-TZ/C-TZ/D-TZ[1] - 4.9E-02 [PCL] B-CZ - 4.9E+00 [PCL]

CP Table III: Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard

On-Site PMZ (cont.)

Unit Name	COLUMN A Hazardous Constituents	COLUMN B Groundwater Protection Standards (GWPS) at Alternate Point of Exposure (APOE) $^{GW}GW_{Ing}$ (mg/l) (C/I)	COLUMN C Groundwater Protection Standards (GWPS) at Alternate Point of Exposure (APOE) $^{GW}GW_{Ing}$ (mg/l) (Residential)
	n-Nitrosodiphenylamine	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 4.2E-01 [PCL] B-CZ - 4.2E+01 [PCL]	A-TZ/B-TZ/C-TZ/D-TZ[1] - 1.9E-01 [PCL] B-CZ - 1.9E+01 [PCL]
	Pentachlorophenol	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 1.0E-03 [PCL] B-CZ - 1.0E-01 [PCL]	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 1.0E-03 [PCL] B-CZ -1.0E-01 [PCL]
	Phenanthrene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 2.2E+00 [PCL] B-CZ - 2.2E+02 [PCL]	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 7.3E-01 [PCL] B-CZ - 7.3E+01 [PCL]
	Phenol	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 2.2E+01 [PCL] B-CZ - 2.2E+03 [PCL]	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 7.3E+00 [PCL] B-CZ -7.3E+02 [PCL]
	Pyrene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 2.2E+00 [PCL] B-CZ - 2.2E+02 [PCL]	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 7.3E-01 [PCL] B-CZ - 7.3E+01 [PCL]
	Arsenic	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 0.01[PCL] B-CZ – 1[PCL]	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 0.01[PCL] B-CZ – 1[PCL]

Note:
$^{GW}GW_{Ing}$ Protective Concentration Levels (PCLs), Commercial/Industrial and Residential assuming Class 2 Groundwater for A-TZ, B-TZ, and C-TZ GWBU, Class 3 Groundwater for B-CZ GWBU, November 8, 2019; Table 3.
NE – Not established (see CP Attachment XI.D)
* Vinyl Chloride shall be sampled in accordance with the schedule specified in CP Table VIII.
[1]- D-TZ wells are corrective action observation wells. There is no PMZ in the D-TZ.

CP Table III: Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard

Off-Site PMZ (City of Houston-owned ROW)

Unit Name	COLUMN A Hazardous Constituents	COLUMN B Groundwater Protection Standards (GWPS) at Alternate Points of Exposure (APOE) $^{GW}GW_{Ing}$ (mg/l) (Res)
Off Site PMZ	1,2-Dichloroethane	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 5.0E-03 MCL/PCL B-CZ- 5.0E-01 MCL/PCL
	Benzene	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 5.0E-03 MCL/PCL B-CZ – 5.0E-01 MCL/PCL
	Chlorobenzene	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 1.0E-01 MCL/PCL B-CZ – 1.0E+01 MCL/PCL
	Ethylbenzene	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 7.0E-01 MCL/PCL B-CZ – 7.0E-01 MCL/PCL
	Methylene Chloride	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 5.0E-03 MCL/PCL B-CZ – 5.0E-01 MCL/PCL
	Toluene	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 1.0E+00 MCL/PCL B-CZ – 1.0E+02 MCL/PCL
	Xylenes (total)	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 1.0E+01 MCL/PCL B-CZ – 1.0E+03 MCL/PCL
	Vinyl Chloride (selected wells)*	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 2.0E-03 MCL/PCL B-CZ – 2.0E-01 MCL/PCL
	1,2-Diphenylhydrazine	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 1.1E-03 PCL B-CZ -
	2,4-Dimethylphenol	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 4.9E-01 PCL B-CZ -4.9E+01 PCL
	2,4-Dinitrotoluene	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 1.3E-03 PCL B-CZ – 1.3E-01 PCL
	2,6-Dinitrotoluene	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 1.3E-03 PCL B-CZ -1.3E-01 PCL
	2-Chloronaphthalene	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 2.0E+00 PCL B-CZ -2.0E+02 PCL
	2-Methyl-4,6-dinitrophenol	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 2.4E-03 PCL B-CZ – 2.4E-01 PCL
	2-Methylnaphthalene	A-TZ/B-TZ/C-TZ/ D-TZ[1] – 9.8E-02 PCL B-CZ -9.8E+00 PCL

CP Table III: Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard

Off-Site PMZ (City of Houston-owned ROW) (cont.)

Unit Name	COLUMN A Hazardous Constituents	COLUMN B Groundwater Protection Standards (GWPS) at Alternate Points of Exposure (APOE) $^{GW}GW_{Ing}$ (mg/l) (Res)
	4-Nitrophenol	A-TZ/B-TZ/C-TZ/ D-TZ[1]- 4.9E-02 [PCL] B-CZ -4.9E+00 [PCL]
	Acenaphthene	A-TZ/B-TZ/C-TZ/D-TZ[1] - 1.5E+00 [PCL] B-CZ - 1.5E+02 [PCL]
	Acenaphthylene	A-TZ/B-TZ/C-TZ/D-TZ[1] - 1.5E+00 [PCL] B-CZ -1.5E+02 [PCL]
	Anthracene	A-TZ/B-TZ/C-TZ/D-TZ[1] - 7.3E+00 [PCL] B-CZ -7.3E+02 [PCL]
	Benzo(a)anthracene	A-TZ/B-TZ/C-TZ/D-TZ[1] - 1.3E-03 [PCL] B-CZ -1.3E-01 [PCL]
	Benzo(a)pyrene	A-TZ/B-TZ/C-TZ/D-TZ[1] - 2.0E-04 [MCL/PCL] B-CZ -2.0E-02 [MCL/PCL]
	bis(2-chloroethoxy)methane	A-TZ/B-TZ/C-TZ/D-TZ[1] - 8.3E-04 [PCL] B-CZ - 8.3E-02 [PCL]
	bis(2-ethylhexyl)phthalate	A-TZ/B-TZ/C-TZ/D-TZ[1] - 6.0E-03 [MCL/PCL] B-CZ - 6.0E-01 [MCL/PCL]
	Chrysene	A-TZ/B-TZ/C-TZ/D-TZ[1] - 1.3E-01 [PCL] B-CZ - 1.3E+01 [PCL]
	Dibenzofuran	A-TZ/B-TZ/C-TZ/D-TZ[1] - 9.8E-02 [PCL] B-CZ - 9.8E-00 [PCL]
	Di-n-butyl Phthalate	A-TZ/B-TZ/C-TZ/D-TZ[1] - 2.4E+00 [PCL] B-CZ -2.4E+02 [PCL]
	Fluoranthene	A-TZ/B-TZ/C-TZ/D-TZ[1] - 9.8E-01 [PCL] B-CZ -9.8E+01 [PCL]
	Fluorene	A-TZ/B-TZ/C-TZ/D-TZ[1] - 9.8E-01 [PCL] B-CZ - 9.8E+01 [PCL]
	Naphthalene	A-TZ/B-TZ/C-TZ/D-TZ[1] - 4.9E-01 [PCL] B-CZ - 4.9E+01 [PCL]
	Nitrobenzene	A-TZ/B-TZ/C-TZ/D-TZ[1] - 4.9E-02 [PCL] B-CZ - 4.9E+00 [PCL]

CP Table III: Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard

Off-Site PMZ (City of Houston-owned ROW) (cont.)

Unit Name	COLUMN A Hazardous Constituents	COLUMN B Groundwater Protection Standards (GWPS) at Alternate Points of Exposure (APOE) $^{GW}GW_{Ing}$ (mg/l) (Res)
	n-Nitrosodiphenylamine	A-TZ/B-TZ/C-TZ/D-TZ[1] - 1.9E-01 [PCL] B-CZ - 1.9E+01 [PCL]
	Pentachlorophenol	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 1.0E-03 [PCL] B-CZ -1.0E-01 [PCL]
	Phenanthrene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 7.3E-01 [PCL] B-CZ - 7.3E+01 [PCL]
	Phenol	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 7.3E+00 [PCL] B-CZ -7.3E+02 [PCL]
	Pyrene	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 7.3E-01 [PCL] B-CZ - 7.3E+01 [PCL]
	Arsenic	A-TZ/B-TZ/C-TZ/ D-TZ[1] - 0.01[PCL] B-CZ – 1[PCL]

Note:
$^{GW}GW_{Ing}$ Protective Concentration Levels (PCLs), Residential assuming Class 2 Groundwater for A-TZ, B-TZ, and C-TZ GWBU, Class 3 Groundwater for B-CZ GWBU, November 8, 2019; Table 3.
* Vinyl Chloride shall be sampled in accordance with the schedule specified in CP Table VIII.
** - Class 3 Groundwater PCLs used for Groundwater Protection Standards at AMPs instead of calculating AALs. AAL was not calculated since no groundwater PCL exceedance (PCLE) zone was observed in the B-CZ for the given COC.
[1]- D-TZ wells are corrective action observation wells. There is no PMZ in the D-TZ.

CP Table IIIA: Corrective Action Program Table of Indicator Parameters and Groundwater Protection Standard

Solid Waste Management Unit (SWMU) 1 – RCRA-Regulated Waste Management Unit 001

Unit Name	COLUMN A Hazardous Constituents	COLUMN B Groundwater Protection Standard ($^{GW}GW_{Ing}$)(mg/l)
RCRA-Regulated Waste Management Unit 001 A-TZ	Acenaphthene	1.5 PCL
	Acenaphthylene	1.5 PCL
	Anthracene	7.3 PCL
	bis(2-ethylhexyl)phthalate	0.006 MCL/PCL
	Dibenzofuran	0.098 PCL
	Di-n-butyl phthalate	2.4 PCL
	Fluoranthene	0.98 PCL
	Fluorene	0.98 PCL
	2-Methylnaphthalene	0.098 PCL
	Naphthalene	0.49 PCL
	Phenanthrene	0.73 PCL
	Phenol	7.3 PCL
	Pyrene	0.73 PCL
RCRA-Regulated Waste Management Unit 001 B-TZ	Acenaphthene	1.5 PCL
	Acenaphthylene	1.5 PCL
	Anthracene	7.3 PCL
	bis(2-ethylhexyl)phthalate	0.006 MCL/PCL
	Dibenzofuran	0.098 PCL
	Di-n-butyl phthalate	2.4 PCL
	Fluoranthene	0.98 PCL
	Fluorene	0.98 PCL
	2-Methylnaphthalene	0.098 PCL
	Naphthalene	0.49 PCL
	Phenanthrene	0.73 PCL
	Phenol	7.3 PCL
	Pyrene	0.73 PCL

Note: $^{GW}GW_{Ing}$ Protective Concentration Levels (PCLs), Commercial/Industrial (C/I) land use assuming Class 2 Groundwater, November 8, 2019; Table 3.

CP Table IIIA: Corrective Action Program Table of Indicator Parameters and Groundwater Protection Standard

On-Site PMZ

Unit Name	COLUMN A Hazardous Constituents	COLUMN B Groundwater Protection Standards (GWPS) at Alternate Point of Exposure (APOE) $^{GW}GW_{Ing}$ (mg/l) (C/I)	COLUMN C Groundwater Protection Standards (GWPS) at Alternate Point of Exposure (APOE) $^{GW}GW_{Ing}$ (mg/l) (Res)
A-TZ	Benzene	0.005 MCL/PCL	0.005 MCL/PCL
	2,4-Dimethylphenol	1.5 PCL	0.49 PCL
	2 Methylnaphthalene	0.29 PCL	0.098 PCL
	Benzo(a)pyrene	0.0002PCL	0.0002PCL
	Dibenzofuran	0.29 PCL	0.098 PCL
	Fluorene	2.9PCL	0.98PCL
	Naphthalene	1.5 PCL	0.49 PCL
	Phenanthrene	2.2PCL	0.73PCL
	Pyrene	2.2PCL	0.73PCL
	Vinyl Chloride*	0.002 MCL/PCL	0.002 MCL/PCL
	Arsenic	0.01 MCL/PCL	0.01MCL/PCL
B-CZ**	Benzene	0.5 MCL/PCL	0.5 MCL/PCL
	2,4-Dimethylphenol	150 PCL	49PCL
	2 Methylnaphthalene	29 PCL	9.8PCL
	Benzo(a)pyrene	0.02PCL	0.02PCL
	Dibenzofuran	29 PCL	9.8PCL
	Fluorene	290PCL	98PCL
	Naphthalene	150 PCL	49PCL
	Phenanthrene	220PCL	73
	Pyrene	220PCL	73
	Vinyl Chloride*	0.2 MCL/PCL	
	Arsenic	1 MCL/PCL	1 MCL/PCL
B-TZ	Benzene	0.005 MCL/PCL	0.005 MCL/PCL
	2,4-Dimethylphenol	1.5 PCL	0.49 PCL
	2 Methylnaphthalene	0.29 PCL	0.098 PCL
	Benzo(a)pyrene	0.0002PCL	0.0002PCL
	Dibenzofuran	0.29 PCL	0.098 PCL
	Fluorene	2.9PCL	0.98PCL
	Naphthalene	1.5 PCL	0.49 PCL
	Phenanthrene	2.2PCL	0.73PCL
	Pyrene	2.2PCL	0.73PCL
	Vinyl Chloride*	0.002 MCL/PCL	0.002 MCL/PCL
	Arsenic	0.01 MCL/PCL	0.01MCL/PCL

Unit Name	COLUMN A Hazardous Constituents	COLUMN B Groundwater Protection Standards (GWPS) at Alternate Point of Exposure (APOE) $^{GW}GW_{Ing}$ (mg/l) (C/I)	COLUMN C Groundwater Protection Standards (GWPS) at Alternate Point of Exposure (APOE) $^{GW}GW_{Ing}$ (mg/l) (Res)
C-TZ	Benzene	0.005 MCL/PCL	0.005 MCL/PCL
	2,4-Dimethylphenol	1.5 PCL	0.49 PCL
	2 Methylnaphthalene	0.29 PCL	0.098 PCL
	Benzo(a)pyrene	0.0002PCL	0.0002PCL
	Dibenzofuran	0.29 PCL	0.098 PCL
	Fluorene	2.9PCL	0.98PCL
	Naphthalene	1.5 PCL	0.49 PCL
	Phenanthrene	2.2PCL	0.73PCL
	Pyrene	2.2PCL	0.73PCL
	Vinyl Chloride*	0.002 MCL/PCL	0.002 MCL/PCL
	Arsenic	0.01 MCL/PCL	0.01MCL/PCL
D-TZ[1]	Benzene	0.005 MCL/PCL	0.005 MCL/PCL
	2,4-Dimethylphenol	1.5 PCL	0.49 PCL
	2 Methylnaphthalene	0.29 PCL	0.098 PCL
	Benzo(a)pyrene	0.0002PCL	0.0002PCL
	Dibenzofuran	0.29 PCL	0.098 PCL
	Fluorene	2.9PCL	0.98PCL
	Naphthalene	1.5 PCL	0.49 PCL
	Phenanthrene	2.2PCL	0.73PCL
	Pyrene	2.2PCL	0.73PCL
	Vinyl Chloride*	0.002 MCL/PCL	0.002 MCL/PCL
	Arsenic	0.01 MCL/PCL	0.01MCL/PCL

Note:
$^{GW}GW_{Ing}$ Protective Concentration Levels (PCLs), Commercial/Industrial and Residential assuming Class 2 Groundwater for A-TZ, B-TZ, and C-TZ GWBU, **Class 3 Groundwater for B-CZ GWBU, November 8, 2019; Table 3.
* Vinyl Chloride shall be sampled in accordance with the schedule specified in CP Table VIII.
** - Class 3 Groundwater PCLs used to develop GWPS for B-CZ GWBU.
[1]- D-TZ wells are corrective action observation wells. There is no PMZ in the D-TZ.

CP Table IIIA: Corrective Action Program Table of Indicator Parameters and Groundwater Protection Standard

Off-Site PMZ (City of Houston ROW)

Unit Name	COLUMN A Hazardous Constituents	COLUMN B Groundwater Protection Standards (GWPS) at Point of Exposure (POE) $^{GW}GW_{Ing}$ (mg/l) (Res)
A-TZ	Benzene	0.005 MCL/PCL
	2,4-Dimethylphenol	0.49 PCL
	2 Methylnaphthalene	0.098 PCL
	Benzo(a)pyrene	0.0002 PCL
	Dibenzofuran	0.098 PCL
	Fluorene	0.98 PCL
	Naphthalene	0.49 PCL
	Phenanthrene	0.73 PCL
	Pyrene	0.73 PCL
	Vinyl Chloride*	0.002 MCL/PCL
	Arsenic	0.01 MCL/PCL
B-CZ**	Benzene	0.5 MCL/PCL
	2,4-Dimethylphenol	49 PCL
	2 Methylnaphthalene	9.8 PCL
	Benzo(a)pyrene	0.02 PCL
	Dibenzofuran	9.8 PCL
	Fluorene	9.8 PCL
	Naphthalene	49 PCL
	Phenanthrene	73 PCL
	Pyrene	73 PCL
	Vinyl Chloride*	0.2 MCL/PCL
	Arsenic	1 MCL/PCL
B-TZ	Benzene	0.005 MCL/PCL
	2,4-Dimethylphenol	0.49 PCL
	2 Methylnaphthalene	0.098 PCL
	Dibenzofuran	0.098 PCL
	Naphthalene	0.49 PCL
	Vinyl Chloride*	0.002 MCL/PCL
	Benzo(a)pyrene	0.0002 PCL
	Fluorene	0.98 PCL
	Phenanthrene	0.73 PCL
	Pyrene	0.73 PCL
	Arsenic	0.01 MCL/PCL
C-TZ	Benzene	0.005 MCL/PCL
	2,4-Dimethylphenol	0.49 PCL

Unit Name	COLUMN A Hazardous Constituents	COLUMN B Groundwater Protection Standards (GWPS) at Point of Exposure (POE) $^{GW}GW_{Ing}$ (mg/l) (Res)
C-TZ (continued)	2 Methylnaphthalene	0.098 PCL
	Dibenzofuran	0.098 PCL
	Naphthalene	0.49 PCL
	Vinyl Chloride*	0.002 MCL/PCL
	Benzo(a)pyrene	0.0002PCL
	Fluorene	0.98PCL
	Phenanthrene	0.73PCL
	Pyrene	0.73PCL
D-TZ[1]	Benzene	0.005 MCL/PCL
	2,4-Dimethylphenol	0.49 PCL
	2 Methylnaphthalene	0.098 PCL
	Dibenzofuran	0.098 PCL
	Naphthalene	0.49 PCL
	Vinyl Chloride*	0.002 MCL/PCL
	Benzo(a)pyrene	0.0002PCL
	Fluorene	0.98PCL
	Phenanthrene	0.73PCL
	Pyrene	0.73PCL

Note:
$^{GW}GW_{Ing}$ Protective Concentration Levels (PCLs), Residential assuming Class 2 Groundwater for A-TZ, B-TZ, and C-TZ GWBU, **Class 3 Groundwater for B-CZ GWBU, November 8, 2019; Table 3.
*Vinyl Chloride shall be sampled in accordance with the schedule specified in CP Table VIII.
** - Class 3 Groundwater PCLs used to develop GWPS for B-CZ GWBU.
[1]- D-TZ wells are corrective action observation wells. There is no PMZ in the D-TZ.

CP Table IV: Compliance Monitoring Program Table of Hazardous and Solid Waste Constituents and Quantitation Limits

Reserved

CP Table IVA: Compliance Monitoring Program Table of Detected Hazardous Constituents and the Groundwater Protection Standard

Reserved

CP Table V: Designation of Wells

Point of Compliance Wells: (RCRA- Regulated Waste Management Unit 001 (SWMU 1) Only)

- A-TZ POC wells: MW-01A, MW-02, MW-07, MW-10A, and MW-11A;
- B-TZ POC wells: MW-10B, MW-11B, and P-10.

Point of Exposure Wells:

NONE

Alternate Point of Exposure Wells (PMZ Wells) (for other SWMUs and AOCs):

1. A-TZ

   On-Site: MW-12A, MW-13, MW-15A, MW-50A, MW-69A, MW-88A, MW-97A, MW-98A

   Off-Site: **MW-101A, MW-32AR, MW-33A, **MW-71A, **MW-34A, MW-36A, MW-25A, MW-61A, MW-59A, MW-47A

2. B-TZ/B-CZ

   On-Site (Main): MW-14, MW-15B, MW-50B, MW-80B, MW-88B, MW-98B
   On-Site (West): MW-22BR, MW-38B, MW-39B, MW-42B, MW-62B, P-10, P-12

   Off-Site: **RW-1B, MW-32B, MW-36B, MW-61B, MW-70B, MW-71B

3. C-TZ

   On-Site: MW-15C, MW-47C, MW-19C, and MW-88C

   Off-Site: **MW-32C, **MW-71C, MW-34CR, MW-54C, MW-48C, MW-70C

Background Wells (RCRA- Regulated Waste Management Unit 001 (SWMU 1)):

1. A-TZ: MW-8
2. B-TZ: P-12

FOA Boundary of Compliance Wells Background Wells:

Exposure Pathway: (e.g. SWGW - Groundwater to surface water PCL for Brazos River or Barge Canal, etc)

NONE

Note: Wells that are not listed in this table are subject to change, upon approval by the Executive Director, without modification to the Compliance Plan.

* - Proposed APOE Wells for the Off-Site PMZ, will be corrective action observation wells pending PMZ approval.

** - Proposed well, will be installed following approval of the Response Action Plan (see CP Attachment XI.D)

CP Table VI: Compliance Period for RCRA-Regulated Units

SWMU 1	Year or Number of Years
Year Waste Management Activities Initiated	1979
Year Closed (Certified Closed)	1984 (April 18)
Compliance Period	5 Years
Compliance Period Began	1994
Compliance Period Remaining	3 Years (2023)

CP Table VIII: Compliance Schedule

Item	**Compliance Schedule** (from the date of issuance of the Compliance Plan unless otherwise specified)	**Regulatory Citation**	**Requirement**
A.	60	Compliance Plan	Submit to the Executive Director a schedule summarizing all activities required by the Compliance Plan. The schedule shall list the starting dates of all routine activities. The Permittee shall include an updated schedule in the report required by Compliance Plan CP Table VII – Reporting Requirements. The schedule shall list the activity or report, the Compliance Plan Section which requires the activity or report and the calendar date the activity or report it to be completed or submitted (if this date can be determined).
B.	120 days from Compliance Plan Issuance	30 TAC §350.31(g)	Submit to the Executive Director proof of compliance with institutional control requirements in accordance with which provides notice of the existence and location of the Plume Management Zone (PMZ) and which prevents exposure to groundwater from this zone until such a time as constituents of concern may be reduced to below the Groundwater Protection Standards of CP Table III – Corrective Action Program Table of Detected Hazardous and Solid Waste Constituents and the Groundwater Protection Standard. • Filing of deed recordation for UPRR-owned properties requiring commercial/industrial land use and prohibiting groundwater use. Deed recordation will also restrict excavation activities over capped areas. • Filing of restrictive covenant prohibiting groundwater use for off-site PMZ.
C.	Notify within 30 days	30 TAC §350.33(k)	After an unexpected event occurs, or a condition is detected, during post-response action care period which indicates that additional response actions will be required at an affected property.
D.	Within 60 Days of Compliance Plan Issuance		DNAPL recovery will continue in the Corrective Action System Wells where DNAPL is recoverable. NAPL recovery through MPE events will be initiated following approval of the RAP and the proposed schedule detailed in the Revised RAP.
E.	During Second and Fourth Quarters of each year	30 TAC §350.33(4)(D)	Conduct groundwater monitoring events for those units listed in CP Table I that are subject to Compliance and Corrective action monitoring.
F.	Annually in accordance with CP Table VII		The Groundwater monitoring report required by CP Table VII shall include the results of all remediation and post-response action activities at the site, including Post Response Action Care Reports, and DNAPL recovery activities.
G.	During Second and Fourth Quarters of each year		Off-site MW-33BR and On-site wells MW-18A and MW-17C shall be sampled for vinyl chloride.

Item	**Compliance Schedule** (from the date of issuance of the Compliance Plan unless otherwise specified)	**Regulatory Citation**	**Requirement**
H.	Weekly until a revised frequency is approved upon submittal of the PRACR.		Inspections of NAPL Collection System in Englewood Intermodal Yard

FIGURES

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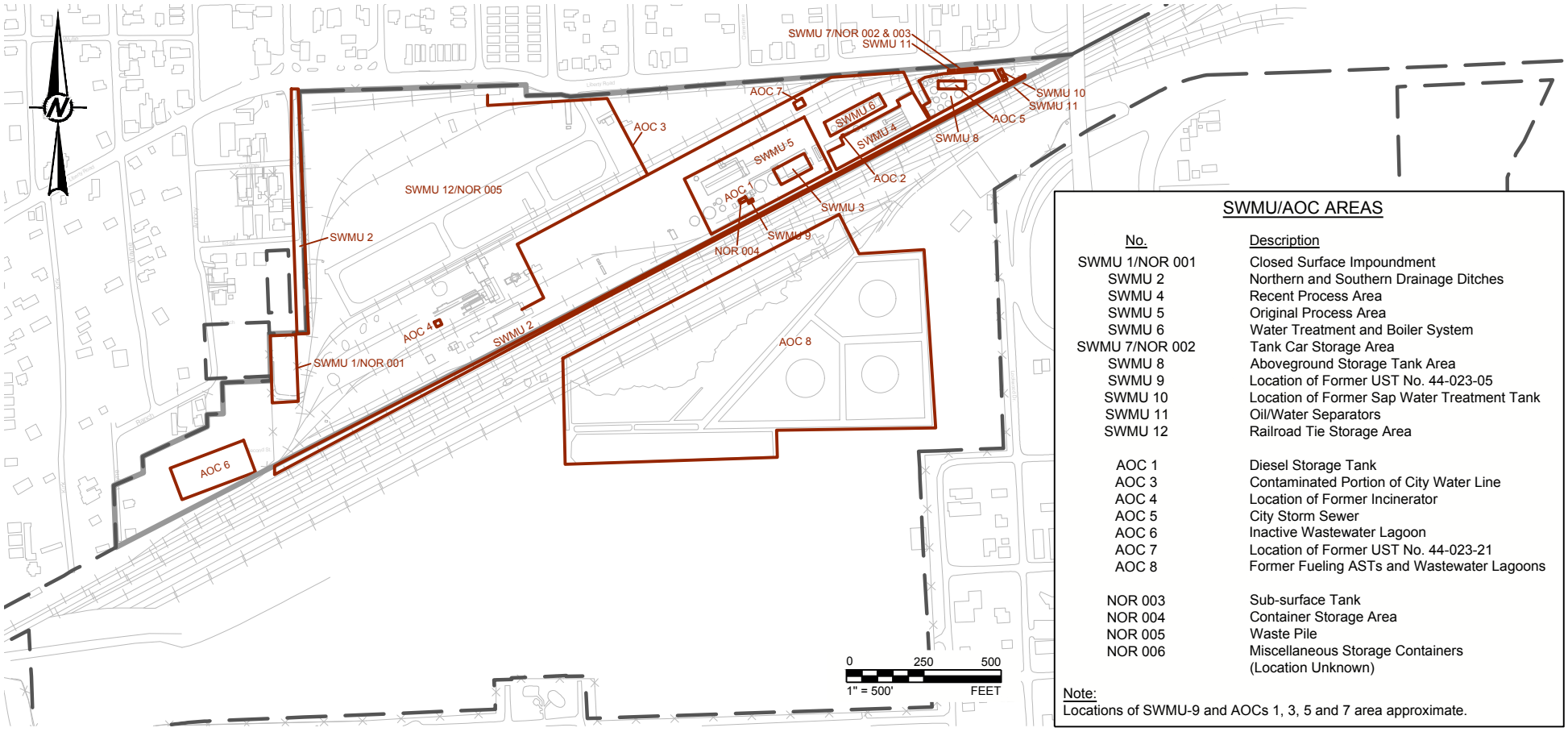
Path: \\texarkana\data\Projects - Round Rock_2019\19119232 - HWPW\2020-8 RAP Revision\ | File Name: FIG XI-A-2 - Locations of Former WMUs.dwg



SWMU/AOC AREAS

No.	Description
SWMU 1/NOR 001	Closed Surface Impoundment
SWMU 2	Northern and Southern Drainage Ditches
SWMU 4	Recent Process Area
SWMU 5	Original Process Area
SWMU 6	Water Treatment and Boiler System
SWMU 7/NOR 002	Tank Car Storage Area
SWMU 8	Aboveground Storage Tank Area
SWMU 9	Location of Former UST No. 44-023-05
SWMU 10	Location of Former Sap Water Treatment Tank
SWMU 11	Oil/Water Separators
SWMU 12	Railroad Tie Storage Area
AOC 1	Diesel Storage Tank
AOC 3	Contaminated Portion of City Water Line
AOC 4	Location of Former Incinerator
AOC 5	City Storm Sewer
AOC 6	Inactive Wastewater Lagoon
AOC 7	Location of Former UST No. 44-023-21
AOC 8	Former Fueling ASTs and Wastewater Lagoons
NOR 003	Sub-surface Tank
NOR 004	Container Storage Area
NOR 005	Waste Pile
NOR 006	Miscellaneous Storage Containers (Location Unknown)

Note:
Locations of SWMU-9 and AOCs 1, 3, 5 and 7 area approximate.

LEGEND

- UPRR PROPERTY BOUNDARY
- UPRR FACILITY BOUNDARY
- HISTORIC STRUCTURE AND FEATURE
- ROAD, PARKING LOT, SIDEWALK
- FENCE
- RAILROAD

REFERENCE(S)
BASE MAP TAKEN FROM ERM-SOUTHWEST, INC APAR ADDENDUM, FIG 3-1, DATED JUNE 2004.

CLIENT
UNION PACIFIC RAILROAD CO.

PROJECT
HOUSTON WOOD PRESERVING WORKS

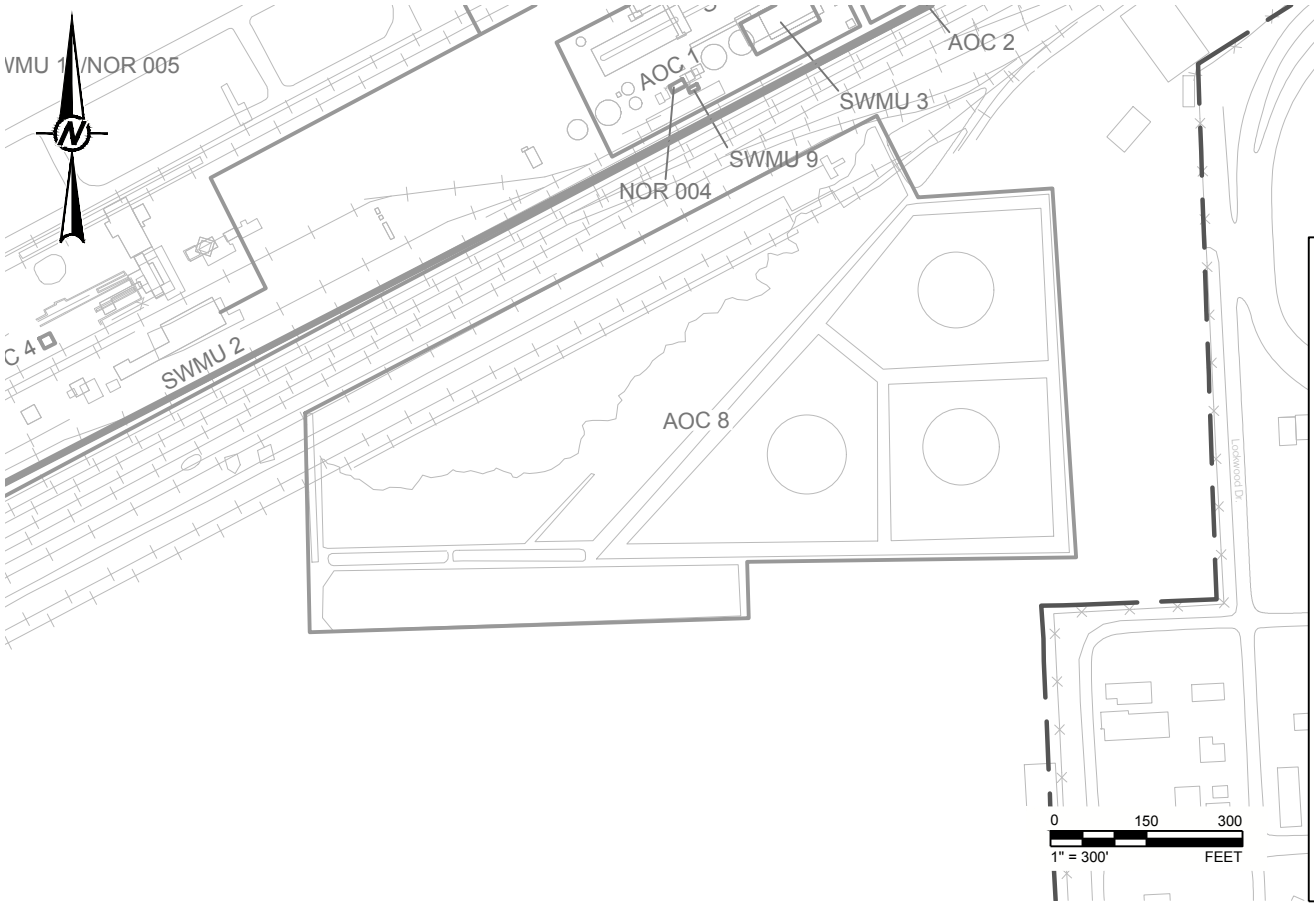
TITLE
LOCATIONS OF FORMER WASTE MANAGEMENT UNITS

CONSULTANT
GOLDER

YYYY-MM-DD	2020-08-26
DESIGNED	RS
PREPARED	RS
REVIEWED	MH
APPROVED	ECM

PROJECT NO. 19119232 | REV. 0 | FIGURE XI.A.2

Last Edited By: rsalazar Date: 2020-08-26 Time:9:13:45 AM | Printed By: RSalazar Date: 2020-08-26 Time:10:26:33 AM |
Path: \\texarkana\data\Projects - Round Rock_2019\19119232 - HWPW\2020-8 RAP Revision\ | File Name: FIG XI-A-2.4 - SWMUs-AOCs Under Corrective Action.dwg



SWMU/AOC AREAS

No.	Description
SWMU 1/NOR 001	Closed Surface Impoundment
SWMU 2	Northern and Southern Drainage Ditches
SWMU 4	Recent Process Area
SWMU 5	Original Process Area
SWMU 6	Water Treatment and Boiler System
SWMU 7/NOR 002	Tank Car Storage Area
SWMU 8	Aboveground Storage Tank Area
SWMU 9	Location of Former UST No. 44-023-05
SWMU 10	Location of Former Sap Water Treatment Tank
SWMU 11	Oil/Water Separators
SWMU 12	Railroad Tie Storage Area
AOC 1	Diesel Storage Tank
AOC 3	Contaminated Portion of City Water Line
AOC 4	Location of Former Incinerator
AOC 5	City Storm Sewer
AOC 6	Inactive Wastewater Lagoon
AOC 7	Location of Former UST No. 44-023-21
AOC 8	Former Fueling ASTs and Wastewater Lagoons
NOR 003	Sub-surface Tank
NOR 004	Container Storage Area
NOR 005	Waste Pile
NOR 006	Miscellaneous Storage Containers (Location Unknown)

Note:
Locations of SWMU-9 and AOCs 1, 3, 5 and 7 area approximate.

LEGEND

- UPRR PROPERTY BOUNDARY
- UPRR FACILITY BOUNDARY
- HISTORIC STRUCTURE AND FEATURE
- ROAD, PARKING LOT, SIDEWALK
- FENCE
- RAILROAD

REFERENCE(S)

BASE MAP TAKEN FROM ERM-SOUTHWEST, INC APAR ADDENDUM, FIG 3-1, DATED JUNE 2004.

CLIENT
UNION PACIFIC RAILROAD CO.

PROJECT
HOUSTON WOOD PRESERVING WORKS

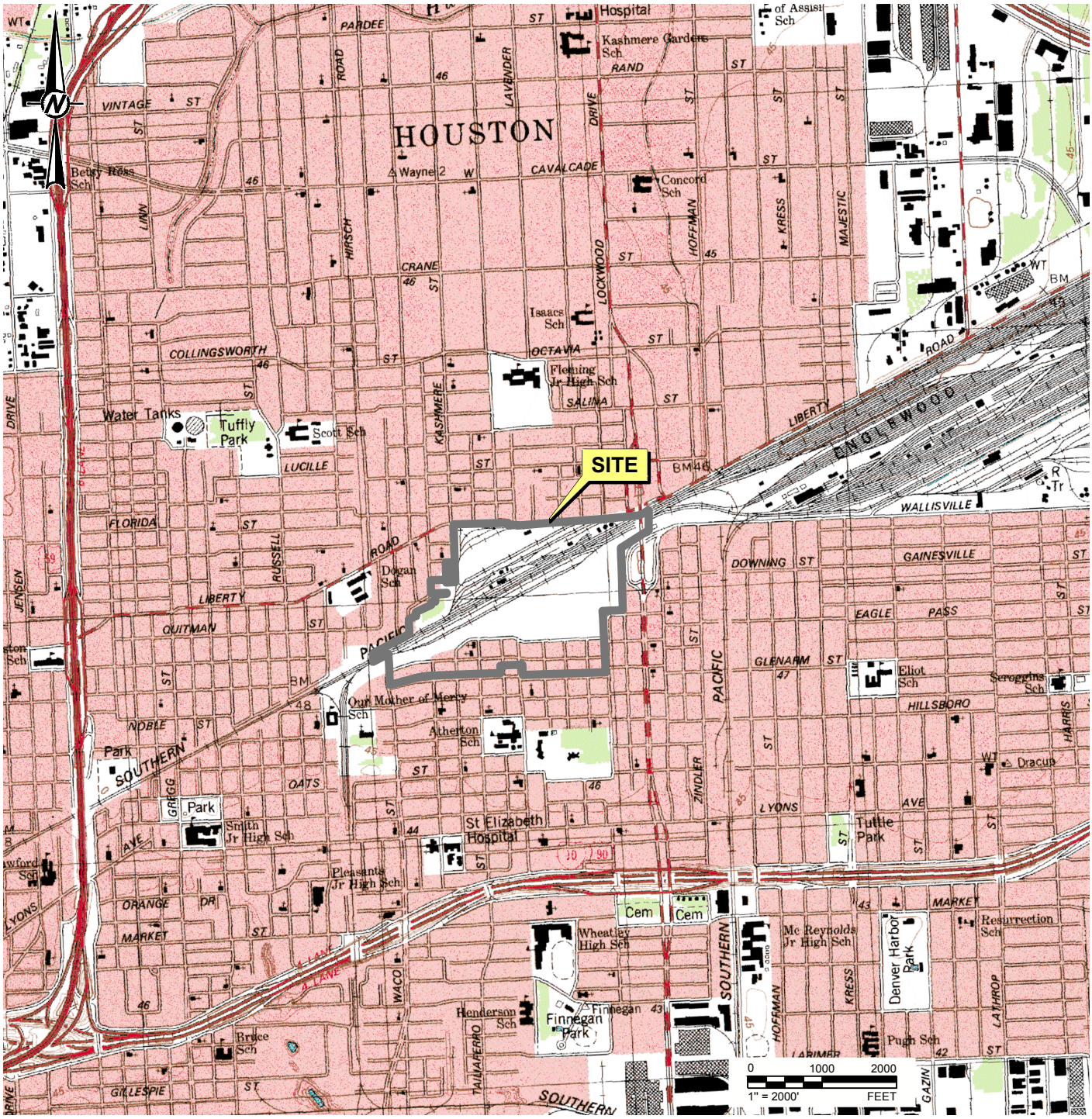
TITLE
SWMUs-AOCs UNDER CORRECTIVE ACTION

CONSULTANT
GOLDER

YYYY-MM-DD	2020-08-26
DESIGNED	RS
PREPARED	RS
REVIEWED	MH
APPROVED	ECM

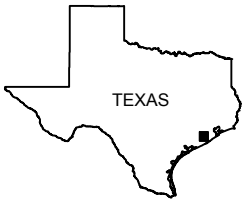
PROJECT NO. 19119232 | REV. 0 | FIGURE XI.A.2.4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0



LEGEND

FACILITY BOUNDARY



QUADRANGLE LOCATIONS

REFERENCE(S)

BASE MAP FROM WWW.TNRIS.GOV, SETTEGAST, TX 7.5 MIN. USGS QUADRANGLE DATED 1982.

CLIENT
UNION PACIFIC RAILROAD CO.

PROJECT
HOUSTON WOOD PRESERVING WORKS

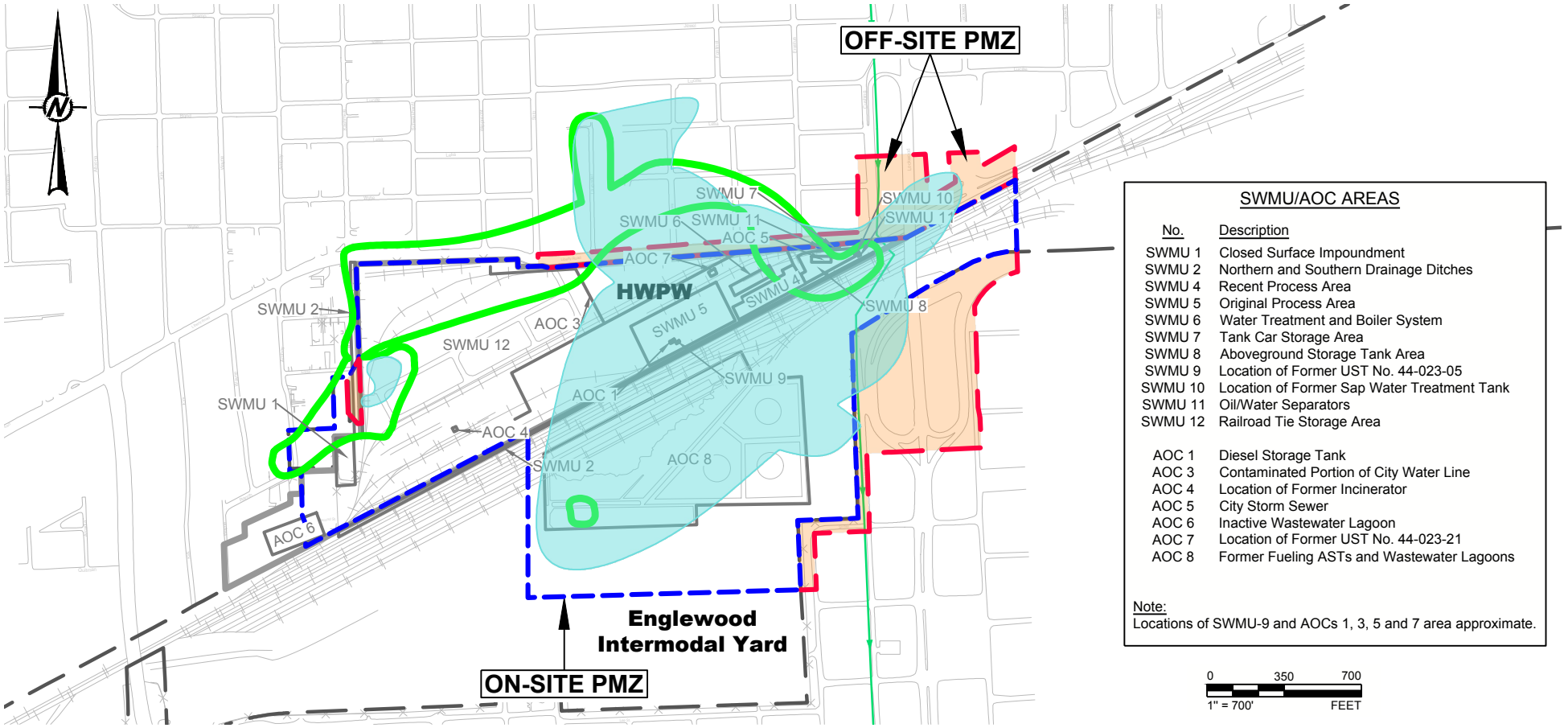
TITLE
FACILITY SITE MAP

CONSULTANT
GOLDER
TEXAS GEOSCIENCE FIRM NO. 50369
TEXAS ENGINEERING FIRM NO. 2578

YYYY-MM-DD	2020-08-26
DESIGNED	AJD
PREPARED	AJD
REVIEWED	MH
APPROVED	ECM

PROJECT NO. 19119232 | REV. 0 | CP ATTACHMENT A SHEET 1 of 7

Last Edited By: rsalazar Date: 2020-08-27 Time:9:44:58 AM | Printed By: RSalazar Date: 2020-08-27 Time:4:51:39 PM |
Path: \\texarkana\data\Projects - Round Rock_2019\19119232 - HWPW\2020-8 RAP Revision\CP Attachments\ | File Name: CP Attachment A Sheet 2 of 7 Solid Waste Management Units (SWMUs)-Areas of Concern (AOCs) Location Map.dwg



SWMU/AOC AREAS

No.	Description
SWMU 1	Closed Surface Impoundment
SWMU 2	Northern and Southern Drainage Ditches
SWMU 4	Recent Process Area
SWMU 5	Original Process Area
SWMU 6	Water Treatment and Boiler System
SWMU 7	Tank Car Storage Area
SWMU 8	Aboveground Storage Tank Area
SWMU 9	Location of Former UST No. 44-023-05
SWMU 10	Location of Former Sap Water Treatment Tank
SWMU 11	Oil/Water Separators
SWMU 12	Railroad Tie Storage Area
AOC 1	Diesel Storage Tank
AOC 3	Contaminated Portion of City Water Line
AOC 4	Location of Former Incinerator
AOC 5	City Storm Sewer
AOC 6	Inactive Wastewater Lagoon
AOC 7	Location of Former UST No. 44-023-21
AOC 8	Former Fueling ASTs and Wastewater Lagoons

Note:
Locations of SWMU-9 and AOCs 1, 3, 5 and 7 area approximate.

0 350 700
1" = 700' FEET

LEGEND

- UPRR PROPERTY BOUNDARY
- ROAD, PARKING LOT, SIDEWALK
- FENCE
- RAILROAD
- UPRR FACILITY BOUNDARY
- GROUNDWATER PCLE ZONES (JAN-MAR 2020) (A-TZ AND B-CZ/B-TZ)
- GROUNDWATER PCLE ZONE - ARSENIC (JAN-MAR 2020) (A-TZ, B-CZ/B-TZ AND C-TZ)
- PROPOSED CUMULATIVE PMZ (A-TZ, B-CZ/B-TZ, AND C-TZ)
- ON-SITE PMZ
- OFF-SITE PMZ
- OFF-SITE PMZ CITY OF HOUSTON ROW

REFERENCE(S)
BASE MAP FROM ERM-SOUTHWEST, INC APAR ADDENDUM, FIG 3-1, DATED JUNE 2004.

CLIENT
UNION PACIFIC RAILROAD CO.

PROJECT
HOUSTON WOOD PRESERVING WORKS

TITLE
SOLID WASTE MANAGEMENT UNITS (SWMUs) / AREAS OF CONCERN (AOCs) LOCATION MAP

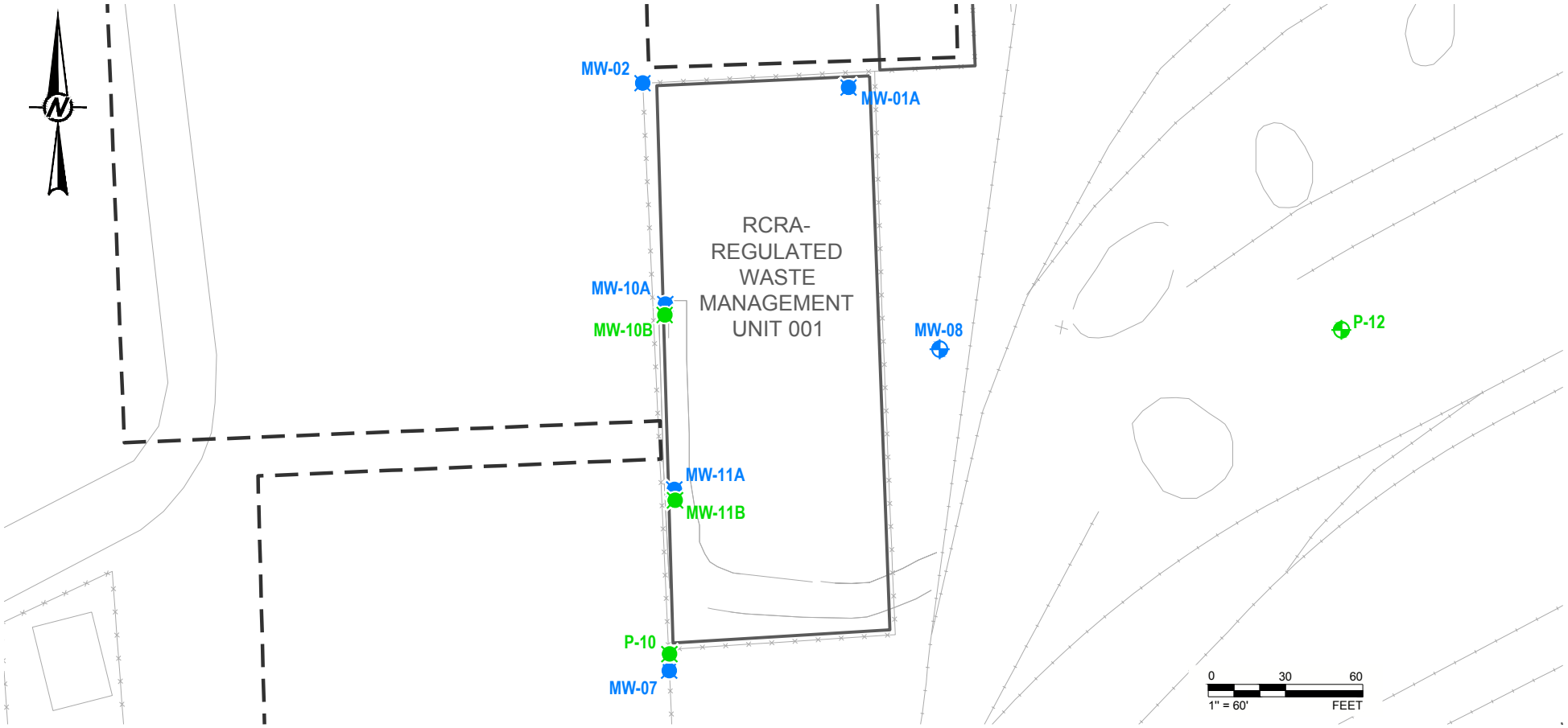
CONSULTANT
GOLDER
TEXAS GEOSCIENCE FIRM NO. 50369
TEXAS ENGINEERING FIRM NO. 2578

YYYY-MM-DD	2020-08-26
DESIGNED	AJD
PREPARED	AJD/RS
REVIEWED	MH
APPROVED	ECM

PROJECT NO. 19119232 | REV. 0 | CP ATTACHMENT A SHEET 2 of 7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0

Last Edited By: rsalazar Date: 2020-08-24 Time:2:59:32 PM | Printed By: RSalazar Date: 2020-08-27 Time:9:46:16 AM |
Path: \\texarkana\data\Projects - Round Rock_2019\19119232 - HWPW\2020-8 RAP Revision\CP Attachments\ | File Name: CP Attachment A Sheet 3 of 7 Compliance Monitoring Well Network TCEQ Permit 50343.dwg



LEGEND

- UPRR PROPERTY BOUNDARY
- ROAD, PARKING LOT, SIDEWALK
- FENCE
- RAILROAD
- A-TZ BACKGROUND MONITORING WELL LOCATION
- B-TZ BACKGROUND MONITORING WELL LOCATION
- A-TZ POINT-OF-COMPLIANCE (POC) WELL LOCATION
- B-TZ POINT-OF-COMPLIANCE (POC) WELL LOCATION

REFERENCE(S)

BASE MAP FROM ERM-SOUTHWEST, INC APAR ADDENDUM, FIG 3-1, DATED JUNE 2004.

CLIENT
UNION PACIFIC RAILROAD CO.

PROJECT
HOUSTON WOOD PRESERVING WORKS

TITLE
CORRECTIVE ACTION MONITORING WELL NETWORK - RCRA - REGULATED WASTE MANAGEMENT UNIT 001 - TCEQ PERMIT 50343; SWR NO. 31547

CONSULTANT
GOLDER
TEXAS GEOSCIENCE FIRM NO. 50369
TEXAS ENGINEERING FIRM NO. 2578

YYYY-MM-DD	2020-08-24
DESIGNED	AJD
PREPARED	AJD/RS
REVIEWED	MH
APPROVED	ECM

PROJECT NO. 19119232
REV. 0
CP ATTACHMENT A SHEET 3 of 7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0

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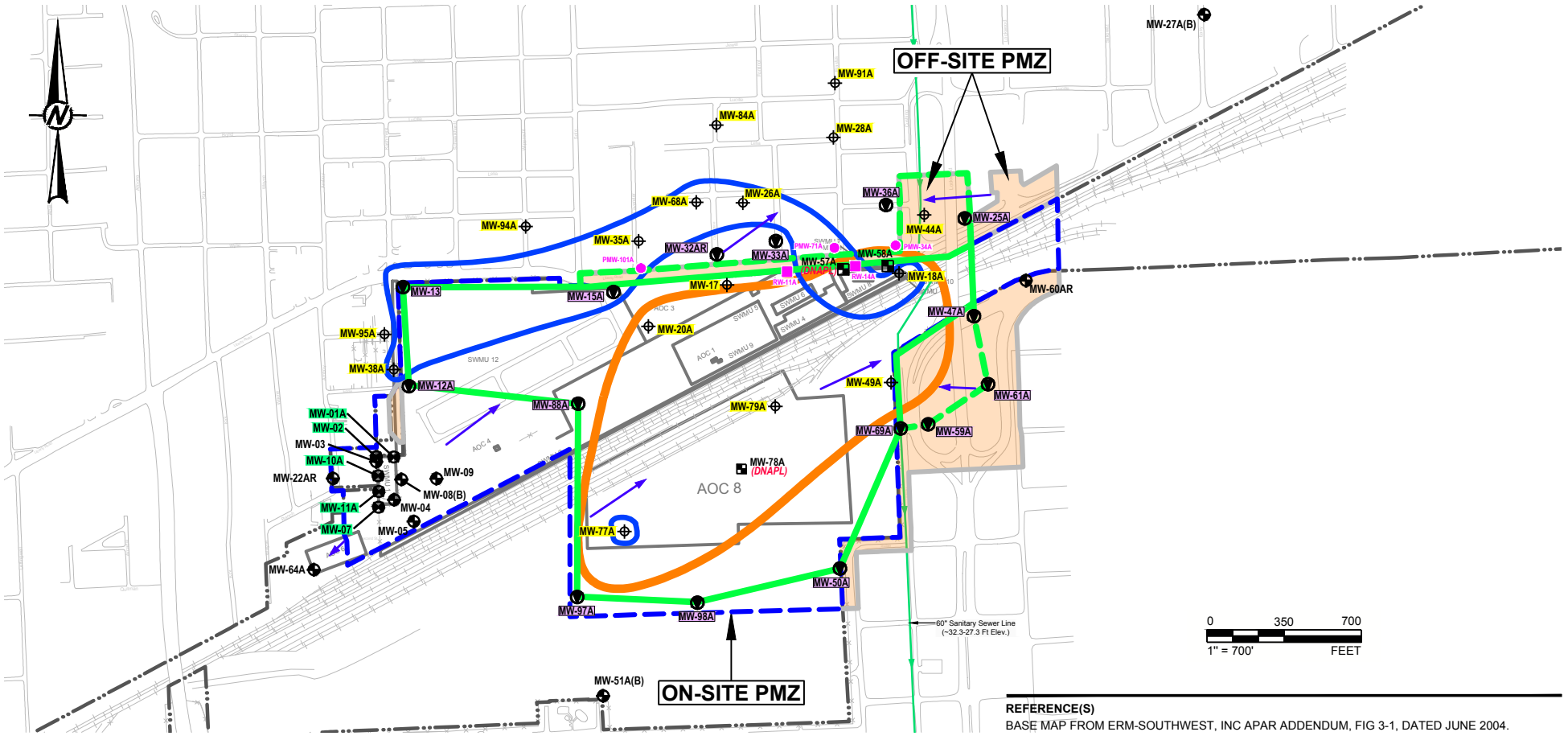
Path: \\texarkana\data\Projects - Round Rock_2019\19119232 - HWPW\2020-8 RAP Revision\CP Attachments\ | File Name: CP Attachment A Sheet 4 of 7 PMZ Boundary Map A-TZ.dwg



REFERENCE(S)

BASE MAP FROM ERM-SOUTHWEST, INC APAR ADDENDUM, FIG 3-1, DATED JUNE 2004.

LEGEND

- UPRR PROPERTY BOUNDARY
- ROAD, PARKING LOT, SIDEWALK
- FENCE
- RAILROAD
- A-TZ MONITORING WELL LOCATION
- A-TZ CORRECTIVE ACTION SYSTEM WELLS (CAS) (DNAPL RECOVERY)
- PCLE ZONE
- A-TZ PMZ BOUNDARY (ON-SITE)
- A-TZ PMZ BOUNDARY (OFF-SITE)
- ARSENIC PCLE ZONE
- PROPOSED A-TZ APOE WELL LOCATION
- PROPOSED CORRECTIVE ACTION WELL LOCATION (A-TZ DNAPL RECOVERY WELL)
- MW-15A — ALTERNATE POINT OF EXPOSURE (APOE) WELLS
- MW-79A — CORRECTIVE ACTION OBSERVATION WELLS (CAO)
- MW-01A — POINT OF COMPLIANCE WELLS (POC)
- INFERRED GROUNDWATER FLOW DIRECTION
- PROPOSED CUMULATIVE PMZ (A-TZ, B-CZ/B-TZ, AND C-TZ)
- ON-SITE PMZ
- OFF-SITE PMZ
- OFF-SITE PMZ CITY OF HOUSTON ROW

NOTE(S)

1. DNAPL = DENSE NON-AQUEOUS PHASE LIQUIDS DETECTED IN MONITORING WELL (JANUARY 2020).
2. (B) - BACKGROUND WELL.

CLIENT
UNION PACIFIC RAILROAD CO.

PROJECT
HOUSTON WOOD PRESERVING WORKS

TITLE
PMZ BOUNDARY MAP - A-TZ

CONSULTANT
GOLDER
TEXAS GEOSCIENCE FIRM NO. 50369
TEXAS ENGINEERING FIRM NO. 2578

YYYY-MM-DD	2020-08-26
DESIGNED	AJD
PREPARED	AJD/RS
REVIEWED	MH
APPROVED	ECM

PROJECT NO. 19119232 | REV. 0 | CP ATTACHMENT A SHEET 4 of 7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
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Last Edited By: rsalazar Date: 2020-08-28 Time:10:16:20 AM | Printed By: RSalazar Date: 2020-08-28 Time:2:19:56 PM |
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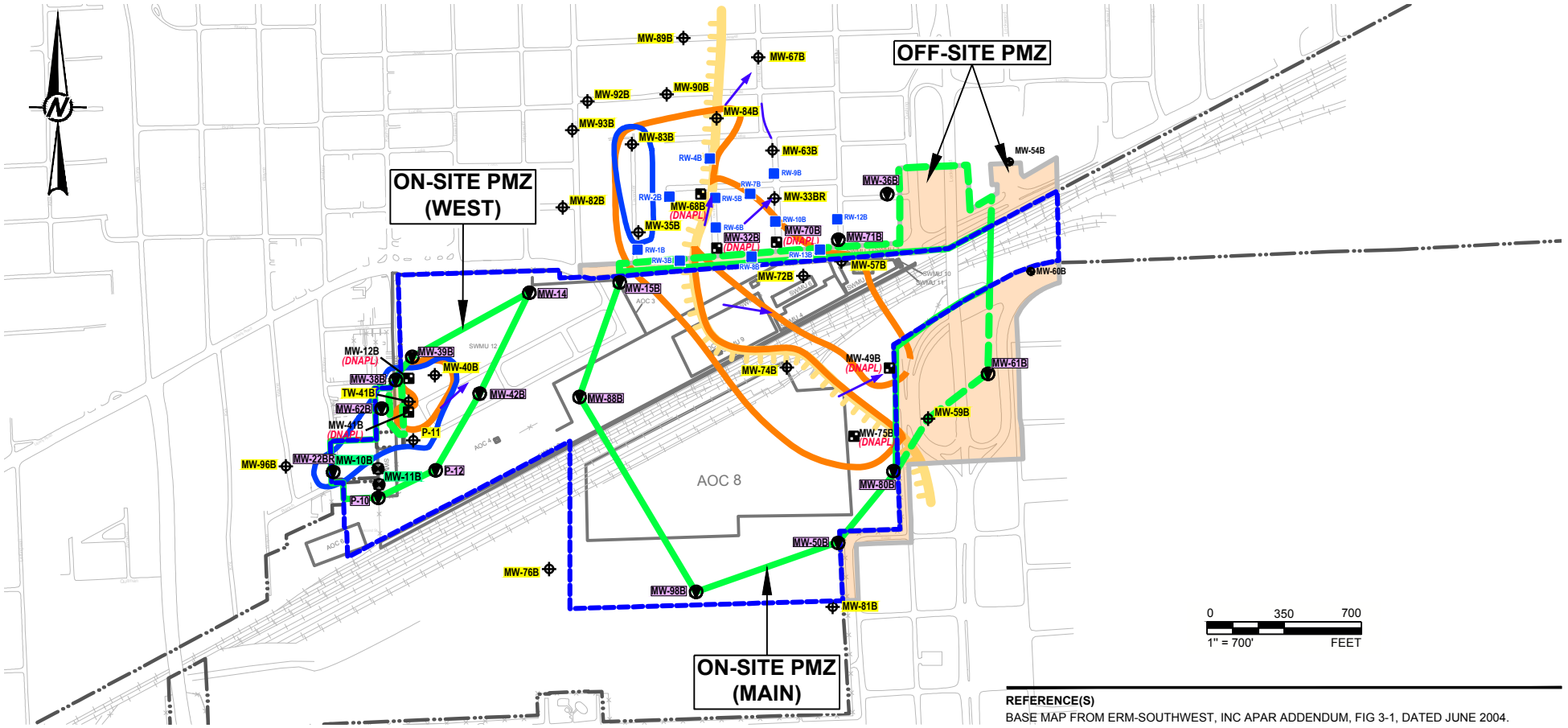

REFERENCE(S)
BASE MAP FROM ERM-SOUTHWEST, INC APAR ADDENDUM, FIG 3-1, DATED JUNE 2004.

LEGEND

- UPRR PROPERTY BOUNDARY
- ROAD, PARKING LOT, SIDEWALK
- FENCE
- RAILROAD
- B UNIT MONITORING WELL LOCATION
- B UNIT CORRECTIVE ACTION SYSTEM WELLS (CAS) (DNAPL RECOVERY)
- B-CZ / B-TZ B-TZ/B-CZ BOUNDARY
- PCLE ZONE
- B-CZ/B-TZ PMZ BOUNDARY (ON-SITE)
- B-CZ/B-TZ PMZ BOUNDARY (OFF-SITE)
- ARSENIC PCLE ZONE
- PROPOSED CORRECTIVE ACTION WELL LOCATION (B-CZ/B-TZ DNAPL RECOVERY WELL)
- MW-15B — ALTERNATE POINT OF EXPOSURE (APOE) WELLS
- MW-76B — CORRECTIVE ACTION OBSERVATION (CAO) WELLS
- MW-11B — POINT OF COMPLIANCE WELLS (POC)
- INFERRED GROUNDWATER FLOW DIRECTION
- PROPOSED CUMULATIVE PMZ (A-TZ, B-CZ/B-TZ, AND C-TZ)
- ON-SITE PMZ
- OFF-SITE PMZ
- OFF-SITE PMZ CITY OF HOUSTON ROW

NOTE(S)
1. DNAPL = DENSE NON-AQUEOUS PHASE LIQUIDS DETECTED IN MONITORING WELL (JANUARY 2020).
2. (B) - BACKGROUND WELL.

CLIENT
UNION PACIFIC RAILROAD CO.

PROJECT
HOUSTON WOOD PRESERVING WORKS

TITLE
PMZ BOUNDARY MAP - B-CZ/B-TZ

CONSULTANT
GOLDER
TEXAS GEOSCIENCE FIRM NO. 50369
TEXAS ENGINEERING FIRM NO. 2578

YYYY-MM-DD	2020-08-26
DESIGNED	AJD
PREPARED	AJD/RS
REVIEWED	MH
APPROVED	ECM

PROJECT NO. 19119232 | REV. 0 | CP ATTACHMENT A SHEET 5 of 7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
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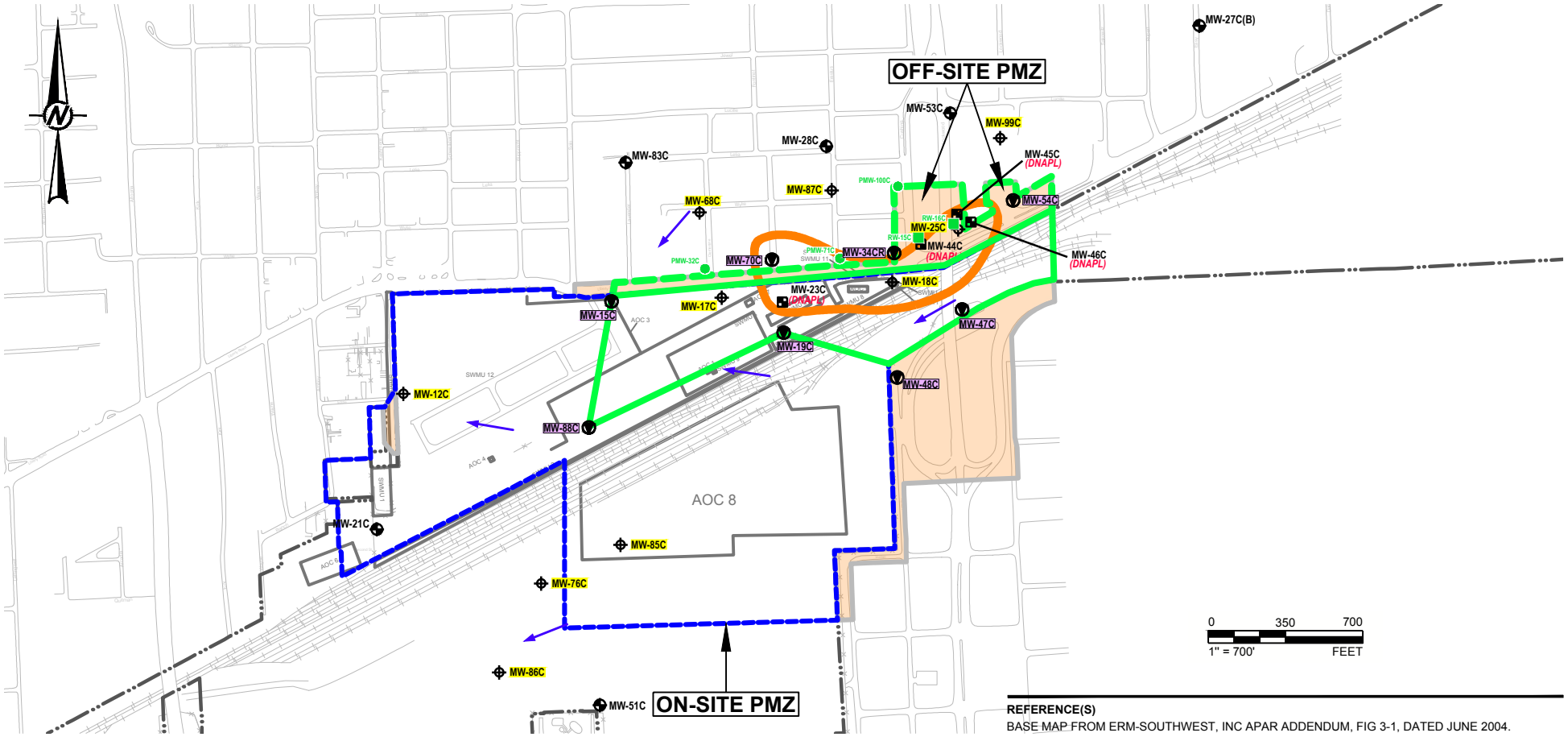
Last Edited By: rsalazar Date: 2020-08-28 Time:2:10:10 PM | Printed By: RSalazar Date: 2020-08-28 Time:4:55:54 PM |
Path: \\texarkana\data\Projects - Round Rock_2019\19119232 - HWPW\2020-8 RAP Revision\CP Attachments\ | File Name: CP Attachment A Sheet 6 of 7 PMZ Boundary Map C-TZ.dwg



REFERENCE(S)
BASE MAP FROM ERM-SOUTHWEST, INC APAR ADDENDUM, FIG 3-1, DATED JUNE 2004.

LEGEND

- UPRR PROPERTY BOUNDARY
- ROAD, PARKING LOT, SIDEWALK
- FENCE
- RAILROAD
- C-TZ MONITORING WELL LOCATION
- C-TZ CORRECTIVE ACTION SYSTEM WELLS (CAS) (DNAPL RECOVERY)
- PCLE ZONE
- C-TZ PMZ BOUNDARY (ON-SITE)
- C-TZ PMZ BOUNDARY (OFF-SITE)
- PROPOSED C-TZ APOE WELL LOCATION
- PROPOSED CORRECTIVE ACTION WELL LOCATION (C-TZ DNAPL RECOVERY WELL)
- MW-15C — ALTERNATE POINT OF EXPOSURE (APOE) WELLS
- MW-86C — CORRECTIVE ACTION OBSERVATION (CAO) WELLS
- MW-01A — POINT OF COMPLIANCE WELLS (POC)
- INFERRED GROUNDWATER FLOW DIRECTION
- PROPOSED CUMULATIVE PMZ (A-TZ, B-CZ/B-TZ, AND C-TZ)
- ON-SITE PMZ
- OFF-SITE PMZ
- OFF-SITE PMZ CITY OF HOUSTON ROW

NOTE(S)
1. DNAPL = DENSE NON-AQUEOUS PHASE LIQUIDS DETECTED IN MONITORING WELL (JANUARY 2020).
2. (B) - BACKGROUND WELL.

CLIENT
UNION PACIFIC RAILROAD CO.

PROJECT
HOUSTON WOOD PRESERVING WORKS

TITLE
PMZ BOUNDARY MAP - C-TZ

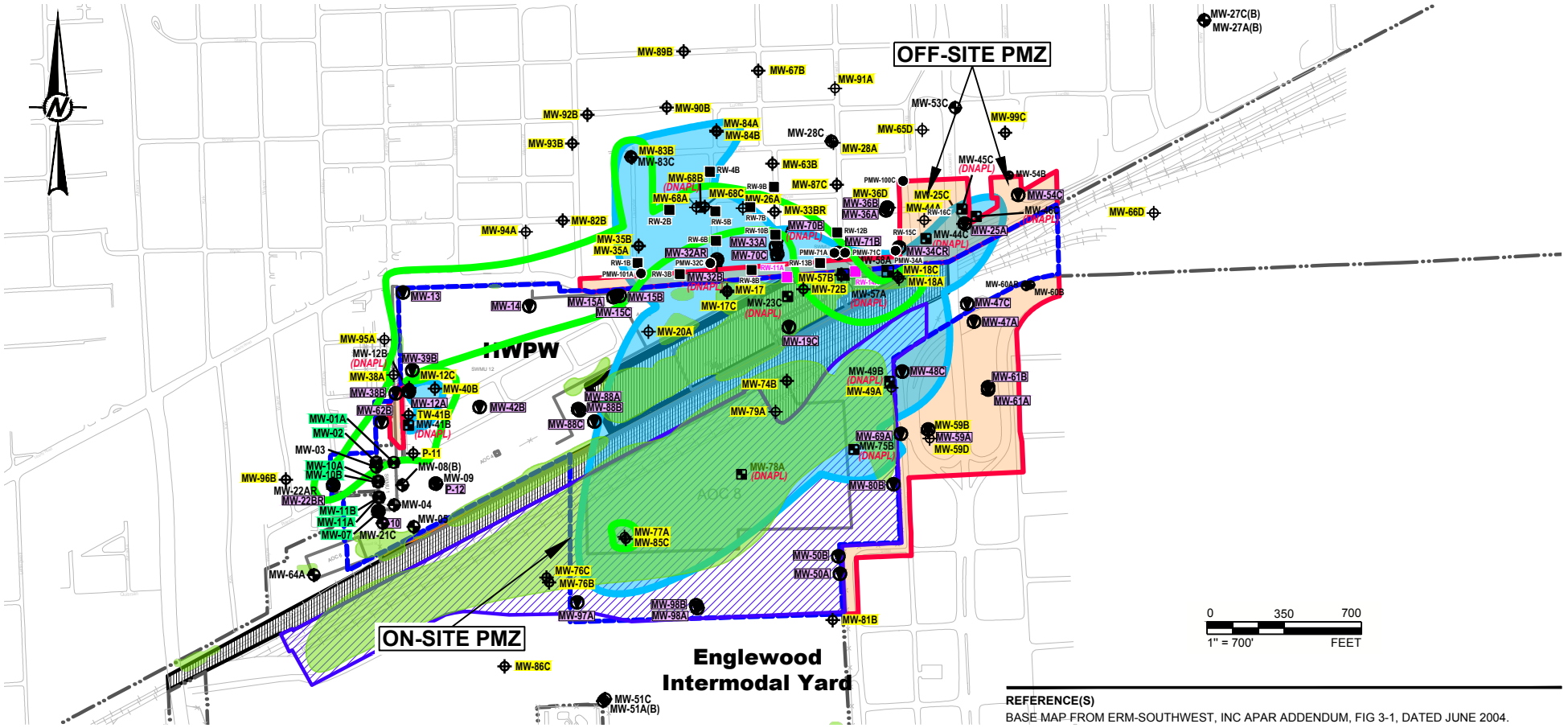
CONSULTANT
GOLDER
TEXAS GEOSCIENCE FIRM NO. 50369
TEXAS ENGINEERING FIRM NO. 2578

YYYY-MM-DD	2020-08-26
DESIGNED	AJD
PREPARED	AJD/RS
REVIEWED	MH
APPROVED	ECM

PROJECT NO. 19119232 | REV. 0 | CP ATTACHMENT A SHEET 6 of 7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0

Last Edited By: rsalazar Date: 2020-08-27 Time:6:02:02 PM | Printed By: RSalazar Date: 2020-08-28 Time:2:14:44 PM |
Path: \\texarkana\data\Projects - Round Rock_2019\19119232 - HWPW\2020-8 RAP Revision\CP Attachments\ | File Name: CP Attachment A Sheet 7 of 7 Post-Response Action Care Well Location Map.dwg



REFERENCE(S)

BASE MAP FROM ERM-SOUTHWEST, INC APAR ADDENDUM, FIG 3-1, DATED JUNE 2004.

LEGEND

- UPRR PROPERTY BOUNDARY
- ROAD, PARKING LOT, SIDEWALK
- FENCE
- RAILROAD
- MONITORING WELL LOCATION
- CORRECTIVE ACTION SYSTEM WELLS (DNAPL RECOVERY)
- SOIL AFFECTED PROPERTY
- GROUNDWATER PCLE ZONES (A-TZ, B-CZ/B-TZ, AND C-TZ)
- GROUNDWATER PCLE ZONE - ARSENIC (JAN-MAR 2020) (A-TZ, B-CZ/B-TZ AND C-TZ)
- MW-15A — ALTERNATE POINT OF EXPOSURE (APOE) WELLS
- MW-96B — CORRECTIVE ACTION OBSERVATION (CAO) WELLS
- MW-10A — POINT OF COMPLIANCE (POC) WELLS
- PROPOSED APOE WELL LOCATION
- PROPOSED CORRECTIVE ACTION WELL LOCATION (DNAPL RECOVERY WELL)
- RAILROAD BALLAST CAP AREA
- ASPHALT CAP AREA
- SOIL CAP
- CONCRETE CAP AREA
- PROPOSED CUMULATIVE PMZ (A-TZ, B-CZ/B-TZ, AND C-TZ)
- ON-SITE PMZ
- OFF-SITE PMZ
- OFF-SITE PMZ CITY OF HOUSTON ROW

NOTE(S)

1. DNAPL = DENSE NON-AQUEOUS PHASE LIQUIDS DETECTED IN MONITORINGWELL (JANUARY 2020).
2. (B) - BACKGROUND WELL.

CLIENT
UNION PACIFIC RAILROAD CO.

PROJECT
HOUSTON WOOD PRESERVING WORKS

TITLE
POST-RESPONSE ACTION CARE WELL LOCATION MAP

CONSULTANT
GOLDER
TEXAS GEOSCIENCE FIRM NO. 50369
TEXAS ENGINEERING FIRM NO. 2578

YYYY-MM-DD	2020-08-25
DESIGNED	AJD
PREPARED	AJD/RS
REVIEWED	MH
APPROVED	ECM

PROJECT NO. 19119232 | REV. 0 | CP ATTACHMENT A SHEET 7 of 7

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A
1 in
0

Attachment D

RESPONSE ACTION PLAN

Union Pacific Railroad Company
Houston Wood Preserving Works
Houston, Texas