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March 23, 2023

Mr. Jeff Kolmel Environnemental Scientist Individual Permitting Section Utah Division of Water Quality 195 North 1950 West Salt Lake City, Utah 84116

Subject: Corrective Action Plan Ted's Service Station 3180 South Highway 89 Logan, Utah 84321 Facility ID: 0100190 BIO-WEST Project No: 3006

Dear Mr. Kolmel:

Executive Summary

BIO-WEST, Inc. (BIO-WEST) is submitting this Corrective Action Plan (CAP) to conduct remediation operations at the Ted's Service Station property located at 3180 South Highway 89 in Logan, Utah. (Attachment 1, Figures 1, 2,). The objective of this CAP is to address contaminated soil and groundwater at subject property. This letter was prepared by Mr. Wes Thompson of BIO-WEST, the environmental consultant for Mr. Ted Ricks, the current property owner.

Introduction and Background

The subject property is located at the address noted above. The property is currently developed as an automotive repair facility and gas station. The property includes an auto repair shop, storage shed, residence, and garage. Three 12,000-gallon aboveground storage tanks (ASTs) are also located on the subject property. The ASTs were labeled as containing gasoline, premium gasoline, and diesel fuel. The ASTs sit on steel pans filled with gravel. Product lines from the ASTs run underground to two fuel dispenser islands located west of the repair shop. Numerous automobiles, automobile engines, automobile parts, tires, and other various debris are stored on the subject property.

The subject property is bound on the south by 3200 South Street, on the east by 2000 West Street, and on the north and west by US-89. Attachment 1 contains a Subject Property Location Map (Figure 1), Subject Property Vicinity Map (Figure 2), and Subject Property Site Map (Figure 3).

Utilities in the area include underground natural gas lines located on both sides of US-89, the south side of 3200 South Street, and the east side of 2000 West Street. An underground sewer line is located on the south side of 3200 South Street. An underground water line is located on the north side of 3200 South Street. An underground telephone line is located on the west side of 2000 West Street. Overhead powerlines are located around the perimeter of the subject property as well as two power poles located near the repair shop. The depth



of the utility lines is not known and it is unclear if the utility line excavations encountered groundwater during installation. The utility lines in the area are shown on the utility map (Figure 4) in Attachment 1.

A Phase II subsurface investigation conducted by BIO-WEST in April 2007 showed significant subsurface contamination was present in both the soil and groundwater on the subject property (BIO-WEST 2007). A total of six monitor wells (MW-1 through MW-6) were installed and sampled on the subject property during this investigation.

A Phase I Environmental Assessment of the subject property conducted by BIO-WEST in January 2015 revealed no evidence that any remedial action had taken place regarding the subsurface contamination at the subject property (BIO-WEST 2015a). As a result, a second Phase II subsurface investigation was conducted by BIO-WEST in April 2015 (BIO-WEST 2015b). An additional five monitor wells (MW-7 through MW-11) were installed and sampled on the subject property and the western-adjacent property across US-89 during this investigation. This investigation revealed that contamination from the subject property extended beneath US-89 and onto the adjacent western property owned by Mr. Doyle Zollinger.

A subsurface investigation was completed by BIO-WEST in September 2022 (BIO-WEST 2022a)to reevaluate the site after a notice of violation was issued by the Utah Department of Environmental Quality (DEQ) in September 2019. The results of this subsurface investigation showed that significant petroleum hydrocarbon (gasoline) contamination exists in the subsurface at the subject property and across US-89 on the Zollinger property.

In December 2022, BIO-WEST conducted an additional subsurface investigation on the Zollinger property (BIO-WEST 2022b). The purpose of this investigation was to further define the extent of the contamination plume and to evaluate possible petroleum vapor intrusion into the house and workshop buildings located on that property. This investigation revealed that soil and groundwater contamination extend beyond the Zollinger property boundaries and that additional investigation is required to determine the extent of the contamination plume. Soil vapor sampling results from this investigation indicate that the house and workshop building on the Zollinger property are impacted by VOC concentrations above EPA screening levels for various chemicals.

Corrective Action Plan

Because of the large extent of contamination identified from the various assessments of the site this corrective action plan will be divided into two separate sections to remediate both the on-site and off-site areas of the project site.

On-site Corrective Action Plan

BIO-WEST has determined that a combination of soil excavation and groundwater removal is the best technique for remediating the on-site portion of the site.

BIO-WEST proposes to remove and dispose of the contaminated soil at an off-site land farm location owned by Mr. Ricks. During excavation and backfilling activities, groundwater will be pumped from the excavation into a steel frac tank for treatment and disposal.

Site Excavation Preparation

Prior to excavation, all of the debris including automobiles, automobile engines, automobile parts, tires, and other various debris will be removed from the excavation area.



Since soil sample results indicate that contamination is present under the repair shop, the repair shop be demolished. An asbestos inspection of the repair shop will be conducted prior to demolition and asbestos containing materials will be properly disposed of.

During excavation activities the product lines and pump islands will be removed. Utah legislation passed in 2021 requires that specific types of ASTs meet certain requirements in order to be operated in Utah. These ASTs must be in compliance with the new regulations by June 30, 2023. Since the three ASTs on-site do not currently meet the requirements outlined in the new AST regulations, substantial improvements to the fuel system will be required in order for the ASTs to be in compliance. As such, the ASTs also be removed during excavation activities. Prior to removal of the fuel system BIO-WEST will complete and submit a closure plan to the Utah Department of Environmental Response and Remediation (DERR). BIO-WEST will then supervise the cleaning, inerting, and removal of the fuel system. Once the fuel system has been removed, BIO-WEST will submit a closure notice to the Utah DERR.

Soil Excavation

BIO-WEST proposes excavation of the petroleum-impacted soils from the on-site area of the site. The excavation area includes all the areas documented as impacted from the previous assessments, including the fuel lines, pump islands and the repair shop. Figure 5 in Attachment A illustrates the proposed excavation area. The former drum storage area that was noted in the Phase I report (BIO-WEST 2015) would be within the excavation area.

Any clean soils that are encountered during excavation activities will be segregated out from the petroleum impacted soils and placed on the field to the north of the repair shop.

BIO-WEST will supervise the soil excavation to ensure the safety of on-site personnel and to provide the oversight required for determining the limits of the excavation. Prior to field work, BIO-WEST will generate a site-specific health and safety plan and notify Blue Stakes a minimum of 48 hours prior to excavation.

Approximately 6,600 cubic yards of soil will be excavated. Based on the soil sample results from previous investigations, the depth of the excavation is expected to range between 12 to 20 feet below surface grade (bsg). Total excavation depth will be determined based on both field readings, past laboratory samples and confirmation sample results.

During excavation operations, BIO-WEST will collect soil samples, which will be screened in the field using a photoionization detector (PID) for the presence of petroleum hydrocarbon vapors to ascertain that the petroleum impacted soils have been excavated. Soil samples that show a PID reading of 20 parts per million (PPM) or less will be considered clean.

Once the petroleum impacted soils have been excavated, twenty five confirmation soil samples will be collected from the bottom and sides of the excavation. The confirmation soil samples will be compared to Utah DEQ initial screening levels (ISLs) to confirm that the petroleum impacted soils have been excavated.

The soil samples will be submitted to Utility Testing Laboratory (a Utah-certified laboratory), where analyses of methyl tertiary-butyl ether, benzene, toluene, ethylbenzene, total xylenes and naphthalene (MBTEXN), and total petroleum hydrocarbons gasoline-range organics (TPH-GRO) will be conducted using EPA Method 8260. Analysis of total petroleum hydrocarbons diesel-range organics (TPH-DRO) will be conducted using EPA Method 8260. Method 8015B.



Once the confirmation soil samples show that the petroleum impacted soils have been removed, the excavated area will be backfilled. Backfilling is expected to occur in three or four stages that will take place as confirmation samples from different areas of the excavation become available. We anticipate excavating the north and south areas near the highway first, followed by excavation along the highway. After those areas are partially backfilled, the excavation will work eastward. The bottom 3 feet of the excavation will be backfilled with porous gravel material to help control water in the excavation, stabilize the excavation, and serve as a contingency measure to facilitate future remediation efforts, if needed. Filter fabric will be placed over the gravel to prevent migration of the overlying material into the gravel. The excavation, up to 1 feet bsg, will be backfilled with structural fill material and compacted. A 1 foot layer of road base will be placed on top of the fill material.

During excavation backfilling activities, BIO-WEST personnel will install four monitor wells, approximately 15 feet deep, within the excavation. Three of the monitor wells will be installed along the western edge of the excavation and one of the monitor wells will be installed in the middle of the excavation to evaluate the effectiveness of the remediation. The wells will be constructed of 2-inch diameter flush-threaded schedule-40 PVC casing, with the screened interval consisting of 0.020-inch machine-slotted casing. The screened areas of the wells will be backfilled with sand.

During backfilling operations, approximately 3,200 pounds of an oxygen release compound (ORC) will be placed along the western edge of the excavation near US-89 to oxidize petroleum in the soil and groundwater near and under US-89 and in soils that were not feasible to excavate, and to oxidize any residual petroleum in the groundwater in or near the excavation area.

All soil and groundwater sampling will be conducted in accordance with industry-standard, soil-and-groundwater sampling protocols.

BIO-WEST is currently evaluating potential sites owned by Mr. Ricks near Mendon, Utah to remediate the excavated soil by land farming. A map showing the potential land farm locations is included as Figure 6 in Attachment 1. Based on the estimated volume of soil to be removed, the land farm will cover approximately 2.5 acres to a depth of 2 feet. Prior to any land farming, BIO-WEST will perform a wetland delineation of the potential sites to determine if any wetlands are present. BIO-WEST will obtain approval from the Bear River Health Department (BRHD) for the land farming operation prior to any operations. If the landfarming location is approved by the BRHD, the land farm will be constructed by clearing the area, leveling the ground, rolling and compacting the ground, and creating a storm water containment berm.

The land farm will be located and designed to eliminate the potential for contaminating any sensitive receptors or conduits for migration. The native soils in the area typically contain between 30-50% clay content and are sufficiently impermeable to be used for pond liners. The laboratory results from shallow samples in the subsurface (BIO-WEST, 2007) confirm the clay content of the native soils. The top 6-12 inches of topsoil will be removed and stockpiled, with a portion of that soil used to create a storm water containment berm. The remaining soils will be disked to a depth of 4-6 inches and then roller compacted to form an impermeable liner.

The soil in the land farm area will be turned approximately once a month for up to a year to facilitate soil aeration. BIO-WEST will notify the Utah Division of Air Quality (DAQ) of the soil aeration operation in the land farm and supply the required forms and calculations to them to obtain a permit for this operation. When treatment is complete, four confirmation samples will be collected from the liner for laboratory analyses to document that no contamination has leached into the liner.



If the potential land farm area is determined to not be suitable for land farming operations, the contaminated soil will be disposed of at the Cache County landfill. Waste manifests for any soil disposed of at the landfill will be completed to document the disposal of the soil.

Groundwater Removal

During excavation operations and prior to backfilling, BIO-WEST calculates that approximately 25,000–30,000 gallons of contaminated groundwater will be pumped from the excavation into two 21,000-gallon portable steel frac tanks for treatment.

A 3-horsepower blower will be connected to each frac tank. The blowers will push air into the tank to aerate the water, thereby stripping off the volatile portions of the petroleum. A 1.5-horsepower submersible pump will be placed in the tank to circulate the water through the aeration zone. BIO-WEST personnel will monitor the equipment on a weekly basis and also monitor the air discharged from the tank. A groundwater sample will be collected from each tank 4 weeks after treatment begins. It is expected that a minimum of 4 weeks of treatment will be necessary to reduce contamination levels in the groundwater to below Utah DEQ ISLs and allow disposal of the water. Once the contamination levels in the groundwater are below Utah DEQ ISLs the water will be disposed of into the Logan City sewer system.

BIO-WEST will obtain a permit from the Utah DAQ for aerating petroleum-impacted water prior to the commencement of excavation activities. BIO-WEST will obtain a permit to discharge treated water from the excavation into the Logan City sewer system.

Land Farm Monitoring

BIO-WEST will monitor the land farm operation by conducting monthly inspections to verify the soil is being turned, that storm water containment berms are functioning, and to monitor the progress of the soil treatment. Cleanup progress will be monitored by collecting at least four samples each month for field analyses of petroleum vapors in the headspace using a PID. The field samples will be collected from random locations within the land farm. Soil from each sampling location will be collected from 0 to 24 inches bsg and composited into one sample for PID screening. Once all the field samples show PID readings below 20 ppm, the soil in the land farm will be considered clean and confirmation samples will be collected.

A total of six confirmation soil samples will be collected and submitted for laboratory analysis of MBTEXN, TPH -GRO, and TPH-DRO. The confirmation samples will be collected from six separate locations throughout the land farm area. Soil from each sampling location will be collected from 0 to 24 inches bsg and composited into one sample for laboratory analysis. The confirmation soil samples will be compared to Utah DEQ ISLs to confirm that the land farm soils have been remediated.

Once the sample results have confirmed that the soil has been remediated, the soil can then be used for other applications by Mr. Ricks. The soil may be used as fill material or topsoil on properties.

An additional four soil samples will be collected from the compacted liner underneath the contaminated soil stockpile after the soil treatment is complete to document that no leaching has occurred. Upon completion of the soil treatment a brief report, including sample results, will be completed to document the soil remediation.

Off-site Corrective Action Plan

Due to the large extent of the contamination plume and since the subsurface lithology of the area is composed of primarily finer grained material (silt and clay), BIO-WEST has determined that in situ ORC injection into the subsurface is the best technique for remediating the off-site portion of the site.



Additional Subsurface Investigation

Results of the previous subsurface investigations have shown that soil and groundwater contamination extends beyond the Zollinger property boundary. Additional investigation is required to determine the extent of the contamination plume. BIO-WEST plans on installing several new monitor wells on the properties down gradient of known contamination plume to collect soil and groundwater samples. Additional monitor wells will also be installed near the utility corridors along US-89 to investigate the utility corridors as preferred pathways for contamination transport. The soil and groundwater samples collected during the additional subsurface investigation will be analyzed for MBTEXN, TPH-GRO, and TPH-DRO.

A workplan to conduct the additional subsurface investigation will be submitted the Utah Division of Water Quality (DWQ) for approval prior to any additional investigation activities. A workplan for the additional subsurface investigation is currently being developed and is expected to be submitted to the DWQ within 30 days.

Vapor Intrusion Investigation

Since there are several residences and other buildings present down gradient of the known contamination plume. BIO-WEST will conduct soil vapor monitoring near these buildings to determine if the buildings are impacted by soil vapors. Soil vapor samples will be collected and analyzed by either installing soil vapor monitor wells or by collecting soil vapor samples through a dedicated soil vapor probe.

BIO-WEST previously submitted a workplan to conduct the vapor intrusion investigation to the DWQ. The vapor intrusion investigation workplan was provisionally approved as an interim action by the DWQ on February 7, 2023. BIO-WEST has submitted the vapor intrusion investigation workplan to Mr. Ricks and is currently waiting for approval from Mr. Ricks to implement the investigation. It is expected that the vapor intrusion investigation will be completed within 30 days.

Drinking Water Supply Wells

A search of the Utah Division of Water Rights (UDWR 2023) website showed that there are six water drinking water supply wells located between Ted's Service Station and 3000 South Street that may be affected by contamination. The majority of these wells were installed in the late 1930s to early 1940s, so few details about well construction are available. Information from the UDWR website showed that the screened interval for these water supply wells ranges from 95 to 133 feet bsg. The fine grained subsurface material in the area makes it unlikely that contamination from Ted's Service Station has affected these wells. However, the water supply wells should be sampled and analyzed to determine if the water supply wells have been affected by the subsurface contamination.

A total of five drinking water samples will be collected from the down-gradient residences. Drinking water from the Zollinger residence was previously sampled by the DWQ on February 16, 2023 and will not be sampled during this investigation. The Zollinger residence drinking water sample showed no concentrations of VOCs or TPH-GRO above laboratory detection limits.

Prior to sample collection, a cold water faucet within the residence will be turned on and flushed for approximately 5 minutes. Once the water line is flushed, samples will be collected in laboratory prepared containers. The drinking water samples will be analyzed for VOCs using EPA method 524.2, TPH-GRO using EPA Method 8260, and TPH-DRO using EPA Method 8015B.

The drinking water sampling will be conducted during the vapor intrusion investigation.



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Insitu Oxygen Release Compound Injection

The injection of ORC into the subsurface will be completed using a direct push GeoProbe® rig. A slurry of the ORC will be injected across the entire vertical contaminated saturated thickness, approximately 5 to 25 feet bsg.

Since the full extent of the contamination plume is not yet known, the amount and frequency of ORC injections has yet to be determined. Based on contamination concentrations observed in previous investigations it is likely that several ORC injections will be required to mitigate the contamination plume.

Dedicated ORC injection wells will be installed throughout the contamination plume to facilitate repeat ORC injections as necessary. The injection wells will be separate from any groundwater monitoring wells and will be located at a sufficient distance away from the monitor wells so as to not bias any groundwater samples collected from the monitor wells.

At this point in the investigation, BIO-WEST plans to conduct ORC injections along US-89 for the entire length of the Zollinger property, and further north if needed, to help remediate down gradient contamination and to prevent any upgradient contamination from migrating any further down gradient. Several ORC injections points will be placed around the house and workshop building on the Zollinger property, and additional buildings if needed, to mitigate the vapor intrusion impacts within these buildings. Other areas of the Zollinger property and other down gradient properties (depending on additional investigation results) will also receive ORC injections to remediate the contamination.

Once the full extent of the contamination plume has been established, BIO-WEST will consult with the ORC supplier to determine the number and spacing of ORC injection wells based on contamination concentrations and soil conditions. A workplan for the ORC injection, including the proposed injection grid, will be submitted to the DWQ for approval as an addendum to this CAP. The ORC injection is expected to be implemented approximately 90 days after the soil excavation on the Ted's Service Station property has been completed.

Soil Vapor Abatement

A previous investigation on the Zollinger property (BIO-WEST 2002b) revealed that the house and the workshop buildings located on the Zollinger property are likely being impacted from soil vapors. Depending on the construction of the building foundations two main options, or a combination of the two, may be used as interim measures to mitigate the soil vapor impacts within the buildings.

The first option would be to install an active vacuum blower underneath the building foundations to vent the soil vapors from underneath the buildings. For this method a trench would be dug along the building foundation using a backhoe. Screened PVC pipe would then be placed underneath the building foundations. An alternate installation technique would be to install the PVC pipe vertically through a hole in the floor slab and route the pipe outside of the building via a hole through a wall. The PVC pipe would then be connected to a vacuum blower. Soil vapor removed from underneath the building foundations by the vacuum blower would then be discharged into the atmosphere through a stack that was located at an appropriate distance and height from the building to prevent exposure to the soil vapors. BIO-WEST will notify the Utah DAQ of the soil vapor extraction operation and supply the required forms and calculations to them.

The second option would be to have a floor coating company come in and epoxy seal the floor and walls of the buildings to prevent soil vapors from entering into the buildings. BIO-WEST will discuss the preferred option and timing with Mr. Zollinger.



When the ORC injections take place on the site, a number of ORC injections will be placed around the impacted buildings to mitigate any soil vapor impacts as a more permanent remedial action.

Reporting

BIO-WEST will complete and submit a report on the on-site remediation operation after all samples have been analyzed and when all the treated water has been disposed of. The report will describe the volume of soil excavated, the volume of water treated, as well as a discussion of the laboratory results. The report will include a table of soil and groundwater analytical results and site maps that include the final excavation boundaries and locations of confirmation samples.

Additional reports will be completed and submitted detailing all off-site remediation operations, additional subsurface investigations, ORC injection events, soil vapor mitigation, and water supply well sampling.

Periodic groundwater sampling will also be conducted during and after the implementation of remediation activities to evaluate the effectiveness of remedial actions. All groundwater sampling results will be reported to the DWQ.

All future reports submitted to the DWQ will address benzene as a primary contaminate of concern, along with TPH-GRO and TPH-DRO. All future reports will include benzene isoconcentration maps.

Permits

BIO-WEST will obtain a permit to discharge treated water from the excavation into the Logan City sewer system.

BIO-WEST will notify supply the required forms and calculations to the Utah Division of Air Quality for the soil aeration operation in the land farm, aeration of the petroleum impacted groundwater pumped from the excavation, and soil vapor mitigation operations.

BIO-WEST will obtain approval from the Bear River Health Department for the chosen land farm operation location in Mendon, Utah.

BIO-WEST will submit a closure plan to the Utah DERR prior to the removal of any of the fuel system components. A closure notice detailing the removal of the fuel system will be submitted to the Utah DERR following excavation activities.

The DWQ will be copied on all communications with other regulatory agencies.

Corrective Action Timeline

The soil vapor intrusion and drinking water supply investigation will be completed as interim actions within 30 days.

If the soil vapor intrusion investigation either shows elevated PID readings inside a home or if soil vapor samples exceed a residential vapor intrusion screening level, a vapor mitigation system will be installed within the home within 10 days. BIO-WEST will conduct additional vapor readings with a PID immediately upon activating the vapor abatement system, after 24 hours and after one week to evaluate the effectiveness of the system.

If deemed necessary by DWQ, additional soil vapor sampling or indoor air sampling will be completed within 30 days following the installation of any vapor mitigation systems to ensure that the soil vapor risk has been mitigated.



An additional subsurface investigation to fully define the vertical and horizontal extent of the contamination plume will be completed within 60 days. A report of the additional subsurface investigation results will be submitted to the DWQ within 90 days.

If the extent of the contamination plume is not fully defined from the additional subsurface investigation, another round of additional subsurface investigation activities will be completed and a report will be submitted to the DWQ within 45 days.

Onsite remediation under a DWQ approved CAP will begin within 90 days of written approval from the DWQ. If written approval of the CAP is not obtained in a timely manner, excavation operations may be initiated as an interim action.

Offsite remediation under a DWQ approved CAP will begin approximately 90 days after onsite remediation activities have been completed.

References

- [BIO-WEST] BIO-WEST, Inc. 2007. Ted's Service Station Phase II Environmental Site Assessment, Subsurface Investigation Report. Logan (UT): Civil Science, Inc. 12 p.
- [BIO-WEST] BIO-WEST, Inc. 2015a. Ted's Service Station Phase I Environmental Site Assessment. Logan (UT): Civil Science, Inc. 27 p.
- [BIO-WEST] BIO-WEST, Inc. 2015b. Ted's Service Station Phase II Environmental Site Assessment, Subsurface Investigation Report. Logan (UT): Civil Science, Inc. 11 p.
- [BIO-WEST] BIO-WEST, Inc. 2022a. Ted's Service Station Assessment, Subsurface Investigation Report. Logan (UT): Ted Ricks. 8 p.
- [BIO-WEST] BIO-WEST, Inc. 2022b. Ted's Service Station Assessment, Subsurface Investigation Report. Logan (UT): Ted Ricks. 9 p.
- [UDWR] Utah Division of Water Rights. 2023. Documents relating to water wells in the area. Location: http://waterrights.utah.gov. Accessed: 1/6/2023.

If you have any questions or comments, please call the BIO-WEST office at (435) 752-4202.

Sincerely,

Wes Thompson P.G. Senior Hydrogeologist

Attachment 1: Figures

c: Ted Ricks, Ted's Service Station

Attachment 1

FIGURES





Figure 2 Subject Property Vicinity Map Note: Base Map from Google Earth (Property boundaries shown are not surveyed) Ted's Service Station 3180 South Hwy 89 Logan, Utah 3006.01 PROJECT NO .: 12/15/2022 DATE: Approximate Scale: 1" = 200 feet Ń DRAWN BY: AC UTAH **BIO-WEST** Γ PREPARED BY: DL www.bio-west.com Ò 200' 400' REVISION NO .: LOCATION 435.752.4202









