



Monitoring Well and Gas Probe Repairs and Upgrades Documentation Report

Refuse Hideaway Landfill
Town of Middleton, Dane County, WI

Revision 0
August 2020

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1.0 Introduction

1.1 Background

The Refuse Hideaway Landfill (RHL) is located at 7562 Highway 14 in the Town of Middleton, Wisconsin. The landfill closed in 1988 and was designated a Superfund site. The State of Wisconsin, through the Wisconsin Department of Natural Resources' (WDNR) Remediation and Redevelopment Program, is responsible for maintaining the landfill monitoring systems. This includes the groundwater monitoring wells and landfill gas monitoring probes. TRC prepared a Work Plan for completing upgrades and repairs to these monitoring points in November 2019.

WDNR sought a contractor to complete repairs and upgrades of the monitoring well and gas probe networks. TRC provided an initial proposal to complete the work date August 23, 2019 and amended September 11, 2019.

1.2 Purpose

This Report has been prepared to describe the completed repair and upgrade activities at the RHL. The purpose of the Report is to document the completed the repairs and upgrades, including the replacement equipment to be installed. TRC and its subcontractor On-Site Environmental Services (On-Site) completed the work as described herein.

In November 2019 TRC submitted a final work plan for the scope of repairs and upgrades to be completed. Work was completed from November 2019 through August 2020, with the majority of the work being completed in November-December 2019.

This Report details and summarizes the work completed by TRC and On-Site staff at RHL based on the November 2019 work plan. A few minor items were identified after the work plan was completed and were approved for over the course of the project. Some correspondence from WDNR regarding changes in the project are included in Attachment 1. The site and the monitoring well and gas probe locations are shown on Figure 1.

1.3 Notifications

WDNR and TRC notified off-site property owners of the planned repairs and upgrades in September 2019. The property owners notified were L&G Investments, Mr. William Kahl, Summers Christmas Tree Farm, Wagner Dairy Farms LLC, Town of Middleton, and Dane County.

1.4 Scope

This Work Plan consists of three sections, including:

- **Section 1** describes the background, purpose, and scope of the Work Plan.
- **Section 2** describes the monitoring well repairs and upgrades.
- **Section 3** describes the gas probe repairs and upgrades.

2.0 Monitoring Well Repairs and Upgrades

Improvements and upgrades to the monitoring well network included relabeling wells, replacing locks, replacing broken well caps, replacement of 15 dedicated pumps, removal and repair of 1 pump, installation/replacement of 10 flow control devices, repairs to protective casings and well heads, abandonment of one gas probe and one monitoring well, and other miscellaneous repairs. Improvements were completed consistent with the Work Plan (TRC, 2019). Details of the work completed, and any issues encountered during the repairs and upgrades are summarized below. The completed repairs and upgrades are summarized in Table 1 and representative photos are included in the photo log in Attachment 2.

2.1 Labeling Wells

- During the November 2019 and May 2020 groundwater sampling rounds wells P-01S, P-03S, P-04S, P-16S, P-16D, P-17S, P-21S, P-21D, P-21BR, P-30S, P-30I, P-30D, P-31S, P-31IA, P-31IB, P-31D, P-32S, P-32D, P-33D, P-36S, P-36D, P-38S, P-39S, P-40S, P-40I, P-40D, P-41S, P-41D, P-42S, P-43S, P-43I, and P-43D were updated with new well ID markings using weather resistant marker. A total of 32 wells were labeled/re-labeled compared to the originally estimated 16 wells.
- During the well repair work in November 2019 it was discovered that at some point prior to May 2019, when TRC began sampling at the site, “P-43S” was incorrectly identified as “P-43I” and “P-43I” was incorrectly labeled as “P-43S” by others. This labeling error was noticed by TRC staff when the pumps were pulled from the wells and depth to bottom measurements were taken prior to installing new pumps. Each protective casing was labeled with the correct Well ID and samples collected in November 2019 and May 2020 were from the correct wells. WDNR was notified so that the GEMS database for P-43S and P-43I could be updated for the May 2019 samples (switch data) and could be updated to add a note for any preceding sampling rounds.
- Labeling was completed with a weather-resistant crayon/marker.

2.2 Replacing Locks and Well Caps

- New brass Master Lock (Key #3807) locks were provided for P-01S, P-03S, P-04S, P-08D, P-09D, P-17S, P-22S, P-22E, P-24D, P-24E, P-25S, P-26S, P-26D, P-30S, P-30I, P-30D, P-31S, P-31IA, P-31IB, P-31D, P-36D, P-38S, P-39S, P-40I, P-40D, P-41S, P-41D, P-43S, P-43I, and P-43D. There were 11 wells that were added to the 19 from the original work plan due to either new casings that were installed and not compatible with existing locks or additional locks that were found to be not functioning at the time of sampling. Locks were installed mainly in November 2019.
- Well caps were replaced at P-01S, P-03S, P-04S, P-08S, P-08D, P-09S, P-16S, P-16D, P-21S, P-24D, P-24E, P-25S, and P-36S.

2.3 Replacement or Repair of Dedicated Pumps

- Wells with non-functioning dedicated bladder pumps were replaced with new QED Well Wizard Bladder Pumps (P1101M) and micropurge fittings at wells P-22S, P-22D, P-26S, P-27D, P-31S, P-31IA, P-31IB, P-35S, P-40D, P-41D, P-43S, and P-43I.

- Due to the well depths a high-pressure QED MicroPurge Bladder Pumps (P1101HM) were installed in wells P-22E, P-29S, and P-43D.
- Product information for the pumps is included in Attachment 3. Note that the model number on the product information is outdated but the information is representative of the P1101M and P1101HM pumps.
- The existing pump at P-26S could not be initially removed during replacement in November/December 2019. The pump was impeded approximately 150 feet below ground surface (bgs), likely due to a bend in the PVC that occurred during well construction. TRC staff mobilized to the site on January 22, 2020 with a down hole camera to inspect the pump at P-26S. The pump was able to be freed and the well was inspected to ensure that the well casing was not broken. No cracks or other issues were noted during inspection. The new pump for P-26S was installed prior to sampling in May 2020.
- The pump in well P-41D was stuck approximately 3 feet below top of casing (TOC) and a significant bend could be seen in the PVC casing that impeded the pump. On April 17, 2020 TRC staff and On-Site mobilized to remove the protective casing and pump. On-Site began by removing the steel protective casing, which caused a previously repaired portion of the PVC riser of the groundwater well to come free. A coupler was glued to reattach the existing PVC riser pieces so no change in elevation occurred. A new protective casing was then installed following the repair. Bentonite was poured into the new protective casing to a level above the coupler and hydrated to prevent possible water infiltration. After the well was repaired the new pump for P-41D was installed.
- The pump at P-35D was removed from the well and shipped to QED for repair. Fittings and check valves were cleaned and replaced. New HDPE tubing was installed when pump was reinstalled in the well in May 2020.
- Pumps for wells at P-8BR, P-31D, and P-33D had the tubing replaced due to packer installations at these locations.
- Stainless steel drop tubes were installed at wells (P-31IB, P-31D, P-40D) where the screened interval was significantly deeper than the groundwater head to minimize the air pressure needed to operate the dedicated bladder pump.
- The new pump at P-43S was found not to be working in May 2020 and was sent to QED for repair under warranty. It was reinstalled after repair and used for sampling in May 2020.
- All tubing used during installation work was unlined HDPE tubing to limit possible PFAS detections in the well and pumps were set to the midpoint of the screened interval.

2.4 Installation/Replacement of Flow Control Devices

- Mechanical packers were installed in wells that exhibited artesian properties to eliminate the discharge of impacted groundwater to the surface. New packers were installed in wells P-08BR, P-09D, P-24D, P-24E, P-33D, P-36S and P-36D where no previous flow prevention was in place.
- In wells P-31IA, P-31IB and P-31D existing flow prevention was no longer functioning properly and required replacement.

- Each mechanical packer is a custom product from QED and manufactured by QSP. All the mechanical packers are 10-feet in length. Product information for the packers is included in Attachment 4.
- Wells P-09D, P-24D, P-24E, P-36S, and P-36D required flow prevention but do not have a dedicated pump for sampling, either because of their shallow screen interval (which allows for sampling with a peristaltic pump) or because they are not in the sampling program.
 - For wells within the current sampling program (P-09D, P-24D, P-24E), the packer had tubing installed through the packer to the midpoint of the screened interval so that sampling can be completed with a peristaltic pump without removing the packer.
 - Packers for P-36S and P-36D were ordered to have no tubing installed, however upon receipt of packers, it was discovered that the manufacturer had installed fittings for them mistakenly. Having water within the tubing in the packer or above the packer could damage the packer or well casing. In order for the packer to function as intended, tubing needed to be installed from the fitting through the packer so that water within and above the packer (in the fittings and tubing) can be blown (using compressed air) to beneath the packer. TRC installed approximately 15 feet of tubing below the packer, water was blown out of the tubing, and the fitting was closed so that the packer should function as intended.
 - Sometime in spring 2020, a landscaping contractor, who was constructing a gravel access road, hit the protective casing of P-09D. On July 21, 2020, TRC went to inspect the location. The packer was found to be bent approximately 10 to 20 degrees. The monitoring well casing and protective casing are not visibly damaged, but the protective casing was loose. The protective casing was reinstalled on July 21, 2020 using bentonite to seal it. TRC took the packer from P-09D to a machine shop to have it straightened.

On August 6, 2020, TRC reinstalled the repaired packer into P-09D and it is functioning as designed. If the repaired packer fails in the future due to the bending of the metal during the damage and repair, this packer could be removed and exchanged for a packer at the P-36 nest. The P-09D and P-36 nest packers are of the same construction. P-09D will be monitored as part of the freeze protection inspections conducted during the four winter months.
- Wells P-8BR, P-311A, P-311B, P-31D, and P-33D required the installation of flow prevention as well as a dedicated bladder pump. Three existing pumps (P-8BR, P-31D, and P-33D) were reinstalled with the new packers and two replacement pumps (P-311A and P-311B) came with the new packer for installation. At all these locations, all tubing and fittings were replaced when the new packer was installed. Additionally, weep holes were placed below the packer so discharge lines could be cleared to prevent freezing in the winter.
- Each location where a packer was installed with a high-grade plastic ball valve at the end of the discharge line to control flow out of the well. These valves will be checked during winter months to ensure integrity of the flow prevention.

2.5 Repairs to Protective Casings and Well Heads

- TRC and its subcontractor On-Site completed repairs to protective casings and surface seals on November 1, 2019, November 7, 2019, and April 17, 2020.
- In locations where the surface seal needed to be repaired, bentonite chips were used instead of concrete. This material choice maximizes the integrity of the seal over time, since historic use of concrete at the site has shown significant heaving. Heaving due to freeze/thaw cycles in the shallow groundwater can push the protective casing up and increase the risk of damaging the well where concrete is installed. In addition, during the work while attempting to dig out casings, hardened grout or bentonite was encountered. The presence of hardened grout or bentonite at these locations shows it can be used as a surface seal and prevent surface water from entering the well.
 - Repair at wells P-09D and P-24E required that the existing protective casings were raised to accommodate new packers. After the protective casings were raised the base of the casing was sealed using bentonite.
 - Approximately 1.5-feet of aluminum casing was cut off P-24E to allow easier access for the planned packer installation. The well was resurveyed to get updated TOC reference elevations for groundwater elevation measurements.
 - Repair at wells P-16S and P-21D required that the existing protective casing was driven deeper into the ground until stable, then the monitoring well PVC was cut so the protective casing could be closed. Each location was sealed with bentonite chips. Wells were resurveyed to get updated TOC reference elevations for groundwater elevation measurements.
 - Protective casing at P-24D could not be removed without damaging the well, so it was lifted instead to be straightened. Soil was compacted around the base of the protective casing to stabilize it.
 - Protective casings at P-30I and P-30D were in acceptable condition and stable. There is some minor cracking in the concrete. No repairs were completed.
 - Repair at well P-32S required removal of heaved concrete around the base of the protective casing. Bentonite chips were added and compacted to create surface seal.
 - An attempt to repair a bent protective casing at P-32D was unsuccessful. On-site tried to remove the current protective casing, however it was not possible to accomplish without damaging the well. The monitoring well PVC was also attempted to be straightened, but also could not be straightened without potentially damaging it. The PVC is not currently compromised but should be left as is to ensure no further damage is done to the well. The protective casing was also left as is, because it is providing protection to the well even though it is bent.
 - The heaved concrete surface seals for the protective casings at P-36S and P-36D could not be replaced due to the wells being in a marsh. Any attempt at putting in new concrete/bentonite or removing existing protective casing would likely compromise the well. A coupler on the top of the PVC riser was removed to accommodate the packer installation. The well was not resurveyed because now that

the packers are installed, these wells will no longer be included in the site groundwater level gauging program.

- Wells P-01S, P-03S, and P-04S did not have protective casings installed prior to TRC sampling at the site. A 7-foot protective casing was driven into the ground around each well to prevent tampering. Well P-03S required the galvanized well riser be cut to fit into protective casing and P-04S required a piece of new pipe be threaded on to the existing riser to bring it to a usable level within the protective casing. Both P-03S and P-04S were resurveyed for updated TOC reference elevations for groundwater elevation measurements.
- An attempt was made to raise the 8-inch protective casing at P-08BR to accommodate the planned packer installation, however it could not be raised without damaging the well. On-Site drove a new 4-inch steel casing inside of the existing 8-inch pipe and sealed it with bentonite. Weep holes were drilled above the bentonite to allow water to drain from inside the 4-inch and 8-inch casings. The packer was installed in the well and fits in the new 4-inch protective casing.
- Protective casings at P-311A, P-311B, P-31D and P-33D needed to be adjusted to accommodate new packers. Instead of attempting to raise the existing 4-inch casings due to competent concrete at the surface, On-Site placed an 8-inch aluminum casing around the existing pipe. The casing was solidified by using clean sand between the steel and aluminum casings then building up the soil around each well to prevent erosion. Because the surface seals were still in good repair these casings were installed to prevent tampering and not for well integrity purposes.
- An additional well, P-41D, required replacement to the protective casing because the existing casing was removed to dislodge the stuck bladder pump. It was discovered during this repair that the existing steel casing had rusted out and been previously repaired. As part of the original repair an 8-inch PVC pipe had been driven into the ground around the steel pipe to a depth greater than 3-feet bgs and filled with bentonite grout. The PVC pipe could not be removed by On-Site so a 12-inch steel protective casing was placed around the well and filled with bentonite and clean sand and gravel.

2.6 Well Abandonment

- On June 22, 2020 TRC staff abandoned monitoring well P-01D in accordance to the WDNR approved variance in an email dated April 20, 2020 (Attachment 1). The 1.25" galvanized steel pipe was pumped dry using an inertial pump then backfilled slowly with 3/8th-inch bentonite chips. The abandonment form is included in Attachment 5.

2.7 Waste Management

- Dedicated pumps and flow control devices removed for replacement were double bagged and labeled for storage in one of the sheds in the leachate flare enclosure.
- All tubing and other waste from replacement of pumps, fittings, etc. was disposed of off-site as non-contaminated general waste.

3.0 Gas Probe Repairs and Upgrades

Planned repairs outlined in the October 2019 Work Plan include labeling and/or replacing sample tubing and ball valves, replacing locks, repairs to protective casings and well heads, and the abandonment of GP-16M. Improvements were completed consistent with the Work Plan (TRC, 2019). Specific details of the repairs are summarized below and in Table 2.

3.1 Labeling Sample Tubing

- In locations where multiple depth intervals are within the same protective casing, gas probes were labeled using colored tubing to differentiate deep, intermediate, and shallow probes.

3.2 Replacing Locks, Sample Tubing, and Ball Valves

- New brass Master Lock (Key #3807) locks were provided for 23 gas probe locations that either did not have locks or the existing lock needed replacement. Four additional locations were planned for lock replacement, but when locks were installed the protective casing crushed the gas probe tubing so that it could not be sampled. One lock was installed on the leachate tank enclosure instead (WDNR email dated October 18, 2019), and WDNR was given the three remaining locks for future use at the site.
- Sample tubing and ball valves for all 62 gas probes was replaced during 2019 gauging.

3.3 Repairs to Protective Casings, Well Heads, and Abandonment

- Gas Probe GP-3 was unable to be bent back into a straightened position without damaging the probe. Additional bentonite was placed around the base to ensure seal stayed in place.
- The protective casing at GP-4 had rusted out 2-feet bgs and during removal the top 5-feet of steel casing separated from the bottom. On-site attempted to install a new steel casing but was impeded by the bottom 3 feet of original casing that had broken off. The existing casing was reinstalled with bentonite then solidified with packed sand and large gravel to prevent movement
- It was determined that gas probes GP-5, GP-16, and GP-17 did not need replacement of protective casing and surface seals were okay.
- An additional probe (GP-8) required maintenance due to damage during fence repair work completed on the Kahl property. The casing had to be reset and a new seal was installed.
- Abandonment of GP-16M was completed on January 22, 2020. The abandonment form is included in Attachment 5.

**Table 1: Monitoring Well Repairs/Upgrades
Refuse Hideaway Landfill
As of August 6, 2020**

| Well Number | In Analytical Program? | Well Depth (Feet) | Approximate DTW (Feet) | Dedicated QED System | New Label | Replaced Lock (Key #3807) | Replaced Well Cap | Replace Fitting/Pump Repair | Replace Pump | Replace/Install New HDPE Tubing | Replace/Install Packer for Flow Control | Repair/Replace Protective Casing | Abandon Well | Maintenance Work Completed |
|-------------|------------------------|-------------------|------------------------|----------------------|-----------|---------------------------|-------------------|-----------------------------|--------------|---------------------------------|---|----------------------------------|--------------|---|
| P-01S | | -- | 1.9 | -- | X | X | X | | | | | X | | Protective casing installed Lock replaced Cap installed |
| P-01D | | -- | 0.7 | -- | | | | | | | | | X | Located October 22, 2019, flowing well In gauging program, but not sampled. Abandoned with April 22, 2020 |
| P-03S | | -- | 4.8 | -- | X | X | X | | | | | X | | Protective casing installed, lock & cap replaced Well casing cut to fit in protective casing Well resurveyed December 2, 2019 |
| P-04S | | -- | 1.3 | -- | X | X | X | | | | | X | | Protective casing installed, lock & cap replaced Additional well pipe threaded on to make more usable in protective casing Well resurveyed December 2, 2019 |
| P-08S | X | 20.5 | 3.5 | No | | | X | | | X | | | | Cap installed HDPE tubing installed for sampling |
| P-08D | X | 42.2 | 3.5 | No | | X | X | | | X | | | | Cap installed Lock replaced HDPE tubing installed for sampling |
| P-08BR | X | 111.5 | 4.1 | Yes | | | | | | X | X | X | | Packer installed for flow control with new tubing for QED bladder pump New ball valve installed for flow control HDPE tubing replaced 4" protective casing installed inside existing 6" casing to fit flow control assembly |
| P-09S | X | 16 | 3.9 | No | | | X | | | X | | | | Cap installed HDPE tubing installed for sampling |
| P-09D | X | 43 | 3.9 | No | | X | | | | X | X | X | | Packer Installed with tubing to well screen for use with peristaltic pump. New ball valve installed for flow control. Unable to remove existing protective casing without damaging well. Driven into ground and recompact soil around base to stabilize. Lock replaced Packer damaged and protective casing loosened in spring of 2020; protective casing repaired July 2020 and packer repaired and reinstalled August 2020. |
| P-16S | X | 17.2 | 5.5 | No | X | | X | | | X | | X | | Subcontractor drove casing into ground to stabilize protective casing then cut well PVC to fit. Well resurveyed December 2, 2019 HDPE tubing installed for sampling Cap installed |
| P-16D | X | 42.9 | 11.0 | No | X | | X | | | X | | | | Cap installed HDPE tubing installed for sampling |
| P-17S | X | 158.8 | 145.1 | Yes | X | X | | | | | | | | New label Replaced lock |
| P-18S | X | 107.2 | 94.5 | Yes | | | | | | | | | | |
| P-20SR | X | 66.3 | 35.8 | No | | | | | | | | | | |
| P-21S | X | 19.7 | 4.2 | No | X | | X | | | X | | | | Cap installed New label HDPE tubing installed for sampling |
| P-21D | X | 41.6 | 9.3 | No | X | | | | | X | | X | | Subcontractor drove casing into ground to stabilize protective casing then cut well PVC to fit. Well resurveyed December 2, 2019 HDPE tubing installed for sampling New label |
| P-21BR | X | 148.3 | 11.1 | Yes | X | | | | | | | | | New label |
| P-22S | X | 184.7 | 170.3 | Yes | | X | | | X | X | | | | Replaced bladder pump and HDPE tubing installed Replaced lock |
| P-22D | X | 217.2 | 171.3 | Yes | | | | | X | X | | | | Replaced bladder pump and HDPE tubing installed |
| P-22E | X | 273 | 172.0 | Yes | | X | | | X | X | | | | High pressure bladder pump replaced and HDPE tubing installed Replaced lock |
| P-23S | X | 48.1 | 36.4 | No | | | | | | | | | | |
| P-23D | X | 80.1 | 36.1 | Yes | | | | | | | | | | |

**Table 1: Monitoring Well Repairs/Upgrades
Refuse Hideaway Landfill
As of August 6, 2020**

| Well Number | In Analytical Program? | Well Depth (Feet) | Approximate DTW (Feet) | Dedicated QED System | New Label | Replaced Lock (Key #3807) | Replaced Well Cap | Replace Fitting/Pump Repair | Replace Pump | Replace/Install New HDPE Tubing | Replace/Install Packer for Flow Control | Repair/Replace Protective Casing | Abandon Well | Maintenance Work Completed |
|-------------|------------------------|-------------------|------------------------|----------------------|-----------|---------------------------|-------------------|-----------------------------|--------------|---------------------------------|---|----------------------------------|--------------|--|
| P-24D | X | 25.2 | 2.0 | No | | X | X | | | X | X | X | | Packer installed with tubing to well screen for use with peristaltic pump New ball valve installed for flow control Unable to remove existing protective casing without damaging well, lifted casing and recompacted soil around base to stabilize. Lock replaced Cap installed |
| P-24E | X | 52.5 | 1.6 | No | | X | X | | | X | X | X | | Packer Installed with tubing to well screen for use with peristaltic pump New ball valve installed for flow control Cut existing aluminum protective casing to make packer installation easier Well resurveyed December 2, 2019 Lock replaced Cap installed |
| P-25S | X | 29.4 | 18.9 | No | | X | X | | | X | | | | Cap installed New lock HDPE tubing installed for sampling |
| P-25D | X | 96.3 | 23.8 | Yes | | | | | | | | | | |
| P-25BR | X | 140.3 | 22.8 | Yes | | | | | | | | | | |
| P-26S | X | 237.6 | 217.1 | Yes | | X | | | X | X | | | | Replaced bladder pump and HDPE tubing installed Replaced lock |
| P-26D | | -- | 219.0 | -- | | X | | | | | | | | Replaced lock (accounted for in GP locks due to sharing casing with G-8.) |
| P-27S | X | 188.8 | 171.5 | Yes | | | | | | | | | | |
| P-27D | X | 204.3 | 172.3 | Yes | | | | | X | X | | | | Replaced bladder pump and HDPE tubing installed |
| P-28S | X | 207.4 | 196.3 | Yes | | | | | | | | | | |
| P-29S | X | 257.2 | 233.3 | Yes | | | | | X | X | | | | High pressure bladder pump replaced and HDPE tubing installed |
| P-30S | | -- | 19.0 | -- | X | X | | | | | | | | New label Lock replaced |
| P-30I | X | 142.3 | 17.6 | Yes, p.m. | X | X | | | | | | | | New label Lock replaced Surface seal repairs not required |
| P-30D | X | 289.5 | 19.5 | Yes, p.m. | X | X | | | | | | | | New label Lock replaced Surface seal repairs not required |
| P-31S | X | 28.8 | 4.1 | Yes | X | X | | | X | X | | | | Replaced bladder pump and HDPE tubing installed Replaced lock New label |
| P-31IA | X | 95.6 | 11.3 | Yes | X | X | | | X | X | X | X | | Packer replaced with new bladder pump and HDPE tubing New ball valve installed for flow control 6" protective casing installed to fit flow control assembly New lock New label |
| P-31IB | X | 135.7 | 10.6 | Yes | X | X | | | X | X | X | X | | Packer replaced with new bladder pump and HDPE tubing Stainless steel drop tube installed to screened interval, pump set @ approx. 30 ft bgs New ball valve installed for flow control 6" protective casing installed to fit flow control assembly New lock New label |
| P-31D | X | 258.2 | 9.8 | Yes | X | X | | | | X | X | X | | Packer replaced with new HDPE tubing; bladder pump repair not needed. Stainless steel drop tube installed to screened interval, pump set @ approx. 25 ft bgs New ball valve installed for flow control 6" protective casing installed to fit flow control assembly New lock New label |
| P-32S | X | 39.5 | 19.3 | No | X | | | | | X | | X | | Repaired surface seal Installed HDPE tubing for sampling New Label |
| P-32D | X | 176.2 | 20.0 | Yes | X | | | | | | | | | Surface seal damaged from protective casing being tilted, repair not recommended due to potential well damage. New label |

**Table 1: Monitoring Well Repairs/Upgrades
Refuse Hideaway Landfill
As of August 6, 2020**

| Well Number | In Analytical Program? | Well Depth (Feet) | Approximate DTW (Feet) | Dedicated QED System | New Label | Replaced Lock (Key #3807) | Replaced Well Cap | Replace Fitting/Pump Repair | Replace Pump | Replace/Install New HDPE Tubing | Replace/Install Packer for Flow Control | Repair/Replace Protective Casing | Abandon Well | Maintenance Work Completed |
|-------------|------------------------|-------------------|------------------------|----------------------|-----------|---------------------------|-------------------|-----------------------------|--------------|--|---|----------------------------------|--------------|--|
| P-33S | X | 27.6 | 2.9 | No | | | | | | | | | | |
| P-33D | X | 103.4 | 2.7 | Yes | X | | | Replaced fitting | | X | X | X | | Packer replaced with new HDPE tubing for existing bladder pump New ball valve installed for flow control 6" protective casing installed to fit flow control assembly New label Fitting replaced when packer was installed |
| P-34S | X | 186 | 157.5 | Yes | | | | | | | | | | |
| P-34D | X | 276.1 | 160.7 | Yes, p.m. | | | | | | | | | | |
| P-35S | X | 184 | 160.6 | Yes | | | | | X | X | | | | Replaced bladder pump and HDPE tubing installed |
| P-35D | X | 252.6 | 162.6 | Yes | | | | X | | X | | | | Bladder pump sent to QED for maintenance, reinstalled repaired pump with new HDPE tubing. |
| P-36S | | -- | 2.1 | -- | X | | X | | | X (tubing not installed to well screen) | X | | | Packer installed with approx. 15 ft of tubing beneath packer to seal off well. New ball valve installed for flow control New label Protective casing stable, concrete replacement not recommended due to potential heaving in wetland. Cap installed |
| P-36D | | -- | 0.0 | -- | X | X | | | | X (tubing not installed to well screen) | X | | | Packer installed with approx. 15 ft of tubing beneath packer to seal off well. New ball valve installed for flow control New label New lock Protective casing stable, concrete replacement not recommended due to potential heaving in wetland. |
| P-38S | | -- | 5.9 | -- | X | X | | | | | | | | New lock New label |
| P-39S | | -- | 33.3 | -- | X | X | | | | | | | | New lock New label |
| P-40S | | -- | 8.1 | -- | X | | | | | | | | | New label |
| P-40I | X | 104.8 | 8.0 | Yes, p.m. | X | X | | | | | | | | New label New lock |
| P-40D | X | 255.2 | 9.3 | Yes | X | X | | | X | X | | | | Replaced bladder pump and HDPE tubing installed Stainless steel drop tube installed to screened interval; pump set at approx. 50 ft bgs New label Replaced lock |
| P-41S | | -- | 7.6 | -- | X | X | | | | | | | | New Label New lock |
| P-41D | X | 104.5 | 14.9 | Yes | X | X | | | X | X | | X | | Replaced bladder pump and HDPE tubing installed New label Replaced lock Casing replaced because pump could not be removed from the well |
| P-42S | | -- | 7.1 | -- | X | | | | | | | | | New Label |
| P-43S | X | 205.7 | 189.4 | Yes | X | X | | | X | X | | | | Replaced bladder pump and HDPE tubing installed New label Replaced lock Discovered well was mislabeled as P-43I when replacing pump |
| P-43I | X | 233.3 | 189.7 | Yes | X | X | | | X | X | | | | Replaced bladder pump and HDPE tubing installed New label Replaced lock Discovered well was mislabeled as P-43S when replacing pump |
| P-43D | X | 283.6 | 186.0 | Yes | X | X | | | X | X | | | | High pressure bladder pump and new HDPE tubing installed New label Replaced lock |

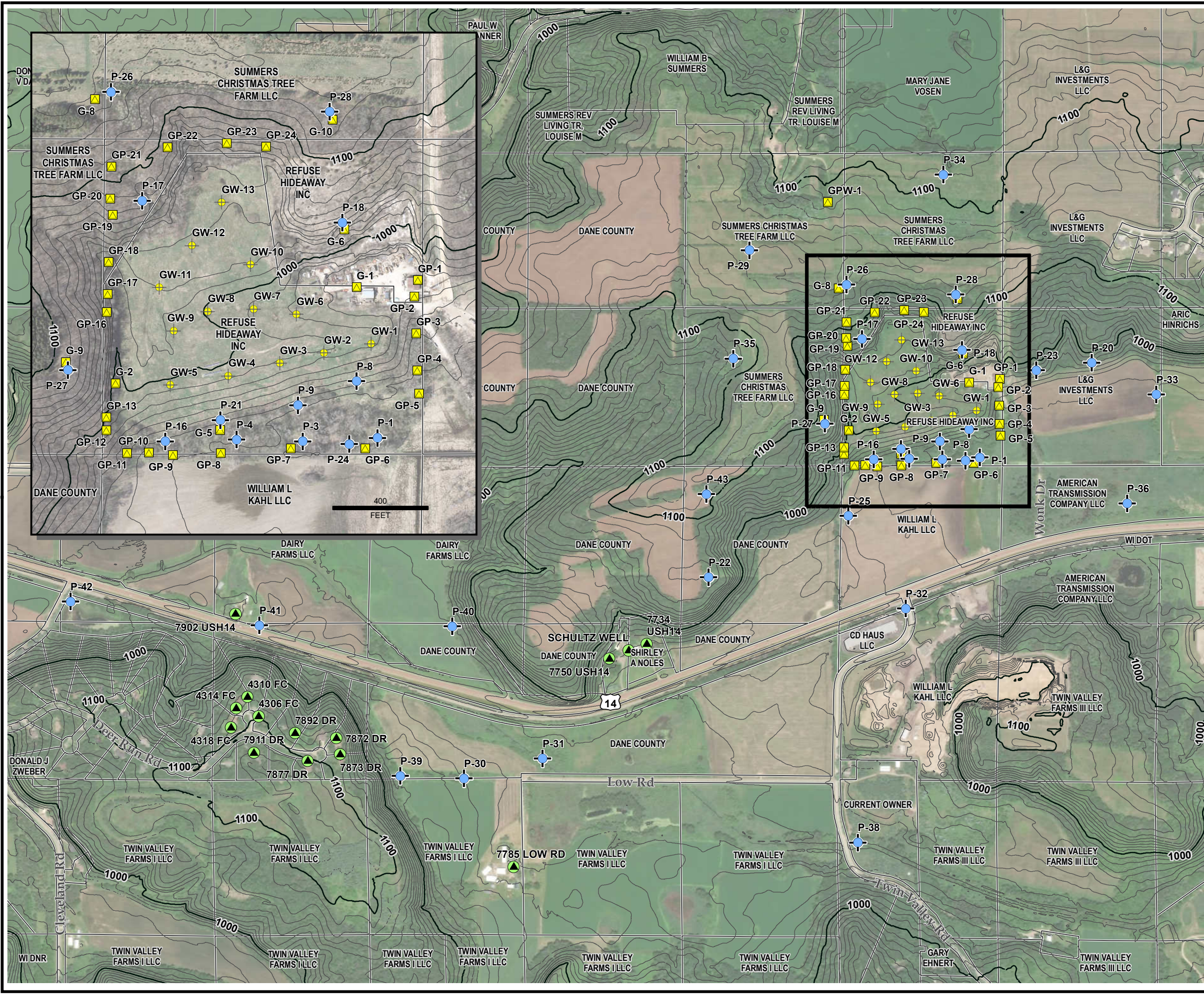
**Table 2: Gas Probe Repairs/Upgrades
Refuse Hideaway Landfill
As of June 15, 2020**

| Gas Probe Number | Proposed/ Added | Repair/Replace Protective Casing Cap | Subcontractor Repairs to Probe | Maintenance Issue |
|-------------------------|------------------------|---|---------------------------------------|--|
| GP-2 | Added | Replaced | | New protective casing top installed. |
| GP-3 | Proposed | Completed-modified as described. | | Unable to be bent back into a straightened position without damaging the probe. Additional bentonite was placed around the base to ensure seal stayed in place. |
| GP-4 | Proposed | Repaired-modified as described. | | Casing rusted out 2-feet bgs, during removal top 5-feet of steel casing separated from bottom. Attempted to install a new steel casing but was impeded by the bottom 3 feet of original casing. The existing casing was reinstalled with bentonite then solidified with packed sand and large gravel to prevent movement |
| GP-5 | Proposed | Not needed | | Casing did not require repair |
| GP-8 | Added | Repaired | | Surface seal repaired due to fence work in the area |
| GP-16 | Proposed | Not needed | | Casing did not require repair |
| GP-16S | Proposed | | Not needed | Casing did not require repair |
| GP-16M | Proposed | | Abandoned | Probe was abandoned January 22, 2020. |
| GP-17 | Proposed | Not needed | | Casing did not require repair |

Additional notes:

1. Twenty-seven (27) of the gas probes did not have locks. Twenty-three (23) new locks installed, remaining four locations not locked. Refer to text for additional details.
2. All sample tubing and ball valves replaced at all locations where needed.
3. The gas probes with multiple depth intervals were uniquely identified using colored tubing.

Plot Date: 4/17/2019 10:51:57 AM by: JPAPEZ -- LAYOUT: ANSI B(11"x17")
 Path: S:\1-PROJECTS\WI_DNR\RefuseHideaway\335719-GW_Proposal\335719-001.mxd
 Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet (Foot US)
 Map Rotation: 0
 TRC - GIS

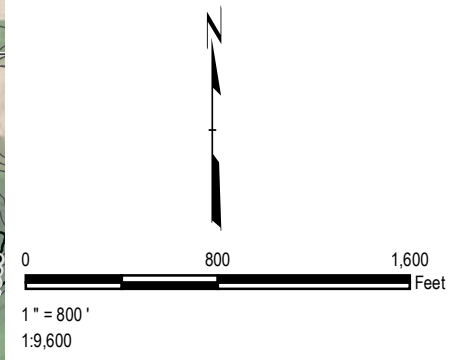


LEGEND

- GAS PROBE
- GAS WELL
- MONITORING WELL
- PRIVATE WELL
- PARCEL BOUNDARY

NOTES

1. BASE MAP IMAGERY FROM ESRI/DANE COUNTY, 2017.
2. TOPOGRAPHY FROM DANE COUNTY LIDAR SURVEY, 2017.
3. PARCELS FROM WISCONSIN STATE CARTOGRAPHER'S OFFICE, 2018.
4. SITE FEATURES SHOWN ARE APPROXIMATE.



| | |
|---|-----------------------|
| PROJECT: | |
| WISCONSIN DNR REFUSE HIDEAWAY LANDFILL | |
| TITLE: | |
| SITE OVERVIEW | |
| DRAWN BY: J. PAPEZ | PROJ NO.: 335719.9990 |
| CHECKED BY: M. WESTOVER | |
| APPROVED BY: K. VATER | FIGURE 1 |
| DATE: APRIL 2019 | |
| | |
| 708 Heartland Trail, Suite 3000 Madison, WI 53717 Phone: 608.826.3600 www.trcsolutions.com | |
| FILE NO.: | 335719-001.mxd |

Attachment 1: Correspondence with WDNR

From: [Koepke, Cynthia L - DNR](#)
To: [Vater, Katherine](#)
Subject: [EXTERNAL] lock for leachate tank enclosure
Date: Friday, October 18, 2019 10:05:25 AM

This is an **EXTERNAL** email. Do not click links or open attachments unless you validate the sender and know the content is safe.

Hi Katherine,

I keep forgetting to ask if you can put a lock on the leachate flare enclosure when you do the monitoring wells (and if at all possible, with the same key as the new locks you'll be using)? I could get a lock but it would make more sense not to introduce yet another key if possible!

thanks

We are committed to service excellence.

Visit our survey at <http://dnr.wi.gov/customersurvey> to evaluate how I did.

Cindy Koepke, P.G.

Hydrogeologist, Remediation & Redevelopment Program

Wisconsin Department of Natural Resources

South Central Region, Fitchburg

(608)275-3257

cynthia.koepke@wisconsin.gov



dnr.wi.gov



From: [Koepke, Cynthia L - DNR](#)
To: [Westover, Meredith](#)
Cc: [Vater, Katherine](#); [Braga, Wesley](#)
Subject: [EXTERNAL] APPROVAL: Refuse Hideaway Landfill - Well P-1D abandonment
Date: Monday, April 20, 2020 11:30:18 AM
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
Importance: High

This is an **EXTERNAL** email. Do not click links or open attachments unless you validate the sender and know the content is safe.

The Department of Natural Resources approves a variance to s. NR 141.25(2)(b), Wis. Adm. Code, for the abandonment of monitoring well P-1D. DNR is responsible for monitoring and source control of the Refuse Hideaway Landfill Superfund site, and TRC will be abandoning this monitoring well on behalf of DNR. This email and the April 20, 2020 email to me from Meredith Westover of TRC (below) will serve as written documentation of the variance request and its approval. Save this email chain as a PDF and attach it to the completed form 3300-005 for P-1D.

Please let me know if there are any questions. Thank you.

We are committed to service excellence.

Visit our survey at <http://dnr.wi.gov/customersurvey> to evaluate how I did.

Cindy Koepke, P.G.

TEMPORARY PHONE NUMBER: 608-622-6741

Phone: 608-275-3257 ←voice mail only while working from home

Email: cynthia.koepke@wisconsin.gov

From: Westover, Meredith <MWestover@trccompanies.com>
Sent: Monday, April 20, 2020 9:24 AM
To: Koepke, Cynthia L - DNR <Cynthia.Koepke@wisconsin.gov>
Cc: Vater, Katherine <KVater@trccompanies.com>; Braga, Wesley <WBraga@trccompanies.com>
Subject: Refuse Hideaway Landfill - Well P-1D abandonment

Cindy,

Thank you for taking time to discuss the abandonment of well P-1D with me last Friday. The following presents a summary of our proposed methods based on our discussion, and the justification for a variance to NR 141 for the abandonment of this well.

- 1) We do not have a well construction diagram for this well that shows an impermeable annular space seal. As a result, abandonment would require complete removal of the well casing per NR 141.25(2)(c). Complete removal of the well casing would require either over-drilling and backfilling, or knocking a hole in the bottom of the casing and filling as the casing is pulled. Note that the casing is galvanized pipe, not PVC. Either option would require heavy equipment, and access to the location is limited due to wet ground and terrain.
- 2) While we do not have a well construction form, we can infer that the well was constructed with an impermeable annular space seal as the well is artesian and has historically shown an upward gradient between P-1D and the adjacent shallow well P-1S. Per NR 141.25(2)(b) a well with an impermeable annular space seal can be abandoned by filling in accordance with NR 141.25(2)(d) and cutting the well casing 30" below ground surface.
- 3) Well P-1D is constructed of galvanized pipe and is not a diameter that is compatible with internal pipe cutters. The water table is near ground surface so we would not be able to dig 30 inches to access the pipe and cut from the outside. We could cut the pipe off below grade at something less than 30 inches, but we believe that could potentially present a hazard in the future.

Based on the rationale presented above, we plan to abandon well P-1D by filling the well pipe in place. We will attempt to lower the water level in the well by bailing or pumping and then fill the well with bentonite chips. If the water level cannot be bailed or pumped down prior to filling, then fill material (e.g., bentonite slurry or bentonite/cement grout) will be tremie pumped to the bottom of the well. The well casing will be filled completely, but we will not cut the casing off below ground surface. Instead, the well casing above grade will be painted yellow or other bright color for visibility, and if possible labeled with a paint marker as "P-1D abandoned".

We are requesting variance to NR 141.25 to proceed with abandonment under NR 141.25(2)(b) in lieu of construction documentation, and to allow the surface seal (if any) and well casing to remain above grade. Let me know if you have any questions.

Regards,

Meredith Westover, P.G. (WI)
Senior Hydrogeologist



708 Heartland Trail, Suite 3000, Madison, WI 53717
T 608.826.3667 | **F** 608.826.3941 | **C** 608.358.5035 | mwestover@trccompanies.com
[LinkedIn](#) | [Twitter](#) | [Blog](#) | TRCcompanies.com



[WorkCare \(888\) 449-7787](tel:8884497787)





[Incident/Safe Catch Notification \(Intelex\)](#)

- -



- -

Attachment 2: Photo Log



Photographic Log

| | | | |
|---|--------------------------|--|------------------------------------|
| Client Name: Wisconsin DNR | | Site Location: Refuse Hideaway Landfill | Project No.: 335719.0004 |
| Photo No. 1 | Date 11/1/2019 |  | |
| Description P-01S casing installed. | | | |
| Photo No. 2 | Date 11/1/2019 |  | |
| Description P-03S casing installed. | | | |



Photographic Log

| | | | | | |
|---|--------------------------|---|--|------------------------------------|--|
| Client Name: Wisconsin DNR | | Site Location: Refuse Hideaway Landfill | | Project No.: 335719.0004 | |
| Photo No. 3 | Date 11/1/2019 | |  | | |
| Description P-04S casing installed. | | | | | |
| Photo No. 4 | Date 11/1/2019 | |  | | |
| Description P-08BR with new protective casing installed inside the existing casing. | | | | | |



Photographic Log

| | | | |
|---|--------------------------|--|------------------------------------|
| Client Name: Wisconsin DNR | | Site Location: Refuse Hideaway Landfill | Project No.: 335719.0004 |
| Photo No. 5 | Date 11/1/2019 |  | |
| Description P-09 with straightened protective casing. | | | |
| Photo No. 6 | Date 11/1/2019 |  | |
| Description P-16S casing stabilized by driving casing deeper. | | | |



Photographic Log

| | | | |
|--|--------------------------|---|--|
| Client Name: Wisconsin DNR | | Site Location: Refuse Hideaway Landfill | Project No.: 335719.0004 |
| Photo No. 7 | Date 11/1/2019 | |  |
| Description P-21D casing stabilized by driving casing deeper. | | | |
| Photo No. 8 | Date 11/1/2019 | |  |
| Description P-24D casing lifted to accommodate flow prevention device. | | | |


Photographic Log

| | | | |
|---|--------------------------|---|--|
| Client Name: Wisconsin DNR | | Site Location: Refuse Hideaway Landfill | Project No.: 335719.0004 |
| Photo No. 9 | Date 11/1/2019 | |  |
| Description P-24E aluminum casing modified to accommodate flow prevention device. | | | |
| Photo No. 10 | Date 11/7/2019 | |  |
| Description P-31A (shown) casing installed to accommodate flow prevention device. Casing installation is representative of casings installed at P-31IB, P-31D and P-33D. | | | |

Photographic Log

| | | | |
|--|--------------------------|---|--|
| Client Name: Wisconsin DNR | | Site Location: Refuse Hideaway Landfill | Project No.: 335719.0004 |
| Photo No. 11 | Date 4/17/2020 | |  |
| Description P-41D prior to monitoring well and casing repair. | | | |
| Photo No. 12 | Date 4/17/2020 | |  |
| Description P-41D groundwater monitoring well with coupler repair. Protective casing (not shown) installed after well repair. | | | |

Photographic Log

| | | | |
|---|-----------|---|------------------------------------|
| Client Name: Wisconsin DNR | | Site Location: Refuse Hideaway Landfill | Project No.: 335719.0004 |
| 13 | 5/14/2020 |  | |
| Description Surface view of packer system installed with ball valve at P-08BR, P-09D, P-24D, P-24E, P-31IA, P-31IB, P-31D, P-33D, P-36S, and P-36D. | | | |

Attachment 3: QED Pump Information

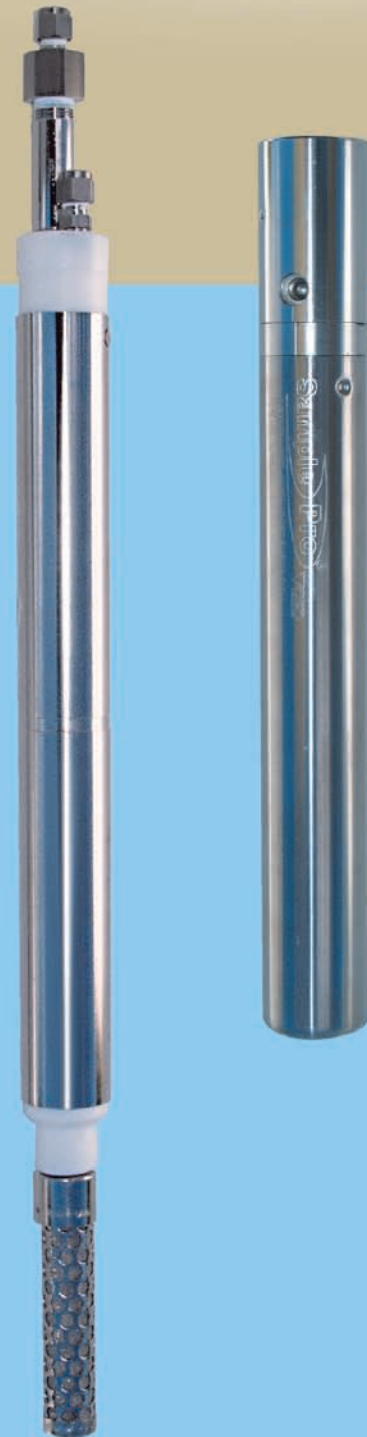
MicroPurge® Low-Flow Sampling Equipment Catalog

*The most complete selection of pumps, controls,
and accessories for groundwater sampling –
from the Low-flow Specialists*



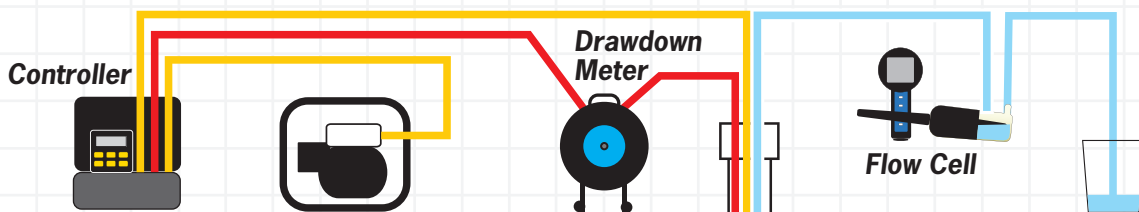
QED[®]
Innovative Environmental Products

*Featuring Well Wizard® and
Sample Pro® Pumps*



Introduction

Low-flow sampling reduces purge volumes, provides less turbid samples and improves precision.



Portable and Dedicated Sampling Pumps:

- Soft-seat check valves for zero leak-back.
- Independently lab-certified clean — 100% traceable.
- Electropolishing of all stainless steel pump parts for maximum purity and corrosion control.
- Bonded, high pullout strength tubing in a range of materials.
- Long-life bladders and standard 10-year pump warranty.
- Deep-well pumps for sampling to 1,000 feet or more.



The Controller

Easy one-touch flow rate control for low-flow sampling — simpler than old-style cycle timers.



The Flow Cell

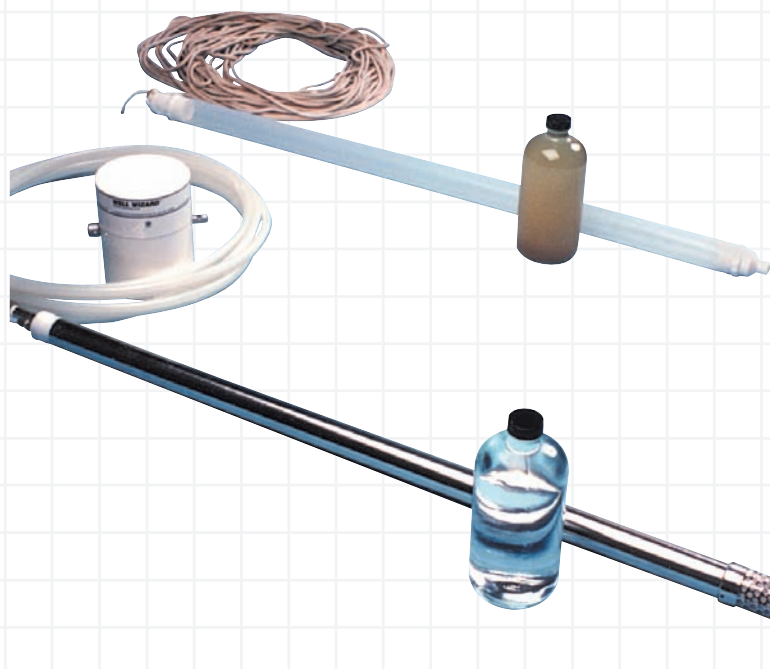
Exclusive PurgeScan™ software automatically indicates purge stabilization.



The Drawdown Meter

Patented controller connection for automatic drawdown control to prevent over-purging.





Low-flow rate purging and sampling provides numerous benefits that make it the method of choice for existing and new groundwater monitoring projects. MicroPurge® low-flow sampling systems deliver all the advantages a project manager needs.

Bladder Pumps are Proven Superior

Bladder pumps have been proven superior by the overwhelming majority of independent studies for the broadest range of groundwater quality parameters. They also have the longest warranties, so when you select a bladder pump you are selecting an enduring sampling device and method. Bladder pump advantages include:

- No suction or high speed impellers to outgas volatile compounds
- No churning action, like with bailers and inertial lift samplers, that disturbs the well and increases sample turbidity
- No contact of the drive air with the sample

Low-Flow Sampling

The science of groundwater sampling has advanced significantly in the past decade. Traditional approaches such as bailing, well-volume purging and high rate pumping have been replaced with a methodology that reduces disturbances to the well and aquifer. This proven approach, low-flow rate purging and sampling, provides numerous benefits that make it the method of choice for existing and new groundwater monitoring projects. MicroPurge® low-flow sampling systems deliver all the advantages a project manager needs:

- Low-flow samples are flow-weighted average of the entire well screen, providing a consistent picture of the subsurface conditions around the well
- More accurate and precise samples that yield consistent, reliable monitoring data
- Lower sample turbidity provides a better picture of the true contaminant level and can eliminate the need to filter samples
- Greatly reduced purge volume and the associated expense of containment, handling, and disposal
- Superior cost control over the life of the monitoring program

Dedicated and Portable Pumps Series

Dedicated pumps such as QED's leading Well Wizard® bladder pumps provide the maximum benefits of faster, easier field operations and avoiding cross-contamination of wells or samples. The dedicated pump and tubing remain in the well, so equipment insertion and removal, and decontamination between wells are eliminated. For short term projects or any situation in which dedicated pumps are not an option, special Sample Pro® portable bladder pumps are available with quick, no-tools disassembly and disposable bladders.

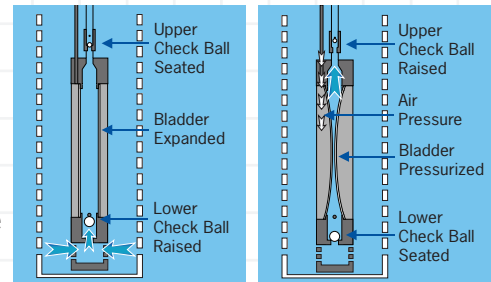
Bladder Pump Info

How a Bladder Pump Works

Pneumatic bladder pumps operate with a unique, gentle action ideal for low-flow sampling. Timed ON/OFF cycles of compressed air alternately squeeze the flexible bladder to displace water out of the pump, and release it to allow the pump to refill by submergence, without creating any disturbance that could affect sample chemistry. Bladder pumps run easily at low rates for extended times, without the problems of other devices.

Why Bladder Pumps are Superior to Other Sampling Devices

Bladder pumps are simple in their fundamental design, which makes them desirable groundwater sampling pumps. Bladder pumps produce samples with minimal alteration, providing greater accuracy and precision than devices such as bailers and electric pumps. With only three moving parts, a flexible bladder and two check valves, bladder pumps are inherently more reliable than electric pumps, air-power piston pumps, and other devices with numerous moving parts, close tolerances and high-speed motors. This combination of sampling accuracy and reliability is unmatched by other sampling devices.



What does it take to make a superior dedicated bladder pump? The answer: ongoing attention to engineering detail based on many years of wide-ranging field experience. This attention to detail focuses on 4 critical areas:

- Long bladder life
- Reliable, leak-tight check valves
- Consistent prevention of air and water leaks
- Purity and durability of materials of construction

Each pump is cleaned and laboratory-certified to be free of volatile organic compounds, acid extractable and base neutral contaminants. Your system is pre-assembled, with tubing cut to length, ready to install. If desired, installation by OSHA-certified field technicians is available. QED customer support backs you with unmatched expertise and service, including trained local representatives, 24-hour toll-free hotline and next-day loaners or service turnaround when needed. More MicroPurge® dedicated sampling systems and pumps have been chosen since 1982 than all other manufacturers' equipment combined. To find out why, call QED today for a Low-Flow Data Sheet and site-specific cost analysis.

QED's attention to detail doesn't stop there. QED uses tubing/fitting sets engineered and quality controlled for high pullout strength so you don't lose a pump downwell; inlet screens to prevent solids from damaging the bladder or hanging up check valves and long enough to provide clear inlet flow even if it rests on the bottom; standard low-clearance wellhead caps that fit even when the well closure installation is tight; and special packaging to keep the equipment clean and help make the installation go smoothly. QED's bladder pumps build in all these details and more. Our engineers have never stopped learning how to make QED bladder pumps better!



Overview

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| Bladder Pumps and Low-Flow Sampling | 1 |
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| How a Bladder Pump Works | 2 |

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Dedicated Sampling Pumps

WELL WIZARD®



*Well Wizard® Bladder Pumps:
The Original, Low-Flow Sampling
Standard*

The leaders since 1982 in dedicated pump technology, performance and support.

The heart of every low-flow groundwater monitoring system is the sampling device. For the system to do its job properly, the sampling device must:

- run reliably even at low rates (100 ml/min or less) over a wide range of conditions;
- operate gently without increasing turbidity or altering samples;
- deliver reliable performance for many years without needing frequent repairs or maintenance.

The Original, Most Complete Low-flow Pump Selection

MicroPurge® system pumps come in an unsurpassed range of sizes, materials and capabilities, including models for deep wells, narrow or obstructed casings, and small-volume pumps for low-yield wells. Together with MicroPurge controllers, flow cells and accessories, they create the most reliable, cost-effective low-flow system available.

Field proven pump designs and exclusive, high performance PTFE bladder formulation offer the reliability critical to long-term monitoring. QED was first in the industry with a standard 10-year sampling pump warranty.

Unmatched Regulatory and User Acceptance

Bladder pumps, EPA-accepted for low-flow sampling, have been shown to deliver superior sample accuracy and precision in dozens of independent studies. Nearly 80,000 Well Wizard® bladder pumps are in use — more than all other brands and types of dedicated groundwater samplers combined.

Well Wizard® Bladder Pump Advantages

- 1. EPA-accepted low-flow sampling accuracy.**
- 2. Models for every well — low yield, short water column, depths over 1,000 feet, casing ID down to 1.25”.**
- 3. Proven reliability since 1982, with the industry’s first standard 10-year warranty.**
- 4. Exclusive PTFE bladder formulation rated for years more flex life than other bladder materials.**

Specifications

| Model No. | Pump Materials | Length | Diameter | Fitting Material | Tubing* OD Size | Volume | Max. Lift |
|-----------|----------------------|-------------------|-------------------|------------------|--------------------------|--------|-------------------|
| T1100M | Teflon® | 3.3 ft. (1.0 m) | 1.66 in. (4.2 cm) | Teflon® | 1/4 & 3/8 in. (6 & 9 mm) | 395 ml | 250 ft. (75 m) |
| P1101M | PVC | 3.4 ft. (1.04 m) | 1.66 in. (4.2 cm) | Polypropylene | 1/4 & 3/8 in. (6 & 9 mm) | 395 mL | 300 ft. (90 m) |
| P1101HM | PVC | 3.3 ft. (1.0 m) | 1.66 in. (4.2 cm) | Stainless Steel | 1/4 & 3/8 in. (6 & 9 mm) | 395 mL | 600 ft. (180 m) |
| ST1102PM | 316 Stainless Steel | 3.4 ft. (1.04 m) | 1.66 in. (4.2 cm) | Stainless Steel | 1/4 & 3/8 in. (6 & 9 mm) | 395 mL | 1,000 ft. (305 m) |
| T1200M | 316 S.S. and Teflon® | 3.4 ft. (1.04 m) | 1.50 in. (3.8 cm) | Stainless Steel | 1/4 & 3/8 in. (6 & 9 mm) | 495 mL | 300 ft. (90 m) |
| T1250 | 316 Stainless Steel | 1.25 ft. (0.38 m) | 1.50 in. (3.8 cm) | Stainless Steel | 1/4 & 1/4 in. (6 & 6 mm) | 100 mL | 300 ft. (90 m) |
| P1150 | PVC, Teflon® | 1.63 ft. (0.5 m) | 1.66 in. (4.2 cm) | Polypropylene | 1/4 & 1/4 in. (6 & 6 mm) | 130 mL | 300 ft. (90 m) |
| T1300 | 316 S.S. and Teflon® | 3.8 ft. (1.16 m) | 1.00 in. (2.5 cm) | Stainless Steel | 1/4 & 3/8 in. (6 & 9 mm) | 220 mL | 200 ft. (90 m) |

* To choose 1/2 in. OD (13 mm) rather than 3/8 in. (9 mm) discharge tube option, delete suffix M from pump model number.

Intake Screen Specifications

| Model No. | Material | Screen Size | Fits Pump Model(s) |
|-----------|-----------------|-------------------------|------------------------------|
| 35200 | Stainless Steel | .010 in. (0.25 mm) mesh | T1200M, T1250 |
| 37789 | PVC | .010 in. (0.25 mm) slot | P1101M, P1101HM |
| 37727 | PVC | .010 in. (0.25 mm) slot | P1250 (also P1101M, P1101HM) |
| 37733 | Teflon® | .010 in. (0.25 mm) slot | T1100 |

Note: Pump models ST1101P, T1300 include intake screens. Screens are optional on other pump models, but are required for full 10-year warranty coverage.

Materials Specifications

| | |
|---------------------------|--|
| Stainless Steel | Type 316 electropolished |
| PVC | NSF-grade, extruded specifically for QED with no markings or lubricants. |
| Teflon® (pumps) | DuPont Teflon and other premium PTFE resins |
| Teflon® (bladders) | Q-flex exclusive 200,000 cycle rated PTFE. |

Teflon is a registered DuPont trademark.

Added System Benefits

Well Wizard® pumps will provide the most precise low-flow purging and sampling when operated by a MicroPurge® Model MP10 Controller, with purge water monitoring via the MicroPurge MP20 Flow Cell.

MicroPurge® Well Caps



MicroPurge® Well Caps

QED provides an extremely wide range of off-the-shelf and custom caps to complete the system to fit your project's needs and allow easy installation. Popular features include:

- high-purity flexible discharge tubes
- low-clearance fit beneath wellhead closure lids
- below-grade water-tight closures
- water level measurement ports
- freeze protection
- protective dust caps

Low Clearance Standard Cap

Low-clearance model includes a dust-tight cover and compact self-storing MicroPurge discharge tubing. Anodized aluminum caps fit 2" and 4" wells. Models for 1/4" and 3/8" discharge tubing available.

Low Clearance

| Model No. | Cap Size | Discharge |
|-----------|---------------|----------------|
| C24L | 2 in. (5 cm) | 1/4 in. (6 mm) |
| C26L | 2 in. (5 cm) | 3/8 in. (9 mm) |
| C44L | 4 in. (10 cm) | 1/4 in. (6 mm) |
| C46L | 4 in. (10 cm) | 3/8 in. (9 mm) |

Sealing Cap

Sealing model includes a water-tight cover and compact self-storing MicroPurge discharge tubing. Anodized aluminum caps fit 2" and 4" wells. Models for 1/4" and 3/8" discharge tubing available. QED offers dozens of custom well caps to work with any unique well casing or schedule. Contact QED with questions.

Sealing

| Model No. | Cap Size | Discharge |
|-----------|---------------|----------------|
| C24S | 2 in. (5 cm) | 1/4 in. (6 mm) |
| C26S | 2 in. (5 cm) | 3/8 in. (9 mm) |
| C44S | 4 in. (10 cm) | 1/4 in. (6 mm) |
| C46S | 4 in. (10 cm) | 3/8 in. (9 mm) |



Sample Pump Tubing

QED tubing innovations such as Teflon®-lining and bonded twin-tube protect sample integrity while making system installation and operation easier and more economical. Careful development and quality control provide tight tubing diameter tolerances for connections that are leak-tight and have high pull-out strength, something not found in hardware store tubing. All tubing is controlled quality, virgin grade material. Economical Teflon-lined polyethylene tubing is the most frequently used, with Teflon on the inside of the sample tubing, where it's really needed. Other choices include all-Teflon, polyethylene, and polypropylene (for deep-well use). QED also stocks bulk tubing and many other sizes and materials; inquire for details.

QED Tubing Advantages

1. Hassle-free, twin-line bonded tubing, not cable tied or loose.
2. Systems are custom cut, pre-assembled, leak-tested and poly-bagged for easy installation all at no additional cost.
3. Highest quality materials and true continuous lengths.

Twin-line simplicity

Our standard twin-line air supply/discharge tubing has a continuous heat-welded bond to prevent tangles and hangups during pump installation and maintenance, and avoids entanglement with portable water level meters and other equipment.

Tubing assemblies are cut to exact length and pre-assembled to well cap and pump per customer specifications at no extra cost. QED stocks the largest variety of discharge adapters, elbows and couplers.

| Model No. | Material | Maximum Pressure | Maximum Depth | Min. Bend Radius |
|--|-----------------|---------------------|-------------------|------------------|
| Air Supply: 1/4 in. OD (6 mm) Discharge: 3/8 in. OD (9 mm) | | | | |
| P5000 | Polyethylene | 300 psi (2,070 kPa) | 600 ft. (183 m) | 1.25 in. (3 cm) |
| PT5000 | Teflon-lined PE | 300 psi (2,070 kPa) | 600 ft. (183 m) | 1.25 in. (3 cm) |
| T5010 | Teflon | 275 psi (1,896 kPa) | 550 ft. (168 m) | 2.5 in. (6 cm) |
| Air Supply: 1/4 in. OD (6 mm) Discharge: 1/2 in. (13 mm) | | | | |
| P5100 | Polyethylene | 200 psi (1,380 kPa) | 400 ft. (122 m) | 2.5 in. (6 cm) |
| PT5100 | Teflon-lined PE | 200 psi (1,380 kPa) | 400 ft. (122 m) | 2.5 in. (6 cm) |
| T5110 | Teflon | 200 psi (1,380 kPa) | 400 ft. (122 m) | 3.0 in. (7.5 cm) |
| Air Supply: 1/4 in. OD (6 mm) Discharge: 1/4 in. (6 mm) | | | | |
| P5200 | Polyethylene | 300 psi (2,070 kPa) | 600 ft. (183 m) | 1.0 in. (2.5 cm) |
| PT5200 | Teflon-lined PE | 300 psi (2,070 kPa) | 600 ft. (183 m) | 1.0 in. (2.5 cm) |
| T5200 | Teflon | 275 psi (1,896 kPa) | 550 ft. (168 m) | 1.0 in. (2.5 cm) |
| Air Supply: 5/16 in. OD (8 mm) Discharge: 3/8 in. (9 mm) | | | | |
| DW5000 | Teflon | 500 psi (3,447 kPa) | 1,000 ft. (305 m) | 2.5 in. (6 cm) |

Well Development Pumps

When a monitoring well is installed, it is essential to clear soil particles and drilling fines out of the well that interfere with pumping and result in excessive turbidity. The Sample Pro® Well Development Pump is ideal for fast, easy development of 2" and 4" diameter wells. The operator pulls up on the hoses to surge the well with the pumps flexible wipers that sweep the inside of the casing. The surge-block action's reversing flow loosens fines in the well filter pack so they can be pumped out of the well. Two models are available – standard PVC/Stainless Steel, and Stainless/Teflon for sensitive sampling situations. Wipers to fit both 2" and 4" wells are included. (This pump can also be used for purging).

Specifications

| Model No. | Well Dia. | Pump Material | Tube Fittings | Wiper Material | Max. Lift | Length | Dia. | Pump Wt. |
|--------------------------|------------|---------------|---------------|----------------|-----------|-----------|----------|-----------|
| Development Pumps | | | | | | | | |
| HR4105D | 2 or 4 in. | PVC/303 S.S. | Brass | PVC/Buna-N | 200 ft. | 65.00 in. | 1.66 in. | 6.0 lbs. |
| HR4105SS | 2 or 4 in. | 304 S.S. | 304 S.S. | S.S./Teflon | 200 ft. | 65.00 in. | 1.66 in. | 15.0 lbs. |

HR4105SS uses barbed S.S. fittings and clamps with 0.50 in. OD air supply and 0.75 in. OD discharge tubing. All other pumps have brass quick connect air supply and thread-on discharge fittings for use with model P5700 Flexible Hose Bundle.





Beyond the Basics...

Since 1981, QED's Well Wizard® and Sample Pro® bladder pumps have been the best choice for producing accurate, precise samples while controlling sampling program costs. The addition of QED's MicroPurge® line of low-flow sampling controls simplifies the low-flow sampling process, further improving sample quality and reducing costs. QED's industry-leading team of technical experts will configure a dedicated or portable sampling system to meet your project needs based on site-specific data and well configurations.

Accessories

- MicroPurge® Flow Cell
- MicroPurge® Drawdown Meter
- Bonded twin-tubing, well caps and discharge adapters
- Electric or Engine-Powered Compressors
- Custom components for special applications

Call us at

800-624-2026

for prompt, expert assistance on your project needs.

Or visit us on the web at

www.qedenv.com

The World Leader in Air-Powered Pumps

For Remediation, Landfills and Groundwater Sampling



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USA

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www.qedenv.com

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800-624-2026
T: 510-346-0400
F: 510-346-0414
info@qedenv.com
www.qedenv.com

WELL WIZARD[®]

WELL WIZARD[®]

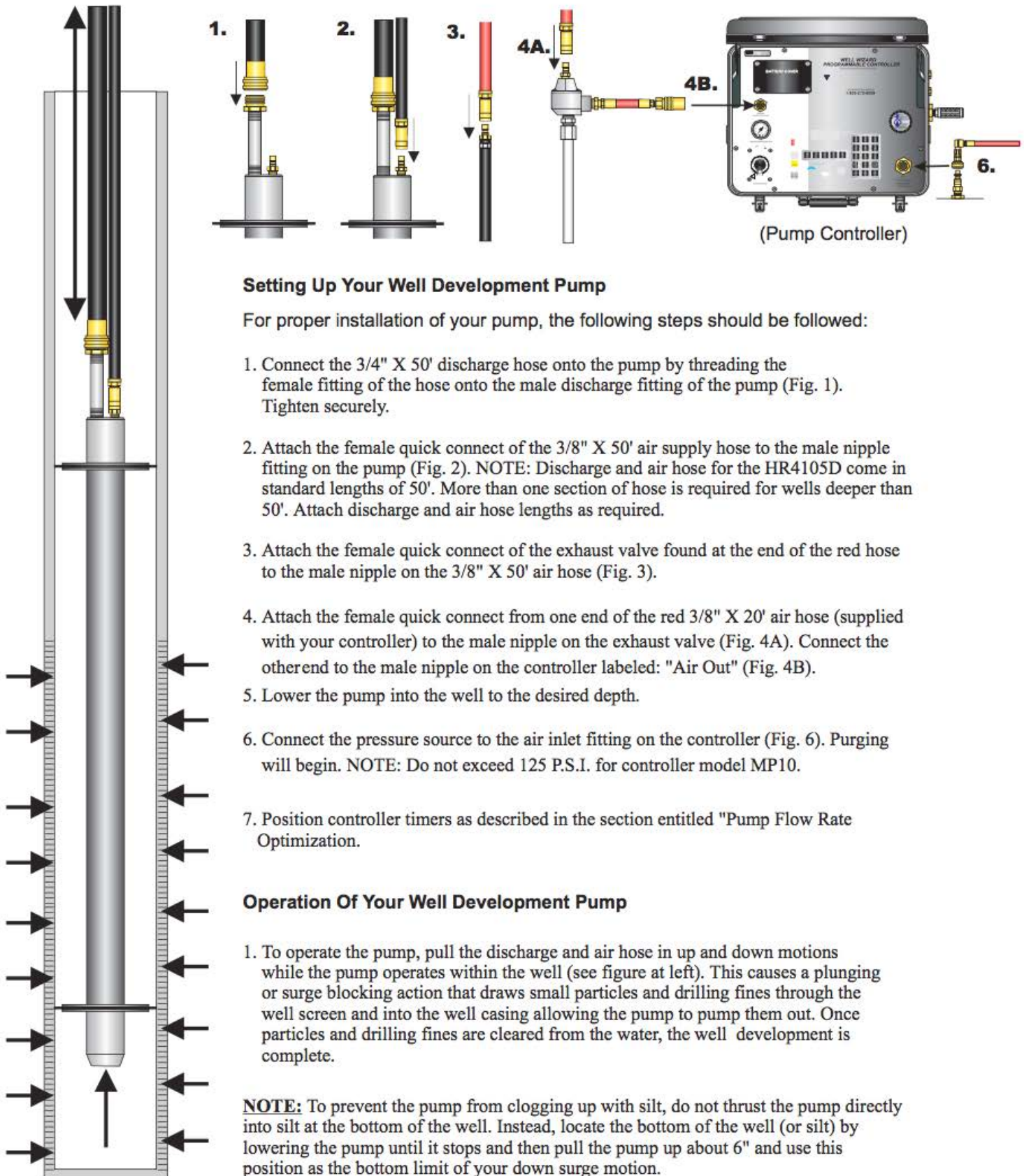
Well Development Pump Installation & Operation Manual

Models HR4105D and HR4105SS



| Contents | Page |
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| HR4105D Setup & Operation _____ | 1 |
| HR4105SS Setup & Operation _____ | 2-3 |
| Flow Rate Optimization _____ | 4 |
| Cleaning & Disassembly _____ | 5 |
| HR4105D Technical Data & Specifications _____ | 6 |
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| Warranty Information _____ | 8-9 |

QED's well development pumps are double action high rate purge pumps designed to develop 2" and 4" wells. As the operator lifts the pump within the well by pulling up on the tubing, flexible wipers attached to the pump sweep the well casing wall creating a surge-block action. The Surging draws small particles through the well screen and into the well casing, where the well development pump pumps them out.



Setting Up Your Well Development Pump

For proper installation of your pump, the following steps should be followed:

1. Connect the 3/4" X 50' discharge hose onto the pump by threading the female fitting of the hose onto the male discharge fitting of the pump (Fig. 1). Tighten securely.
2. Attach the female quick connect of the 3/8" X 50' air supply hose to the male nipple fitting on the pump (Fig. 2). NOTE: Discharge and air hose for the HR4105D come in standard lengths of 50'. More than one section of hose is required for wells deeper than 50'. Attach discharge and air hose lengths as required.
3. Attach the female quick connect of the exhaust valve found at the end of the red hose to the male nipple on the 3/8" X 50' air hose (Fig. 3).
4. Attach the female quick connect from one end of the red 3/8" X 20' air hose (supplied with your controller) to the male nipple on the exhaust valve (Fig. 4A). Connect the other end to the male nipple on the controller labeled: "Air Out" (Fig. 4B).
5. Lower the pump into the well to the desired depth.
6. Connect the pressure source to the air inlet fitting on the controller (Fig. 6). Purging will begin. NOTE: Do not exceed 125 P.S.I. for controller model MP10.
7. Position controller timers as described in the section entitled "Pump Flow Rate Optimization."

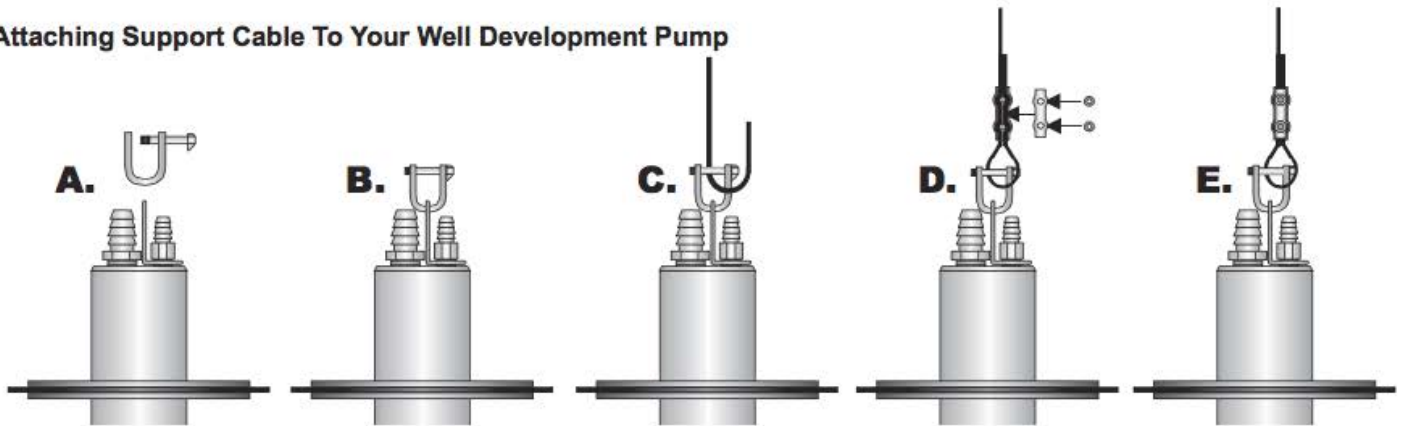
Operation Of Your Well Development Pump

1. To operate the pump, pull the discharge and air hose in up and down motions while the pump operates within the well (see figure at left). This causes a plunging or surge blocking action that draws small particles and drilling fines through the well screen and into the well casing allowing the pump to pump them out. Once particles and drilling fines are cleared from the water, the well development is complete.

NOTE: To prevent the pump from clogging up with silt, do not thrust the pump directly into silt at the bottom of the well. Instead, locate the bottom of the well (or silt) by lowering the pump until it stops and then pull the pump up about 6" and use this position as the bottom limit of your down surge motion.

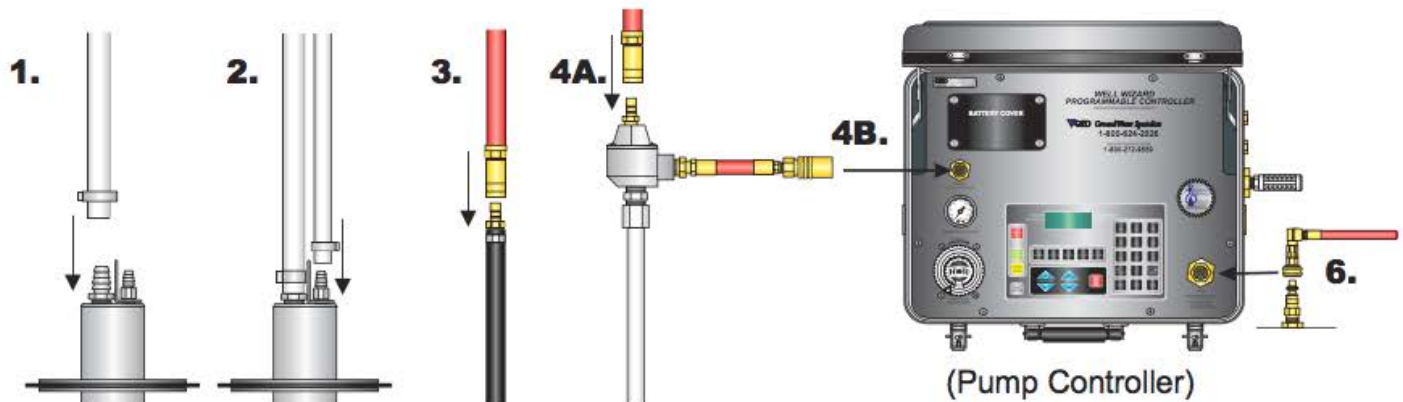
QED's well development pumps are double action high rate purge pumps designed to develop 2" and 4" wells. As the operator lifts the pump within the well by pulling up on the tubing, flexible wipers attached to the pump sweep the well casing wall creating a surge-block action. The Surging draws small particles through the well screen and into the well casing, where the well development pump pumps them out.

Attaching Support Cable To Your Well Development Pump



1. Unthread post from horseshoe clamp (fig. A). Insert clamp through the hole in the cable support bracket and thread post fully back into the clamp (fig. B).
2. Pass support cable through the horseshoe clamp (fig. C). Remove Nuts and pressure plate from the cable clamp then thread the support cable through the cable clamp (fig. D)
3. Place clamp pressure plate on clamp and thread nuts down on the pressure plate until clamp is tight and secure (fig. E).

Setting Up Your Well Development Pump



1. Slide clamp over 3/4" discharge tube then connect the tube to the pump discharge barb fitting. Position clamp over the barb fitting then using the clamp tool crimp clamp down onto tubing (fig. 1).
2. Slide clamp over 1/2" pump air supply tube then connect the tube to the pump air supply fitting. Position clamp over the barb fitting then using the clamp tool crimp clamp down onto tubing (fig. 2).
3. Attach the female quick connect of the exhaust valve found at the end of the red hose to the male nipple on the air supply tubing (Fig. 3).
4. Attach the female quick connect from one end of the red 3/8" X 20' air hose (supplied with your controller) to the male nipple on the exhaust valve (Fig. 4A). Connect the other end to the male nipple on the controller labeled: "AIR OUT" (Fig. 4B).
5. Lower the pump into the well to the desired depth.
6. Connect the pressure source to the "Air In" fitting on the controller (Fig. 6). Purging will begin. **NOTE:** Do not exceed 125 P.S.I. for controller model MP10.

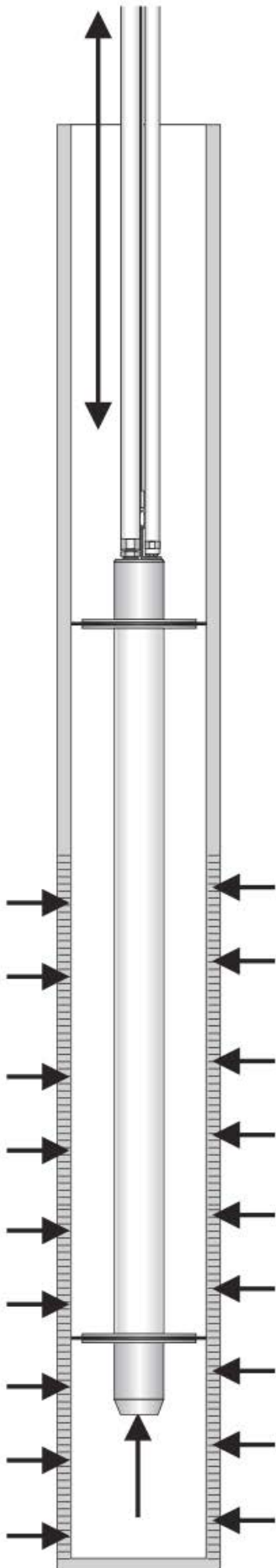
Setting Up Your Well Development Pump Continued...

7. Position controller timers as described in the section entitled "Pump Flow Rate Optimization"

Operation Of Your Well Development Pump

1. To operate the pump, pull the Support cable along with the discharge and air hose in up and down motions while the pump operates within the well (see figure at left). This causes a plunging or surge blocking action that draws small particles and drilling fines through the well screen and into the well casing allowing the pump to pump them out. Once particles and drilling fines are cleared from the water, the well development is complete.

NOTE: To prevent the pump from clogging up with silt, do not thrust the pump directly into silt at the bottom of the well. Instead, locate the bottom of the well (or silt) by lowering the pump until it stops and then pull the pump up about 6" and use this position as the bottom limit of your down surge motion.



Optimizing Flow Rates For The Well Development Pump

The purpose of optimizing flow rates is to create maximum flow rates and pump efficiency at the pump's operating conditions. To accomplish this, both the refill and discharge times on the pump controller must be optimized.

To optimize the refill and discharge times, the following steps should be followed:

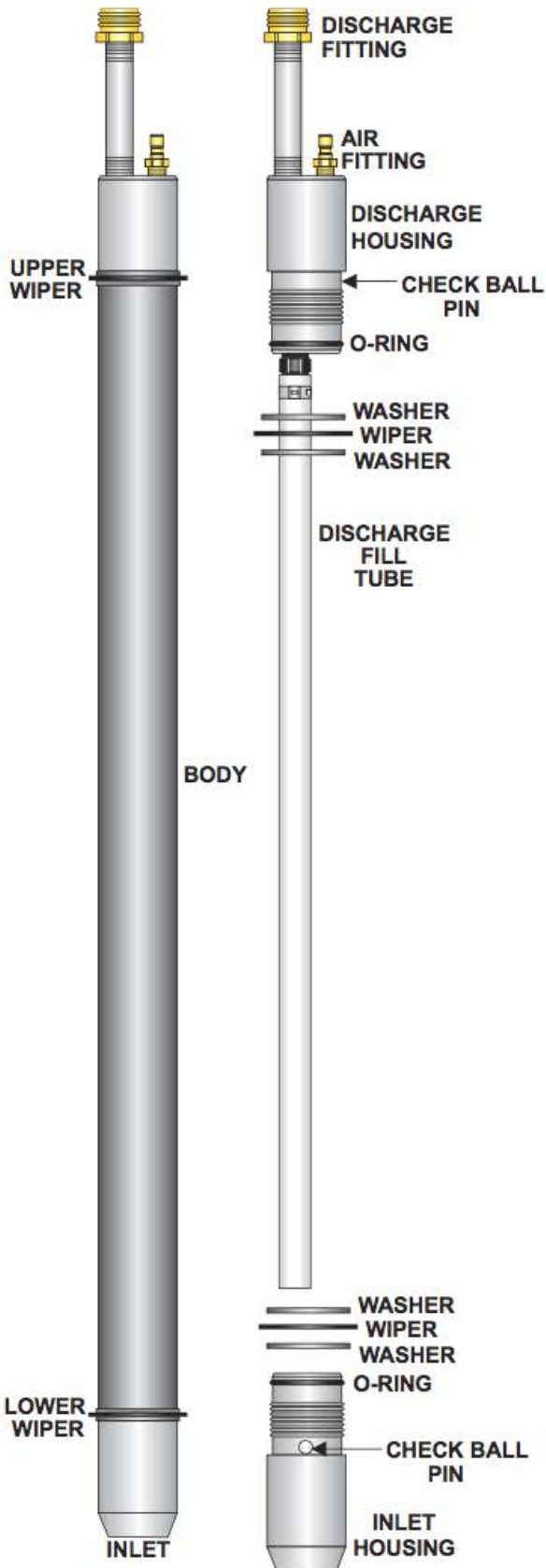
1. Set the refill time on the controller at 15 seconds. Set the discharge time at 1 second if your well depth is under 50', set the discharge time at 3 seconds if your well depth is 51' to 100', for wells with a depth greater than 100' set the discharge timer at 5 seconds. With these settings, it should take 5-15 cycles to purge the air from the discharge line depending on the pump's depth. If liquid fails to discharge after 15 cycles, begin increasing the discharge time (as discussed in step #2 below). When liquid begins to flow from the discharge line, measure the amount of liquid being discharged per cycle. At this point the volume measured is probably less than the full internal volume of the well development pump which is 1.15 liters
2. Begin to increase the discharge time slightly in about 1/2 second increments allowing the pump to cycle 3-5 times between each adjustment. Repeat this operation until air can be detected coming up through the discharge line in the form of bubbles. The amount of liquid being discharged per cycle at this point should be close to the full internal volume of the pump (1.15 liters). If air and water begin to burst out of the discharge line, it means that the pump's discharge time is set too long. Decrease the discharge time and repeat the initial procedure with using smaller time increments (i.e. 1/4 sec. Vs. 1/2 sec.). The Discharge time of the pump should now be optimized.
3. Now begin to decrease the refill time slightly in about 1 second increments allowing the pump to cycle 3-5 times between each adjustment. Repeat this operation until air can be detected coming through the discharge line in the form of air bubbles. The amount of liquid being discharged per cycle at this point should still be close to the full internal volume of the pump (1.15 liters). If air and water begin to burst out of the discharge line hard it means that your refill time is too short. Increase the refill time and repeat the initial procedures this time with smaller time increments (i.e. 1/2 sec. Vs. 1 sec.). Both the discharge and refill times should now be optimized.

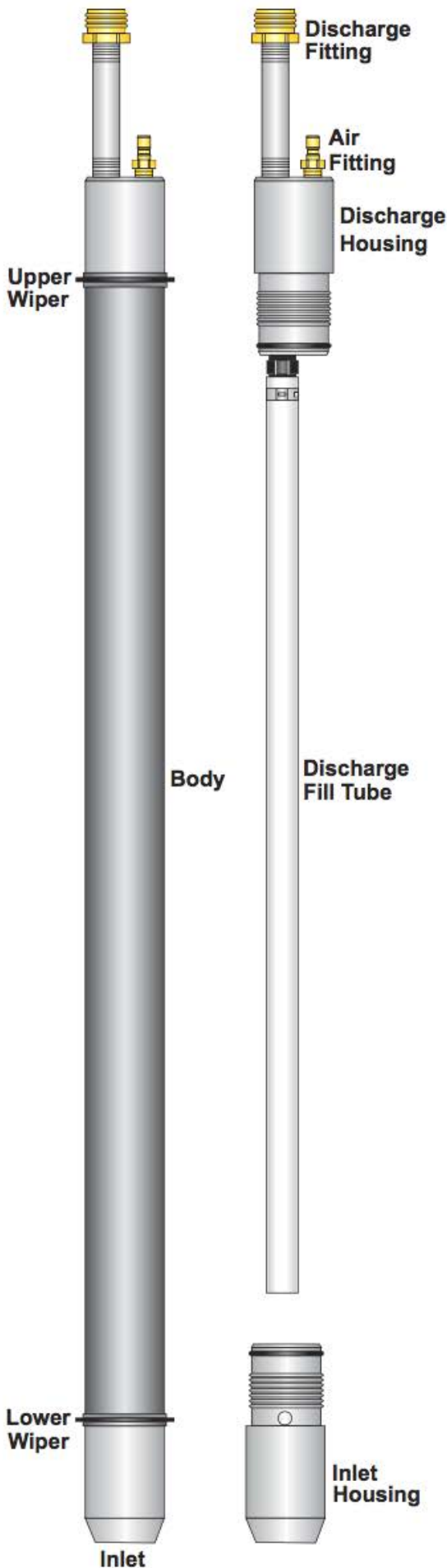
NOTE: The best of flow rates are obtained when the pump's submergence is 10' or more. Partial submergence of the well development pump will severely lower the pumps efficiency and flow rates.

Cleaning And Disassembly Of The Well Development Pump

Please observe the following recommendations when disassembling or assembling your well development pump.

1. It is important to make sure that all sand or like substances are washed off of the pump. These particles can cause damage to the threads on the discharge and inlet housings.
2. The pump should be taken apart by hand. **DO NOT USE A WRENCH OR YOU MAY DAMAGE THE PUMP.** Both the inlet and the discharge housings simply unthread from the main body of the pump.
3. The pump's 2 wiper assemblies will slide off after removal of the inlet and the discharge housings. Both 2" and 4" wipers come with your pump and may need occasional replacement due to abrasion wear from the well casing and screen.
4. Both the Inlet and the discharge housings checkballs are held in place by pins which prevents loss during disassembly.





Pump Type: Gas Displacement

Dimensions:

Pump O.D.: 1.66" (42 mm)
Length: 65" (165 mm)
Weight: 6 lbs. (2.7 kg)

Materials: PVC, Stainless Steel, Viton (O-Rings) and Buna-N (Wipers)

Fittings: Brass

Discharge Size: 3/4" (19 mm) O.D.

Air Supply Size: 3/8" (9.5 mm) O.D.

Casing Wipers: 2" (50 mm) Wipers For 2" Casings
 4" (100 mm) Wipers For 4" Casings

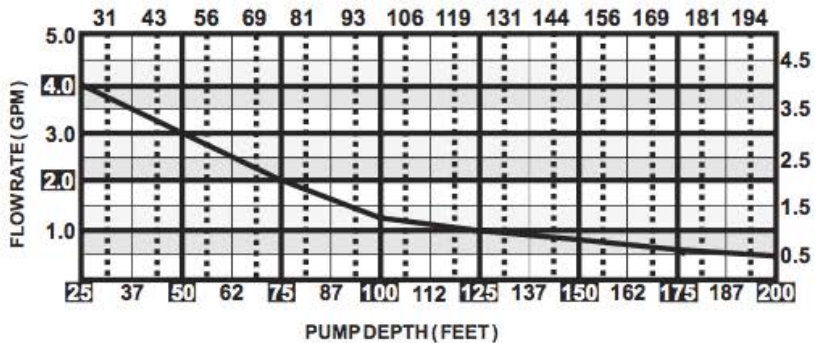
PUMP PERFORMANCE:

Maximum Lift: 200 Feet (60 m)

Pump Stroke Volume:

| LITERS | MILLILITERS | GALLONS | OUNCES |
|-------------|-------------|------------|-------------|
| 1.15 | 1150 | .30 | 38.4 |

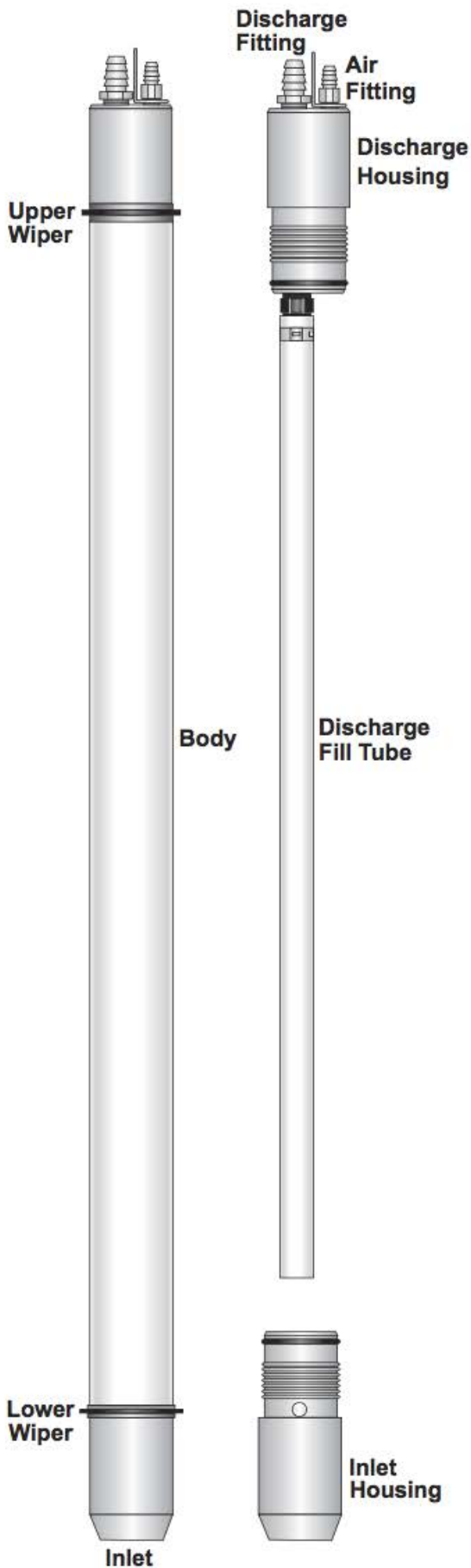
HR4105D FLOW RATES



NOTE: Flow rates are based on pump submergence of 25 feet (7.6 m) and operating gas pressure of 100 p.s.i. (9.6 bar) / 4.5 s.c.f.m.

ACCESSORIES:

- P/N P5700** 50' (15 m) Flexible Hose Bundle 3/4" x 3/8"
- P/N 35347** 2" (50 mm) PVC Washer
- P/N 35348** 2" (50 mm) Buna Washer
- P/N 35382** 4" (100 mm) PVC Washer
- P/N 35383** 4" (100 mm) Buna Washer



Pump Type: Gas Displacement

Dimensions:

Pump O.D.: 1.66" (42 mm)
Length: 65" (165 mm)
Weight: 15 lbs. (6.8 kg)

Materials: Stainless Steel, Teflon, Viton (O-Rings) and Buna-N (Wipers)

Fittings: Stainless Steel Barb

Discharge Size: 3/4" (19 mm) O.D.

Air Supply Size: 1/2" (12.7 mm) O.D.

Casing Wipers: 2" (50 mm) Wipers For 2" Casings
 4" (100 mm) Wipers For 4" Casings

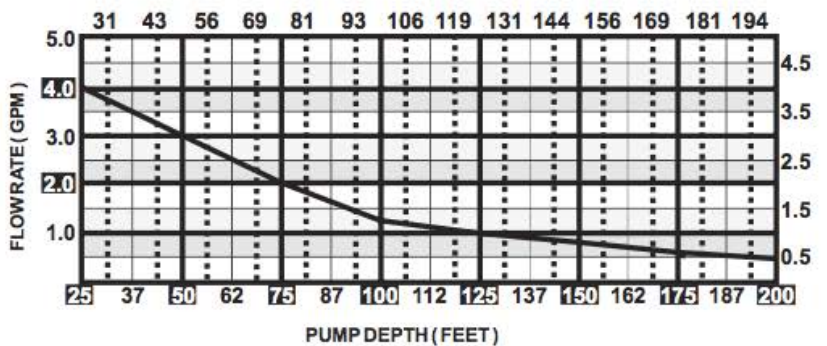
PUMP PERFORMANCE:

Maximum Lift: 200 Feet (60 m)

Pump Stroke Volume:

| LITERS | MILLILITERS | GALLONS | OUNCES |
|-------------|-------------|------------|-------------|
| 1.15 | 1150 | .30 | 38.4 |

HR4105D FLOW RATES



NOTE: Flow rates are based on pump submergence of 25 feet (7.6 m) and operating gas pressure of 100 p.s.i. (9.6 bar) / 4.5 s.c.f.m.

ACCESSORIES:

- P/N P5610** Poly Tubing 3/4" (19 mm) + 1/2" (12.7 mm)
- P/N 35998** 2" (50 mm) Stainless Steel Washer
- P/N 35999** 2" (50 mm) Teflon Washer
- P/N 36001** 4" (100 mm) Stainless Steel Washer
- P/N 36002** 4" (100 mm) Teflon Washer
- P/N 8330** 3/32" (2.4 mm) Stainless Steel Teflon Coated Support Cable

QED Environmental Systems, Inc. (QED) warrants to the original purchaser of its products that, subject to the limitations and conditions provided below, the products, materials and/or workmanship shall reasonably conform to descriptions of the products and shall be free of defects in materials and workmanship. Any failure of the products to conform to this warranty will be remedied by QED in the manner provided herein

This warranty shall be limited to the duration and the conditions set forth below. All warranty durations are calculated from the original date of purchase.

1. Liquid contacting equipment (including pumps), tubing, liquid contacting supplies and flow totalization equipment are warranted for 1 year.
2. Control devices, control device mounting, and surface air supply hose are warranted for 1 year.
3. Separately sold parts and spare parts kits are warranted for ninety (90) days.
4. Repairs performed by QED are warranted for ninety (90) days from date of repair or for the full term of the original warranty, whichever is longer.

Buyer's exclusive remedy for breach of said warranty shall be as follows: if, and only if, QED is notified in writing within the applicable warranty period of the existence of any such defects in the said products, and QED upon examination of any such defects, shall find the same to be within the term of and covered by the warranty running from QED to buyer, QED will, at its option, as soon as reasonably possible, replace or repair any such product, without charge to the buyer. If QED for any reason, cannot repair a product covered hereby within four (4) weeks after receipt of the original Purchaser's/Buyer's notification of a warranty claim, then QED's sole responsibility shall be, at its option, either replace the defective product with a comparable new unit at no charge to the buyer, or to refund the full purchase price.

In no event shall such allegedly defective products be returned to QED without its consent, and QED's obligations of repair, replacement or refund are conditioned upon the Buyer's return of the defective product to QED.

IN NO EVENT SHALL QED ENVIRONMENTAL SYSTEMS, INC. BE LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF SAID WARRANTY.

The foregoing warranty does not apply to major subassemblies and other equipment, accessories, and other parts manufactured by others, and such other parts, accessories, and equipment are subject only to the warranties, if any, supplied by their respective manufacturers. QED makes no warranty concerning products or accessory, QED will give reasonable assistance to Buyer in obtaining from the respective manufacturer whatever adjustment is reasonable in light of the manufacturer's own warranty.

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED OR STATUTORY (INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE), WHICH OTHER WARRANTIES ARE EXPRESSLY EXCLUDED HEREBY, and of any other obligations or liabilities on the part of QED, and QED neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with said products, materials and/or workmanship.

It is understood and agreed that QED shall in no event be liable for incidental or consequential damages resulting from its breach of any of the terms of this agreement, nor for special damages, nor for improper selection of any product described or referred to for a particular application.

This warranty will be void in the event of unauthorized disassembly of component assemblies. Defects in any equipment that result from abuse, operation in any manner

outside the recommended procedures, use and applications other than for intended use, or exposure to chemical or physical environment beyond the designated limits of materials and construction will also void this warranty.

Chemical attack to liquid contacting equipment and supplies shall not be covered by this warranty. A range of materials is available from QED and it is the Buyer's responsibility to select materials to fit the Buyer's application. QED will only warrant that the supplied liquid contacting materials will conform to published QED specifications and generally accepted standards for that particular material.

QED shall be released from all obligations under all warranties if any product covered hereby is repaired or modified by persons other than QED's service personnel unless such repair by others is made with the written consent of QED. If any product covered hereby is actually defective within the terms of this warranty, Purchaser must contact QED for determination of warranty coverage. If the return of a component is determined to be necessary, QED will authorize the return of the component, at owner's expense. If the product proves not to be defective within the terms of this warranty, then all costs and expenses in connection with the processing of the Purchaser's claim and all costs for repair, parts and labor as authorized by owner hereunder shall be borne by the Purchaser.

The original Purchaser's sole responsibility in the instance of a warranty claim shall be to notify QED of the defect, malfunction, or other manner in which the terms of this warranty are believed to be violated. You may secure performance of obligations hereunder by contacting the Customer Service Department of QED and:

1. Identifying the product involved (by model or serial number or other sufficient description that will allow QED to determine which product is defective).
2. Specifying where, when, and from whom the product was purchased.
3. Describing the nature of the defect or malfunction covered by this warranty.
4. Sending the malfunctioning component, after authorization by QED to:

QED Environmental Systems
2355 Bishop Circle West
Dexter, MI 48130

Telephone: 1-734-995-2547
1-800-624-2026
1-734-995-1170 (Fax)

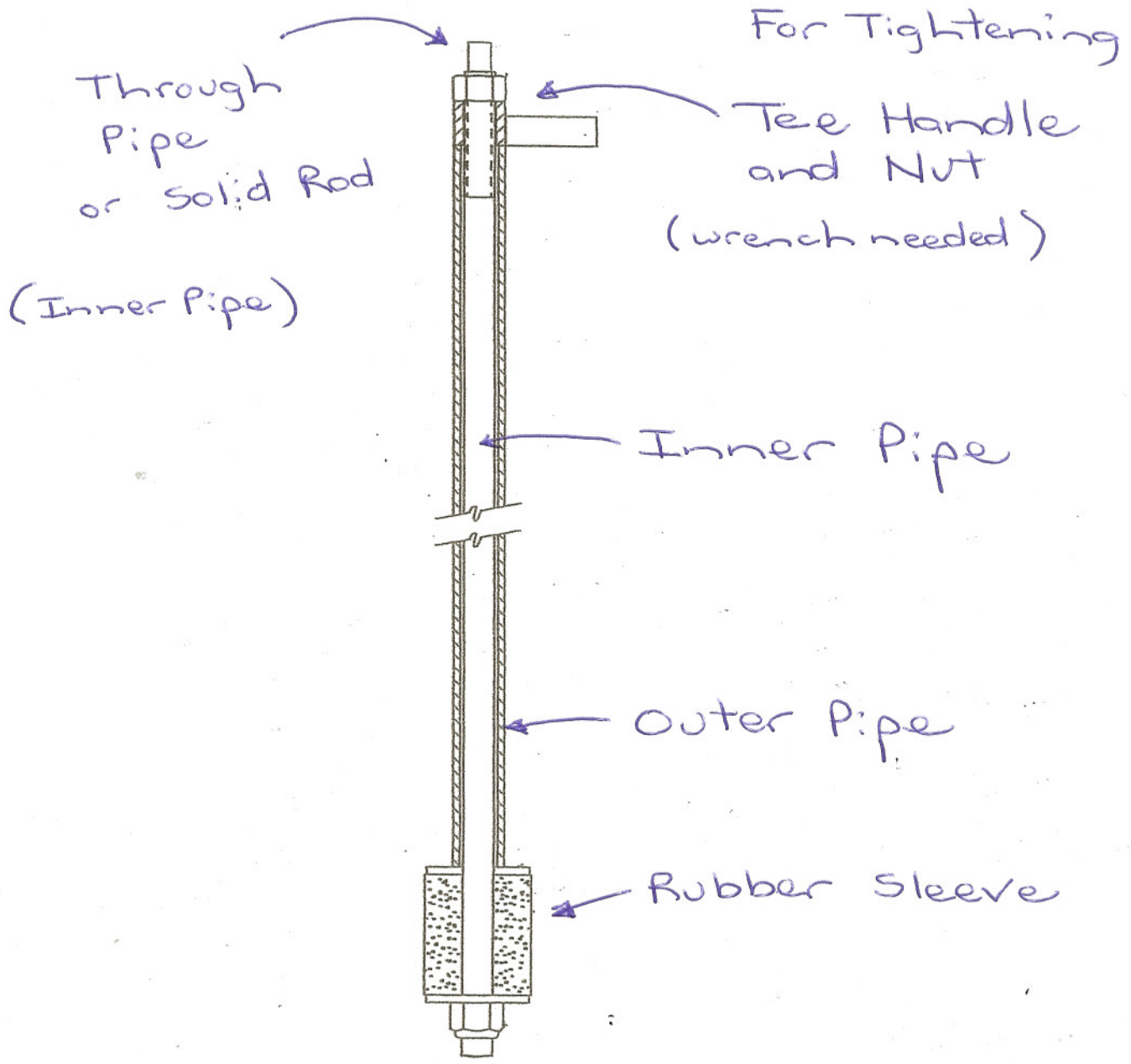


P/N 95121 4-23-19

Attachment 4: QSP Packer Schematic

12" to 20'
Lengths

Mechanical Packer



Attachment 5: Well and Gas Probe Abandonment Forms

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between \$10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return this form to the appropriate DNR office and bureau. See instructions on reverse for more information.

Verification Only of Fill and Seal

Route to DNR Bureau:

- Drinking Water Watershed/Wastewater Remediation/Redevelopment
 Waste Management Other _____

1. Well Location Information **2. Facility / Owner Information**

| | | | | | | | |
|--|--|---|--|--|--|---|--|
| County Dane | | WI Unique Well # of Removed Well (P-011) | | Hicap # | | Facility Name Refuse Hideaway Landfill | |
| Latitude / Longitude (see instructions) ° N ° W | | Format Code <input checked="" type="checkbox"/> DD <input type="checkbox"/> DDM | | Method Code <input type="checkbox"/> GPS008 <input type="checkbox"/> SCR002 <input type="checkbox"/> OTH001 | | Facility ID (FID or PWS) | |
| ¼ / ¼ SW ¼ NW | | Section 8 | | Township 7 | | Range <input checked="" type="checkbox"/> E <input type="checkbox"/> W | |
| or Gov't Lot # | | Well Street Address 7562 US Hwy 14 | | Well City, Village or Town Town of Middleton | | Well ZIP Code 53562 | |
| Subdivision Name | | Lot # | | Original Well Owner Wisconsin DNR | | Mailing Address of Present Owner 3911 Fish Hatchery Road | |
| Reason For Removal From Service Out of Program | | WI Unique Well # of Replacement Well P-011 | | City of Present Owner Fitchburg | | State WI | |
| Well Street Address | | Well ZIP Code | | City of Present Owner | | ZIP Code | |
| Well City, Village or Town | | Well ZIP Code | | City of Present Owner | | ZIP Code | |
| Subdivision Name | | Lot # | | City of Present Owner | | ZIP Code | |

3. Filled & Sealed Well / Drillhole / Borehole Information **4. Pump, Liner, Screen, Casing & Sealing Material**

| | | | | | |
|--|--|--|--|--|--|
| <input checked="" type="checkbox"/> Monitoring Well <input type="checkbox"/> Water Well <input type="checkbox"/> Borehole / Drillhole | | Original Construction Date (mm/dd/yyyy) | | Pump and piping removed? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Liner(s) removed? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A Liner(s) perforated? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Screen removed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A Casing left in place? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | |
| Construction Type: <input checked="" type="checkbox"/> Drilled <input type="checkbox"/> Driven (Sandpoint) <input type="checkbox"/> Dug <input type="checkbox"/> Other (Specify) _____ | | If a Well Construction Report is available, please attach. | | Was casing cut off below surface? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A Did sealing material rise to surface? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Did material settle after 24 hours? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A If yes, was hole retopped? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A If bentonite chips were used, were they hydrated with water from a known safe source <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | |
| Formation Type: <input checked="" type="checkbox"/> Unconsolidated Formation <input type="checkbox"/> Bedrock | | Required Method of Placing Sealing Material | | Sealing Materials <input type="checkbox"/> Neat Cement Grout <input type="checkbox"/> Concrete <input type="checkbox"/> Sand-Cement (Concrete) Grout <input checked="" type="checkbox"/> Bentonite Chips | |
| Total Well Depth From Ground Surface (ft) 31.0 | | Casing Diameter (in.) 1.25 | | For Monitoring Wells and Monitoring Well Boreholes Only: <input checked="" type="checkbox"/> Bentonite Chips <input type="checkbox"/> Bentonite - Cement Grout <input type="checkbox"/> Granular Bentonite <input type="checkbox"/> Bentonite - Sand Slurry | |
| Lower Drillhole Diameter (in.) 31.0 | | Casing Depth (ft.) 31.0 | | Was well annular space grouted? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown If yes, to what depth (feet)? Depth to Water (feet) | |

| 5. Material Used to Fill Well / Drillhole | From (ft.) | To (ft.) | No. Yards, Sacks Sealant or Volume (circle one) | Mix Ratio or Mud Weight |
|---|------------|----------|---|-------------------------|
| Hole Plug 3/8" Chips | Surface | 31.0 | 0.26 cubic feet | |
| | | | | |
| | | | | |

6. Comments
Pumped well dry using inertial pump prior to filling to avoid potential bridging. WDNR variance to NRI40 abandonment protocol approved on 4/20/20 by C. Koepke

| | | | | |
|--|---|---|-------------------------------|----------|
| 7. Supervision of Work | | | DNR Use Only | |
| Name of Person or Firm Doing Filling & Sealing TRC Environmental | License # | Date of Filling & Sealing or Verification (mm/dd/yyyy) 06/22/2020 | Date Received | Noted By |
| Street or Route 708 Heartland Trail STE 3000 | Telephone Number 608-826-3600 | Signature of Person Doing Work | Comments | |
| City Madison | State WI | ZIP Code 53717 | Date Signed 6/26/20 | |

Notice: Completion of this report is required by chs. 160, 281, 283, 289, 291-293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291-293, 295, and 299, Wis. Stats., failure to file this form may result in a forfeiture of between \$10-25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. Return this form to the appropriate DNR office and bureau. See instructions on reverse for more information.

Verification Only of Fill and Seal

Route to DNR Bureau:

- Drinking Water Watershed/Wastewater Remediation/Redevelopment
 Waste Management Other

1. Well Location Information

| | | | | |
|---|------|---|--|---|
| County Dane | | WI Unique Well # of Removed Well (GP-16M) | Hicap # | |
| Latitude / Longitude (see instructions) ° N ° W | | Format Code <input checked="" type="checkbox"/> DD <input type="checkbox"/> DDM | Method Code <input type="checkbox"/> GPS008 <input type="checkbox"/> SCR002 <input type="checkbox"/> OTH001 | |
| ¼ / ¼ SW | ¼ NW | Section 8 | Township 7 | Range <input checked="" type="checkbox"/> E <input type="checkbox"/> W |
| Well Street Address 7562 US Hwy 14 | | Well ZIP Code 53562 | | |
| Well City, Village or Town Town of Middleton | | Lot # | | |
| Reason For Removal From Service Damaged | | WI Unique Well # of Replacement Well GP-16M | | |

2. Facility / Owner Information

| | | |
|--|--------------------|--------------------------|
| Facility Name Refuse Hideaway Landfill | | |
| Facility ID (FID or PWS) | | |
| License/Permit/Monitoring # | | |
| Original Well Owner | | |
| Present Well Owner Wisconsin DNR | | |
| Mailing Address of Present Owner 3911 Fish Hatchery Road | | |
| City of Present Owner Fitchburg | State WI | ZIP Code 53711 |

3. Filled & Sealed Well / Drillhole / Borehole Information

| | | |
|--|-----------------------|--|
| <input type="checkbox"/> Monitoring Well <input type="checkbox"/> Water Well <input checked="" type="checkbox"/> Borehole / Drillhole | | Original Construction Date (mm/dd/yyyy) |
| Construction Type: <input checked="" type="checkbox"/> Drilled <input type="checkbox"/> Driven (Sandpoint) <input type="checkbox"/> Dug <input type="checkbox"/> Other (Specify) | | If a Well Construction Report is available, please attach. |
| Formation Type: <input type="checkbox"/> Unconsolidated Formation <input checked="" type="checkbox"/> Bedrock | | |
| Total Well Depth From Ground Surface (ft) | Casing Diameter (in.) | |
| Lower Drillhole Diameter (in.) | Casing Depth (ft.) | |
| Was well annular space grouted? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Unknown | Depth to Water (feet) | |

4. Pump, Liner, Screen, Casing & Sealing Material

| | | | |
|---|---|--|---|
| Pump and piping removed? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A |
| Liner(s) removed? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A |
| Liner(s) perforated? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| Screen removed? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | <input type="checkbox"/> N/A |
| Casing left in place? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| Was casing cut off below surface? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | <input type="checkbox"/> N/A |
| Did sealing material rise to surface? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| Did material settle after 24 hours? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | <input type="checkbox"/> N/A |
| If yes, was hole retopped? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A |
| If bentonite chips were used, were they hydrated with water from a known safe source? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A |
| Required Method of Placing Sealing Material. | | | |
| <input type="checkbox"/> Conductor Pipe-Gravity | <input type="checkbox"/> Conductor Pipe-Pumped | | |
| <input checked="" type="checkbox"/> Screened & Poured (Bentonite Chips) | <input type="checkbox"/> Other (Explain) | | |
| Sealing Materials | | | |
| <input type="checkbox"/> Neat Cement Grout | <input type="checkbox"/> Concrete | | |
| <input type="checkbox"/> Sand-Cement (Concrete) Grout | <input checked="" type="checkbox"/> Bentonite Chips | | |
| For Monitoring Wells and Monitoring Well Boreholes Only: | | | |
| <input checked="" type="checkbox"/> Bentonite Chips | <input type="checkbox"/> Bentonite - Cement Grout | | |
| <input type="checkbox"/> Granular Bentonite | <input type="checkbox"/> Bentonite - Sand Slurry | | |

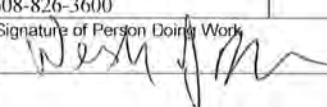
5. Material Used to Fill Well / Drillhole

| | From (ft.) | To (ft.) | No. Yards, Sacks Sealant or Volume (circle one) | Mix Ratio or Mud Weight |
|----------------------|------------|----------|---|-------------------------|
| Hole Plug 3/8" Chips | Surface | 40.0 | 0.22 cubic feet | |
| | | | | |

6. Comments

Vapor probe, not set in groundwater

7. Supervision of Work

| | | | | | |
|--|--------------------|---|--|------------------------------|----------|
| Name of Person or Firm Doing Filling & Sealing TRC Environmental | | License # | Date of Filling & Sealing or Verification (mm/dd/yyyy) 01/22/2020 | DNR Use Only | |
| Street or Route 708 Heartland Trail STE 3000 | | Telephone Number 608-826-3600 | | Date Received | Noted By |
| City Madison | State WI | ZIP Code 53717 | Signature of Person Doing Work  | Comments | |
| | | | | Date Signed 7/8/20 | |