



Hard Truth: Why ET & Deep Wells Need Stainless Steel Downhole Pipe



Blackhawk Technology Company

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Hard Truth

“For our needs, the PE downtubing simply does not work with hot wells.

Within a week’s time, or less, the downtubing warps and goes non-operational.

The SS tubing is worry-free once it is installed.”

--Eastern U.S. landfill engineer

Changing Nature of Landfills

- Traditional landfills not built for 150 °F+ zones, 200 ft. wells
- As heat rises (and depths increase), air pumps struggle
 - In-well parts become encrusted
 - Mechanical breakdowns

More than Driver - Downhole Trouble

Lightweight, flexible PE air tubes & hoses

- Smart at normal temps, shallow depths
- Become elastic or brittle, pigtail, alter shape & strength with ET heat and depth

Even if driver is operating, PE eductor/riser tubes lose integrity after 150° F+, 200 ft.

- Connections leak, system integrity compromised

Preventative Intervention

Taking action . . .

- Before rising temps become full ET state
- Rescuing a failing system

Three Big Questions

1. What do I have to do?
2. When do I have to do it?
3. How much will it cost?

What Do I Have to Do?

One Solution - Stainless Steel Hard Pipe

- Maintaining integrity to 750 °F
- Best with heat-resistant piston pumps
- Structural strength withstands weight pressure beyond 200 ft.
- Increased flow rates - 17%+ reported with 1¼-inch steel pipe replacing PE

What Do I Have to Do?

Replacing Tubes - Less Daunting

- Water-well tools & truck-mounted winch
- Wellfield techs
- 10-foot sections
- Time equal to pulling/reinstalling air pump
 - One manager reports 1 hr. (or less) for 100-foot well

When Do I Have to Do It?

When? ASAP if temp is 150 °F+

- **Before entire system is compromised**
- **Cooling depends on dewatering**
 - Allowing gas to replace fluid, which retains heat
- **Solar, AC-electric, pneu piston pumps maintain reliability at high temps**

How Much Will It Cost?

Replacing PE Eductor Pipe with 1¼-inch 304 Stainless Steel Pipe

- Using site technicians, pipe clap, hoist and hoisting tool
- Roughly \$750 per 100-foot well, including pipe and connectors

Tools Needed and Connection

Pipe Hoist
1¼-inch

Pipe Locking
Clamp 1-2 inches

Truck-mounted winch
lifts green pipe hoist



Hoist Lifts Stainless Steel Pipe

SS drain coupling
1¼-inch

1¼-inch pipe
in 10-foot sections

Well casing

Be sure that foot valve
pump barrel is attached
to bottom of first pipe
section!



Lower Hard Pipe into Well Casing



Set Pipe Hoist & Pipe Clamp



Lock Down Pipe Clamp



Hoist Pipe Into Position



Lower Pipe & Drain Coupling Into Casing



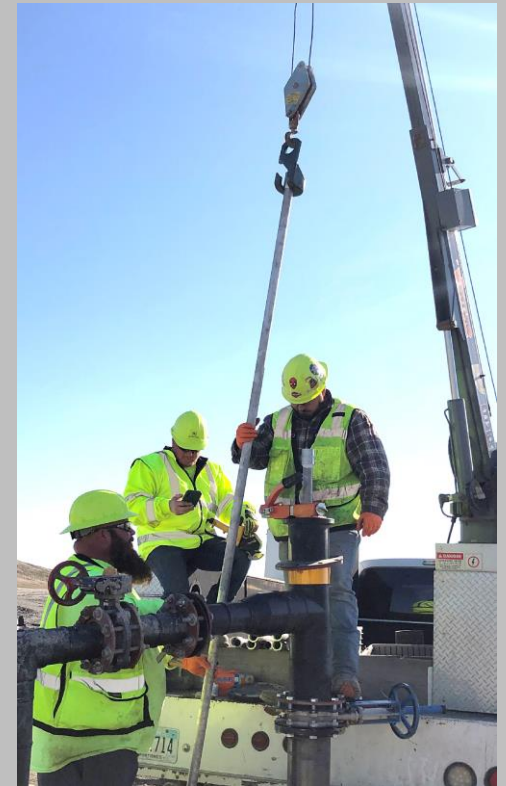
Attach Next 10-Foot Section



Clamp and secure pipe on top of well head casing.



Attach drain coupling, then hoist next pipe section into position.



Thread new pipe section onto top of secured downhole-pipe drain coupling.

Thread Next Section of Hard Pipe



Using pipe hoist, lower this section of hard pipe with drain coupling into position



Lock and secure at top of the wellhead

Final Length of Pipe w/Landing Plate



Orange top-head clamp with drain coupling on flanged wellhead casing

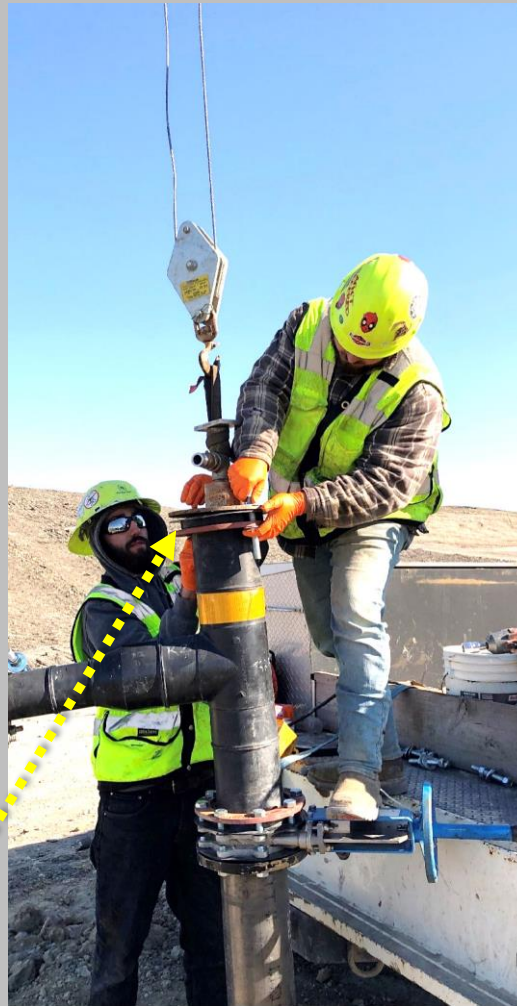


Strap and hoist the final hard pipe with top-head steel-flanged wellhead, discharge tee and landing plate attached

Lower Final Section w/Wellhead Into Place



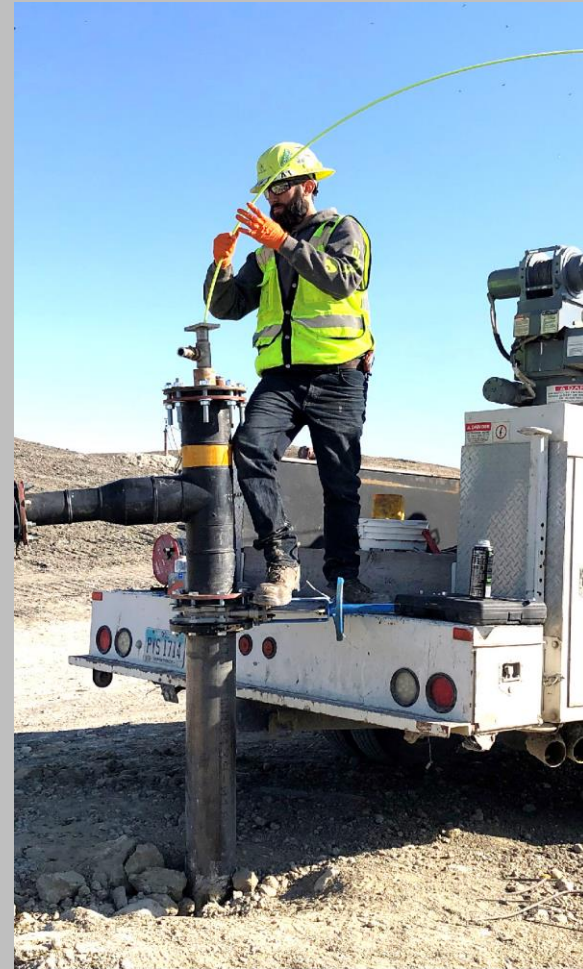
Wellhead assembly attached to final pipe section



Secure wellhead

Install Downhole Drive Piston & Drive Rod

Feed
piston-end
first



Thread piston and rod through center of eductor hard pipe

Lower Drive Piston & Drive Rod Into Position



Set the Top-Head Drive Motor



Drive rod will be threaded through discharge tee & landing plate, and attached to motor

Connect Piston Rod to Actuator, Secure



After piston rod lowered into downhole, attach it to drive rod of actuator



Secure pump/actuator onto wellhead

Installed Pump, 8" Steel Flanged Gas-Well Seal



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Thank You



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