# LaBounty Disposal Site

## → LBTD Shutdown – Response to February 15, 2022 Comments

# Agenda

## Introductions

## EPA Comment Letter – February 15, 2022

- Comment 1 – Further discussion.
- Comment 2 – Further discussion.
- Comment 3 – No discussion needed.
- Comment 4 – No discussion needed
- Comment 5 – Further discussion.
- Comment 6 – Further discussion.
- Comment 7 – Further discussion.

## Next Steps

- Response to comments.
- EPA review.

# Introductions

## Zoetis

– Dawn Horst

## GHD

– Jeff Coon, Kevin Armstrong

## USEPA

– Brad Johnson, Liz Hagenmaier, Vanessa Madden, Randy Brown

## IDNR

– Hylton Jackson, Mike Sullivan

# Model Used and Model Inputs (EPA Comment 1)

- Spreadsheet calculations used to estimate the effect of the LBTD system on reducing groundwater and mass discharge to the Cedar River.
- Groundwater and Mass Flux calculation - actual field and laboratory measurements.
  - Calculations demonstrate minimal influence of LBTD
    - Low discharge - Reduction of 0.4%
    - High discharge - Reduction of 1.6%
- Calculations are conservative when extended to estimate surface water concentrations.
  - Overestimates loading to Cedar River (compared to actual surface monitoring data).
  - Do not account for attenuation of arsenic at groundwater-surface water transition zone.

# Inputs

Table 3.3



Calculations of Arsenic Flux at Low and High Discharges
LaBounty Disposal Site
Charles City, Iowa

| Flow-tube | Representative Monitoring Wells | Upgradient Groundwater Elevation (ft NGVD) | Downgradient Groundwater Elevation (ft NGVD) | Horizontal Gradient | Arsenic Conc. (ug/L) | Aquifer Thickness (m) | Flowtube Width (m) | Cross Sectional Area (m2) | Average Linear Velocity (cm/s) | Arsenic Mass Flux (kg/(day m2)) | Arsenic Total Flux (kg/day) | Groundwater Flux (m3/day) | Groundwater Flux (gal/day) | Groundwater Volume Diverted by LBTD (gal/day) | LBTD Arsenic Loading Reduction (kg/day) | LBTD Arsenic Loading Prevention (kg/year) | Percent Reduction of Arsenic Discharge by LBTD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Low discharge scenario - 2018 Jan -April (April groundwater elevation and concentration)** | | | | | | | | | | | | | | | | | |
| A1 | 04A to 05A | 975.07 | 974.57 | 0.0015 | 9.13 | 9.6 | 134.5 | 1,298 | 5.86E-04 | 1.39E-06 | 0.002 | 197 | 52,054 | | | | |
| A2 | 04A to 07AS | 975.07 | 974.18 | 0.0023 | 159,000 | 11.3 | 217.8 | 2,469 | 8.76E-04 | 3.61E-02 | 89.1 | 561 | 148,069 | | | | |
| A3 | 09A to 08A | 974.68 | 974.41 | 0.0008 | 123,000 | 5.0 | 247.7 | 1,240 | 3.07E-04 | 9.79E-03 | 12.1 | 99 | 26,062 | | | | |
| B1 | 04R to 05R | 975.13 | 975.13 | 0.0000 | 14.6 | 4.0 | 134.5 | 533 | 0.00E+00 | 0.00E+00 | 0 | 0 | 0 | | | | |
| B2 | 04R to 07R | 975.13 | 974.71 | 0.0011 | 630 | 5.8 | 184.3 | 1,068 | 1.64E-05 | 2.68E-06 | 0.003 | 4.54 | 1,198 | | | | |
| B3 | 09R to 08R | 974.70 | 974.35 | 0.0010 | 8,100 | 7.0 | 207.6 | 1,456 | 1.58E-05 | 3.31E-05 | 0.048 | 5.96 | 1,574 | | | | |
| | | | | | **48,459** | | **Total** | **8,064** | | | **101.3** | **867** | **228,957** | **2,145** | **0.39** | **144** | **0.4%** |
| **High Discharge scenario - 2019 Jan -April (April groundwater elevation and concentration)** | | | | | | | | | | | | | | | | | |
| A1 | 04A to 05A | 977.59 | 976.94 | 0.0020 | 6.21 | 10.4 | 134.5 | 1,395 | 7.62E-04 | 1.23E-06 | 0.002 | 275 | 72,740 | | | | |
| A2 | 04A to 07AS | 977.59 | 976.59 | 0.0025 | 139,000 | 12.1 | 217.8 | 2,630 | 9.84E-04 | 3.54E-02 | 93.2 | 671 | 177,153 | | | | |
| A3 | 09A to 08A | 976.81 | 976.64 | 0.0005 | 118,000 | 5.7 | 247.7 | 1,408 | 1.93E-04 | 5.91E-03 | 8.3 | 71 | 18,639 | | | | |
| B1 | 04R to 05R | 977.59 | 977.56 | 0.0001 | 12.3 | 4.0 | 134.5 | 533 | 1.39E-06 | 4.44E-09 | 0.000002 | 0.19 | 51 | | | | |
| B2 | 04R to 07R | 977.59 | 977.14 | 0.0011 | 5,660 | 5.8 | 184.3 | 1,068 | 1.76E-05 | 2.58E-05 | 0.028 | 4.86 | 1,284 | | | | |
| B3 | 09R to 08R | 977.00 | 976.60 | 0.0012 | 4,670 | 7.0 | 207.6 | 1,456 | 1.80E-05 | 2.18E-05 | 0.032 | 6.81 | 1,799 | | | | |
| | | | | | **44,558** | | **Total** | **8,490** | | | **101.6** | **1028** | **271,666** | **9,984** | **1.68** | **615** | **1.6%** |

Notes:

LBTD - LaBounty tile discharge.
Effective Porosity: 0.3.
Alluvial Aquifer Hydraulic Conductivity: 1.2E-01 cm/sec (CH2M Hill, 1985).
Bedrock Aquifer Hydraulic Conductivity: 4.6E-03 cm/sec (CH2M Hill, 1985).

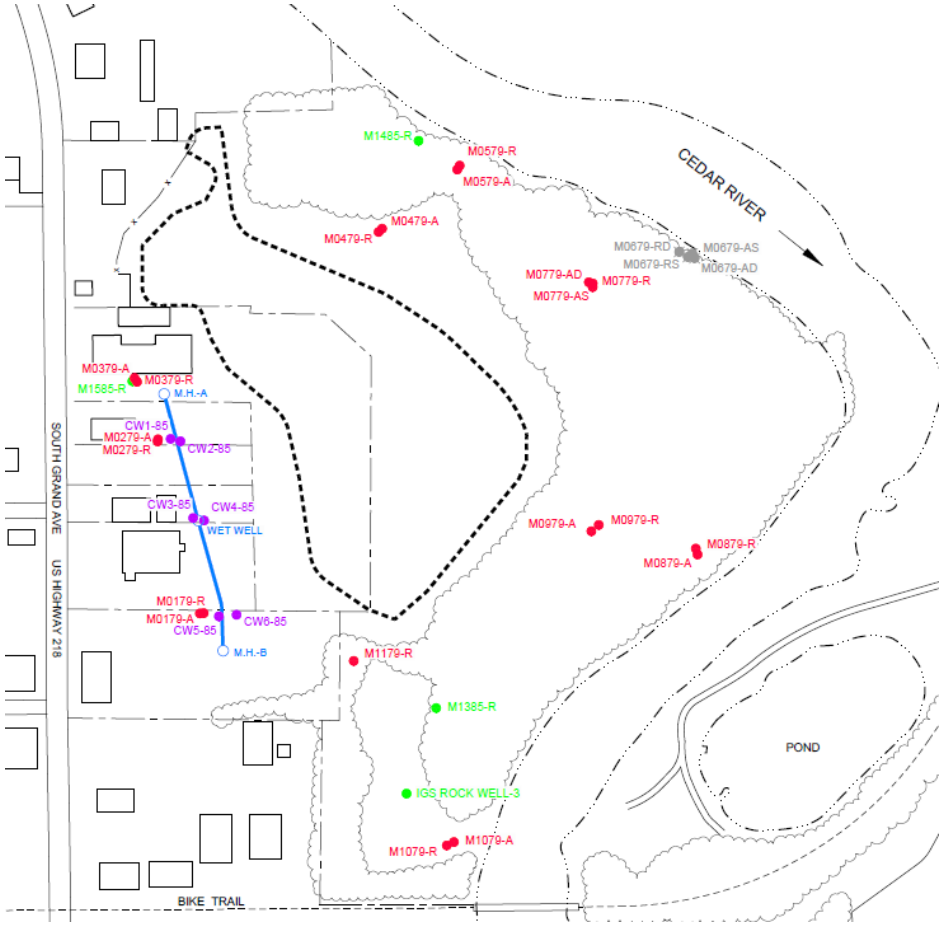
# Conceptual Site Model - Discharge to River

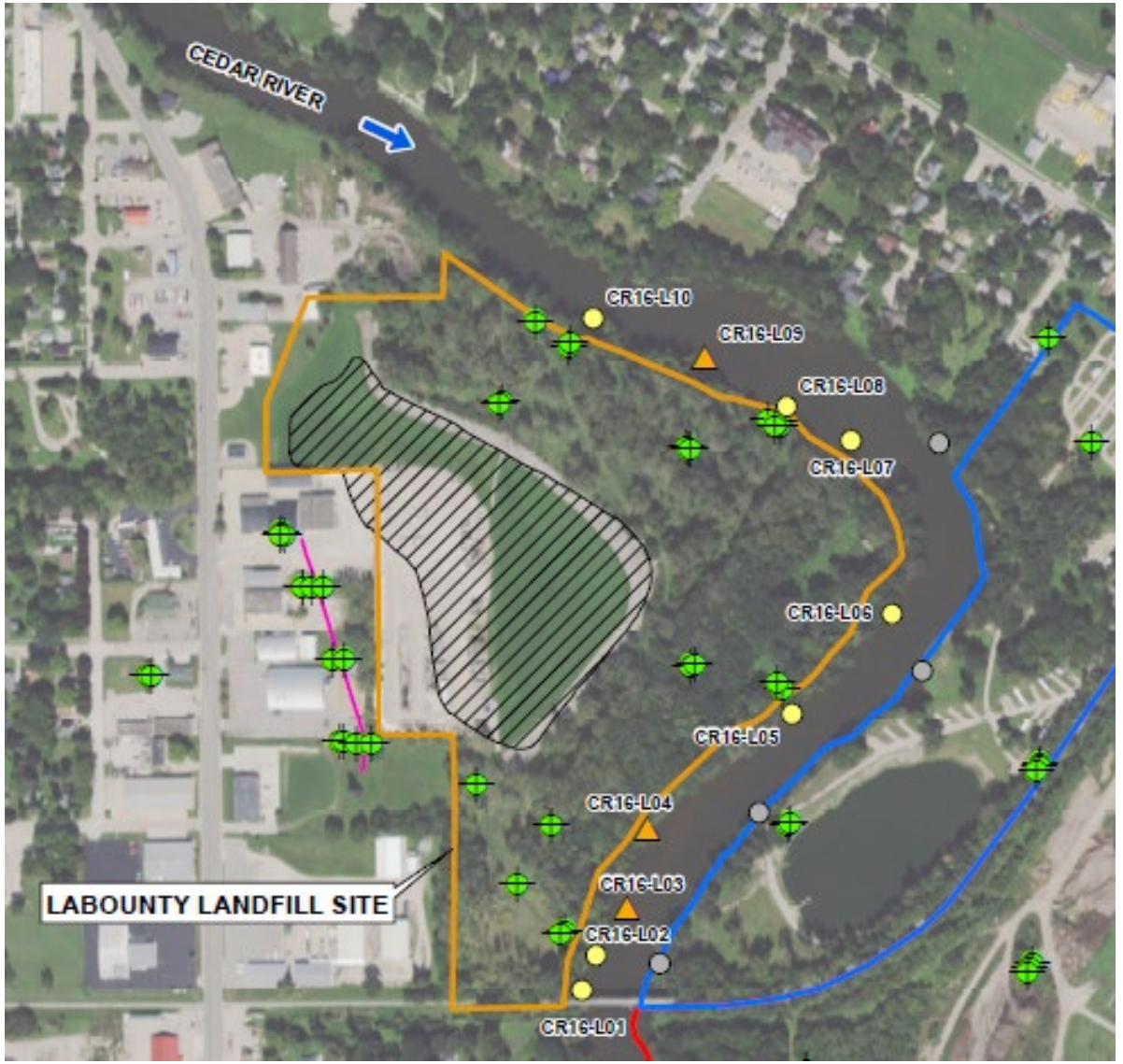
- Highest arsenic in groundwater - shallow alluvial aquifer.
- Arsenic attenuation occurring.
- During low river stages, low groundwater conditions are expected.
  - Reducing groundwater and arsenic flux to river.

# Effect of LBTD Shutdown

- No apparent effect on McDonnell Station.
  - Actual monitoring data (during operation and during LBTD pilot shutdown).
- Limited influence on groundwater elevations and flow conditions.
  - < 2% reduction in groundwater and arsenic flux to Cedar River

# 2016 Sampling Summary (Golder, 2017)



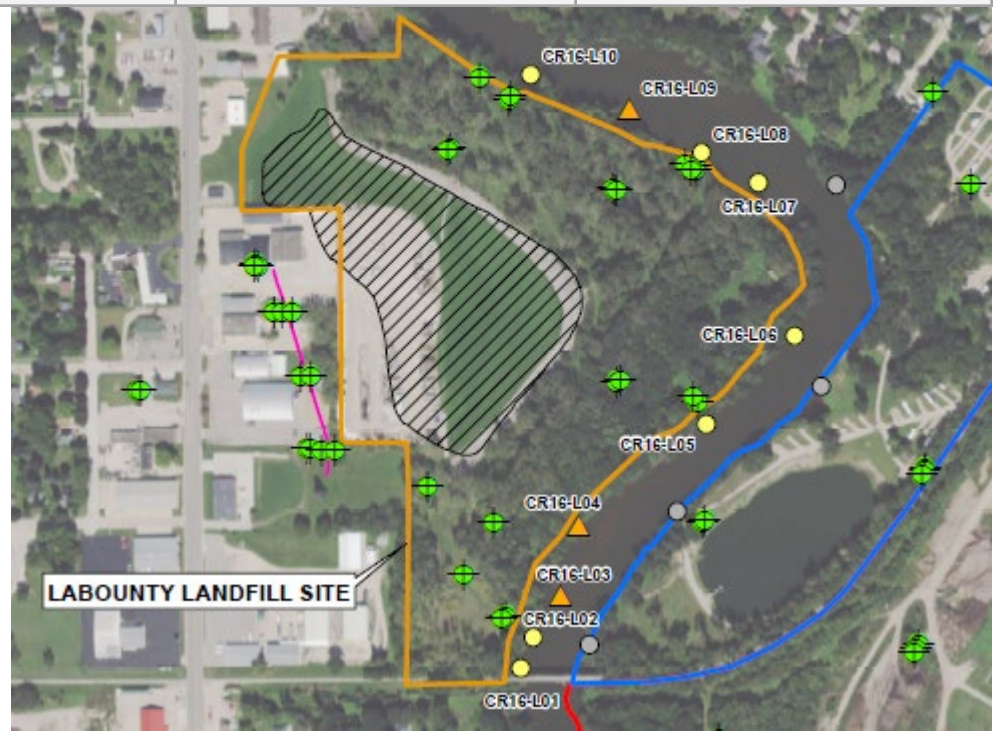



# 2016 Sampling Summary (Golder, 2017)

Arsenic Concentrations (µg/L)

| | Screening Level | CR16-L08 | CR16-L07 | CR16-L06 | CR16-L05 |
|---|---|---|---|---|---|
| Surface Water | 150/50 | 1.6 | Not Analyzed | 6.2 | 16 |
| Pore Water | 150 | 160 | 32 | 510 | 140 |
| Groundwater | 10 | 43,300 (M0679-AS) | 43,300 (M0679-AS) | 174,000 (M0879-A) | 174,000 (M0879-A) |

- Surface water and sediment concentrations were 1 - 2 orders of magnitude below screening values.
- Two discrete exceedances in pore water (surface water ecological screening value).
  - Mean and 95% UCL for pore water < surface water screening value.
- Pore water 95% UCL < screening value for infaunal species.



# River concentrations at low flow (EPA Comments 2, 5, and 6)

- Record Low Flows for Cedar River at Charles City, IA (October 1964 to present)
  - Daily mean low – 60 cfs
    - November 1976
    - December 1997
    - January 1978
  - Record low (instantaneous reading) – 37 cfs (below 60 cfs for ~2 hours)
- LaBounty – Projected Cedar River Concentrations
  - Maximum concentration at McDonnell Station - 22 µg/L (actual)
    - 150 samples collected since 2004 (low flow of 113 cfs)
  - Calculated 95% UCL of actual arsenic load in Cedar River at lower flow conditions (<200 cfs)
    - McDonnell Station during low flows - arsenic < 50 µg/L at daily mean low of 60 cfs (calculated)
      - Arsenic loading - 50 µg/L criteria exceeded at 55 cfs

# Ongoing sediment and pore water sampling (EPA Comment 7)

- 2015 Five-year Review - Surface water, sediment, and pore water sampling completed (2016)
  - Two pore water samples > surface water screening levels.
    - Localized arsenic transport to the Cedar River may occur
    - Adverse impacts on ecological receptors are not likely - localized nature of any impact
- Five-Year Review Addendum, EPA (Feb. 2019)
  - “No further investigation or assessment be performed to assess potential arsenic impacts from the Site, other than annual surface water monitoring in a location directly downstream of CR16-L06 to confirm no material changes.”
  - EPA concurred with minimal effect of LBTD on groundwater flow and discharge to Cedar River.
- Recommend continue with annual surface water sampling directly downstream of CR16-L06.
  - Included in approved monitoring and maintenance plan.

# Conclusions

- LBTD has minimal effect on groundwater elevations and flow conditions.
  - <2% on groundwater and mass flux to Cedar River.
- Based on 95% UCL, exceedance of 50 µg/L not expected at mean daily low flow of 60 cfs.
- Site remains protective of human health and the environment.

# Recommendations

- Continue with Five-Year Review Addendum, EPA (Feb. 2019) recommendations.
- Permanently shutdown the LBTD system.
- Continue annual surface water monitoring downstream of CR16-L06.

# Next Steps

- Zoetis to submit response to comments – by March 31.
- EPA review - expected response date?
- February 1, 2025 – NPDES compliance date.

# Thank You

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