The U.S. Department of Energy (DOE) Office of Legacy Management's (LM) 15th annual community meeting on the Fernald Preserve was held October 16, 2018, at the Fernald Preserve Visitors Center. The 15 guests in attendance received a summary of the *2017 Site Environmental Report* and an update on site activities.

Community meeting agenda.

Fernald Preserve

U.S. Department of Energy (DOE)
Office of Legacy Management (LM) Mission

To fulfill the Department's post-closure responsibilities and ensure the future protection of human health and the environment.

9040.03 10/18

The LM mission at the Fernald Preserve.

Worker Safety and Health

Occupational Safety and Health Administration
Recordable Rates

Industry (Remediation Services)	DOE Complex	LMS
1.4	0.83	0.23

Fernald Preserve

Restricted Days	First Aid
0	3

Safe Work Hours: 873,094

Department of Energy VPP

9040.04 10/18

Safety records at the Fernald Preserve and in the nationwide LM program continue to surpass overall DOE and private sector industry standards.

The *Comprehensive Legacy Management and Institutional Controls Plan* documents the requirements for Fernald Preserve's long-term management and is reviewed and updated yearly. The latest version is available on the LM website.

Fernald Preserve LM contractor, Navarro Research and Engineering, Inc., site management and project leads.

2017 Site Environmental Report

SER

- https://energy.gov/lm

9040.07 10/18

The *2017 Site Environmental Report* contains annual monitoring requirement results and is available on the LM website.

Monitoring

2017

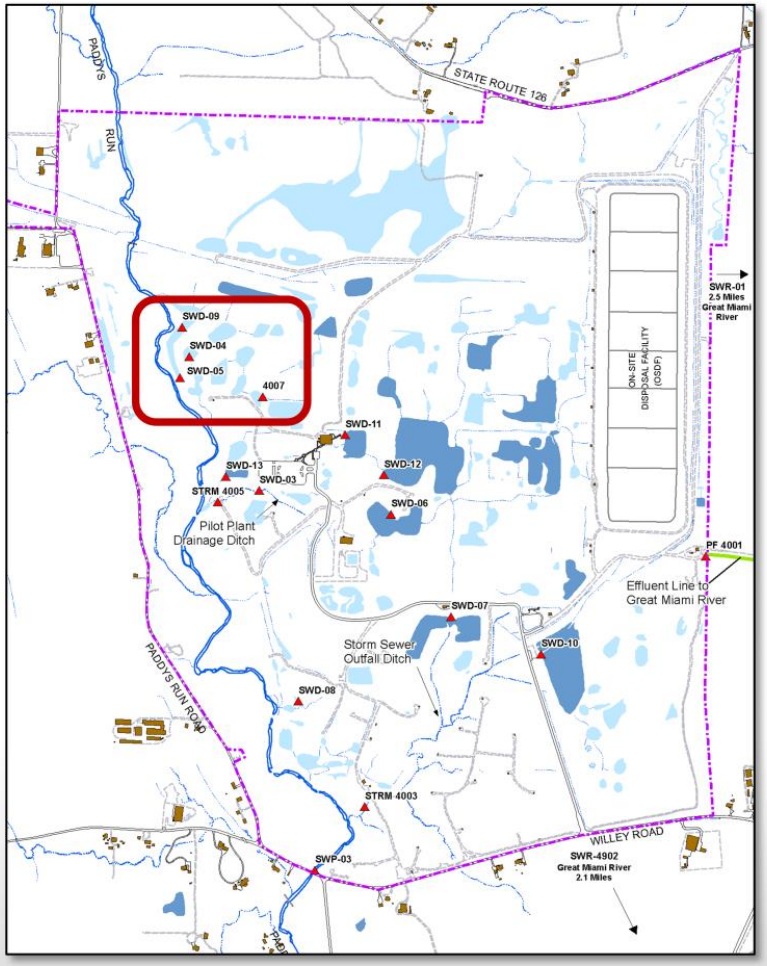
- Surface water sampling at 16 locations
- Site effluent sampling at one location
- OSDF leak-detection monitoring at 42 locations
- Groundwater sampling at 93 monitoring wells
- Water level monitoring at up to 177 wells

9040.08 10/18

Routine environmental monitoring is conducted to ensure continued effectiveness of the site's cleanup. The 2017 monitoring regimen included sampling groundwater, surface water, and liquid effluent.

Monitoring

Surface Water and Site Effluent



9040.09 10/18

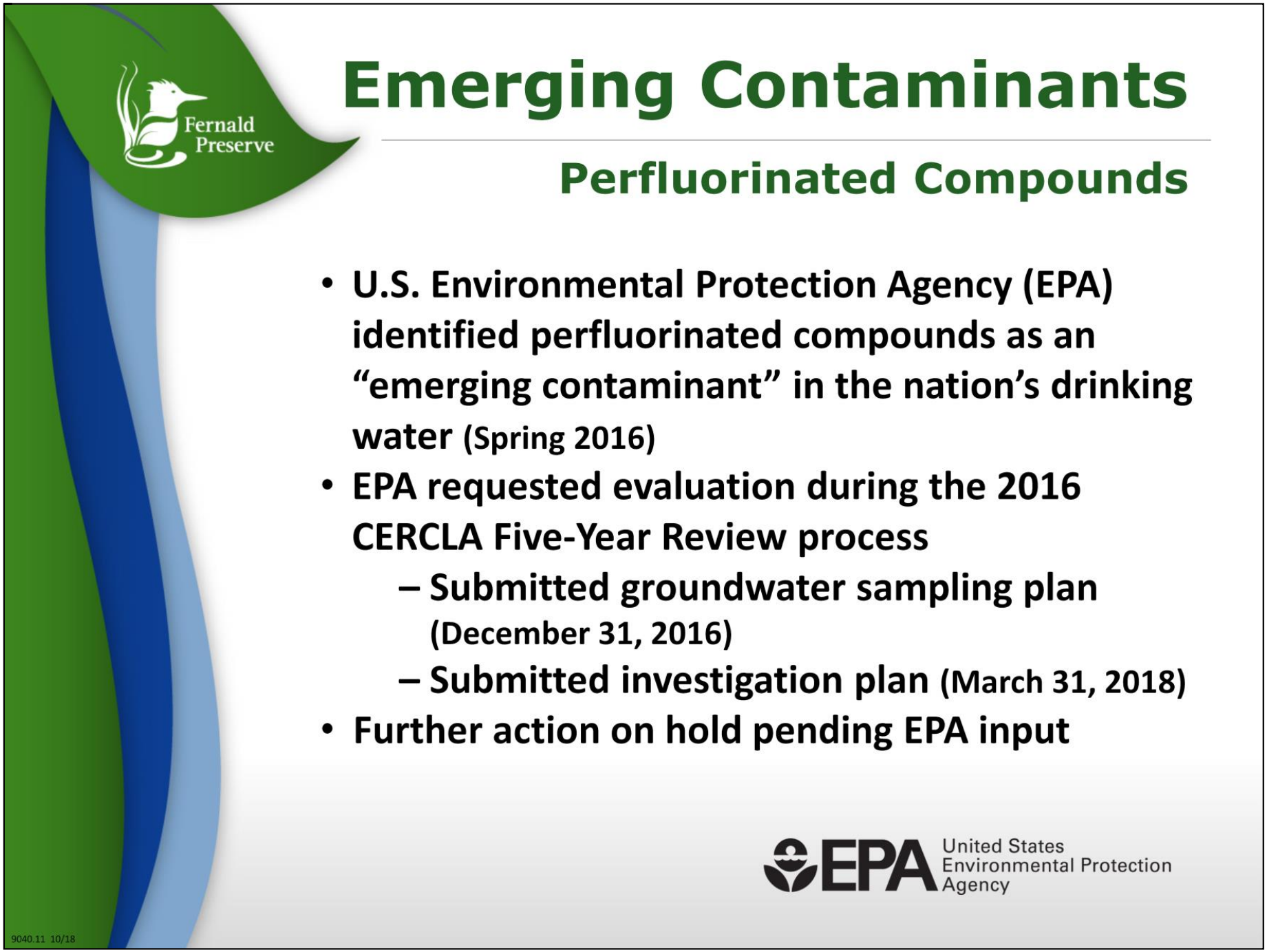
Surface water continues to be monitored at numerous locations on-site and off-site.

Uncontrolled Runoff

Update

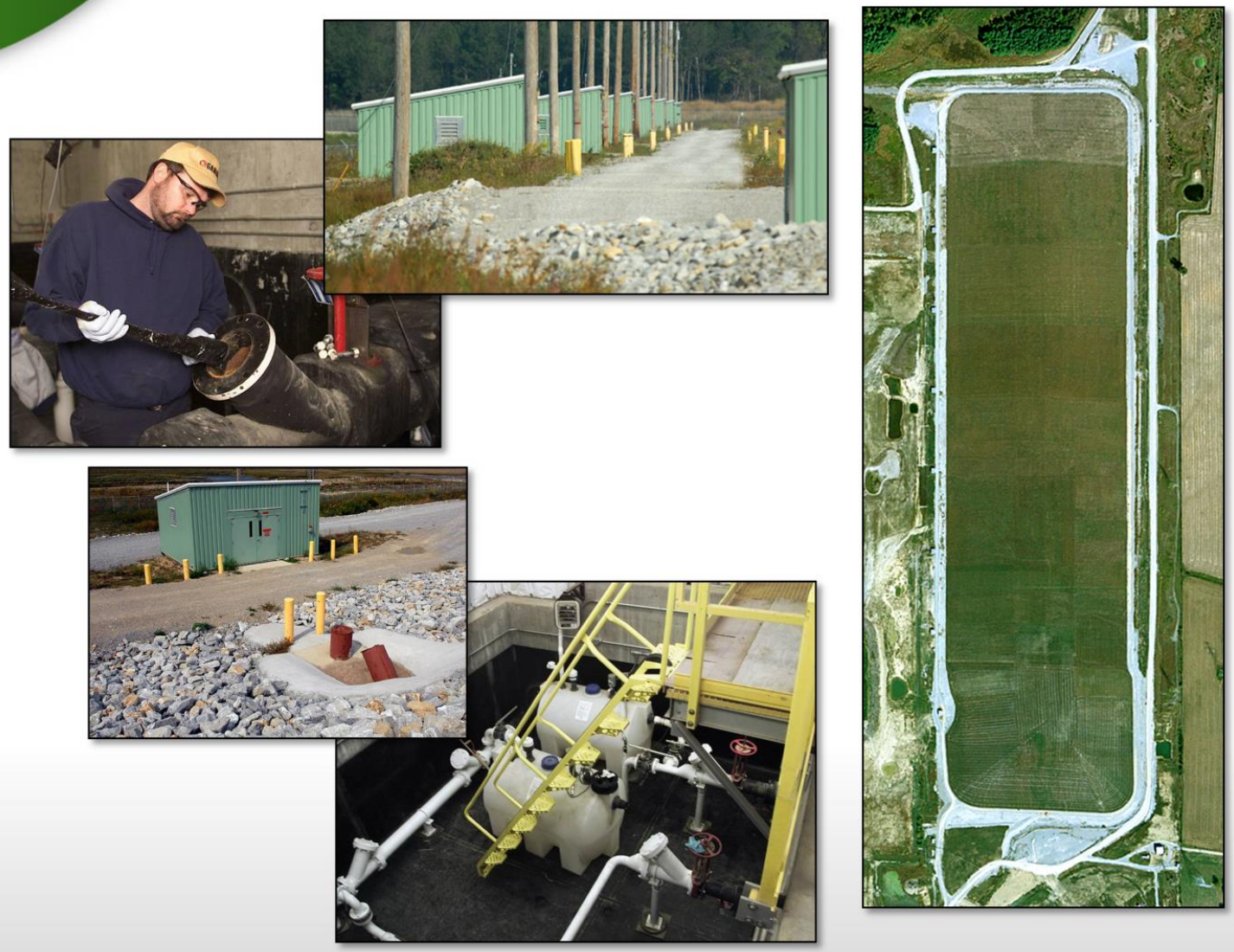
- Uncontrolled runoff discharging into Paddys Run creek contributes to the amount of uranium entering surface water
- Loading terms used in the past
  - Original in remedial investigation
    - 6.25 pounds of uranium per inch of rainfall
  - Updated in 2004
    - 2.1 pounds of uranium per inch of rainfall
  - Updated in 2017
    - 0.8 pounds of uranium per inch of rainfall

Beginning in 2018, a revised loading term began to estimate the pounds of uranium discharged to Paddys Run via uncontrolled runoff. The term has decreased significantly since soil remediation was completed.



Perfluorinated compounds are emerging contaminants for the nation's drinking water, according to the U.S. Environmental Protection Agency, and will be evaluated to confirm their presence or absence. The compounds are associated with foam firefighting agents that were once used in small quantities on-site at the Fire Training Facility.

On-Site Disposal Facility

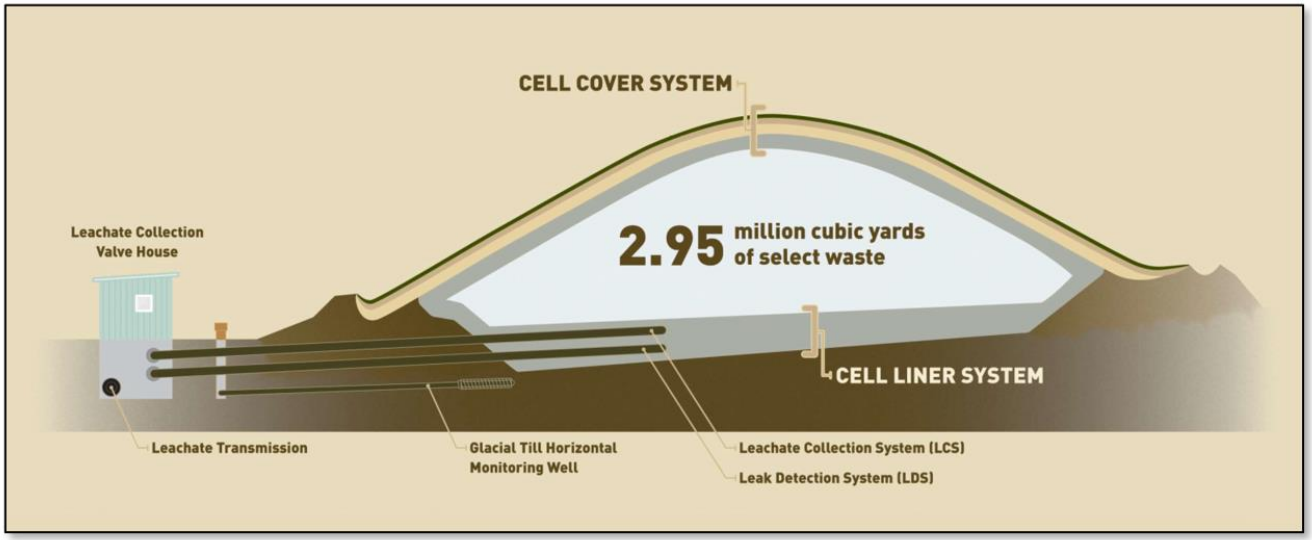


9040.12 10/18

The On-Site Disposal Facility (OSDF) is an engineered waste storage area that holds 2.95 million cubic yards of waste (85 percent soil and soil-like material, and 15 percent demolition debris) that was generated as part of the site cleanup.

On-Site Disposal Facility

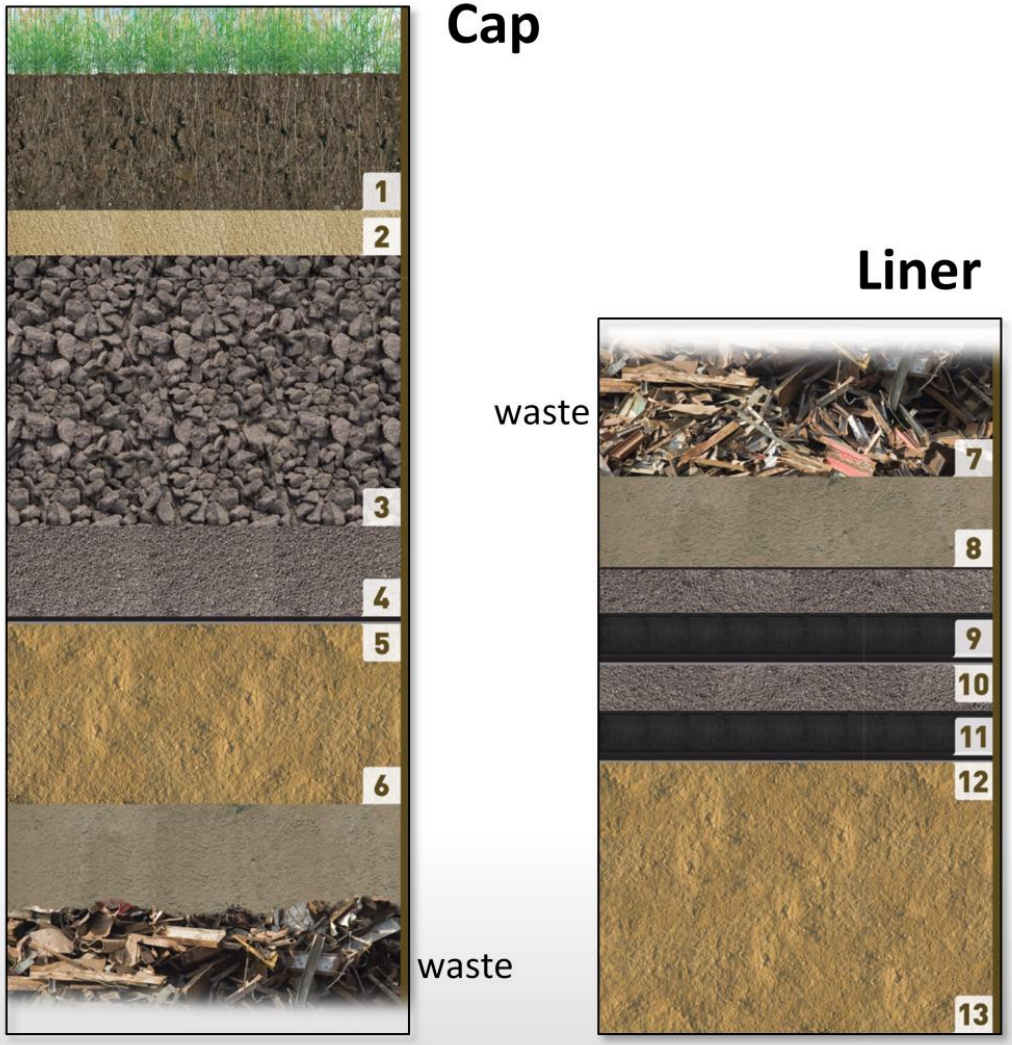
Leachate Collection System



9040.13 10/18

The OSDF was constructed with an engineered liner and cover system that serves to isolate the entombed waste from the environment.

On-Site Disposal Facility

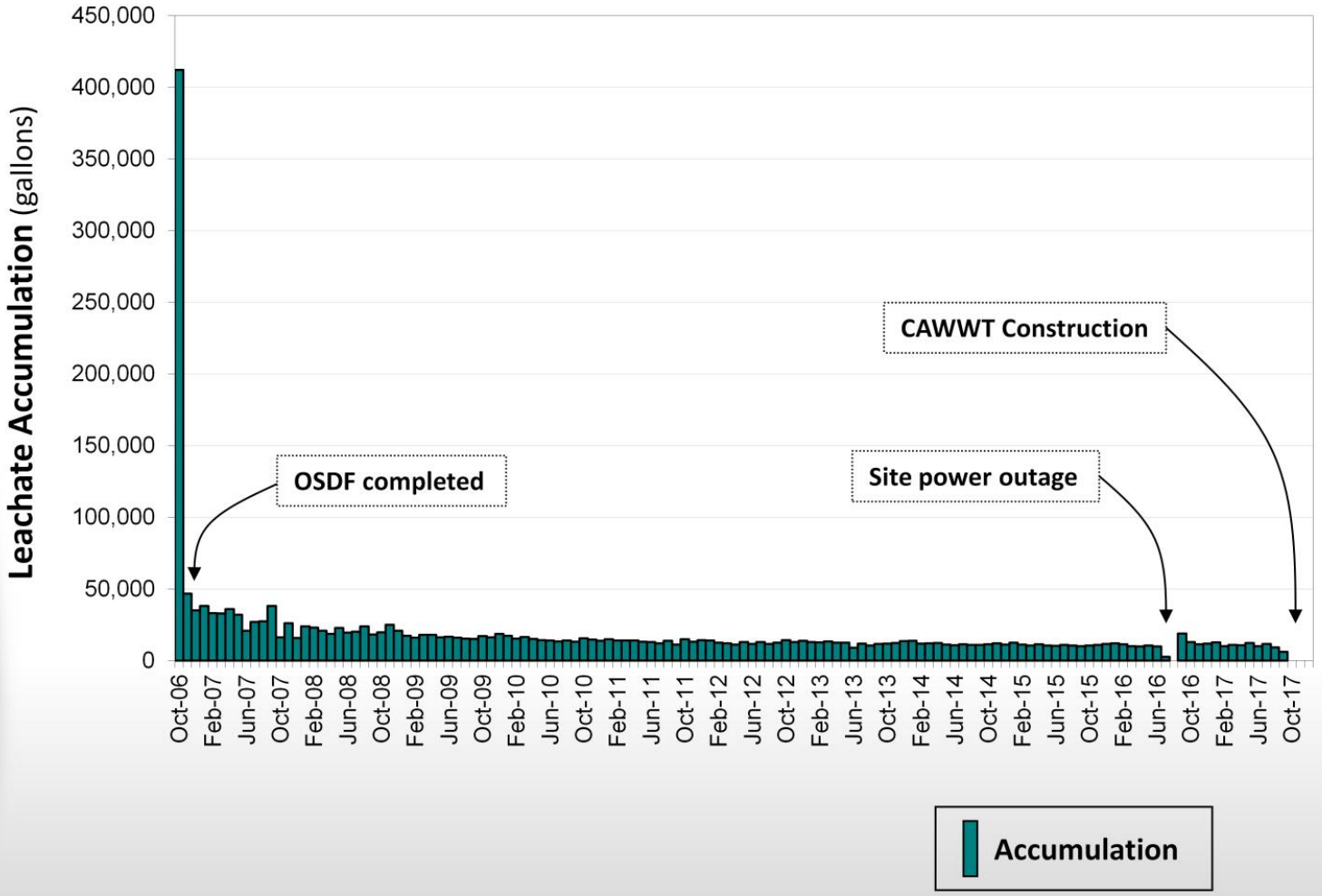


9040.14 10/18

Waste is safely encapsulated between a 9-foot cap and a 6-foot liner within the OSDF.

On-Site Disposal Facility

Leachate Collection System – Monthly Flow

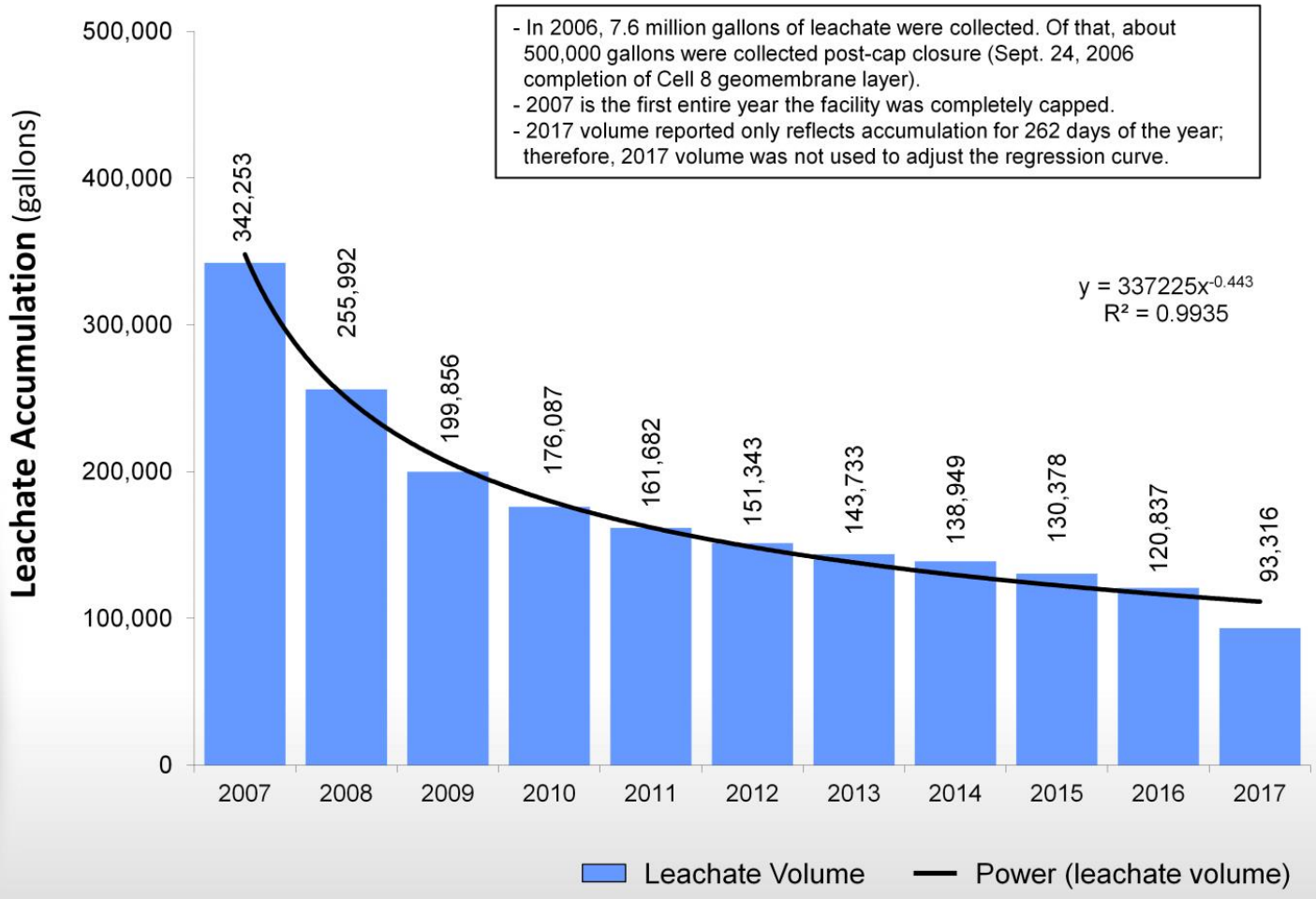


9040.15 10/18

Leachate is the moisture in the waste within the OSDF and includes water sprayed on the waste to control dust and rainfall events prior to cell capping. The leachate is collected and transferred to an on-site treatment facility. Before the cover system was completed in October 2006, hundreds of thousands of gallons of leachate flowed each month.

On-Site Disposal Facility

Leachate Collection System – Annual Flow

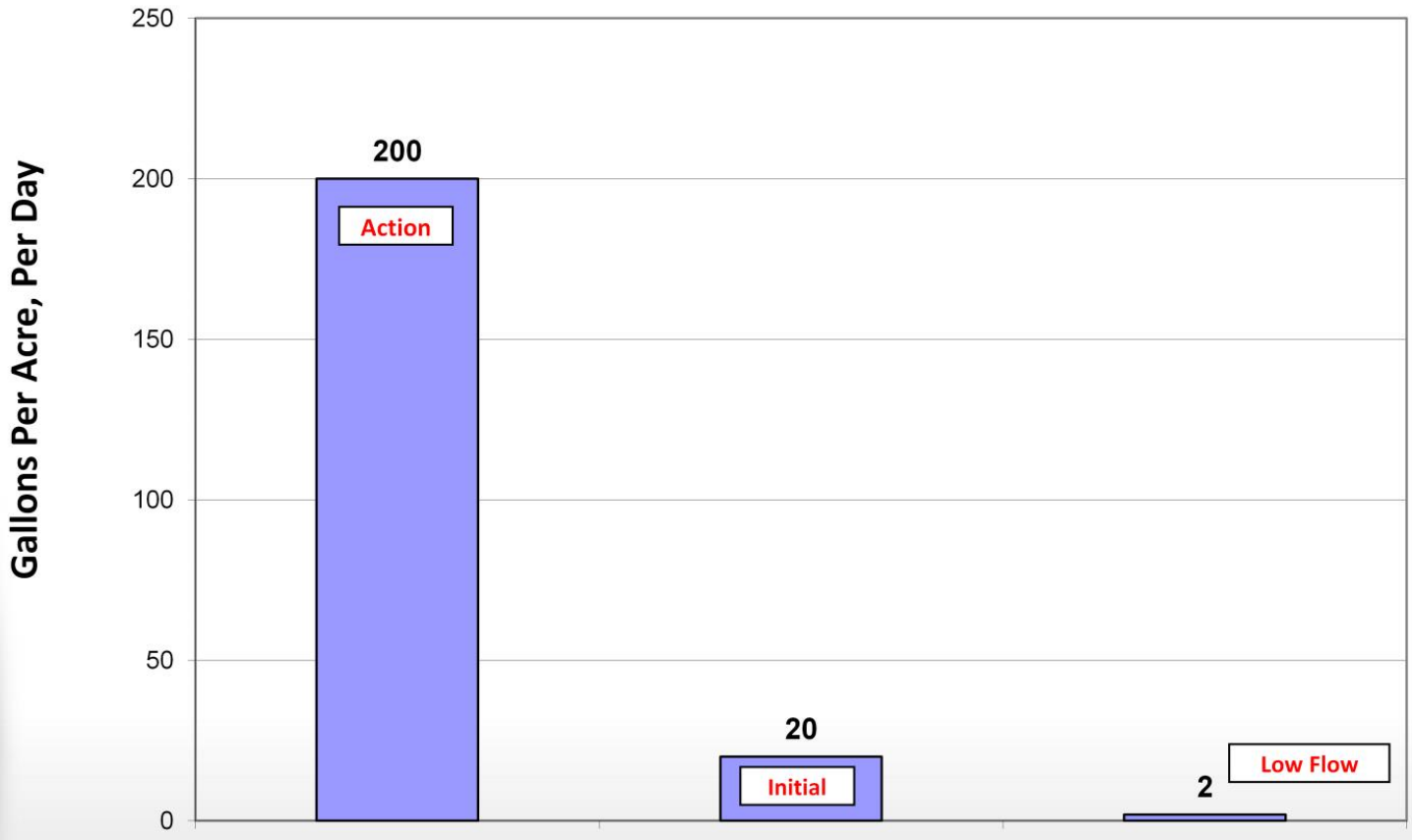


9040.16 10/18

Leachate is the moisture in the waste within the OSDF. The leachate is collected and transferred to an on-site treatment facility. Annual leachate flow continues to decline.

On-Site Disposal Facility

Leak Detection System – Flow Rates



9040.17 10/18

By design, monitoring flow from the Leak Detection System is one of the main indicators of whether or not the facility is operating as designed.

On-Site Disposal Facility

Low Flow Response Leakage Rate Basis

Year	Cell	Maximum Accumulation Rate (gpad)	Maximum Flow Rate (gpd)
2008	5	1.36	8.70
2009	5	0.48	3.10
2010	6	0.21	1.30
2011	8	0.38	3.50
2012	6	0.10	0.64
2013	6	0.07	0.45
2014	6	0.06	0.40
2015	6	0.23	1.50
2016	6	0.18	1.20
2017	6	0.05	0.32

Action leakage rate	200 gpad	1,300–1,900 gpd
Initial response leakage rate	20 gpad	130–190 gpd
Low response leakage rate	2 gpad	13–19 gpd

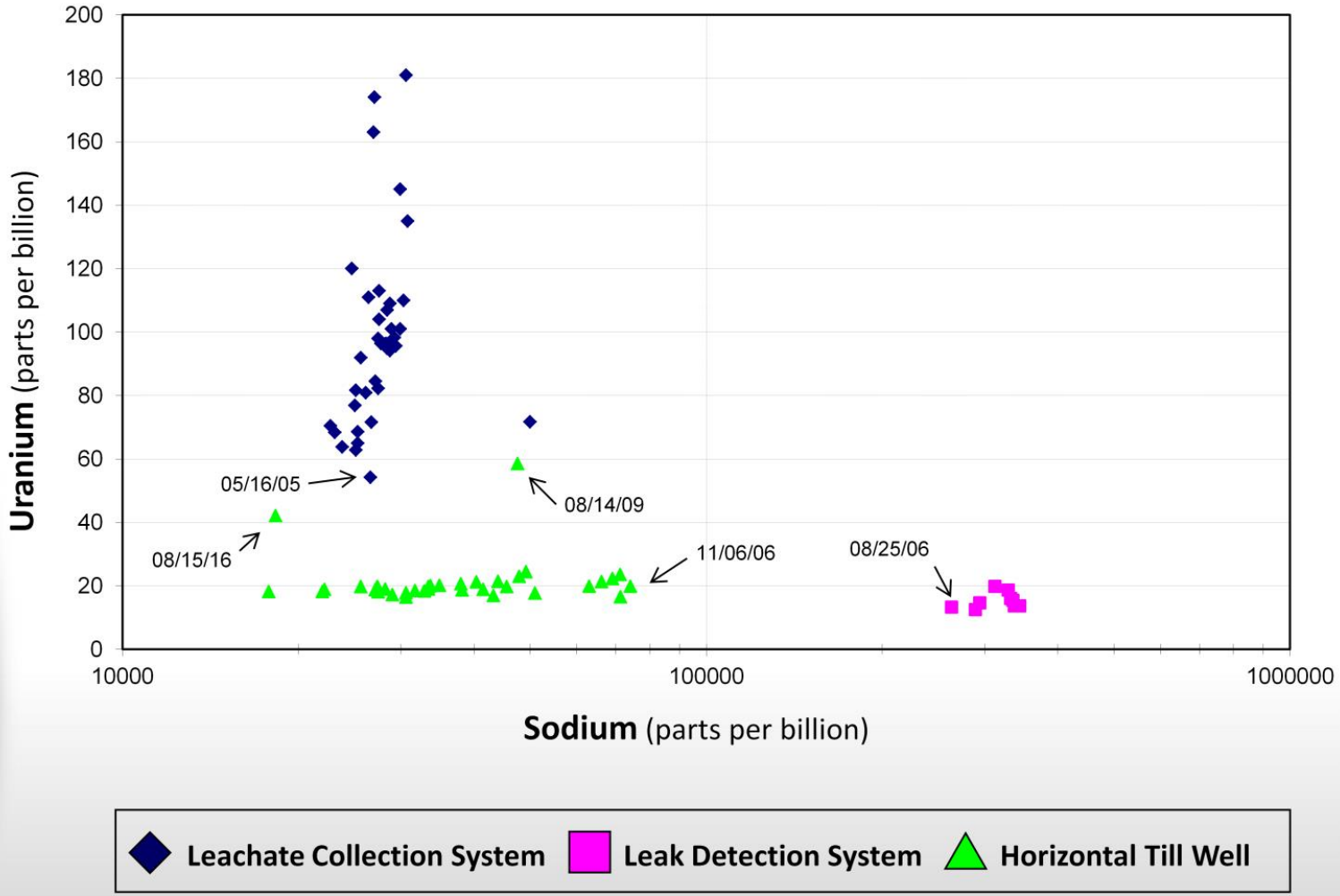
gpad: gallons per acre per day
gpd: gallons per day

9040.18 10/18

Leak detection system accumulation rates in the disposal cells are so low that a new low-flow response leakage rate of 2 gallons per acre per day has been defined. By comparison the response leakage rate is 20 gallons per acre per day, and the action leakage rate is 200 gallons per acre per day.

On-Site Disposal Facility

Uranium versus Sodium Concentrations: Cell 3
(Bivariate Plot)

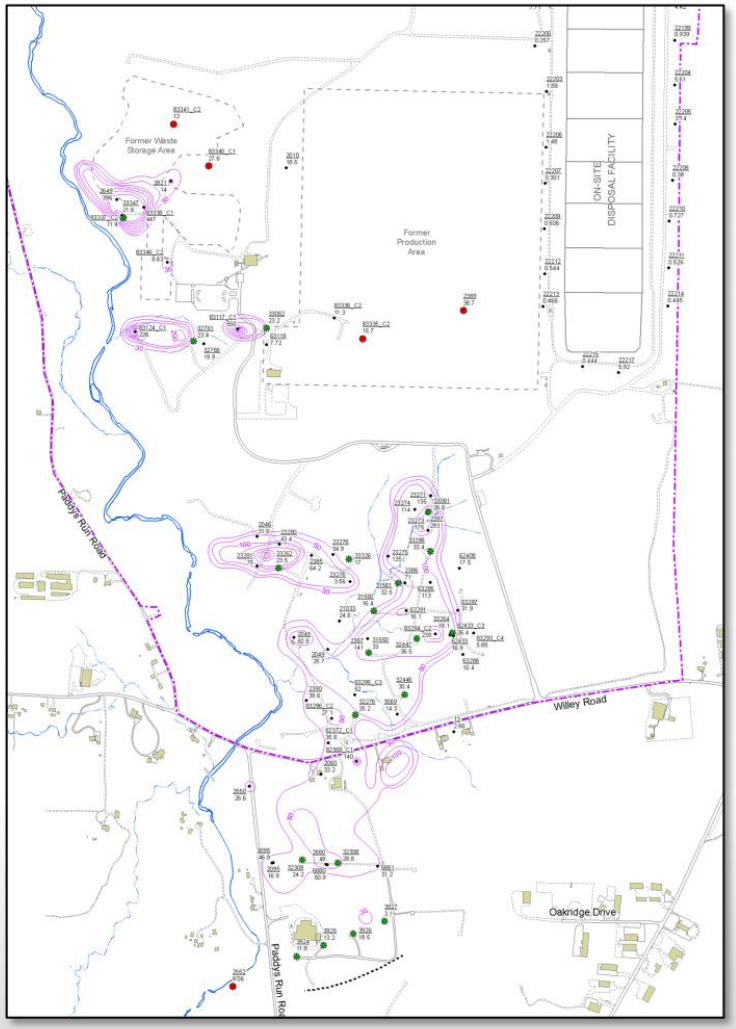


9040.19 10/18

A comparison of uranium concentrations and sodium concentrations in and below Cell 3 of the OSDF is an example of a method used to demonstrate the liner system is working as designed.

OSDF cap and liner systems are performing as designed.

Aquifer Restoration

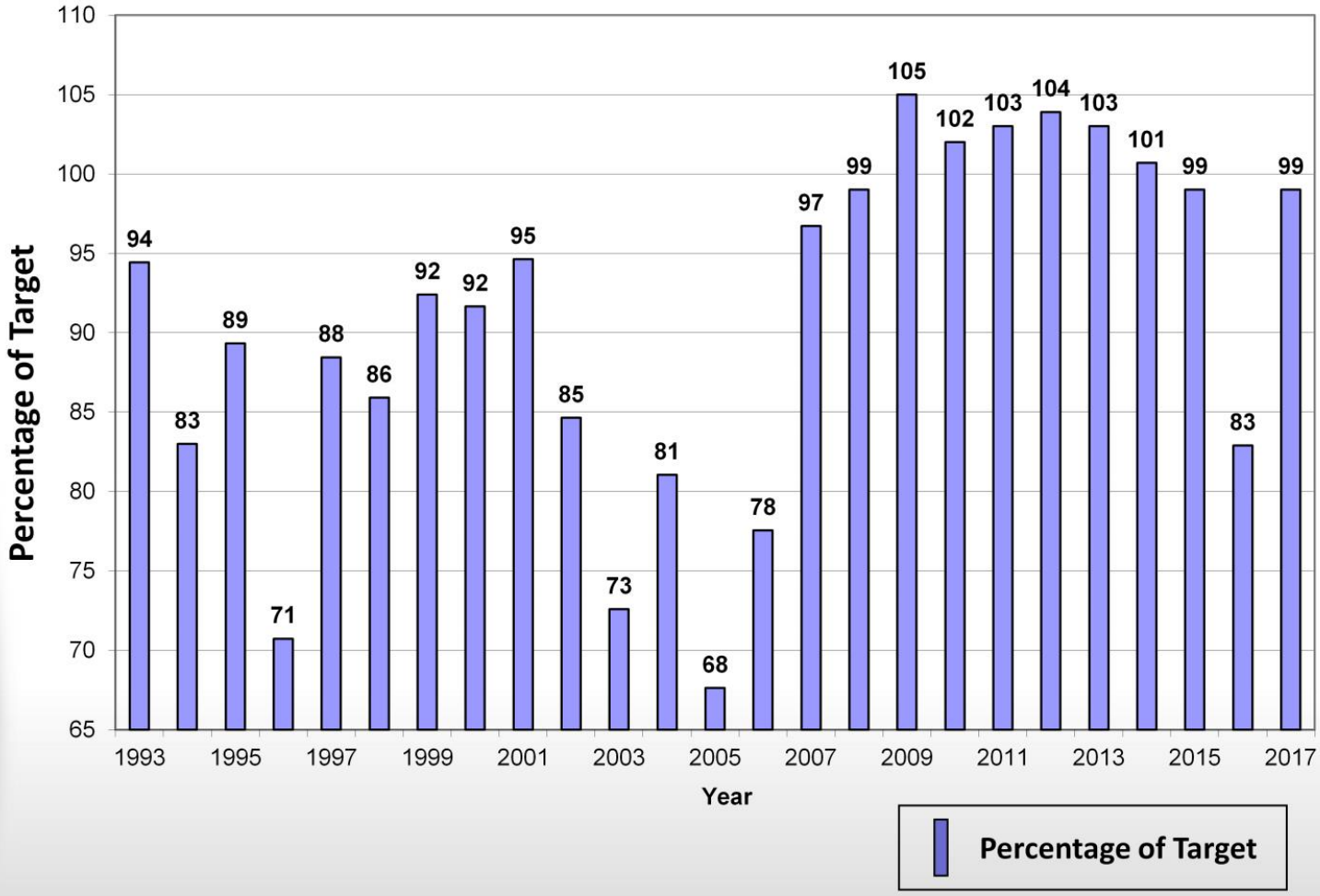


9040.12 10/18

Groundwater cleanup continues at the site.

Aquifer Restoration

Pumping: Percentage of Target Achieved

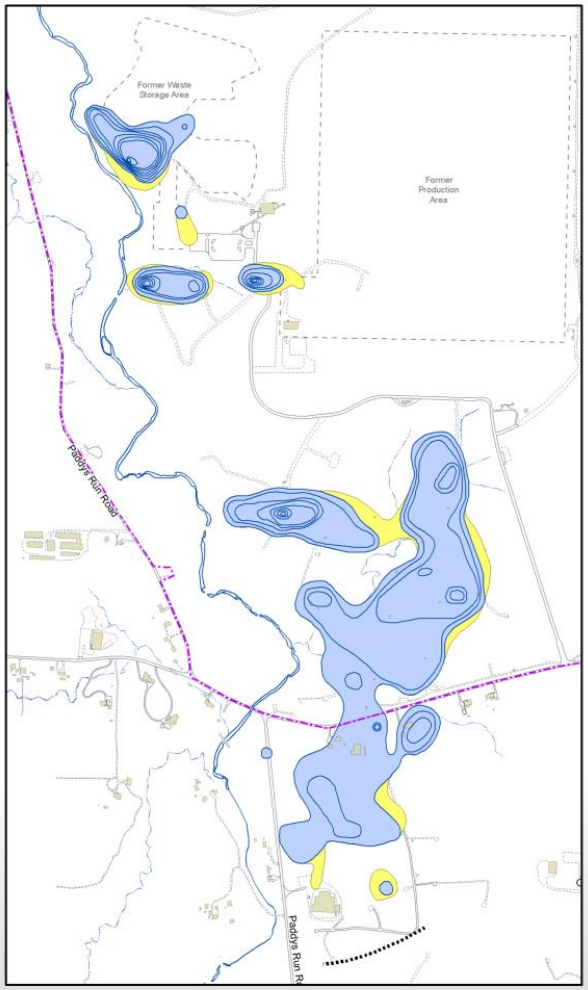


9040.22 10/18

Since site closure in 2006, operations have achieved at least 97 percent of the planned annual target pumping rates, with the exception of 2016 when the site experienced an unplanned well field shutdown in the summer due to site electrical problems.

Aquifer Restoration

Maximum Plume Acreage: 2016 and 2017



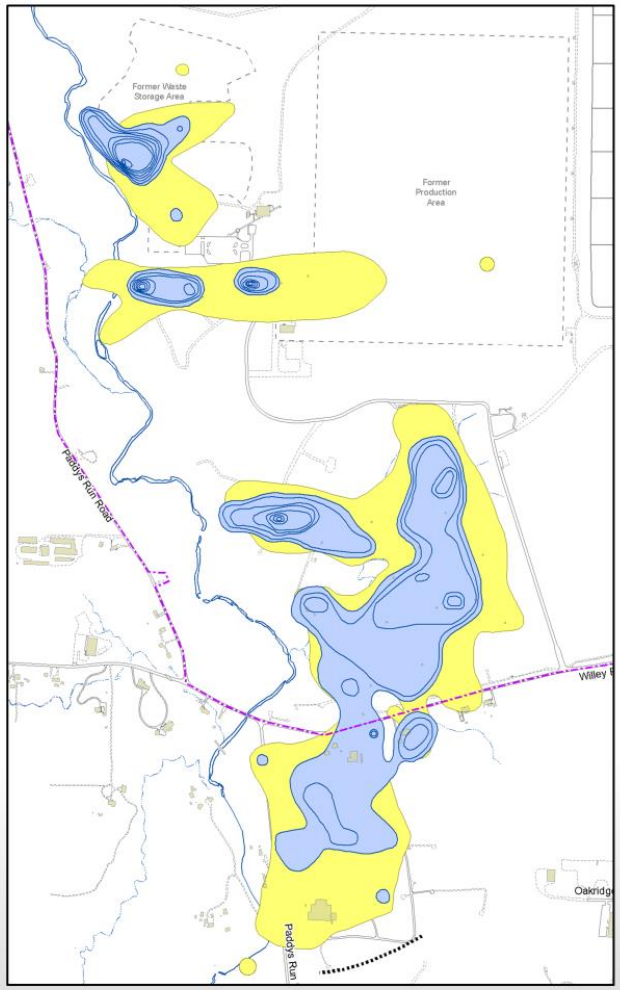
2016
2017

9040.23 10/18

The maximum uranium plume footprint interpretation decreased by 10.6 acres from 2016 to 2017.

Aquifer Restoration

Maximum Plume Acreage: 2006 and 2017

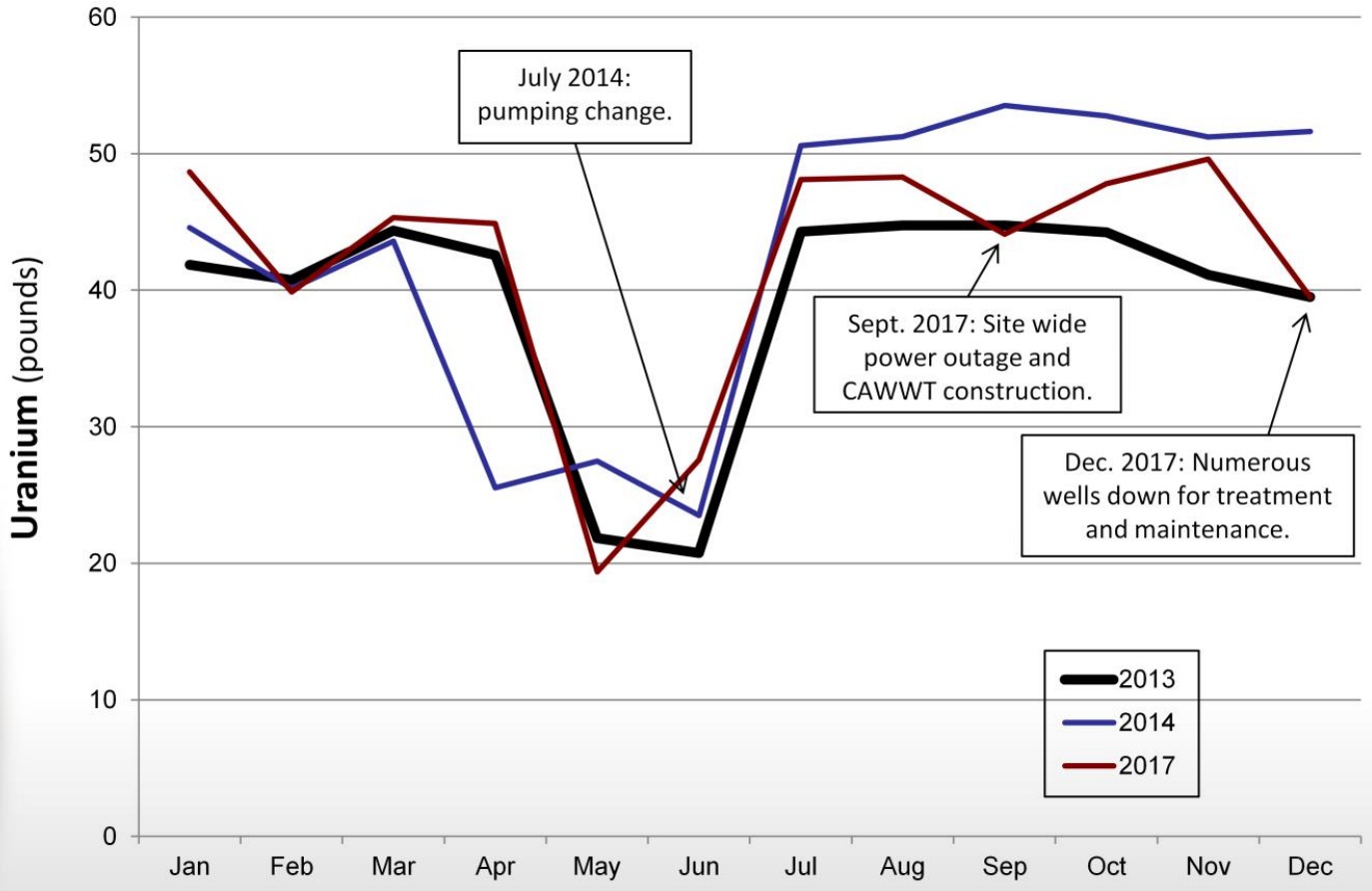


9040.24 10/18

Maximum size of the uranium plume footprint interpretation was 189.3 acres in 2006. Maximum size of the uranium plume footprint interpretation was 94.4 acres in 2017.

Aquifer Restoration

Uranium Removed: 2014 Operational Changes



9040.25 10/18

More uranium is being removed from the aquifer as a result of operational adjustments implemented in 2014.

Aquifer Restoration

Remaining Uranium Estimation

- Uranium dissolved in water (aqueous phase)
- Uranium sorbed to sediment (solid phase)
- 2017 SER (Section A.2)
  - Calculation for present uranium in each phase
- Calculation based on formula in *Groundwater Chemistry* by William J. Deutch
  - Uranium = aqueous + (multiplier X aqueous)
- Fernald Preserve
  - Uranium = aqueous + (19.83 X aqueous)

Calculations are presented that provide an estimate of how many pounds of uranium may be left in the aquifer after concentration-based cleanup goals are achieved.

Aquifer Restoration

Remaining Uranium Estimation

- 2017 aqueous estimation: 175 pounds (lbs.)
  - 2017 SER, Figure A.2-20
- Total Uranium = aqueous + (19.83 X aqueous)
- Total Uranium = 175 lbs. + (19.83 X 175 lbs.)
- Total Uranium = 175 lbs. + 3,470.25 lbs.
- Total estimated mass uranium = 3,645.25 lbs.

9040.27 10/18

At the end of 2017, an estimation of total mass of uranium remaining in the aquifer is 3,645.25 pounds.

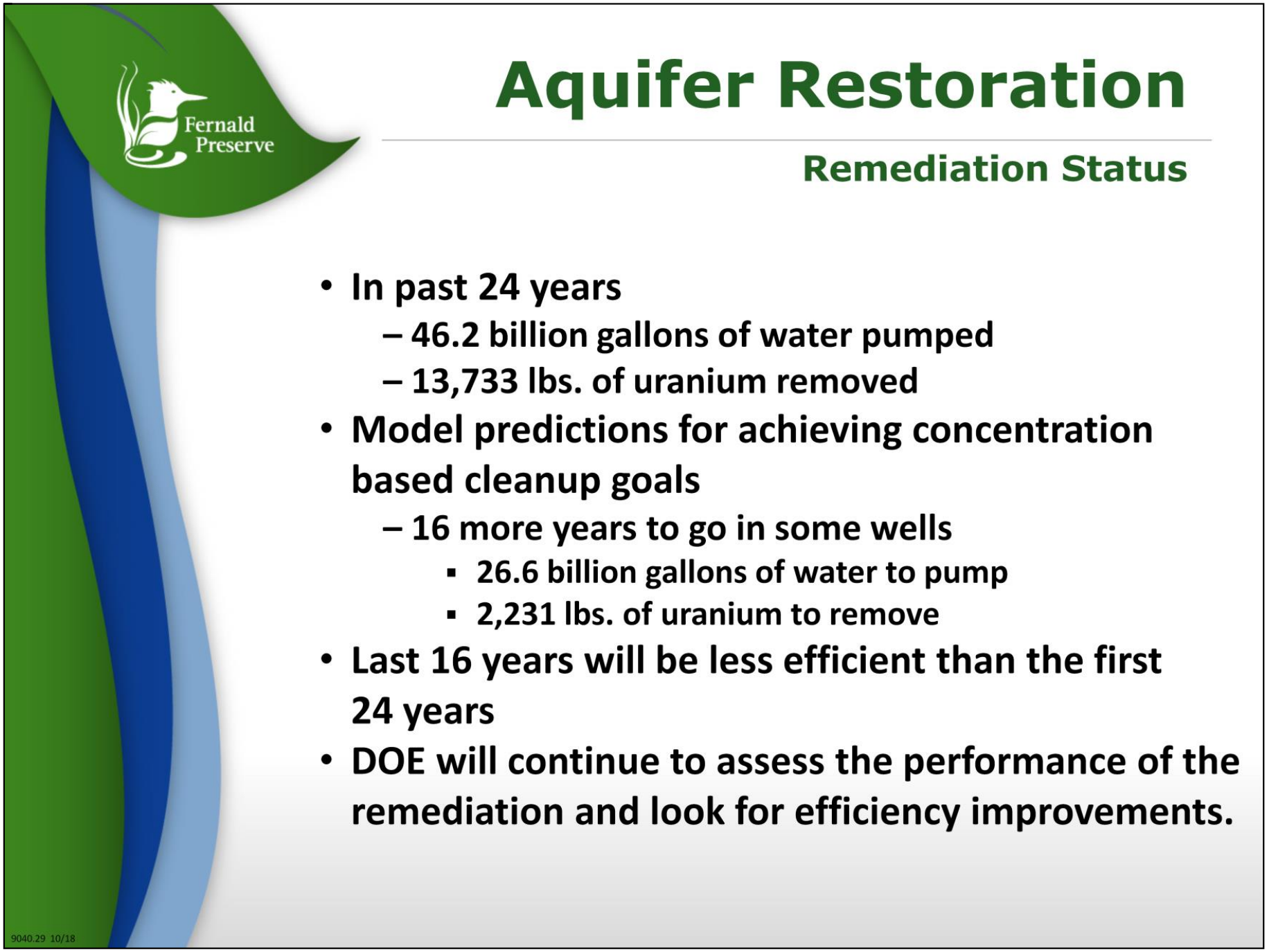
Aquifer Restoration

Remaining Uranium Estimation After Concentration Cleanup Goals Are Achieved

- Total estimated mass remaining: 3,645.25 lbs.
- Two predictors of how much mass needs to be removed to achieve concentration based cleanup goal of 30 micrograms per liter (µg/L)
  - 2,131 lbs.: model prediction
  - 2,234 lbs.: data regression
- Two predictors of how much mass will remain in the aquifer once concentration based cleanup goal of 30 (µg/L) is achieved
  - 1,514.25 lbs.: model prediction
    - (3,645.25 lbs. – 2,131 lbs. = 1,514.25 lbs.)
  - 1,411.25 lbs.: data regression
    - (3,645.25 lbs. – 2,234 lbs. = 1,411.25 lbs.)

9040.28 10/18

An estimate of how many pounds of uranium may be left in aquifer after concentration-based cleanup goals are achieved is presented.



Uranium concentration data trends and modeling predictions indicate the pumping operation is becoming less efficient over time. This is typical of groundwater pump-and-treat systems, and DOE continues to look for ways to improve system performance.

Aquifer Restoration

9040.30 10/18

Five wells were rehabilitated in 2017 to address iron plugging. Iron plugging decreases the pumping efficiency of the well.

Ecological Restoration

- Restoration projects
- Restored-area maintenance
- Ecological monitoring
- Site inspections
- OSDF inspections

9040.31 10/18

Ecological restoration work includes maintenance, monitoring, and inspections.

Ecological Restoration

Restored-Area Maintenance

- Vegetation management
- Inspection follow-up

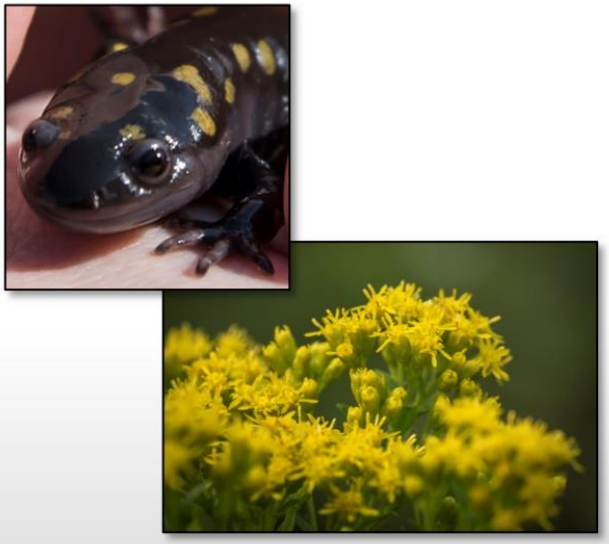
9040.32 10/18

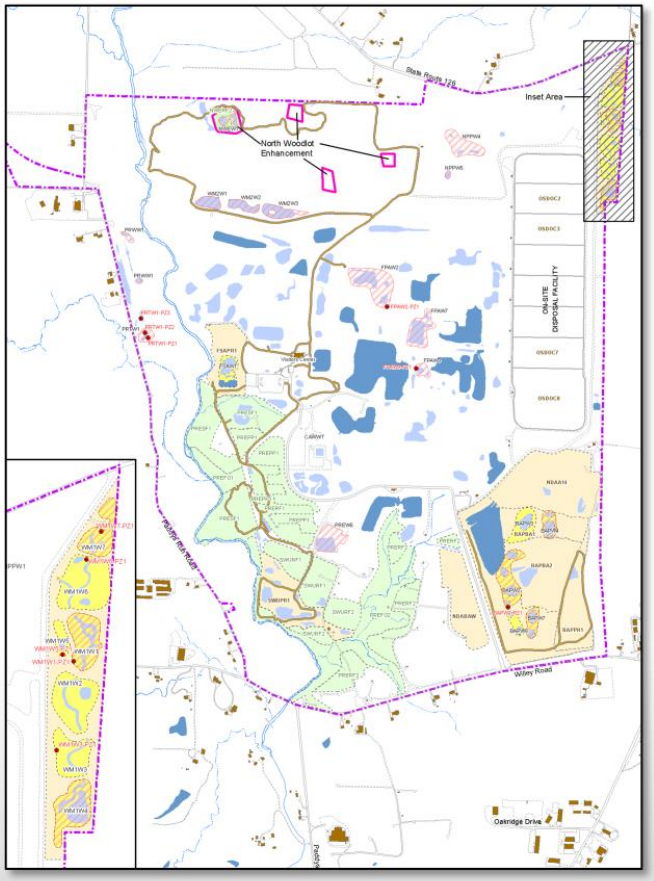
Restored area maintenance includes vegetation management and follow-up from site inspections.

Ecological Restoration

Monitoring

- Wetland mitigation
- Implementation
- Functional
- OSDF vegetation cover





9040.33 10/18

Monitoring programs help site personnel evaluate the status of ecologically restored areas at the site, including the health and diversity of amphibian populations.

Ecological Restoration

Inspections

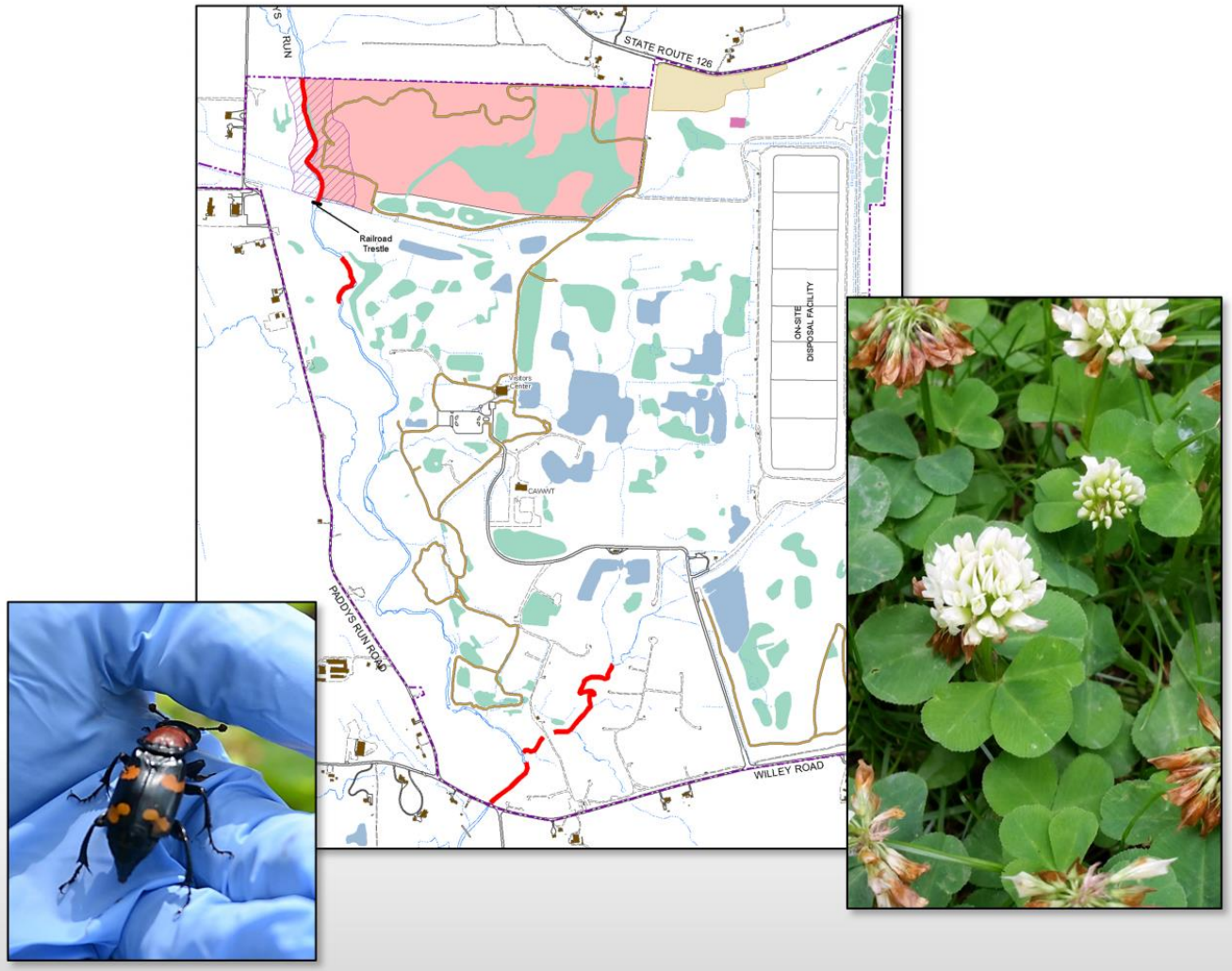
- Site
- OSDF
- Trails

9040.34 10/18

The inspection process continues in compliance with the Fernald Preserve *Comprehensive Legacy Management and Institutional Controls Plan*.

Ecological Restoration

Endangered Species and Cultural-Resources Surveys



9040.35 10/18

Endangered species and cultural resource surveys are conducted prior to field activities.

Community Engagement

- **Public amenities**
- **Public programs**

9040.36 10/18

Since the site opened to the public in 2008, schools, conservation organizations, former workers, bird watchers, hikers, and many others have used the public amenities at the site, including the Visitors Center, the walking trails, wildlife observation opportunities, interpretive programs, and reservable spaces.

Community Engagement

- **Envirothon 2017**
- **National Day of Remembrance for Cold War Workers 2017**

9040.37 10/18

Envirothon was held on-site April 25 with more than 500 high school students participating in the regional competition style event sponsored by local Soil and Water Conservation Districts. A celebration of the National Day of Remembrance for Cold War Workers was held on October 28. Many visitors enjoyed the commemorative American flag quilt made for the Cold War Patriots.

Community Engagement

- **Night programs and hikes remain popular**





9040.38 10/18

Nature at Night captures community interest. A variety of public night hikes and other activities were offered throughout the year.

Community Engagement

- **Birders and photographers are frequent guests**

9040.39 10/18

Ecologically restored habitats at the site are recognized as regionally important birding areas that attract bird watchers and photographers.

Community Engagement

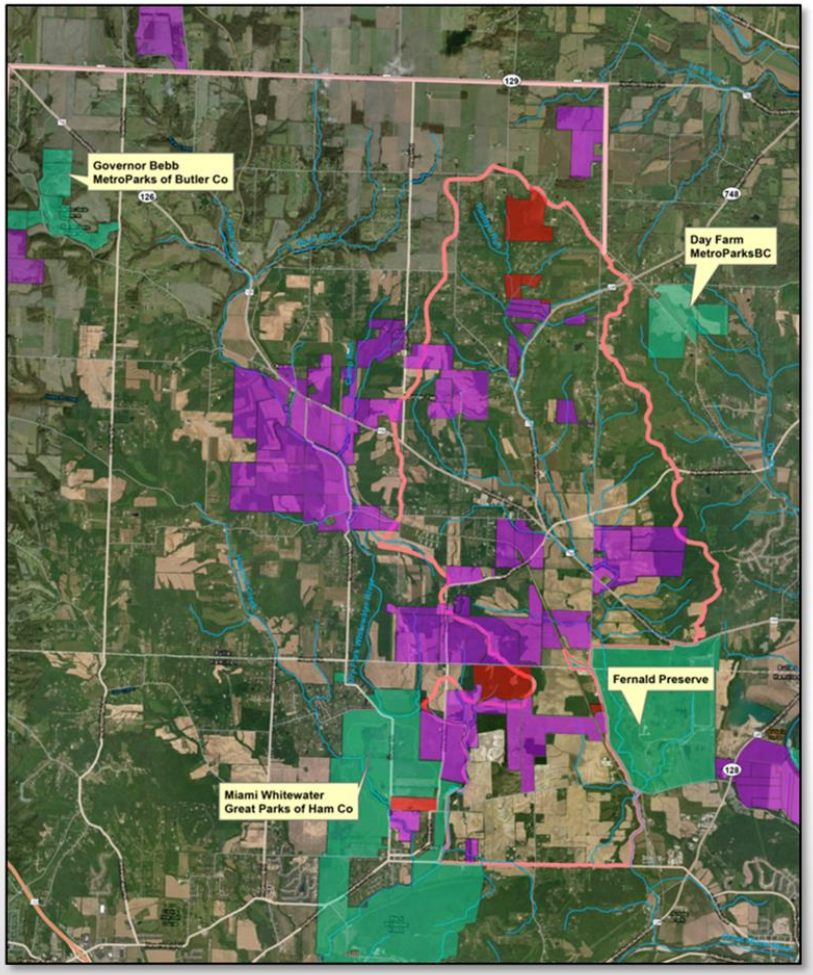
- **Bobcat update 2017**
- **Conservation commendation received**

9040.40 10/18

Bobcats have raised kittens on-site for five consecutive years. The Garden Club of America awarded the Fernald Preserve a Conservation Commendation in 2017.

Natural Resource Trusteeship

Summer 2018

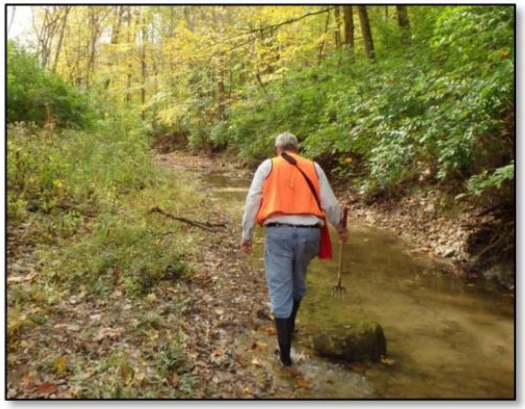


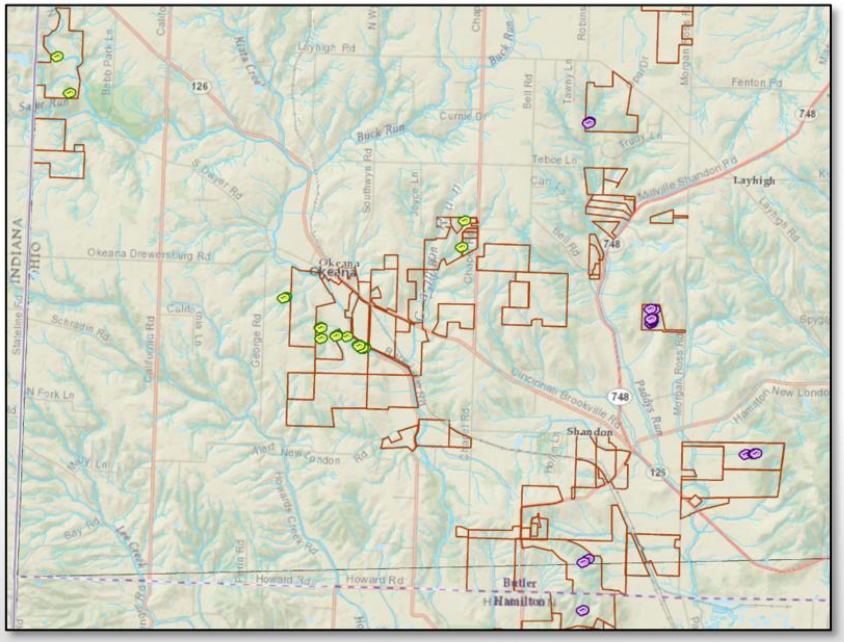
9040.41 10/18

The Natural Resource Trustees (Ohio EPA, U.S. Fish and Wildlife Service, DOE) have partnered with the Three Valley Conservation Trust to purchase conservation and agriculture easements in the Paddys Run watershed and above the associated Buried Valley Aquifer.

Natural Resource Trusteeship

Reptile and Amphibian Survey





9040.42 10/18

Several new populations of cave salamanders and long-tailed salamanders have been found on Paddys Run Conservation Project properties. The cave salamander is listed as endangered in Ohio.

2017 Site Projects

Wastewater Treatment Optimization Project

- **Components/sub-projects**
  - **Design new system**
  - **Remove old system components**
  - **Fabricate and install new system components**
  - **Backwash basin**

9040.43 10/18

The wastewater treatment optimization project was substantially completed (with exception of backwash basin) in 2018.

2017 Site Projects

CAWWT Backwash Basin Leak

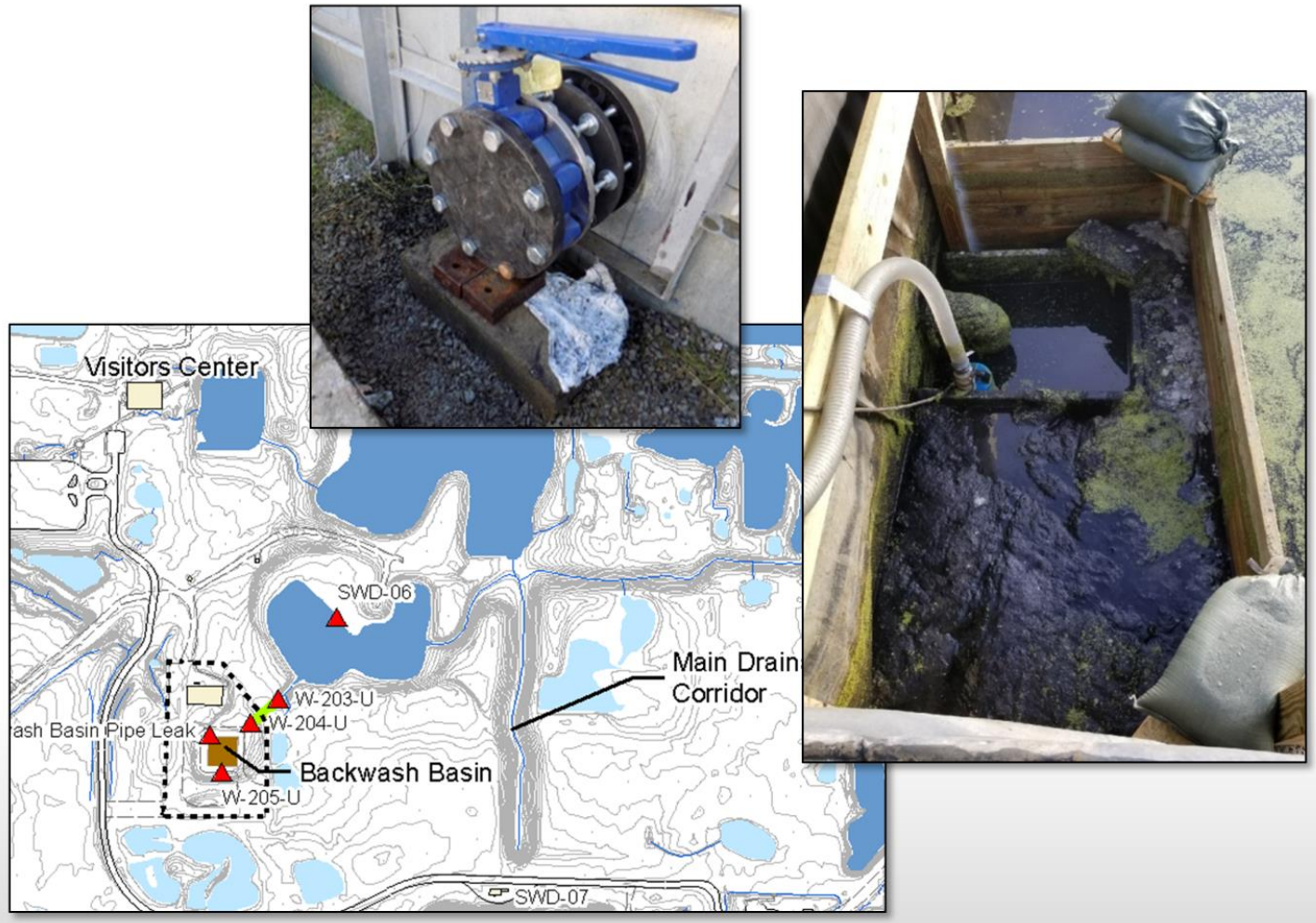
- Leak occurred when a blind flange was being installed on the basin exit pipe on November 1, 2017
- Regulators and stakeholders notified immediately
- Total of 46,000 gallons leaked before repairs could be made on November 14, 2017
- Uranium concentration in leaked water was 5 ppb
  - Leaked water below both groundwater (30 ppb) and surface water (530 ppb) final remediation levels
- Surface water sampling results indicated no adverse impact beyond the CAWWT area

9040.44 10/18

Water sampling following a November 2017 backwash basin leak indicated that there were no adverse impacts outside the Converted Advanced Wastewater Treatment facility area.

2017 Site Projects

CAWWT Backwash Basin Leak



9040.45 10/18

Water sampling following a November 2017 backwash basin leak indicated that there were no adverse impacts outside the Converted Advanced Wastewater Treatment facility area.

2018 Site Projects

CAWWT Operations: Then and Now

System	OLD	NEW
Capacity	500–600 gpm	50 gpm
Operation	1–2 days per month or less	Daily during work hours
Blending (Backwash basin water with groundwater)	100–200 gpm	5–10 gpm

9040.46 10/18

Experience has shown that operating the wastewater treatment system as frequently as possible maximizes efficiency.

2018 Site Projects

- **Paving**
  - **– Weapons-to-Wetlands/Visitors Center trails**
- **Asphalt seal coating**
- **Erosion repair**

9040.47 10/18

Completed 2018 projects include erosion repairs and asphalt sealing.

Master Plan

9040.48 10/18

DOE is developing a Master Plan that will help guide decisions regarding future land use, public amenities, and interpretive services. The Master Plan will not affect CERCLA cleanup levels, remediation plans, or institutional controls.

Look Ahead

- Aquifer restoration
- Environmental monitoring
- Site and OSDF monitoring and maintenance
- Restored area monitoring and maintenance
- Prescribed burns
- American burying beetle recovery program
- Educational programs
- Master Plan
- Complete Wastewater Treatment Optimization Project
  - Backwash basin

Numerous work activities are planned for the coming year.

Questions and Contacts

Sue Smiley

Fernald Preserve Manager
U. S. Department of Energy
Office of Legacy Management
(513) 648-3333
sue.smiley@lm.doe.gov

Penny Borgman

Interpretive Services
Navarro Research and Engineering, Inc.
(513) 648-3334
penny.borgman@lm.doe.gov

General

(513) 648-6000
fernald@lm.doe.gov
www.lm.doe.gov

The next annual Fernald Preserve community meeting will take place in the fall of 2019.