

# Compliance Monitoring Program

## EPA Annual Inspection – 2019

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**SNL/JHA**



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# Presentation Overview

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- Brief description and basis and scope of the Compliance Monitoring Program
- Summary of what is new for this reporting period
- Briefly discuss Compliance Monitoring Program results for 2018



# Basis of Compliance Monitoring Program

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- Addresses EPA requirements in 40 CFR 194.42 – Monitoring
  - 40 CFR 194.42(a) The Department shall conduct an analysis of the effects of disposal system parameters on the containment of waste in the disposal system and shall include the results of such analysis in any compliance application. The results of the analysis shall be used in developing plans for pre-closure and post-closure monitoring required pursuant to paragraphs (c) and (d) of this section.
- Analysis documented in Compliance Certification Application Appendix MONPAR (DOE 1996)



# Basis of Compliance Monitoring Program

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- **Compliance Monitoring is used to monitor the disposal system to detect any substantial and detrimental deviations from expected long-term repository performance indicators**
  - **Monitoring parameters are based on their importance to the WIPP Performance Assessment (PA)**
  - **“Substantial and detrimental deviations” are not expected**
  - **Program compares monitoring data against PA assumptions, repository conditions and expectations**
  - **Exceeding expected results (Trigger Values [TV]) does not indicate an out-of-compliance condition**



## What is Monitored

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- **Ten Compliance Monitoring Parameters (COMPs)**
  - Drilling Rate
  - Probability of Encountering a Brine Reservoir
  - Waste Activity
  - Subsidence
  - Changes in Groundwater Flow
  - Change in Groundwater Composition
  - Creep Closure
  - Extent of Deformation
  - Initiation of Brittle Deformation
  - Displacement of Deformation Features



## What's New

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- **Annual assessment in COMPs reports**
  - *Sandia National Laboratories Compliance Monitoring Parameter Assessment for 2018, ERMS 570837*
- **2018 COMPs report concluded that monitoring results do not indicate unexpected conditions**

**“The results of this year’s COMP assessment conclude that there are no COMPs data or results that indicate a reportable event or condition adverse to predicted performance.”**



# COMPs Results for 2018

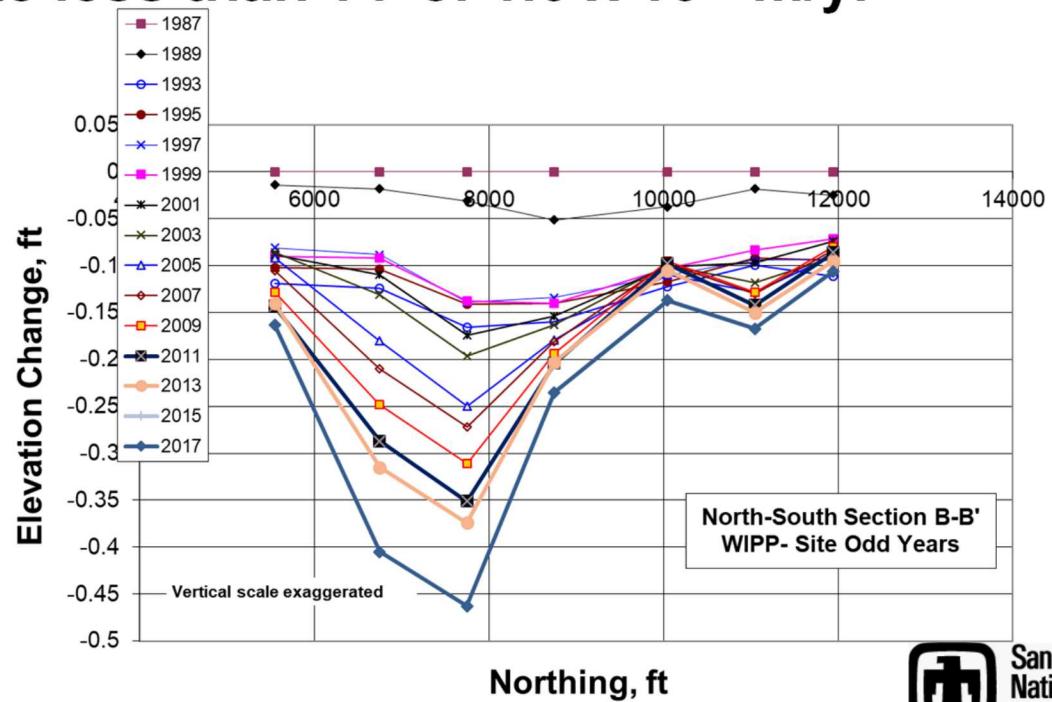
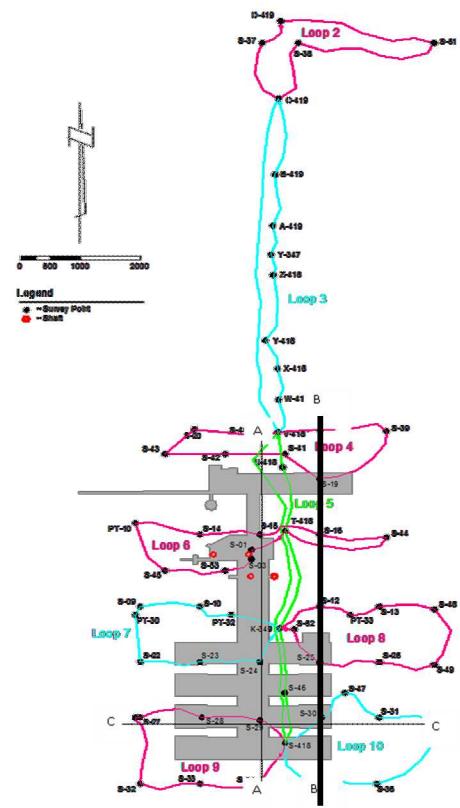
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- **Drilling Rate (bh/km<sup>2</sup>/10,000yrs)**
  - 2017 rate = 93.4
  - 2018 rate = 99.0
  - No TV
- **Probability of Encountering a Brine Reservoir**
  - No new Castile brine encounters
  - No TV
- **Waste Activity**
  - Emplaced Curies less than PA input parameters
  - RH less than 5.1 Million Curies (TV)

# COMPs Results for 2018

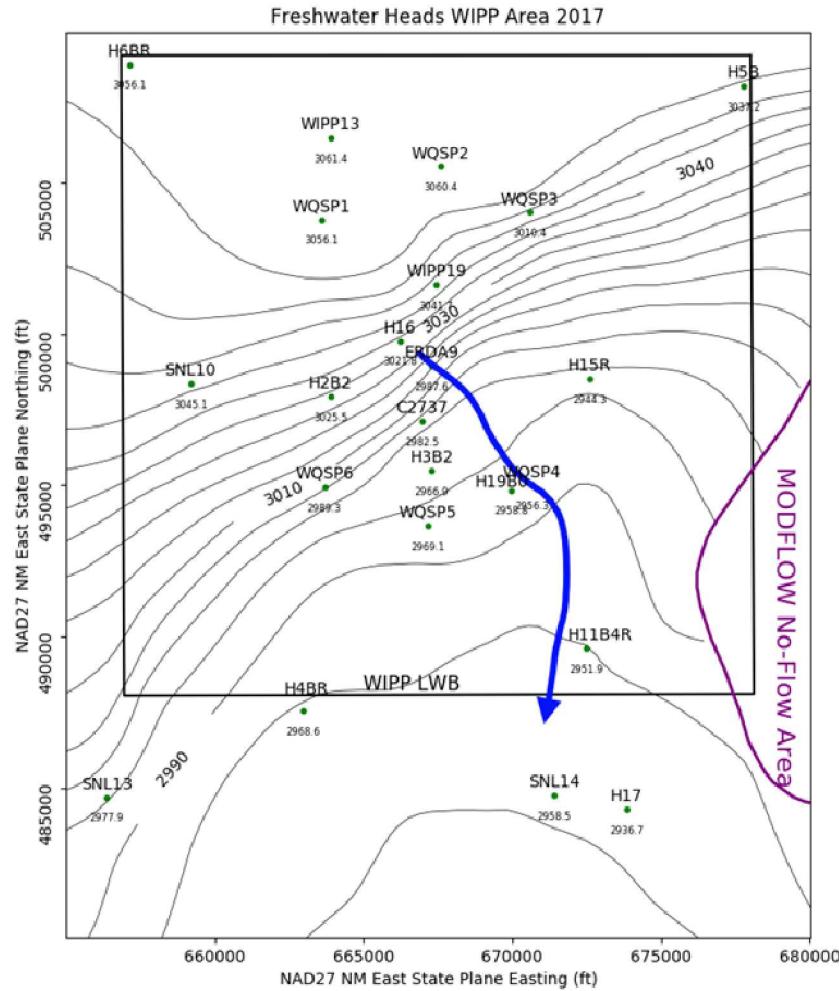
## • Subsidence

- The highest subsidence rates measured for the 2016-2017 survey correspond to benchmarks directly over panels 2,3,6 & 7 (e.g., S-24, S-28, S-29 and S-46)  
Subsidence rate less than TV of  $1.0 \times 10^{-2}$  m/yr



# COMPs Results for 2018

- Changes in Groundwater Flow
  - Comparison of particle travel times to those used in PA
  - 5,248 years - Within TV



September 2017 modeled Culebra potentiometric surface of the immediate WIPP vicinity (DOE 2018) generated using ensemble average distributed aquifer parameters from the SNL Culebra flow model used in CRA-2014 PA (DOE 2014).



# COMPs Results for 2018

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- **Change in Groundwater Composition**
  - WQSP Wells analyzed for major anions and cations
- **TV**
  - Charge Balance Error not greater than 5%
  - P-value less than 0.05 for three consecutive rounds
- **All samples for round 39 are within P-value**
- **CBE for WQSP-3 duplicate outside CBE, all others within TV**



# COMPs Results for 2018

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- Creep Closure
  - Horizontal and Vertical Displacement Rate of Shaft Stations, Panel Access Drifts and Waste Disposal Areas (in/yr)
  - Creep rate within the TV – Order of Magnitude change in rate from previous year's data



# COMPs Results for 2018

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- **Extent of Deformation**
  - Comparison of fracture maps
  - No new data for this reporting period
  - No TV
- **Initiation of Brittle Deformation**
  - Qualitative assessment, limited data for this reporting period
  - No TV
- **Displacement of Deformation Features**
  - Offset of Observation Boreholes (OHBs)
  - Limited data set for this reporting period
  - No TV



## COMPs Conclusion

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- This monitoring program is used to validate assumptions and PA models that are used to predict WIPP performance and identify conditions that could potentially cause radioactive release above the EPA limits (40 CFR § 191.13). Since releases above these limits cannot occur during the operational period of WIPP, the monitoring program looks at other potential performance indicators of the disposal system and compares these data to PA performance expectations. No additional actions were specified in the 2018 COMPs report as a result of the monitoring data analysis



## References

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- DOE (U. S. Department of Energy). 2018b. *Geotechnical Analysis Report for July 2016 – June 2017, DOE/WIPP-18-3561, Volume 1 & 2, October 2018.*
- DOE (U. S. Department of Energy). 2014. *Title 40 CFR Part 191 Subparts B and C Compliance Recertification Application for the Waste Isolation Pilot Plant, DOE/WIPP 2014-3503, March 2014.*