

Questions and answers about potential underground experiments

The U.S. Department of Energy (DOE) is proposing to expand the availability of Waste Isolation Pilot Plant (WIPP) facilities and infrastructure to scientists who wish to conduct experiments there. DOE would allow these experiments if they can be conducted without interfering with the WIPP's primary transuranic waste disposal mission and if they reflect contemporary budget priorities.

DOE has prepared a *Draft Environmental Assessment for Conducting Astrophysics and Other Basic Science Experiments at the WIPP Site*. This document examines the potential environmental consequences from conducting particular types of scientific experiments in an area of the WIPP underground called the experiment gallery. The environmental assessment also looks at the potential cumulative impacts of conducting experiments and operating WIPP as a transuranic waste repository. This fact sheet presents questions and answers about the proposed experiments, based on the environmental assessment.

What types of experiments would be conducted at the WIPP?

To identify the range of experiments that could be conducted at the WIPP, the DOE reviewed experiments that have been proposed to date. The DOE also consulted scientists from Pacific Northwest National Laboratory regarding the needs and potential hazards of these experiments and identified other potential experiments that could be conducted at the WIPP. Non-DOE scientists would primarily perform all of these experiments, although some experiments may receive DOE funding. The draft environmental assessment analyzed 15 experiments in the following five categories:

Particle physics experiments – eight experiments that would focus on the search for knowledge concerning substances that could account for missing mass in the universe: dark matter, weakly interacting massive particles (WIMPs), and neutrinos.

Other astrophysics and physics experiments – one experiment that would study the interaction between magnetic and radiation fields.

Mine safety and geophysical studies – three potential experiments were analyzed. One would focus on the testing of prototype in-mine monitoring systems. Another would offer a better understanding of explosions in salt mines by conducting tests with small explosives comparable to a shotgun shell. The third would test the thermal stress response of salt deposits to better understand past and future behavior of such deposits.

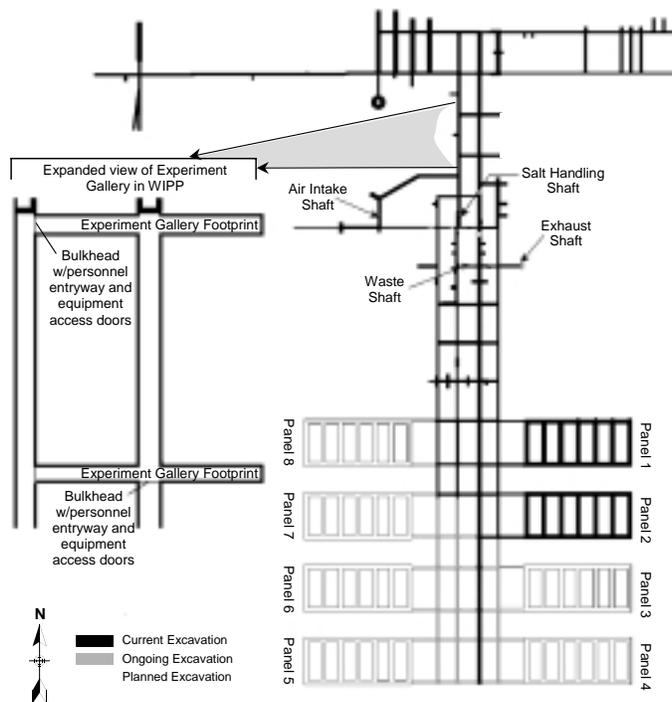
Nonproliferation and nuclear accountability experiments – one experiment that would use transuranic waste to be disposed of at the WIPP as a surrogate for fissile materials to test monitoring devices that could be used to track and account for such materials around the world.

Chemical and material processing experiments – two experiments, one involving deep mine electroplating and the other involving crystal or microprocessor development.

Other experiments were considered but not analyzed in detail, including the Ultimate underground Neutron decay and neutrino Observatory (UuNnO) experimental facility. The UuNnO would observe cosmic neutrinos as well as those generated by a neutrino (muon) factory like that proposed for Brookhaven National Laboratory or Fermi National Accelerator Laboratory. Because it would be so large, would involve so much water, and would operate so long, DOE believes construction of the UuNnO at the WIPP is well beyond the scale of other near-term experiments. If the UuNnO were developed beyond the current conceptual stage, a separate NEPA document describing its impacts would be necessary. Should additional experiments be proposed that are unlike the experiments described above or that could pose unidentified hazards, additional NEPA analysis would be conducted.

Where would the experiments take place?

The experiments would take place in an area of the WIPP underground called the experiment gallery. The WIPP facility is 2,150 feet beneath the Earth's surface. The gallery includes a north/south drift 330 feet long by 33 feet wide, and two 33-foot-wide cross-cutting drifts extending approximately 150 feet on each side of the north/south drift. This area of the repository has been fully excavated and is not currently in use. The experiment gallery is nearly 0.5 mile from the nearest waste disposal room.



The WIPP repository footprint and the proposed experiment gallery.

What kinds of structural modifications would be made to the WIPP facility?

At the WIPP site, construction and preparation activities would be minimal. DOE is proposing to seal access points between the experiment gallery and the rest of the repository with bulkheads that would include doors for both equipment and people. Air flow in the rest of the repository would be maintained at a rate that allows the use of diesel equipment. Within the experiment gallery, such equipment would rarely be used, so the flow bulkheads would allow the flow rate to be reduced to just that needed for safe occupation. This would enable any salt dust to quickly settle within the experiment gallery. Some experiments would require air conditioning and humidity control to maintain experimental and data recording equipment within operating specifications. For those experiments, bulkheads would be required with exchangeable filters and/or refrigerated air conditioners.

Would future experiments require more construction at the WIPP?

Some astrophysicists and other scientists have requested that DOE expand the experiment gallery to the east or west to allow for larger experiments or those that must be placed at particular locations or angles. As part of the Proposed Action, DOE could authorize additional excavation near the experiment gallery as long as it could be done safely by DOE's current excavation staff, could be done without impacting emplacement of transuranic waste, and would not affect repository performance. For purposes of analysis, the additional excavation would be limited to east and west of the experiment gallery and to an extent no greater than that necessary for a standard WIPP disposal panel. Salt from the excavations would be placed with the other salt from WIPP excavations at the surface of the facility.

When would the experiments take place and how long would they last?

The experiments would not all begin or end at the same time, and each would be operated on its own schedule as funding became available. The experiments could run from 2 to 35 years. For purposes of analysis, however, it is assumed that (1) all experiments would begin simultaneously after preparation of the experiment gallery, (2) each would run for 35 years (the planned operation life of the WIPP), and (3) they would then be decommissioned. DOE made these "conservative" assumptions to ensure that the analyses would evaluate a broad range of possibilities over a long period of time. In reality, the number and length of experiments will probably be much less.

How do I get more information?

For more information about experiments at the WIPP, or to be placed on the WIPP mailing list, call the WIPP Information Center at 1-800-336-WIPP (9477). Or you may review the full environmental assessment on the WIPP Home Page at <http://www.wipp.carlsbad.nm.us/library/ea/ea.htm>. If you prefer, write to:

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U.S. Department of Energy
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The Waste Isolation Pilot Plant