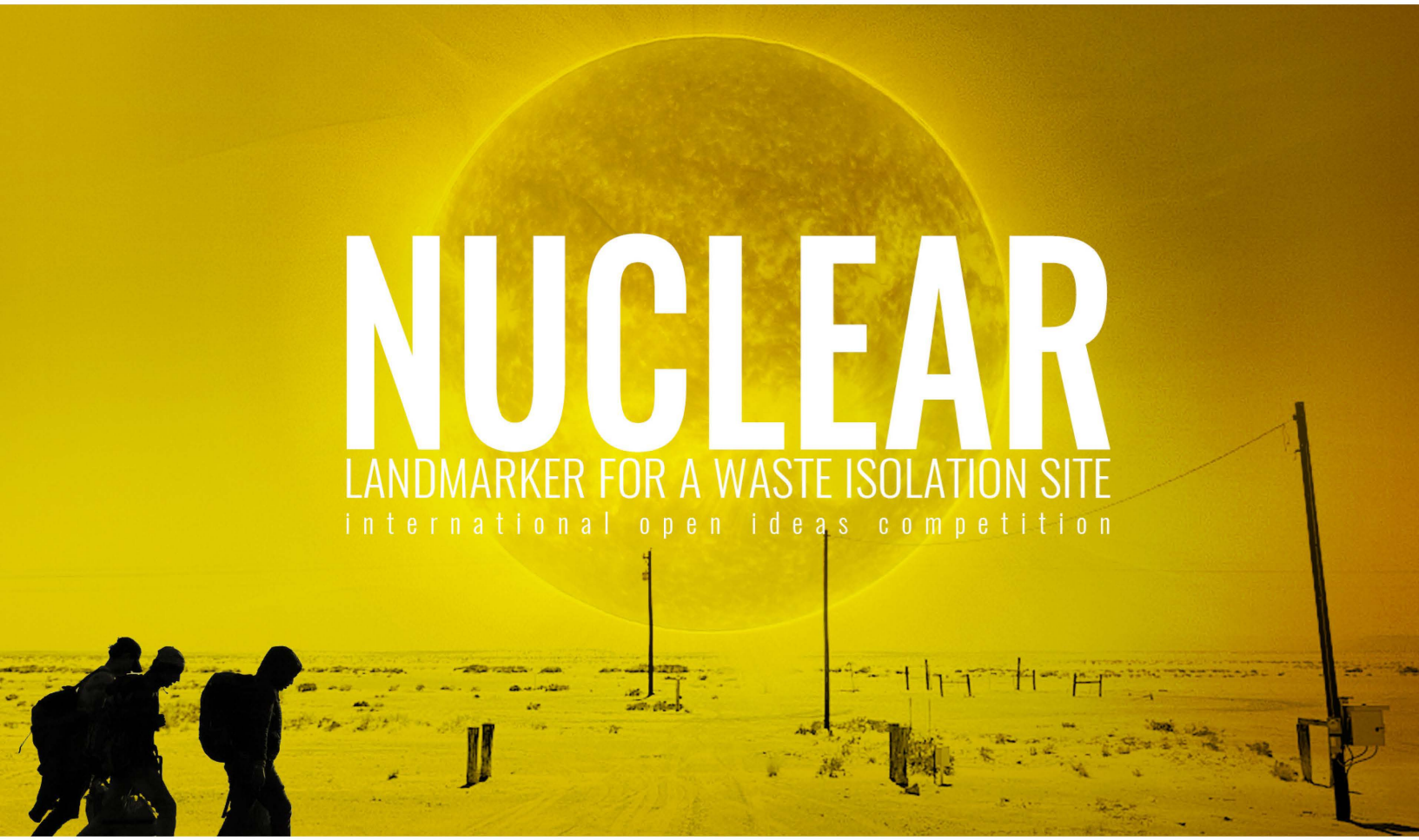

NUCLEAR
LANDMARKER FOR A WASTE ISOLATION SITE
international open ideas competition

contents

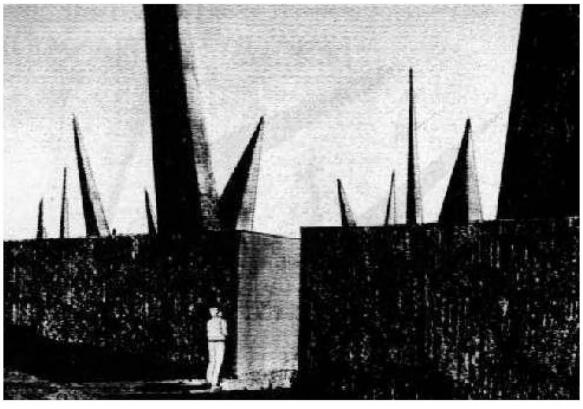
NUCLEAR WASTE

Since the Cold War, one of the most challenging and urgent tasks facing governments around the world has been the disposal of **transuranic nuclear waste**. As a by-product from nuclear weaponry production, transuranic waste is not only harmful, but also boasts a formidable decay process lasting thousands of years.

To address this issue, millions of barrels of highly radioactive waste have been buried in repositories deep beneath the earth's surface. One such disposal site is the Waste Isolation Pilot Plant (WIPP) in New Mexico, United States. To ensure public safety, it is imperative that the site remain undisturbed for the duration of the waste's decay process.

In 1993, a report issued by Sandia National Laboratories described architectural and semiotic proposals for markers designed to discourage human intrusion upon the site. These markers were not barriers of force but signs, meant to signal that the place was dangerous and should remain undisturbed.

Besides the designs put forth by the report, very few alternative proposals have addressed these concerns. In the interest of public safety, how could other **architectural proposals** for markers serve to warn future societies of the dangers of such a place with messages that could endure for millennia?



Spike Field, (concept by Michael Brill and art by Safdar Abidi)
proposed marker for the WIPP

WWII Atomic Bomb Test Site, Nevada
dirigible falls due to shock wave in the air near atomic bomb test site

CHALLENGE

arch out loud **asks competition entrants to design a marker or marker system to deter inadvertent human intrusion into the Waste Isolation Pilot Plant.** The marker should exist as a means of passive institutional control of the site for the **duration of 10,000 years,** following the closure and deactivation of the WIPP.

The purpose of the marker is to **communicate with future generations** that transuranic waste is buried within a repository at the facility, located 2,150 feet beneath its surface, and should remain isolated until the risks posed by its release have been sufficiently diminished.

MARKER

A marker is an indicator of position and place and a physical structure capable of carrying a message over a long period of time. Architectural markers include earthworks, berms, and other man-made formations. Notable historic markers, like the Ancient pyramids of Egypt and Stonehenge in England, demonstrate the dilemma inherent in the enduring yet, mysterious nature of such structures. Though they have survived antiquity, much of their intended meaning has been lost.

Other ancient markings, like the Palaeolithic cave paintings of Lascaux (dating about 20,000 years), feature surprisingly legible illustrations despite their age. Conversely, the more contemporary, fictional Monolith in the film *2001:A Space Odyssey* bears a powerful message through its ominous presence without revealing exactly what the message nor its source.

The **WIPP marker** cannot eliminate all likelihood that the site shall remain undisturbed. However, the marker can **communicate the potential dangers** associated with the site, and help prevent unintended harm.

Pyramids of Giza
enduring architectural markers

Trinity Site Obelisk
marker designates where the world's first nuclear device was detonated

FUTURE GENERATIONS

10,000 years from now, future generations may be more, less, or equally developed as present-day people. Since political or natural forces may shift the demographic of the site, the **customs and languages** of future inhabitants will likely be different from those existing today. What changes to language, infographics, and nomenclature should we anticipate to occur in the years to come?

Future generations might be motivated to excavate the site in search of resources or wish to reopen the site to store additional waste. Excavation for archaeological purposes, explosive testing, and infrastructural projects could also pose potential threats to the site's intended isolation.

PROGRAM

Designers should interpret the marker program as they feel best addresses the particular concerns of the brief. There is no suggested scale to the project, as long as the project does not exceed site boundaries. At minimum, proposals should include the following:

WIPP Marker or Marker System
The marker (or marker system) should be a built (or series of built) structures used to communicate a message of warning to future generations to deter inadvertent intrusion upon the site and excavation of its subsurface.

The design of the WIPP marker/marker system should meet the following design criteria:

1) **Durability** - Teams must consider the construction techniques, materials, and placement of the marker(s) on the site and how they will react to natural forces and human vandalism for a duration of 10,000 years.

2) **Effective Communication** - Teams should consider which gestures / symbols / signs / expressions would be the most legible and enduring means of communication.

Supplemental Program - Teams are invited to consider but are NOT REQUIRED to include any supplemental program to accompany the marker that could support:

a) *Archives* - research documents / samples of uranium (either located on-site or information demarking off-site locations)
b.) *Maps* - maps of Waste Storage Facilities around the world, maps of other nuclear sites in the United States
c.) *Barriers of Entry* - walls / barricades
d.) *Signs / Placards* - written / illustrated images and text to communicate warning
e.) *Laboratories* - ongoing, unmanned control labs, for research or to measure air quality / contamination
f.) *Visitor Center or Cultural Center* - a space of cultural value preserved by locals and used for education

OBJECTIVES

1 To create a marker or marker system who's architecture is **durable** and who's message is **compelling** and **legible**.

2 To consider how language, culture, and meaning evolve

3 To consider **redundant** forms of communication and construction to ensure longevity.

4 To consider who or what might threaten the site and why.

5 To consider the distinct function of a marker as a means of **passive institutional control.**

6 To consider how the site itself may evolve over time due to political, social, and environmental forces.

7 To consider how the marker shall be "read" or interpreted by future generations from both **near** and **distant** proximity.

8 To assign **cultural value** to such a place, so that future generations may want to protect and preserve it.

Project submissions are not required to meet each of the above objectives, though meeting some or all objectives is strongly

Nazca Lines in Peru | Credit: Diego Delso, delso.photo, License CC-BY-SA

EXPERT JUDGEMENT

In November 1993, Sandia National Laboratories released a report titled *Expert Judgement on Markers to Deter Inadvertent Human Intrusion into the Waste Isolation Pilot Plant* for the United States Department of Energy. The report contains information presented by two teams representing the Markers Panel as well as recommendations made by the Futures Panel. The teams were comprised of experts from many disciplines including engineers, geologists, linguists, academics, and an architect.

The report documents each team's research, highlighting important design considerations. For instance, the report's authors agreed that the site should be truthfully marked rather than left unmarked or signified with deliberately misleading information. They also emphasized that there should be redundancy and complexity within each marker system element.

Proposals from both teams relied on architectural programming, built forms, and semiotic and linguistic signage to convey their message through marking. Some designs were highly experiential, communicating warning messages through menacing forms. 'Spike fields', 'forbidding blocks', and 'rubble landscapes' are some titles given to the ominous formations. Also, written and illustrated means of communication including pictographs, caution symbols, caricatures, and text written in multiple languages appeared on some marker elements.

It is recommended that participants familiarize themselves with the Sandia Report proposals listed in the Sandia Report's appendices F & G. A PDF of the report can be found at the link below.

http://prod.sandia.gov/techlib/access-control.cgi/1992/921382.pdf

The report on *Expert Judgement of Markers to Deter Inadvertent Human Intrusion into the Waste Isolation Pilot Plant* was released more than two decades ago. Since its publication, several documentaries and articles have discussed its proposals including Danish film-maker Michael Madsen's film *Into Eternity* and the 2015 documentary *Containment*.

In April 2017, ***arch out loud*** spoke with scientists Russ Patterson and Thomas Klein, committee members of the Nuclear Energy Agency (NEA) to hear their thoughts regarding the proposals in the Sandia Laboratories Report and about the future of designating the WIPP. Mr. Patterson and Klein's work in the NEA focuses in areas of Passive Institutional Control and Records, Knowledge, and Memory.

When asked to comment on how the two thought the WIPP site should be designated for future generations, they responded:

'We need to development a new plan. It should be multi-generational, socially equitable, as permanent as practicable (a few hundred to possibly 10,000 years), and informative. [Nuclear waste] could be a material that is useful to the future generations.'

'We should have something that carries on and has some meaning for people in the future, and that the locals will benefit from and maintain.'

'These monuments and the messages they contain should only be to inform the future and not to imply what future generations will need, want or deem good or bad.'

Mr. Patterson and Mr. Klein will join as part of the panel of jury for the NUCLEAR competition.

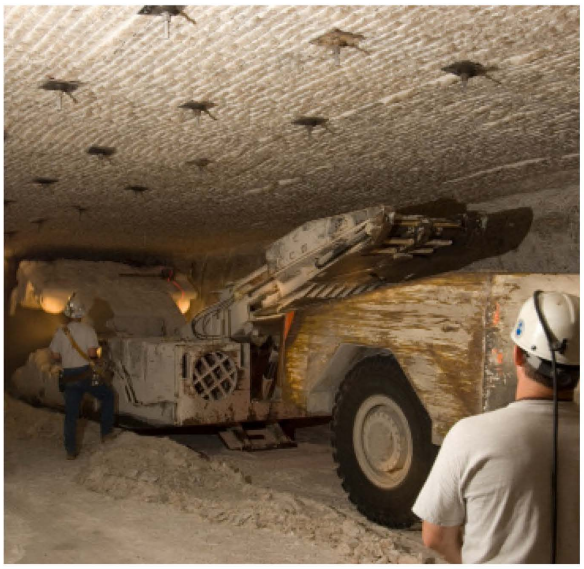
WASTE ISOLATION PILOT PLANT

The Waste Isolation Pilot Plant (WIPP) is located in the Chiuahuan Desert, 26 miles outside Carlsbad, New Mexico. It is managed by the U.S. Department of Energy and began disposing defense-related waste in 1999.

Waste disposed in the plant includes clothing, tools, equipment, soils, and other materials contaminated with radioactive elements heavier than uranium. Since the waste is potentially hazardous to humans and the environment, it is too dangerous to be stored above ground. The United States government mandated all defense related, high level waste be stored away and inaccessible.

In other facilities around the United States, waste is stored temporarily until it passes regulations and is then transported to WIPP. The majority of waste is stacked by personnel in columns of barrels in the underground rooms of the disposal site.

Crews repackage waste to be shipped to the Waste Isolation Pilot Plant.



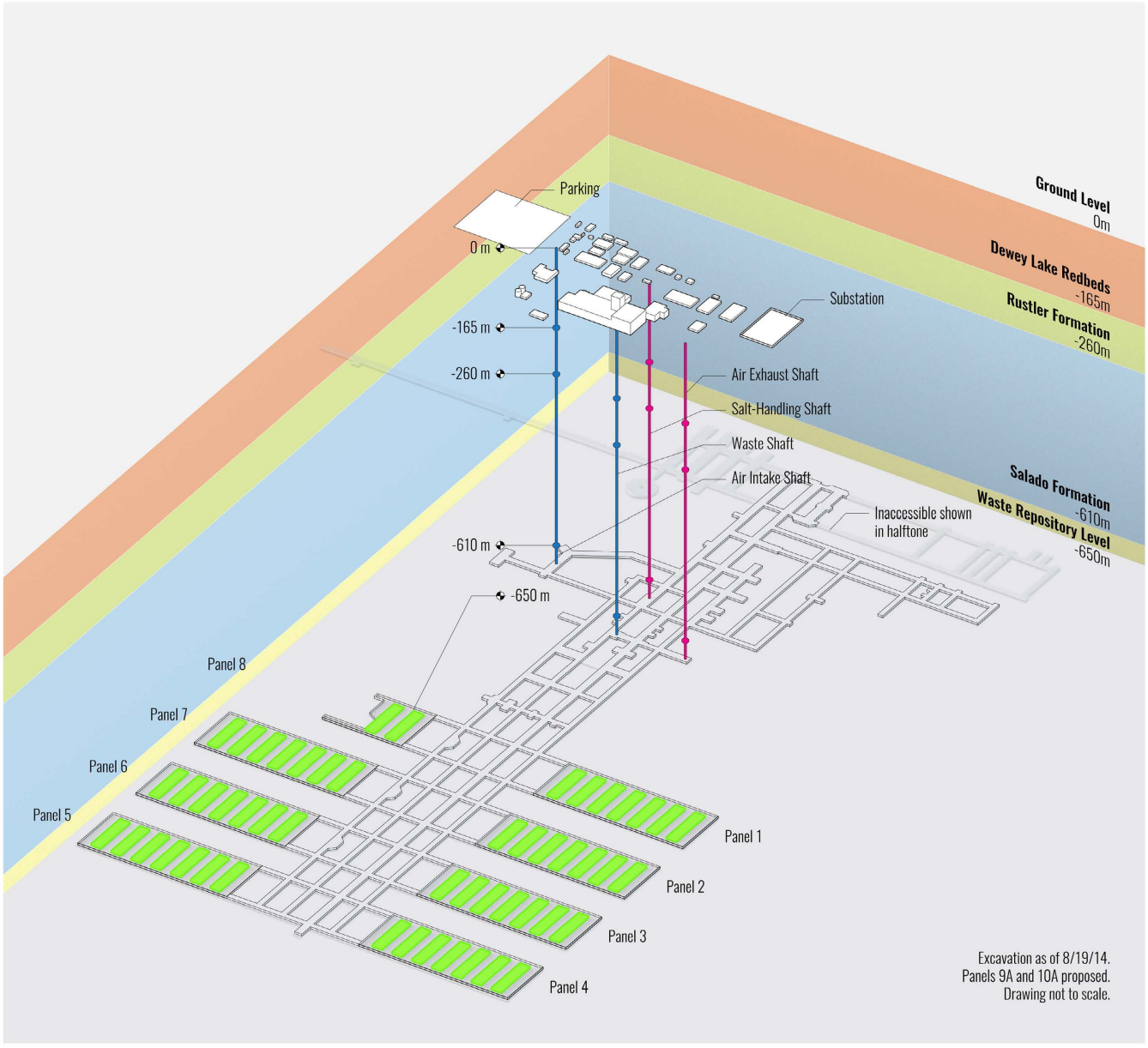
DOE Begins Mining Operations for Salt Disposal Investigations at WIPP

SITE

Until 250 Million years ago, the site was completely covered by sea water. It has since left behind a stable salt bed where transuranic nuclear waste can be safely and permanently stored. Over time, it is expected that the residual salt will gradually seep into the cracks of the rooms where barrels are stored and seal the chambers of waste permanently.

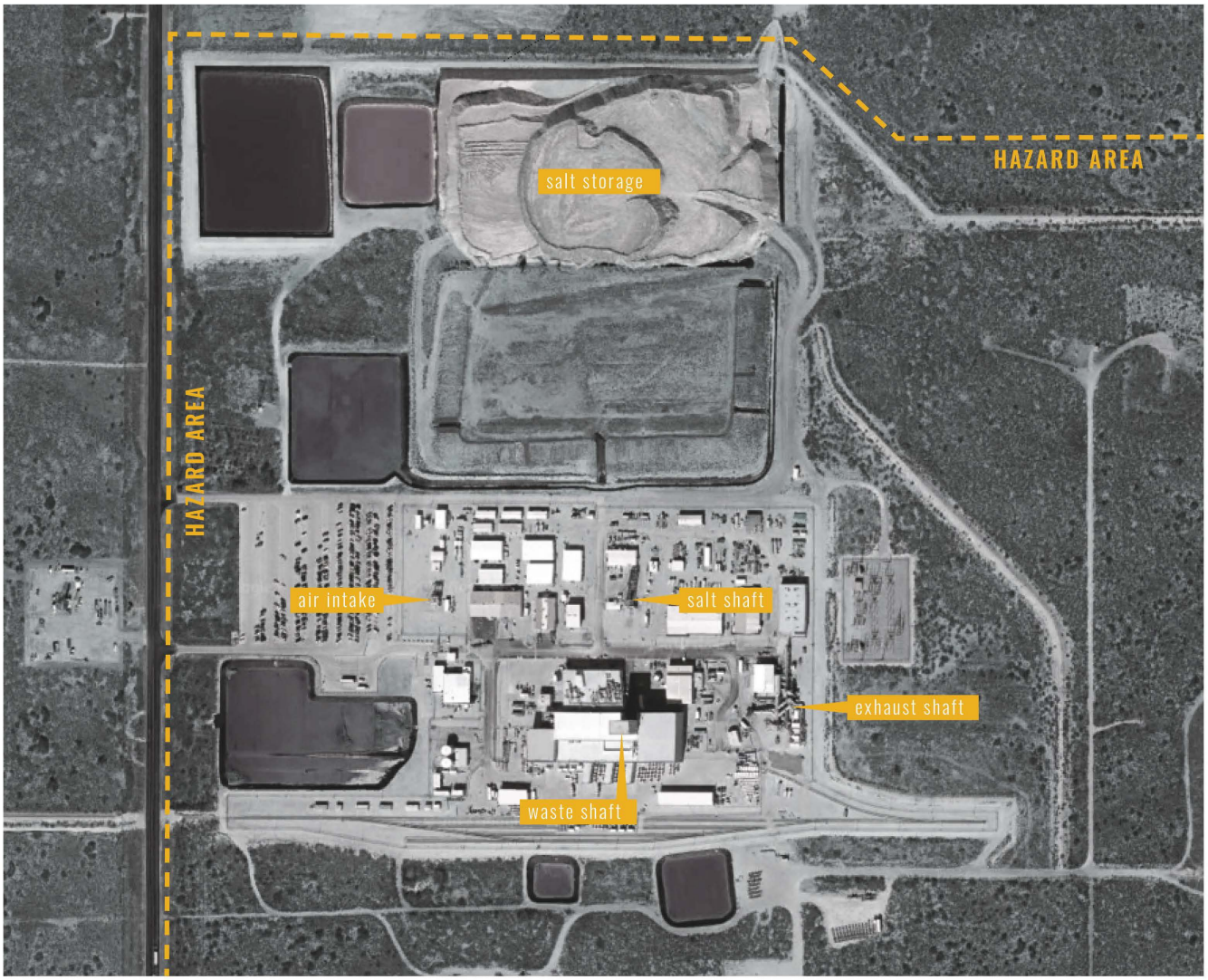
The extents of the site are dictated by the U.S. Environmental Protection Agency's Standards, which require a minimum boundary encircle the site separating the accessible area from the WIPP control area. In 1992, U.S. Congress designated **16 square miles** within the control area as part of the WIPP Land Withdrawal Act. This surface and all subsurface below has been dedicated for all disposal operations performed at the WIPP.

site info

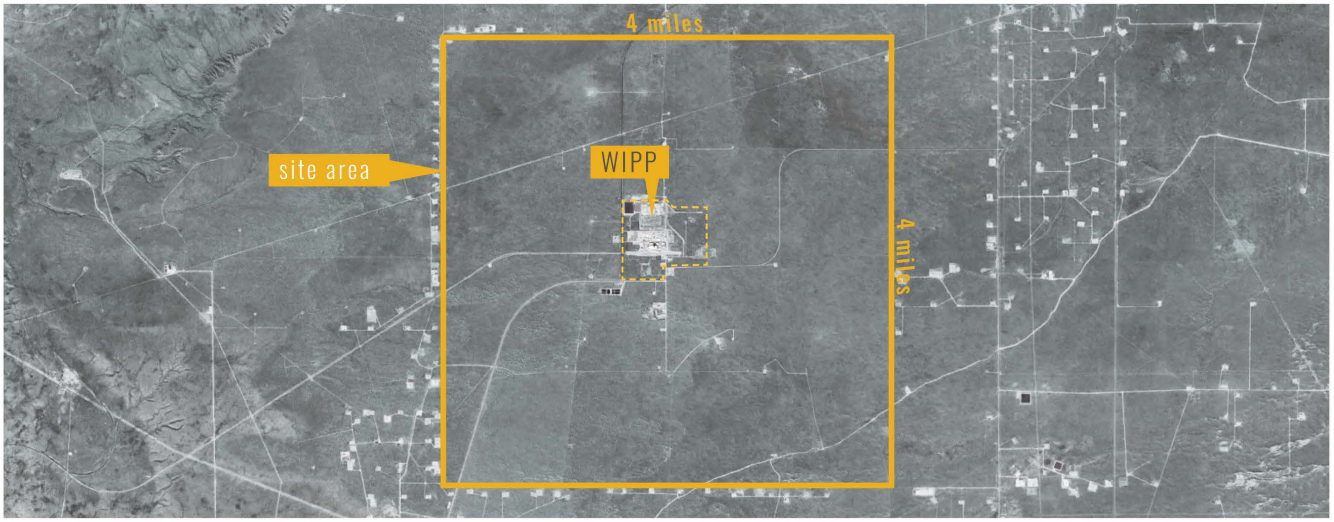


WIPP axonometric drawing

site info

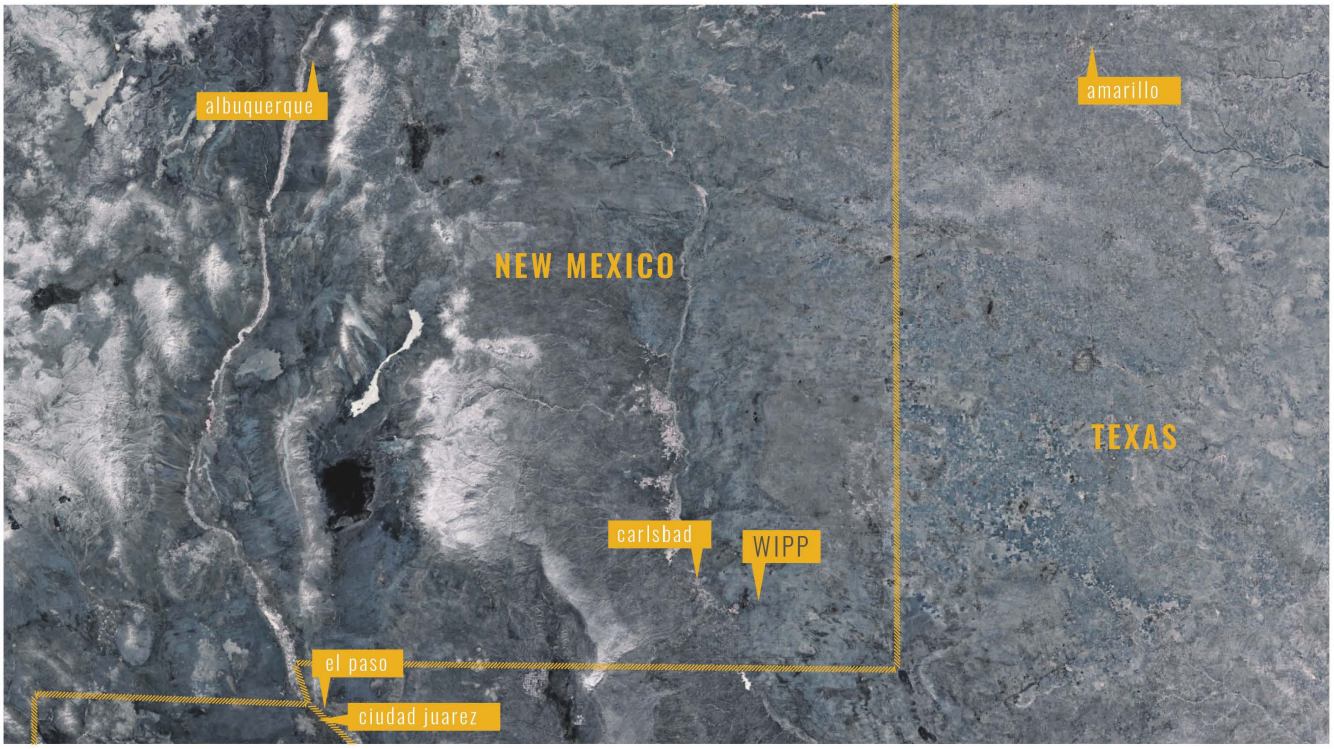


waste isolation pilot plant (WIPP)

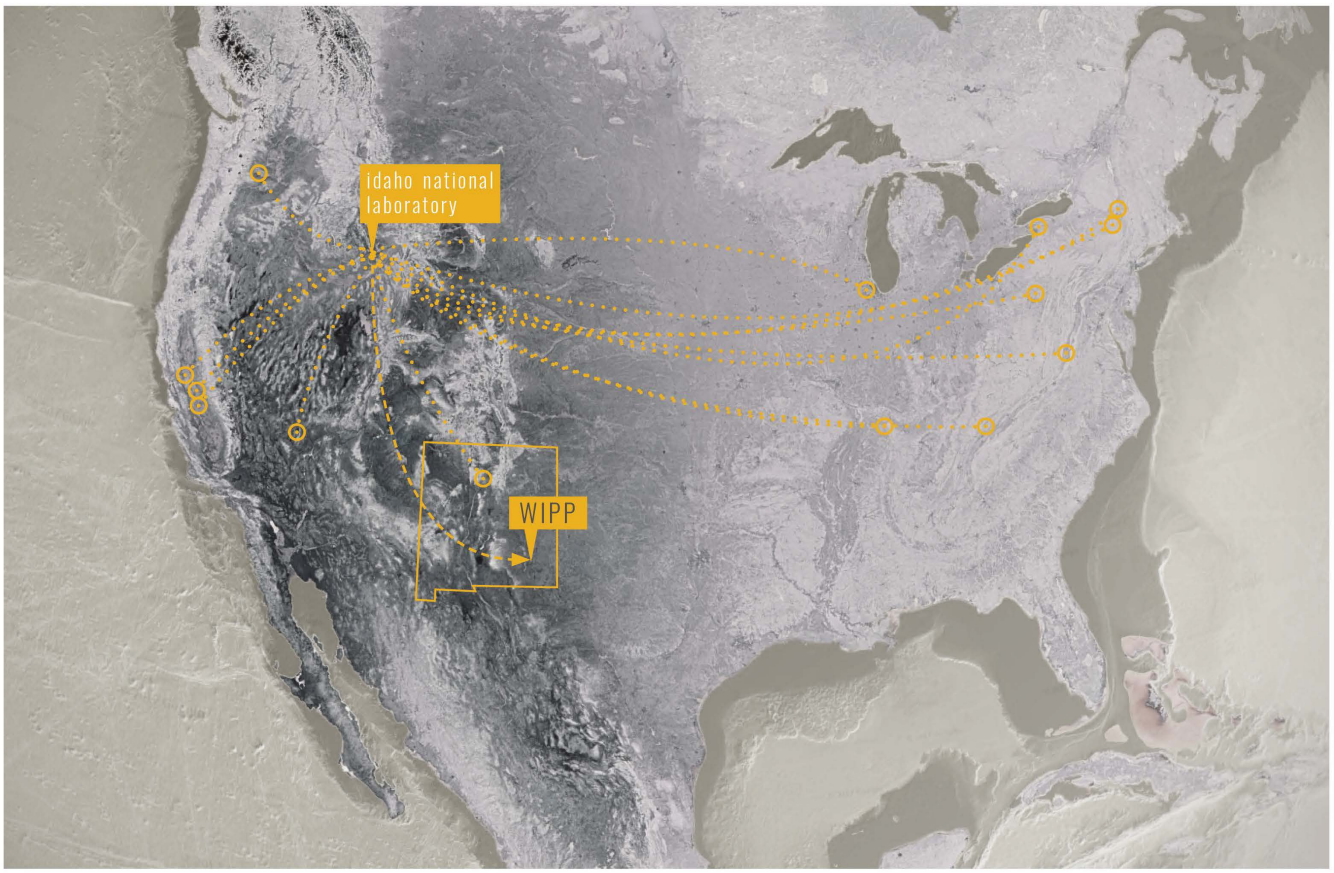


site border around the plant

site info



region around the plant



nuclear waste processing path

JURY

EVA FRANCH

STOREFRONT FOR ART AND ARCHITECTURE
EXECUTIVE DIRECTOR

00AA
FOUNDER

ELAINE MOLINAR

SNOHETTA
PARTNER, MANAGING DIRECTOR

THEODORE HOERR

TERRAIN WORK
FOUNDER, PRINCIPAL

RUSSELL PATTERSON

U.S. DEPARTMENT OF ENERGY
WIPP
COMPLIANCE MANAGER - SCIENTIST

THOMAS KLEIN

AECOM
WIPP
SENIOR SCIENTIST 5

+ MORE JURORS TO BE ANNOUNCED

EVALUATION CRITERIA

The jury will evaluate projects based on the participants' interpretation of the program and ability to meet the competition objectives.

arch out loud encourages creativity, innovation, and risk-taking. Winning projects should inspire with great ideas and compel with memorable visuals.

The jury reserves the right to add additional criteria that they deem critical to the topic and site. Additionally, the jury reserves the right to select projects that do not meet all of the brief's criteria as long as they justify their selection.

JUDGING PROCESS

All proposals will be considered in order to determine 50 submissions that will advance to the final round. Projects will advance based on the outlined competition objectives and evaluation criteria. The jury will select winners after review of each finalist's proposal. The jury's decision is final and sovereign in determining the overall winner, three runner-ups and 10 honorable mentions. The jury has the right to add additional honorable mentions as it feels necessary.

The Directors' Choice Award will be determined by the *arch out loud* competition organizers. The award will be given following the announcement of winners.

AWARDS

FIRST PLACE	**$5,000**
RUNNER-UP	**$1,000**
RUNNER-UP	**$1,000**
RUNNER-UP	**$1,000**

DIRECTORS CHOICE AWARD

HONORABLE MENTIONS

TOTAL PRIZE PACKAGE	**$8,000**

Depending on the country in which a team lives and pays taxes in some prizes may be subject to withholding in order to meet corresponding legal regulations.

GENERAL PUBLISHING

Winning projects will be published across international platforms including websites, blogs and magazines as available. Some of the projects from the competition will be featured at various times on arch out loud's social media. Following the competition, all winning projects will be published on the arch out loud website. Each project feature will list authors. Links to the author's personal website will be included upon request.

COMPETITION DETAILS

CALENDAR

June 7th, 2017	Competition opens and Advance registration begins
July 8th, 2017	Advance registration closes
July 9th, 2017	Early registration begins
Aug 12th, 2017	Early registration closes
Aug 13th, 2017	Regular registration begins
Oct 21st, 2017	Registration deadline
Oct 22nd, 2017	Submission deadline
Nov 20th, 2017	Winners announced

SUBMISSION MATERIALS

Each team is required to submit one (1) ARCH D size board (24in x 36in or 610mm x 914mm) oriented landscape or portrait. Teams must place their given order number in a corner of their board in Arial 18 pt font.

The content of the board is left open to each team to decide what best communicates its concepts and solutions to the jury. Designers will also be asked to include a 100-word max explanation of the project, for publishing purposes, in a text field on the submission page.

Possible board content may include - but is not limited to - plans, sections, elevations, rendered perspectives, diagrams and images of physical models.

www.archoutloud.com/-submit

PLEASE NOTE:
All text on submission boards MUST be in English. Text written in a different language will not be considered during judging. For publishing purposes winners will be asked to submit individual images within one week of the announcement.

PAYMENT

advance registration:	$55
early registration:	$75
regular registration:	$95

Payments for registering teams in the competition are made through the arch out loud web page portal. A team is not officially registered until they complete the payment process.

Credit or Debit Cards

The following major credit cards may be used and will be handled by Weebly checkout to ensure web security: VISA, MasterCard, American Express, & Discover. Please provide the cardholder's name and cardholder information exactly as shown on the card. arch out loud will not have access to any credit card or personal

REGISTRATION

Following registration **each team will receive a confirmation email with an order number located in the top right corner**. This number is the only means of identifying teams during jury selection. The number will be necessary for project submission. Once the registration process is complete there are no refunds of fees.

www.archoutloud.com/-register

RULES AND REGULATIONS

ELIGIBILITY

Teams may be formed by one (1) individual or up to four (4) members. Team members can come from different universities and countries. Additionally, interdisciplinary teams are allowed, although it is recommended that at least one member have an architectural background.

Under no circumstances will members of the jury, members of the organization, or persons with a direct personal or professional relationship with members of the jury be allowed to participate in this competition.

FAQ

During the competition participants are allowed to send, through email, questions to **arch out loud** in order to help them better understand certain aspects of the project or any unspecified details.

Questions will then be posted and answered on the competition FAQ webpage in order to ensure that all participants have access to the same information.

www.archoutloud.com/nuclear-faq

OWNERSHIP AND COPYRIGHT

All material submitted to the competition will become property of **arch out loud** and therefore give arch out loud all rights to publishing the material for promotion of the competition. Any materials that are published will be given appropriate attributes to authors. **arch out loud** maintains the right to modify any information in its files in order to better adapt it to any publishing platforms.

ADDITIONAL NOTES

arch out loud reserves the right to make any changes to this document. All modifications will be emailed to each registered team at the time of the change and posted on the **arch out loud** facebook page. It is the responsibility of the team to check provided email addresses and the **arch out loud** website.

There is currently existing infrastructure located on the competition site. It is assumed, for this competition, that the land would be acquired and participants have an empty site to design as they please.

This competition is an ideas competition and at the time of release will not result in any realization of an actual building. **arch out loud** does not own the area used for the competition site nor will the site be altered in any way as a result of this competition.

arch out loud is not responsible for any in-person research done on or around the competition site. Please abide by local private property laws.

arch out loud was not hired or contracted to organize this competition. Every aspect of this competition was fully developed by arch out loud.

Breaking of rules and regulations set in this competition brief or on the **arch out loud** website will result in the disqualification of the given team without any refund of registration fees.

www.archoutloud.com/terms-and-conditions