



U.S. DEPARTMENT OF
ENERGY

CARLSBAD FIELD OFFICE

STRATEGIC PLAN 2019-2024



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U.S. DEPARTMENT OF
ENERGY

CARLSBAD FIELD OFFICE

STRATEGIC PLAN
2019-2024

Approved by: _____
Kirk D. Lachman, Acting Manager
Carlsbad Field Office

Date

:

CHANGE HISTORY	
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ACTING CBFO MANAGER'S VISION

The Carlsbad Field Office (CBFO) mission is vital to America's security and prosperity as it supports the U. S. Department of Energy Office of Environmental Management's (DOE-EM's) clean-up mission, the National Nuclear Security Administration's national security mission, and the Office of Science mission. Characterization and shipment of defense-generated transuranic (TRU) waste by the National TRU Program (NTP) and the final disposal of the waste at the Waste Isolation Pilot Plant (WIPP) is critical to the environmental cleanup of Los Alamos National Laboratory, Idaho National Laboratory, Savannah River Site, Oak Ridge Site, Argonne National Laboratory, Sandia National Laboratories, the Hanford reservation, and other sites with defense TRU waste inventories. TRU waste removal is key to the ongoing national security missions of Los Alamos National Laboratory and Lawrence Livermore National Laboratory. Activities executed in the next five years by the NTP and at the WIPP will support those missions, and set the course for successful operation of the WIPP through 2050, the estimated duration needed to emplace the existing defense TRU waste inventory.

Our ability to support these critical missions over the next five years and beyond is contingent on repairing, refurbishing, and recapitalizing aged and failing infrastructure at the WIPP facility, as well as modernizing the WIPP facility. As we move into the next five years of operation, significant attention must be given to ensuring that sufficient funding is allocated for ongoing maintenance and infrastructure projects, including moving to a low-emission or zero-emission underground vehicle fleet. WIPP is extremely fortunate to have substantial support at all levels of government; from our local leaders in Carlsbad, to our State elected leaders, to our national elected leaders. WIPP is in the enviable position of having exceptionally strong community support. We are grateful for all of the support this unique, national asset known as WIPP receives.

In addition to ongoing maintenance and recapitalization of existing infrastructure, our focus over the next five years is the construction of a new underground ventilation system consisting of two capital asset projects: 1) the Safety Significant Confinement Ventilation System and 2) the Utility Shaft. The existing underground ventilation system is currently operating in filtration mode at a reduced flowrate, which cannot provide adequate air quality to support concurrent ground control, mining, and waste emplacement activities to dispose TRU waste at the rates expected through 2050. The completion of both capital asset projects will provide the underground ventilation required for simultaneous mining, ground control, and waste emplacement operations at the facility to achieve shipping and waste emplacement rates needed to support the cleanup of defense TRU waste while protecting the health and safety of the public and our workers, as well as the environment from a future radiological release event.

Current estimates indicate that Panel 7 in the WIPP underground will be filled with TRU waste and Panel 8 will be ready for waste emplacement in two to three years. The primary goal of this five-year plan is to maintain a high level of safety for the workers, public, and the environment, while we recapitalize the infrastructure and modernize the site moving WIPP towards the next 20-30 years of safely emplacing waste. To reach that goal within five years, the new underground ventilation system must be operational, the new low or zero-emission underground vehicles must be deployed, the pipeline of certified TRU waste must support a nominal 14 shipments per week, and State and U.S. Environmental Protection Agency approval for the development and use of additional panels for waste emplacement beyond Panel 8 are necessary. We will focus on these objectives until they are completed to establish a path for TRU waste disposal through 2050.

The CBFO needs to continue its focus on maintaining and strengthening its safety management programs. For example, ground control is key to maintaining safe working conditions, including the active disposal areas in the WIPP underground. Ground control has been restored to a maintenance level. The radiological controls program continues to support waste operations. The site continues to strive for continuous improvement in other areas such as engineering, maintenance, quality assurance, emergency management, and work planning and control. All of these activities support our mission to perform the safe, compliant, and efficient disposal of defense-generated TRU and TRU-mixed waste.

We are focusing on the improvement of our nuclear safety culture that learns from events, pro-actively identifies and resolves issues to prevent recurrence, and fosters behavior that encourages positive performance and feedback from its people to continuously improve performance. This strategic plan includes objectives to identify and make improvements in areas that drive us towards attaining a sustainable, high-performing, and mature nuclear safety culture.

My goal is to lead a robust and resilient WIPP. The improvement of our overall safety, performance, and cost as we move forward into the next 20-30 years of operations is key to this goal. We will define future needs and develop the necessary plans and designs for the repository, along with the associated regulatory strategies that will help ensure the future success of our TRU waste disposal mission. Along the way, we should consider all new ideas, new technologies, and new methods to improve ways to successfully accomplish that mission. Lastly, I am committed to proactively engaging with our stakeholders.



Kirk D. Lachman, Acting CBFO Manager



Department of Energy Secretary Rick Perry visits the WIPP

MISSION

Provide safe, compliant, and efficient characterization, transportation, and disposal of defense TRU waste.

VISION

Enable a nuclear future for our country by providing safe and environmentally-responsible waste management.

CORE VALUES

The Carlsbad Field Office embraces the DOE-EM C7 Core Values of Commitment, Character, Collaboration, Conduct, Communication, Competency, and Culture, and has identified the additional core value of Caring. We believe that Caring should be the first core value and represents our commitment to respect our staff as our most valuable asset.

INTRODUCTION AND BACKGROUND

The U.S. Department of Energy (DOE) created the Carlsbad Area Office in Carlsbad, New Mexico, in late 1993 to lead the Nation's transuranic (TRU) waste disposal efforts through the management of the National TRU Program (NTP) and the Waste Isolation Pilot Plant (WIPP). On March 26, 1999, the WIPP received its first shipment of TRU waste from the Los Alamos National Laboratory (LANL) to open the WIPP. In September 2000, the office was elevated in status to become the Carlsbad Field Office (CBFO). As such, the CBFO has continued its primary mission of managing the NTP to characterize, certify, and ship defense-generated TRU and TRU mixed waste (hereafter referred to as "TRU waste") to the WIPP, and operating the WIPP to permanently dispose of TRU waste in conformance with the WIPP Land Withdrawal Act (LWA) (Public Law 102-579, as amended by Public Law 104-201). The CBFO has taken on additional roles to support the DOE Offices of Environmental Management (EM) and Nuclear Energy (NE) by enabling the unique capabilities of the WIPP to be utilized to support basic scientific research in various areas of study.

In addition to a waste repository, WIPP has also been an underground science laboratory. Following the designation of the DOE's Carlsbad office as a field office in 2000, numerous universities and research institutions across the nation have taken advantage of WIPP's open door policy and unique underground geology. The following are some examples of some of the experiments conducted underground at WIPP:

- Double Beta Decay: Measuring the Mass of the Neutrino
- Dark Matter Research
- Biology @ WIPP: Life Begins at 250,000 Years
- Repository Science to conduct field-scale heater tests

The CBFO is organized into the following offices: Office of the Manager, Office of the Waste Isolation Pilot Plant (OWIPP), Office of the National TRU Program (ONTP), Office of Environmental Protection (OEP), Office of Business Operations (OBO), Office of Quality Assurance (OQA), and Office of Program Management (OPM).

The WIPP was originally designed to receive and dispose of TRU waste at a rate of 17 shipments per week, with an operational life of 25 years. During the first 15 years of operations, the WIPP demonstrated that it could exceed the design disposal rate. After the first waste receipt, shipping rates exceeded the designed shipping rate to a maximum of 36 shipments received in one week, and an average of about 25 shipments per week towards the end of that 15-year operational period.

With the resumption of waste shipments and emplacements, the WIPP facility has been operating at approximately 8-10 shipments per week (less than the designed 17-shipment per week capability), and is anticipated to continue to operate at this limited rate until about fiscal



Mobile waste loading at a generator



Waste en-route to the WIPP site for permanent disposal



A Radiological technician surveys a TRUPACT-II



The waste face, 2150 feet below the surface of the WIPP in the Chihuahua desert

year (FY) 2022, due to a shortfall of normal operational ventilation capability (425,000 cubic feet per minute [cfm] pre-2014 event conditions), which is a result of ventilation system flowrate reduction to filter the exhaust from the WIPP underground. The reduced ventilation flowrates not only limit waste disposal capability, but also limit mining capability. It is imperative to complete the mining of Panel 8 before Panel 7 is full in order to accommodate TRU waste disposal without interruption. These operational limitations exist because waste emplacement, mining, and ground control operations are executed predominantly through the use of diesel-powered equipment, which emits diesel byproducts such as sulfur dioxide, nitrogen dioxide, and carbon monoxide. In order to ensure that the air quality underground is safe for workers, the use of diesel-powered equipment must be limited, thereby limiting operations. A new WIPP underground ventilation system with a 540,000 cfm filtration capability is projected to be operable around FY 2022. This increased flowrate will allow the necessary diesel-powered equipment to operate simultaneously to conduct waste emplacement, mining, and ground control operations. During this period before the new underground ventilation system is operational, the CBFO and NWP are evaluating options to increase airflow in the diesel-powered equipment areas, as well as incorporate the use of battery-electric and low-emissions diesel-operated heavy equipment, which does not degrade the air quality underground or minimizes air quality degradation during operation.

The two accident events led to implementing significant corrective actions resulting in more robust WIPP operations. The term ‘new normal’ is a phrase used as a general description of the improvements to the program and changed conditions in the facility as a result of the events. Examples of program improvements are the changes to the WIPP Documented Safety Analysis (DSA) and enhanced TRU waste characterization certification methods. An example of changed conditions is that TRU waste disposal operations are being conducted in a radiologically-contaminated environment in Panel 7 until Panel 7 is full of TRU waste.

This strategic plan describes program enhancements as we learned from the 2014 WIPP events, but looks forward to recapitalizing the infrastructure; modernizing our facilities and ways of doing business; strategically using the regulatory process to receive approvals for the proposed upcoming projects, as required; the ten-year permit renewal; additional panels to facilitate TRU waste emplacement within LWA capacity limits; and streamline and improve TRU waste characterization/certification activities to fill the shipping pipeline by building quality into the process up-front instead of inspecting it at the end. The following sections of this plan describes these efforts in detail and shows CBFO objectives and goals alignment with the latest DOE Strategic Plan to successfully execute our mission.

ALIGNMENT WITH THE LATEST DOE STRATEGIC PLAN

The CBFO 2019-2024 Strategic Plan is aligned with the DOE Strategic Plan 2014-2018. Although the time frame for the DOE Strategic Plan has passed, the goals and objectives in that plan remain valid for the CBFO. The DOE Strategic Plan contains DOE Strategic Goal 3, Management and Performance, which states: “Position the Department of Energy to meet the challenges of the 21st century and the Nation’s Manhattan Project and Cold War legacy responsibility by employing effective management and refining operational and support capabilities to pursue departmental missions.” DOE Strategic Goal 3 presents three Strategic Objectives, which are summarized below. Each of these Strategic Objectives directly applies to CBFO Strategic Goals and Objectives, which are presented later in this plan, implementing the alignment of CBFO Strategic Goals and Objectives with the latest version of the DOE Strategic Plan. It is anticipated that the DOE Strategic Plan will be updated within the next few years. When that occurs, the CBFO Strategic Plan will be revised to align to the updated version of the DOE Strategic Plan, if necessary.

ALIGNMENT WITH DOE STRATEGIC OBJECTIVE 8

DOE Strategic Objective 8: “Continue cleanup of radioactive and chemical waste resulting from the Manhattan Project and Cold War activities.”

CBFO Alignment: The CBFO’s focus is to provide safe, compliant, and efficient characterization/certification, transportation, and permanent disposal of up to 175,600 cubic meters of TRU waste from the TRU waste generator sites to reduce risk to the public and the environment. To achieve the goal of disposing of TRU waste, the coordination of the operations of various DOE TRU waste generator and storage sites, CBFO, DOE-HQ, and WIPP contractors is integrated by the National TRU Program (NTP). The CBFO ONTP implements a comprehensive approach to TRU waste characterization/certification and transportation, and the CBFO OWIPP implements oversight of the WIPP Management and Operating (M&O) contractor who manages and operates the WIPP disposal facility.



A TRUPACT-III leaves the Savannah River Site with waste destined for the WIPP

TRU WASTE CHARACTERIZATION/CERTIFICATION AND TRANSPORTATION

TRU waste characterization/certification is performed by contractor programs that are certified by the CBFO Manager upon recommendations from the ONTP and the CBFO OQA. TRU waste characterization involves the evaluation of the contents of the TRU waste and determining its physical, chemical, and radiological properties to categorize the type of waste. TRU waste certification evaluates the information provided by TRU waste characterization and inspects the contents to ensure the waste meets the WIPP Waste Acceptance Criteria (WAC) prior to shipment to the WIPP. TRU waste transportation involves the packaging and shipment of the waste to the WIPP. The ONTP interfaces and coordinates with the TRU waste generator sites and provides oversight of all of these processes to ensure they are safe, compliant, and efficient.

TRU WASTE DISPOSAL

The CBFO OWIPP is responsible for oversight of TRU waste disposal at the WIPP. The WIPP M&O contractor directly operates and manages the WIPP for TRU waste disposal under a contract, and the OWIPP provides oversight of the M&O contractor to ensure WIPP operations are safe, compliant, and efficient.

WIPP operations involve the following:

- 24-hour/7-days per week (24/7) coverage by facility operations personnel to ensure that electrical, pneumatic, ventilation, water, and other utilities are provided for performing WIPP activities.
- 24/7 coverage by protective force personnel to provide physical security to the WIPP.
- 24/7 coverage by emergency management personnel to provide emergency response in the event of accidents and off-normal events.
- Waste operations associated with the unloading and handling of TRU waste on the surface portion of the WIPP, including the WHB, and the emplacement of TRU waste in the WIPP underground repository for permanent disposal.
- Underground operations to ensure that mining, hoisting, ventilation, and ground control are conducted to secure space in the repository for TRU waste disposal while maintaining safe underground conditions for the workers.
- A number of other support functions include nuclear safety, radiation protection, industrial safety, quality assurance, engineering, maintenance, environmental protection, emergency management, project/program management, and business functions necessary for the operation of the WIPP.



Waste containers are loaded into a TRUPACT-II shipping package



Waste is offloaded at the Waste Hoist

Extensive inspections, surveys, and evaluations have been conducted of WIPP facility equipment and processes to ensure the WIPP's ability to fulfill its long-term mission. Two capital asset projects involving the redesign of the underground and surface ventilation systems have been approved. Construction of these systems is currently underway. Extensive maintenance work on, or replacement of, surface and underground facilities, process systems, and equipment must be performed in order to continue to safely operate and dispose of TRU waste throughout the expected WIPP lifecycle.

As a result of reduced ground control due to limited airflow underground, the decision was made to withdraw from areas in the south end of the disposal area. This has resulted in the loss of the equivalent Panel 9 area as a waste emplacement area. Waste emplacement is currently occurring in Panel 7 and is planned for Panel 8.

The WIPP facility is the only repository for defense-related TRU waste, and is critical to the cleanup of the Nation's Manhattan Project and Cold War legacy wastes. The CBFO will measure performance against the Strategic Plan objectives to ensure that the WIPP continues to safely operate and meet the DOE goals established for TRU waste characterization/certification, transportation, and disposal.

ALIGNMENT WITH STRATEGIC OBJECTIVE 10

DOE Strategic Objective 10: “Effectively manage projects, financial assistance agreements, contracts, and contractor performance.”



The Environmental Protection Agency tours the WIPP repository

CBFO Alignment: With the large amount of operations, maintenance, and project work that must be accomplished on schedule and within budget over the next five years, CBFO oversight of contractor performance is critical. CBFO project and program management documents are in the process of being developed, reviewed, and/or revised for managing capital asset projects, general plant projects (GPP), and maintenance and repair projects, as well as on-going operations activities. Close attention will be paid to earned value management, the contractor’s measurement of work activities, and the planning and implementation of maintenance activities versus GPP to ensure there is correct categorization for budgeting, accounting, and project/program management purposes. Monthly program and project reviews of contractor work performance will be evaluated in detail and assessed to ensure variances are appropriate and explained, and issues are being identified and resolved on a timely basis.

The WIPP M&O contractor monthly performance reviews are held to give the contractor the opportunities to highlight continuous positive performance and address areas for improvement. At the end of each fiscal year, the CBFO provides an overall subjective performance evaluation and a summary of objective performance incentives that were achieved by the contractor during the fiscal year period, resulting in a total award of fee as incentive to accomplish contractual objectives.

In July 2017, DOE-EM issued the EM Cleanup Policy to deliver the EM Cleanup Program (projects, programs, and operational activities) at the authorized scope, cost, and schedule, with a priority on maintaining safety, security, environmental, and health expectations. The CBFO has implemented that policy in its management of DOE-funded contracts, projects, and programs.

This Strategic Plan provides CBFO strategic objectives for monitoring and communicating contractor performance to ensure DOE expectations are met in this area. These CBFO strategic objectives will align with the DOE’s overall objective of delivering every project and operational activity at the original performance baseline, on schedule, within budget, and fully capable of meeting the mission performance.

ALIGNMENT WITH STRATEGIC OBJECTIVE 11

DOE Strategic Objective 11: “Operate the DOE enterprise safely, securely, and efficiently.”

CBFO Alignment: The WIPP facility operations and processes will continue to operate within the guidelines of the Integrated Safety Management System and the Environmental Management System to ensure safe and compliant operations. As a result of corrective actions, the WIPP Documented Safety Analysis (DSA) (Nuclear Safety Basis) was re-evaluated and revised to strengthen controls and safety management programs. In addition, a new safety management program was added to ensure WIPP WAC compliance. The new program requires multiple acceptable knowledge (AK) enhancements, such as:

- Chemical Compatibility Evaluations (CCEs) to ensure that waste contents are compatible and will not result in unacceptable consequences.
- Comparison of TRU waste streams to a Basis of Knowledge (BoK) for Oxidizing Chemicals in TRU Waste. The BoK bounds mixtures of oxidizing chemicals and other materials (e.g., absorbents) found in the TRU waste through laboratory tests.
- AK Assessments (AKA) of TRU waste populations for previously certified waste to ensure that all new program requirements are met.
- The development of the Integrated Waste Management Documents List (IWMDL) for verification that current and adequate TRU waste generator site program documents and procedures are being used for transportation to and disposal at the WIPP and to ensure changes are appropriately communicated.

These enhancements provide additional assurance that the TRU waste shipped to and disposed of at the WIPP will meet the WIPP WAC requirements.

In addition to ensuring that TRU waste offered for disposal at the WIPP is safe, the CBFO and NWP are focused on implementing measures to ensure safe air quality for the underground workers during this time when the underground ventilation flowrate is limited due to the ventilation working in filtration mode. Deploying local ventilation fans, monitoring the air frequently for gases from diesel exhaust emissions, such as Nitrogen Dioxide (NO₂), and applying controls to keep workers safe, as well as procuring and implementing battery-electric equipment and low-emissions diesel-operated equipment to replace the current diesel-operated equipment, are all measures being utilized until the new underground ventilation system is operational, which is projected to occur in about FY 2022. The WIPP received the first battery-electric vehicle in late August of 2019. After the new underground ventilation system is operating, the use of battery-electric equipment and low-emissions diesel-operated equipment will continue to be used. In addition, the fleet size of battery-electric and low emissions diesel-operated equipment will be increased to improve air quality and modernize mining and ground control capability over time.

CBFO GOAL (1)

1. RECAPITALIZATION AND MODERNIZATION OF WIPP MAJOR SAFETY SIGNIFICANT AND CRITICAL INFRASTRUCTURE SYSTEM

OBJECTIVES

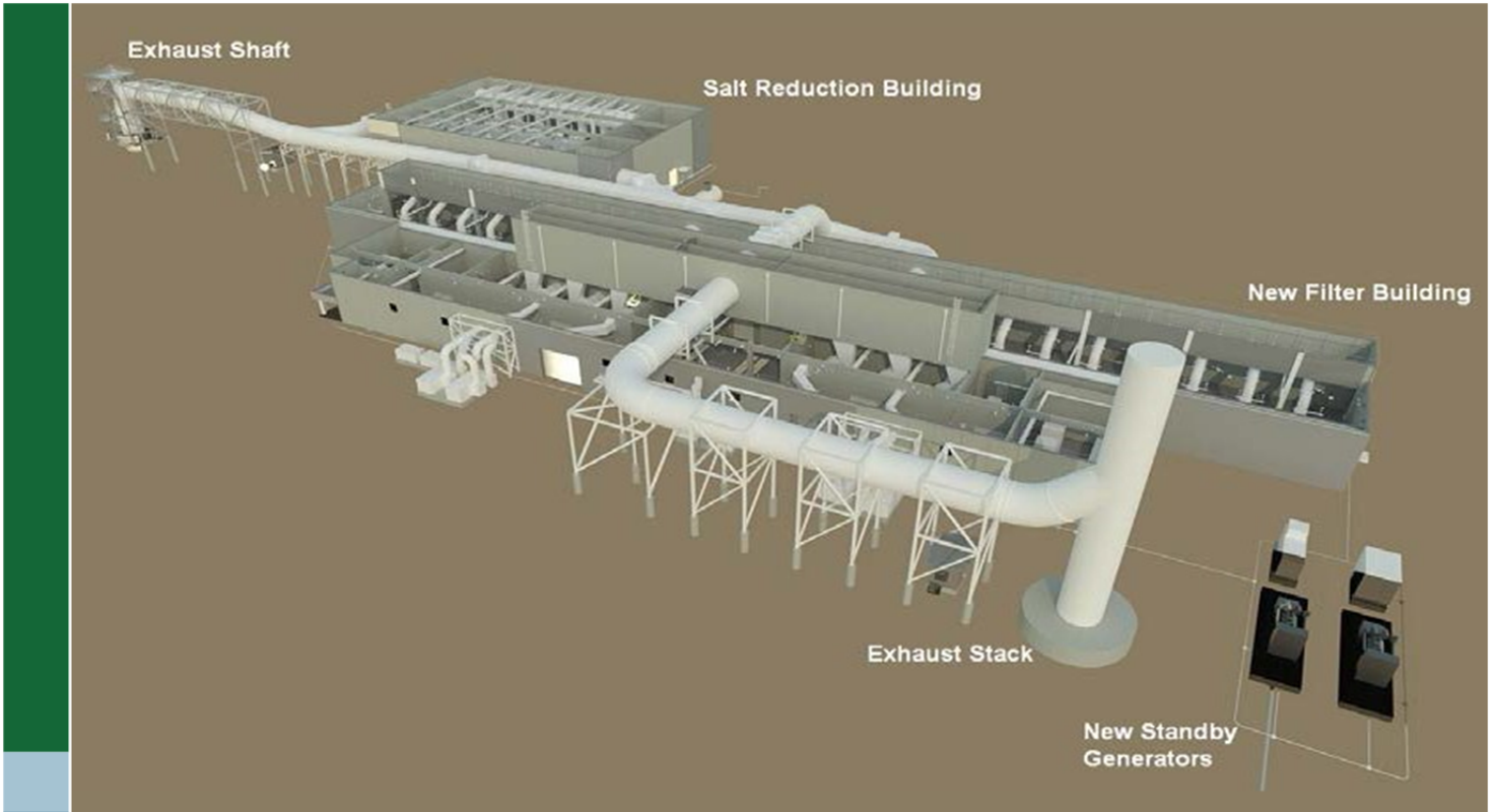
The recapitalization and modernization of WIPP critical infrastructure will include the completion of construction of a new underground ventilation system, comprised of two capital asset projects entitled the “Safety Significant Confinement Ventilation System (SSCVS)” and the “Utility Shaft.” The new SSCVS for the WIPP underground repository will provide the entire surface and subsurface equipment and infrastructure for the continuous filtration of exhaust from the underground ventilation system as necessary. The system is designed to provide 540,000 cfm, and includes a salt reduction system (designed to be upstream of the HEPA filters). The SSCVS building that will contain the HEPA filters and fans is called the New Filter Building.

The new underground ventilation system, with additional fans and filter banks, will provide ventilation flow rates at levels greater than previous system capability. The new Utility Shaft project will consist of a new 2,150-foot vertical ventilation shaft connected to the existing WIPP repository by two new horizontal drifts.

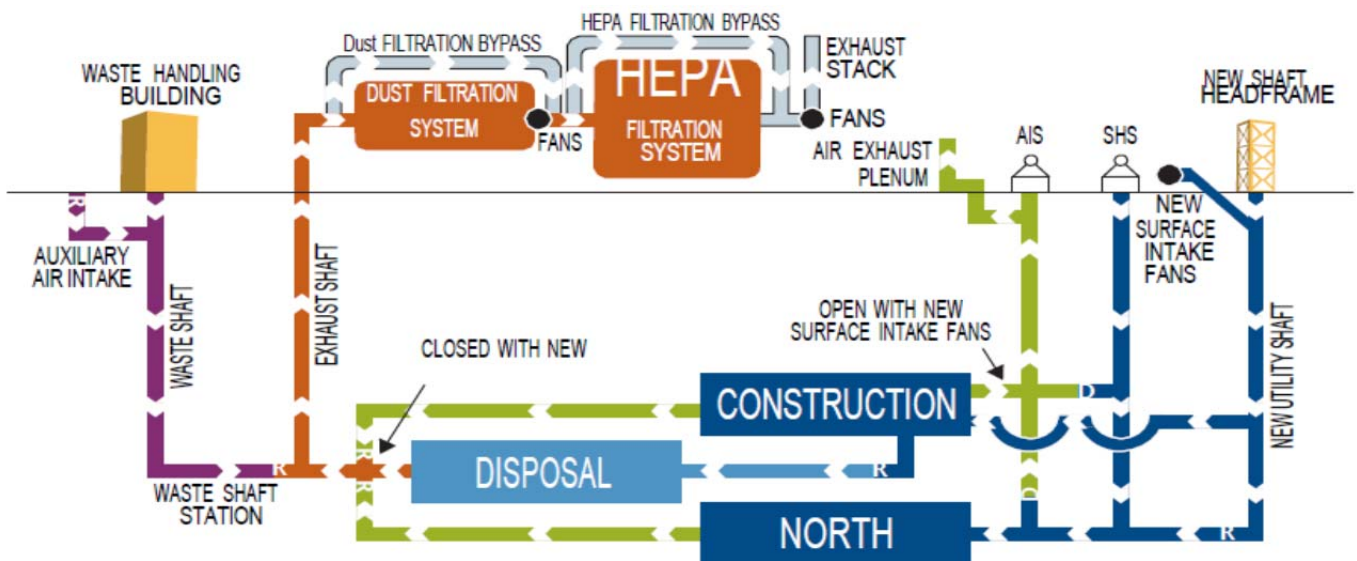
Plans to include construction of a complete hoisting system within the new shaft are being considered at this time; however, decisions to proceed with these plans have yet to be made. This would allow for installation of a large conveyance for personnel and materials to enter the construction side of the facility. This would also reduce reliance on the original Waste Hoist when people and large equipment need to be transported to or from the underground. The conveyance could be equipped as a salt skip, which could potentially allow nearly continuous capability for removal of salt from the underground during mining operations. A complete hoisting system would also provide for an additional escape path for underground personnel.

The two capital asset projects are currently in the construction phase and are planned to be completed in about FY2022. Upon completion, the SSCVS and Utility Shaft will:

1. Provide sufficient ventilation for concurrent mining, maintenance, and waste emplacement operations at design capacity.
2. Provide sufficient ventilation to meet industrial hygiene standards with mining equipment in operation.
3. Provide a ventilation system that can maintain continuous operations, while allowing maintenance and filter medium replacement.
4. Provide for an unfiltered exhaust path for underground mining.
5. Provide operational flexibility.



A rendering of the Safety Significant Confinement Ventilation System



- ▶ Fresh air intake
- ▶ waste shaft intake
- ▶ disposal intake
- ▶ disposal exhaust
- ▶ construction and north exhaust



Examples of the aging infrastructure

WIPP INFRASTRUCTURE REPAIR, RECAPITALIZATION AND MODERNIZATION

A Condition Assessment Survey was performed at the WIPP by an independent service in May 2016. The Survey identified that WIPP structures, facilities, and properties have exceeded their design life. WIPP maintains a process of periodic inspections, system health walk-downs, and planned maintenance activities to ensure continued continuity of operations.

The CBFO clearly recognizes that a major investment in facility maintenance and infrastructure repair recapitalization and modernization is going to be required to prevent costly failures and to continue to safely perform mission requirements. CBFO and the WIPP M&O contractor have reviewed and prioritized currently-known infrastructure projects that are needed to return the WIPP to normal waste emplacement capability; to ensure mining of repository space is complete in time to ensure waste emplacement is sustained; and to sustain normal mining and waste emplacement operations through WIPP’s anticipated lifecycle through FY 2050.

Some high priority critical infrastructure repairs and replacements targeted for completion by 2024 include, but are not limited to:

FIRE WATER LOOP PHASE 1 & 2 (LOOP, PUMPS & TANKS) (INCLUDES ORIGINAL PARTS 1 & 2 SCOPE)

The fire water supply system receives its water from one on-site 180,000-gallon ground-level storage tank, which is part of the water distribution system. The yard compound-loop distribution system serves all areas of the site by supplying fire water to all facilities with sprinkler systems, and to the fire hydrants located at approximately 300-foot intervals throughout the site. The system contains numerous sectionalizing and control valves, which are locked open and visually checked monthly. The system is degraded but remains operable. Failure to address the needed upgrade of the fire water loop could result in waste handling interruptions and significant operational impacts.

The scope of the planned upgrade includes the procurement of design and installation services to upgrade the critical water supply structures and portions of the loop.

PLANT COMPRESSED AIR SYSTEM (BLDG 485)

Compressed air is utilized on the surface and in the underground for operations such as opening and closing airlock doors, and is a critical support system to WIPP operations. The existing compressors are old enough now that spare parts are no longer available for the equipment. The current compressor capacity will not support panel mining. The south compressor building’s air compressors have been declared out of commission, eliminating the availability of redundant systems.

The planned upgrades include design, fabrication, and installation of new compressors, piping, and other components, and the addition of test plant air systems and components as a turnkey system. The new system will distribute plant air to additional parts of the WIPP site. This infrastructure improvement is near completion.

ELECTRICAL SUBSTATION REPLACEMENTS

Many of the electrical substations have outlived their design life. The planned upgrade will include the design, procurement, and installation of replacements for seven obsolete and aging substations.

LIGHTNING ARRAY DESIGN UPGRADE AND NEW CONSTRUCTION

The Lightning Array System at the WIPP was evaluated and it was determined that the system needed to be upgraded. The upgrade for the lightning array system is currently in progress.

SAFETY SIGNIFICANT FIRE SUPPRESSION SYSTEM (WASTE HANDLING BUILDING 411 FIRE SYSTEM)

The Safety Significant Fire Suppression System in the WHB is mandated by the WIPP Technical Safety Requirements to protect workers and waste. Currently, the system is planned to be upgraded. The scope of the pending upgrade includes addressing the deficiencies noted by the DOE Operational Readiness Review team.

FIRE WATER LOOP PHASE 3 & 4 (ALARMS, SPURS TO FACILITIES)

The Fire Water Loop Phase 2 System is beyond its design life and is planned to be upgraded. Plans for the upgrade include the procurement of subcontractor services to design, fabricate, install, and test the alarms and spurs to the facilities for installment in this phase.

SALT HOIST REFURBISHMENTS

The Salt Hoist is the only means of hoisting mined salt and, depending on the ventilation mode, serves as both a secondary source of intake air to the underground as well as an unfiltered exhaust pathway for uncontaminated air. The conveyance is also used to transport small equipment and personnel to the underground, and provides an additional route for power, control, and communications cables from the surface to the underground. The shaft is over 30 years old, and there is observed evidence of corrosion on the shaft buntons and shaft liner. All buntons and guides, as well as the steel liner and loading pocket in the underground, are in need of replacement.



The Salt Hoist head-frame

CENTRAL MONITORING SYSTEM

The systems currently available in the Central Monitoring Room (CMR) have been determined to be insufficient for providing adequate real-time monitoring of all plant systems and alarms. The scope of the proposed modernizations will include services to design, fabricate, install, and test several of the CMR components that are at the end of their service life or are no longer supported by the manufacturers. Several of the new systems that were installed as part of the WIPP recovery will need to be reconfigured in a manner that provides for better organization of the CMR. The modernizations are expected to improve response times.

INFORMATION TECHNOLOGY BACKBONE AND INFRASTRUCTURE MODERNIZATION

The Information Technology (IT) backbone (network fiber) infrastructure currently used in the WIPP underground was installed approximately 20 years ago. Although this was the best available technology at the time, the existing system will only support data at speeds of up to 1 Gbit/s and it has a maximum length of 2,000 feet. The proposed upgrade to replace the existing system includes the design and installation of a new IT backbone that will meet all of the new cyber security requirements and add teleconference capability for the WIPP site.

Use of modern technology for fiber optic cabling will support speeds 100 times faster than the existing cabling. In addition, the newer technology allows for channelizing of traffic. This channelizing or segregation of different types of data will greatly enhance cyber security. This newer technology will also allow for centralization of network device management.

Using the current configuration as an example, centralized management will decrease the number of network nodes from 90 to 2. With fewer devices to manage, the likelihood of errors decreases, which improves the cyber security posture of the facility. The proposed infrastructure modernization also includes redundancy of the network at the site. If the site network infrastructure is not updated to newer technology, client disconnects and disruption of network traffic will become much more frequent.

SALT HOIST AND WASTE HOIST UPGRADE CONTROLLER MODERNIZATION

Long-term recapitalization and modernization of the Salt Hoist controllers and Waste Hoist controllers are critical to the WIPP's mission. Both are extremely old structures that still function well. The Salt Hoist is the only structure designed for the purpose of removing mined salt from the underground, which will be key to mining additional waste panels underground. The Waste Hoist design provides a load capacity capable of downloading TRU waste and equipment into the underground. If the Waste Hoist becomes inoperable, the overall occupancy of the underground is limited to ensure safe emergency egress. The scope of planned modernizations to this equipment includes design, installation, and testing services to upgrade the Salt Hoist controllers and Waste Hoist controllers in order to improve both daily reliability and long-term viability of the systems.

PUBLIC ADDRESS (PA) SYSTEM

The WIPP facility PA system is currently outdated and operating under compensatory measures to address dead zones. The infrastructure plan includes replacing the degraded system while modernizing its capabilities and expanding the coverage area.

SALT SHAFT LOADING POCKET REFURBISHMENT

The Salt Shaft Loading Pocket is necessary for removing mined salt from the underground. Over the years, the loading pocket has degraded to the point that the hoist guides are not aligned properly. Further degradation of the loading pocket system runs the risk of stopping salt haulage and removal from the underground, which would impact Panel 8 mining and could eventually impact waste emplacement; recapitalization of this equipment is critical.

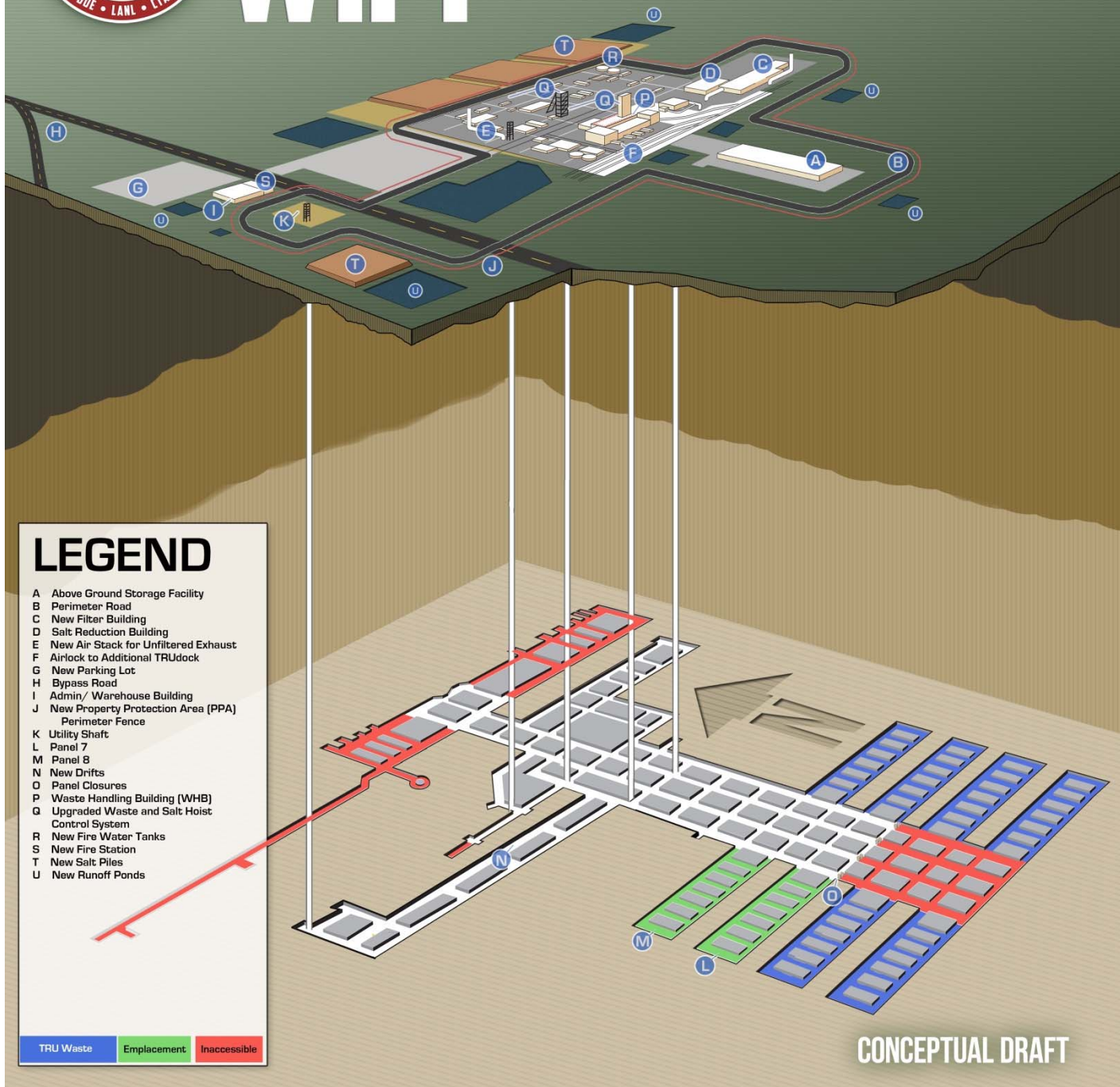
WIPP IN THE FUTURE

The illustration on the following page is a conceptual drawing of what the WIPP might look like after these much needed recapitalization and modernization projects are complete, as well as other potential improvements.

CONCEPTUAL DRAFT



THE FUTURE OF WIPP

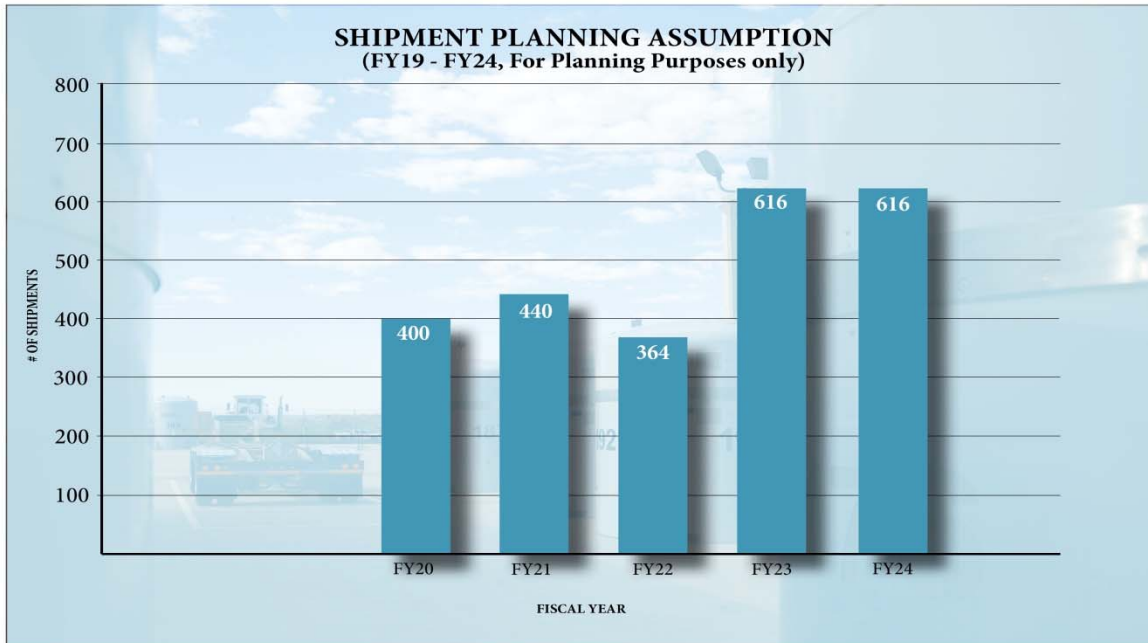


CONCEPTUAL DRAFT

LEGEND

- A Above Ground Storage Facility
- B Perimeter Road
- C New Filter Building
- D Salt Reduction Building
- E New Air Stack for Unfiltered Exhaust
- F Airlock to Additional TRUdock
- G New Parking Lot
- H Bypass Road
- I Admin/ Warehouse Building
- J New Property Protection Area (PPA) Perimeter Fence
- K Utility Shaft
- L Panel 7
- M Panel 8
- N New Drifts
- O Panel Closures
- P Waste Handling Building (WHB)
- Q Upgraded Waste and Salt Hoist Control System
- R New Fire Water Tanks
- S New Fire Station
- T New Salt Piles
- U New Runoff Ponds

TRU Waste Emplacement Inaccessible



CBFO GOAL (2)

2. RAMP UP SHIPMENTS SUSTAINABLY TO NORMAL OPERATIONAL EMPLACEMENT CAPABILITY

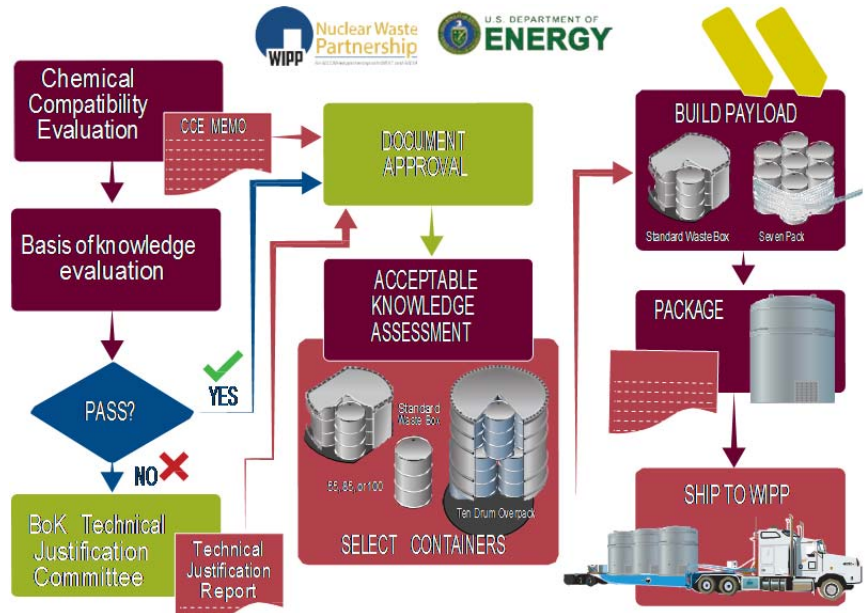
OBJECTIVES

Ramping up TRU waste shipments to normal and sustainable levels will be coordinated by the CBFO based on contributing factors (e.g., adequate ventilation, available shipping weeks, hoist controller upgrade/maintenance outages, staffing resources, ground control activities, radiological controls, and emplacement rates).

The NTP will manage a rigorous safety-based shipping process that will align shipping rates from generator sites with emplacement rates at the WIPP facility. Shipments are from generator sites, primarily from the backlog of previously-certified TRU waste (i.e., waste certified prior to June 2016 that has met all of the requirements under Chapter 18 of the WIPP DSA). Most of these shipments originate from the four main sites: Idaho National Laboratory (INL), Savannah River Site (SRS), Oak Ridge National Laboratory (ORNL), and LANL, and are limited to contact-handled (CH) waste. The shipping schedule also includes certain classes of TRU waste that originated at LANL, but are currently being stored at Waste Control Specialists (WCS) near Andrews, Texas. All Type I and the majority of Type II waste stored at WCS has been safely transported to the WIPP. LANL is working with the CBFO and Texas State regulators to develop and implement acceptable plans for dispositioning the remaining TRU waste inventory stored at WCS.

When the WIPP resumed shipping operations in April 2017, there were approximately 25,000 containers of TRU waste stored at generator sites across the DOE complex. All of this waste had been characterized, packaged, and certified under approved programs prior to issuance of the new WIPP WAC in June 2016. The evaluations of the contents of these “previously-certified” waste containers must be completed, reviewed, and approved by the CBFO before these containers can be shipped. This population of previously-certified waste will be the primary source of shipments to the WIPP over the next several years, with approximately half of the shipments coming from INL, and most of the remaining shipments coming from SRS, ORNL, and LANL. A small number of shipments will also come from Argonne National Laboratory, Lawrence Livermore National Laboratory, and Sandia National Laboratories, as well as other small quantity site generators, as defense-generated TRU waste is identified.

The diagram at right shows a simplified version of the review and approval process followed by the CBFO-certified waste certification programs, which are managed by the WIPP M&O contractor's Central Characterization Program (CCP) at all of the TRU waste sites and the contractor at the Advanced Mixed Waste Treatment Project, before a shipment to the WIPP can be made. CCEs, BoK reviews for oxidizing chemicals, and AKAs for previously certified waste must be completed, and all approval documents must be signed before payloads can be built and the waste can be entered into the Waste Data System and scheduled for transport.

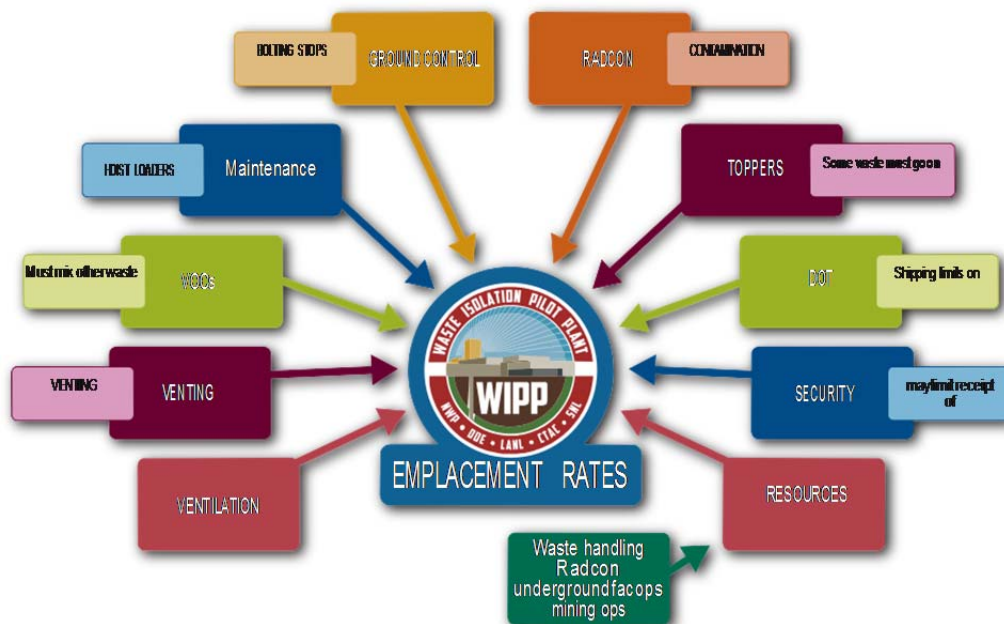


Although disposal of remote-handled (RH) waste using canisters emplaced in boreholes in the mine is not addressed in the current WIPP DSA, and is not authorized at this time, the use of shielded containers for shipment and disposal of RH waste is authorized. Shielded containers do not require RH equipment and are handled and disposed of in the same way as CH waste containers. Evaluations of the RH waste inventories and the existing RH emplacement processes revealed that emplacing RH waste using shielded container assemblies (SCAs) are much more efficient and safe. However, some of the RH waste populations have dose rates that exceed the shielding capabilities of the currently approved SCAs. Therefore, preliminary planning to design and fabricate new SCAs is being explored.

There are a number of competing factors that impact waste emplacement rates.

The diagram below identifies key issues that impact waste emplacement rates. These include mine maintenance and ventilation to ensure safe air quality and ground control, which are necessary to ensure the safety of workers in the underground; logistical issues related to shipping and receipt; and the coordination of necessary resources in different work categories (i.e., radiological controls, underground operations, maintenance, mining, air quality; and waste emplacement).

In the near term, the goal will be to coordinate generator site waste packaging and transportation activities closely with site operations in order to maintain shipment rates that are consistent with WIPP site waste emplacement rates; include consideration of waste characteristics and packaging types; and meet the sites' logistical needs for waste emplacement.



CBFO GOAL (3)

3. CONTINUOUS IMPROVEMENT OF THE CBFO SAFETY MANAGEMENT PROGRAMS

OBJECTIVES

Weaknesses in the WIPP Safety Management Programs (SMPs) were identified as a contributing factor to the occurrence of the February 2014 accidents. Compensatory measures were adopted early in the recovery process, and significant effort focused on improving SMP performance. SMPs provide an important part of the overall strategy for protecting nuclear facility workers, with any further controls typically consisting of specific administrative controls or safety significant (SS) structures, systems, and components.

WIPP enhanced the following SMPs in a revision to the WIPP DSA.

- Radiological protection program
- Radioactive and hazardous waste management programs
- Initial testing, in-service surveillance and maintenance programs
- Operational safety program
- Procedures and training programs
- Quality assurance (QA) program
- Emergency preparedness program
- Management, organization and institutional safety programs

The improvements to these SMPs included the implementation of newly-defined Key Elements (KEs), which are specific activities in those SMPs required to be performed to increase the rigor with which these programs are implemented.

Also, there was the addition of Chapter 18.0 to the WIPP DSA which included multiple KEs to ensure compliance with the revised WIPP WAC.

CBFO OQA validate that the WIPP M&O contractor conforms to the SMPs in the WIPP DSA with QA assessments (audits and surveillances). Conditions Adverse to Quality (CAQs) are documented and resolved through the Corrective Action Reports process. In addition, the CBFO OWIPP, ONTP, and OPM verify that the WIPP M&O contractor is complying with the other SMPs through operational surveillances, Operational Awareness activities, and general oversight. Issues are identified and resolved through the Issues Collection and Evaluation process.



Workers complete a HEPA filter change in the filter building



Salt trucks load salt mined out of panel 8 at WIPP

CBFO GOAL (4)

4. MATURE OUR REPOSITORY PLANS AND DESIGNS WITH THE ASSOCIATED REGULATORY STRATEGY

OBJECTIVES

Additional panels will be needed to achieve the current mission and TRU waste disposal volume capacity (i.e., 6.2 million cubic feet), as specified by the WIPP LWA.

REGULATORY APPROACH

The regulatory approach is to maintain compliance with applicable requirements while supporting the goals and objectives to fulfill the CBFO's mission to safely and compliantly dispose of defense-related TRU waste at the WIPP during this period of changing conditions and needs. The CBFO OEP is responsible for overseeing the WIPP M&O contractor's compliance with federal and state regulations related to operating the WIPP facility. The CBFO regulatory approach consists of managing and overseeing the implementation of environmental laws and regulations, including, but not limited to, the WIPP LWA; 40 CFR Part 191, Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes; Environmental Protection Agency (EPA) Rulemakings and EPA Federal Register Notices; Final Notices on Recertification Decisions; the WIPP Hazardous Waste Facility Permit (HWFP - NM4890139088-TSDF); applicable DOE Orders; the National Environmental Policy Act; and additional WIPP-related permits, certifications, authorizations, and environmental and regulatory compliance activities for the WIPP project.

Over the next five years, the two most resource intensive and visible recurring WIPP regulatory submittals to the EPA and the NMED are, the 2019 Compliance Recertification Application and the Hazardous Waste Facility Permit 10-year renewal, which will be submitted for regulatory review (including public comment) and regulator decisions. The WIPP LWA, Section 8(f) Periodic Recertification, requires the DOE to submit documentation of continued compliance with EPA final disposal regulations to the EPA every five years after the initial receipt of TRU waste for disposal at the WIPP. Since the approval of the initial Compliance Certification Application in March 1999, CBFO has submitted Compliance Recertification Applications (CRAs) to meet the requirement for periodic recertification every five years and received EPA recertification approvals through the present, as required, and will continue to do so in the future.

The WIPP HWFP has a fixed term, not to exceed 10 years from the effective date of the HWFP (New Mexico Administrative Code 20.4.1.900, incorporating 40 CFR Part 270.50(a)). The first permit renewal application was submitted to the NMED in May 2009, and the NMED Secretary issued a final order granting the renewal of the WIPP HWFP, effective on December 30, 2010. The next permit renewal application is due to the

NMED in July 2020. The WIPP facility, equipment, mining, ground control, monitoring, sampling and reporting, characterization activities, surface facilities, and underground repository configuration, and numerous other WIPP site-related recapitalization activities, alterations, or changes can, and typically do, affect WIPP permits, authorizations, certifications, and regulatory documentation. Therefore, in order to be successful in making the needed changes and staying compliant, it will be important to

support the recurring regulatory submittals mentioned above and the needed changes to critical missions desired by the CBFO, other CBFO offices and/or contractors, and/or generator sites that will impact permits, authorizations, and certifications.

The regulatory-required submittals and critical changes flow through the environmental purview in order to facilitate adherence to regulatory change processes and reporting, and to establish and coordinate efficient and effective regulatory change submittals. The environmental and regulatory strategy and coordinated submittals support the CBFO mission to continue to protect the workers, the public, and the environment; to maintain and improve the WIPP SMPs described above; to maintain compliance; to increase project efficiencies; to reduce overall costs; to support the construction and operation of capital asset projects; and to support strategic plans, objectives, and activities. As needed WIPP strategic objectives arise, the environmental and regulatory staff will be involved to discuss strategy, coordinate timing, and manage the appropriate regulatory change processes and submittal of proposed changes.

GROUND CONTROL

The properties of bedded salt formations that make them the medium of choice for permanent isolation of long-lived radioactive waste also create operational challenges that must be addressed on a daily basis in order to ensure the safety of workers and the continued viability of the WIPP underground. The convergence of salt in the mined panels and rooms must be slowed, to the extent possible, to allow sufficient time for waste emplacement and to ensure safe occupancy while work is being performed. Ground control activities normally include the installation of long bolts and chain link fence in the roof (back) and ribs (sides), scaling (or the removal of loose rock), and milling of the floors to allow for safe movement of foot and vehicular traffic. Over time, shifting of the geologic layers causes bolts to break and fail. In the WIPP underground, bolts currently break at the rate of about 40 per week. This means that ground control is not a one-time activity, but a continuous routine maintenance activity.

The prioritization of ground control (bolting or floor milling) is based on a combination of geotechnical measurements, inspections, and investigations. Geotechnical engineers have an ongoing ground control inspection program, and instrumentation (wire extensometers) that is installed throughout the WIPP underground that measures convergence points, expansion of cracks, and an increase in closure rates. The combination of the measurement data and physical observations — i.e., cracks, broken bolts, and stressed plates — is used, along with other factors (traffic, occupancy, access), to determine ground control priorities.

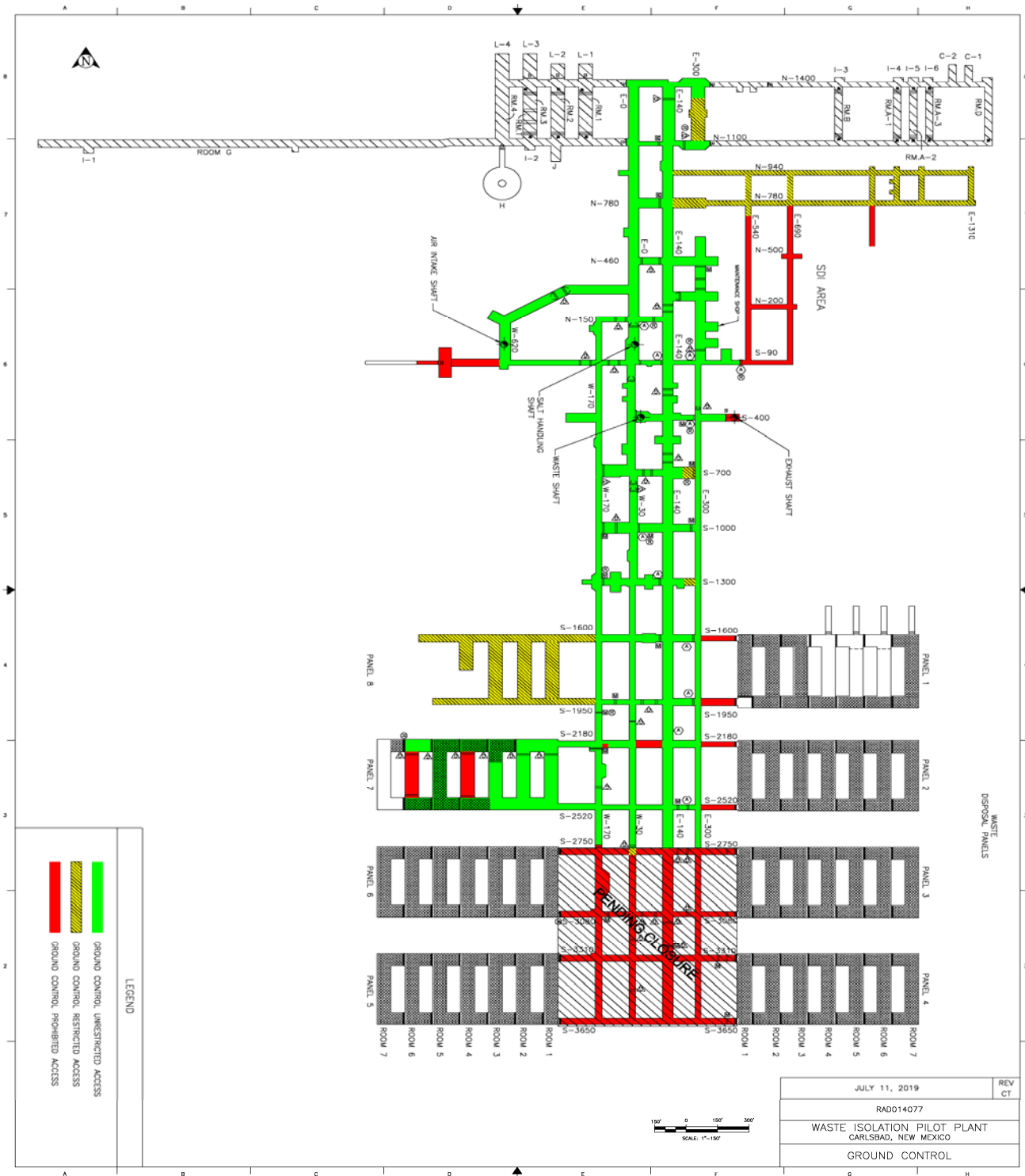
The current status of ground control is determined by the geotechnical monitoring program and is depicted in the WIPP Ground Control map (Page 23). The areas of the map indicated in green are areas where convergence rates are normal, routine ground control maintenance is ongoing, and access, from a geotechnical standpoint, is unrestricted. The areas depicted in yellow identify those areas where personnel access is restricted only to personnel responsible for performing mining and ground control activities in process. The areas depicted in red identify those areas where personnel access is prohibited until ground control activities are performed and the areas are determined to be safe. Prohibited areas are areas where higher-than-normal ground convergence or a number of broken bolts exist and, therefore, the roof is considered unstable until additional roof bolts are installed and/or other ground control activities are completed.

WITHDRAWAL FROM THE SOUTH END

Although withdrawal from the mine's south end entails abandoning previously mined drifts, the CBFO and NWP agreed that mining of new panels/disposal rooms in uncontaminated portions of the WIPP underground will be a safer, more cost effective and an efficient alternative to continue maintaining the degrading contaminated areas of the south end.¹

Final panel closures have been installed in the main drifts between S2520 and S2750 and will require regulatory-required inspections. These closures provide final closure of Panels 3, 4, 5, and 6.

¹ It is important to note that our decision to withdraw from the south end of the WIPP underground is based on worker safety concerns and efficient use of available ground control/ventilation resources, and will have no long-term effect on WIPP disposal capacity. WIPP disposal capacity in the Land Withdrawal Act is based on final waste disposal volume and not on the number of disposal panels or rooms.



STAKEHOLDER ENGAGEMENT

The missions of the WIPP and the NTP remain vital to the Nation and to the overall success of the DOE-EM's cleanup effort. Public understanding of the missions of the WIPP and the NTP is a critical element to both continued operations and public awareness.

As WIPP explores lifecycle planning to 2050 and the continued acceptance of TRU waste, appropriate public involvement and stakeholder outreach practices must continue throughout the 5-year strategic planning cycle and beyond. The Waste Isolation Pilot Plant Stakeholder Outreach Plan has a variety of strategies to best meet those communications and interface goals. Based on stakeholder feedback, we have recently begun providing public notice in English and Spanish, as well as providing translators at all of our meetings. In addition, we are also holding more than the regulatory required meetings.

BUDGET AND FUNDING OUTLOOK

The President's Budget Request for the WIPP in FY 2019 supports disposal facility operations and transportation capabilities of up to 10 shipments per week; regulatory and environmental compliance actions; the CCP to maintain progress toward legacy TRU waste-related milestones at generator sites; some progress on infrastructure recapitalization of aged systems/components/equipment; and continued progress on line item capital asset projects. Current budget planning amounts for FY 2020 through FY 2024 support completion of both capital asset projects, near total completion of all infrastructure upgrade needs, and the necessary increase in personnel resources and/or contract support that will return the WIPP and the NTP to a shipping and emplacement capacity of approximately 14 shipments per week by FY 2023. Current budget planning beyond FY 2024 supports sustainment of normal operations through FY 2050. The CBFO currently has strong support from DOE senior management (EM-1 and S-1) for our budget needs.

LIST OF ACRONYMS


AK	acceptable knowledge
AKA	Acceptable Knowledge Assessments
ARRA	American Reinvestment and Recovery Act
BoK	Basis of Knowledge
CBFO	Carlsbad Field Office
CCE	Chemical Compatibility Evaluation
CCP	Central Characterization Program
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CH	contact-handled
CMPL	Consolidated Master Project List
CMR	Central Monitoring Room
CONs	Conclusions
CRA	Compliance Recertification Application
DOE	U. S. Department of Energy
DSA	Documented Safety Analysis
EM	DOE Office of Environmental Management
EM-1	Assistant Secretary, Environmental Management
EPA	U.S. Environmental Protection Agency
FY	fiscal year
GPP	general plant projects
HEPA	high-efficiency particulate air (filter)
HWFP	Hazardous Waste Facility Permit
INL	Idaho National Laboratory
IT	Information Technology
JONs	Judgments of Need
KEs	Key Elements
LANL	Los Alamos National Laboratory
LWA	Land Withdrawal Act
M&O	Management and Operating (Contractor)
NE	DOE Office of Nuclear Energy
NMED	New Mexico Environment Department
NTP	National TRU Program
NWP	Nuclear Waste Partnership
OEP	CBFO Office of Environmental Protection
ONTP	CBFO Office of the National TRU Program
OPM	CBFO Office of Program Management
OQA	CBFO Office of Quality Assurance
ORNL	Oak Ridge National Laboratory
OWIPP	Office of the Waste Isolation Pilot Plant
PA	Public Address system
QA	quality assurance
RH	remote-handled
SMP	Safety Management Programs
SRS	Savannah River Site
SS	safety significant
SSCVS	Safety Significant Confinement Ventilation System
TRU	transuranic
VOC	volatile organic compound
WAC	Waste Acceptance Criteria
WCS	Waste Control Specialists
WHB	Waste Handling Building
WIPP	Waste Isolation Pilot Plant



CBFO presentation of WIPP status to Carlsbad residents at a town hall meeting



Safety Significant Ventilation System ground breaking



U.S. DEPARTMENT OF ENERGY
CARLSBAD FIELD OFFICE