INFORMATION LAG IN CERTIFICATION AND RECERTIFICATION OF WIPP

S.C. Casey, R.L. Patterson,
U.S. Department of Energy, Carlsbad Field Office,
4021 National Parks Highway, Carlsbad, NM 88220

P.E. Shoemaker,
Sandia National Laboratories – Carlsbad Programs Group,
4100 National Parks Highway, Carlsbad, NM 88220

ABSTRACT

The DOE established a Waste Isolation Pilot Plant (WIPP) Recertification Project to ensure the timely completion of the documentation to meet the requirement of the WIPP Land Withdrawal Act (LWA) (1) to demonstrate continued compliance with U.S. Environmental Protection Agency (EPA) disposal regulations at five-year intervals. This paper describes the reason for the self-imposed "blackout" period and provides an outline of the compliance process.

The first WIPP compliance application, commonly known as the Compliance Certification Application (CCA) (2), documented the basis of DOE's approach to demonstrating compliance. This included the basic information on the facility and regional descriptive information, summaries of more than twenty years of scientific studies, details of the long-term repository performance assessments, and descriptions of programs in place to assure the long-term reliability of the WIPP repository. The range in types of data varied as much as the dates in which the data was collected, though most of the data collection activities ended in early 1996.

After much review and supplemental information submittals, EPA gave conditional confirmation that DOE had provided documentation demonstrating compliance and it issued a Certification of WIPP in May 1998 (3). Every five years after the initial receipt of waste, as initiated in March 1999, DOE must submit an application that is able to demonstrate continued compliance with the long-term disposal standards established by the EPA.

DOE will be submitting the Compliance Recertification Application (CRA) to the EPA in November 2003. Due to the vast accumulation of information since the original application was submitted, DOE has established a data cut-off point over a year prior to submittal of the required documentation. The importance of this date ties to the programs that supply information for consideration within the repository long-term performance assessment (PA) process. Since the PA process must consider the combined and synergistic impacts of any new or modified data, the process will require a long lead time to perform the range of activities required for such an assessment. The 2003 CRA, along with any future CRAs, will require a data analysis lead time such that the digestion of data and information, collected over the range of time since the last data cut-off point, can be analyzed for its use within the PA process. A regulatory "blackout" period is also imposed by the DOE to help ensure that the data analysis can occur without disruption, or rework. In turn, the CRA documentation can be prepared in tandem with the PA process, and the complete package can be submitted to the EPA within a reasonable amount of time.

DISCUSSION

The DOE will submit the first WIPP Compliance Recertification Application (CRA) to the EPA in November 2003. The documentation will comprise data and information current through September 30, 2002. This is known as the CRA data cut-off point. The duration remaining between the data cut-off point and the submittal of the CRA – approximately 14 months – will be put to use completing data verification and validation, performing a comprehensive analysis of the data and information, and updating the WIPP system PA. All of these activities will be performed in parallel to producing the extensive amount of documentation necessary for recertification.

In addition, although DOE may consider future changes for out year planning purposes, major changes will not be proposed for implementation during the second and third phases of the project. This period of regulatory inactivity, known as the Blackout Period, will help to minimize the risk posed by changes (pending the approval of EPA) when the CRA is submitted. Such a situation would impose regulatory and technical complications, which could result in a delay to the recertification process.

Similar circumstances existed when producing the original WIPP compliance application. The monitoring data provided in the *Compliance Certification Application (CCA)* was as recent as each program allowed. Information compiled for the CCA was considered up through the most current sources of data made available to DOE. The definition of "most current" was dependent upon the type and nature of the data. In some cases, the data was provided up through the first few months of 1995, effectively cutting off the ability to consider further information. The submission of the final application to EPA occurred in late October 1996. Considering the unique nature of WIPP (being the world's first deep geologic repository for radioactive waste), specifying the exact layout and content of the CCA was highly dependent upon the EPA's criteria for certification (4). Although these criteria were still in development at the same time the CCA was being drafted, the EPA expected that the DOE still submit the application at the time required in Section 8 of the WIPP Land Withdrawal Act (LWA).(1)

A major difference between the original application (the 1996 CCA) and the first recertification application (the 2003 CRA) is mode of operation. In the period between 1996 through early 1999 the WIPP facility was in a 'readiness' or ready-to-receive-waste mode. Since March 1999, WIPP has been in an operational mode, which means that the facility is receiving, processing, and emplacing TRU waste. At the end of September 2002, the WIPP facility processed more than 500 shipments of waste in 42-months. In that time period, many changes have been made to increase the efficiency of operations while still protecting the safety of the public, WIPP workers, and the environment. Within the realm of compliance recertification, all those changes have to be compiled and analyzed for impacts to the disposal system.

PROJECT TIMELINE

The project timeline contains four major phases. A central purpose of this paper is to discuss the reasoning for the duration of the first phase, and how it feeds into the subsequent phases. The first phase is a portion of a broader program that involves the continuous collection of data and information related to WIPP.[a] Once all the data and information are compiled and sorted into categories related to compliance with EPA disposal standards (3), the data analysis and PA modification process begins. In instances where known changes have taken place prior to receiving comprehensive package information (such as shift in the excavated elevation for a portion of the repository), steps are being taken to incorporate such changes within the PA modeling. This is the reason that the second phase begins prior to the end of the first phase.

The second phase is the data and information analysis which covers the long-term assessment of the repository performance projected over a 10,000 year period. This is the most critical and complicated phase, as it involves a robust risk analysis and modeling system that is specific to the WIPP disposal system. The third phase occurs in parallel with the majority of the second, and involves all the steps necessary in producing the final product – the CRA documentation. The fourth phase is the part that relies upon the EPA to evaluate the CRA documents and make a decision as to whether or not the WIPP facility continues to be in compliance. Although the primary product will be completed once Phase 3 is finished, it is expected that the DOE will be requested to provide additional information during the fourth and final phase. DOE also plans to respond to public comments during that period of time. Figure 1 shows the timing and duration of the four phases.

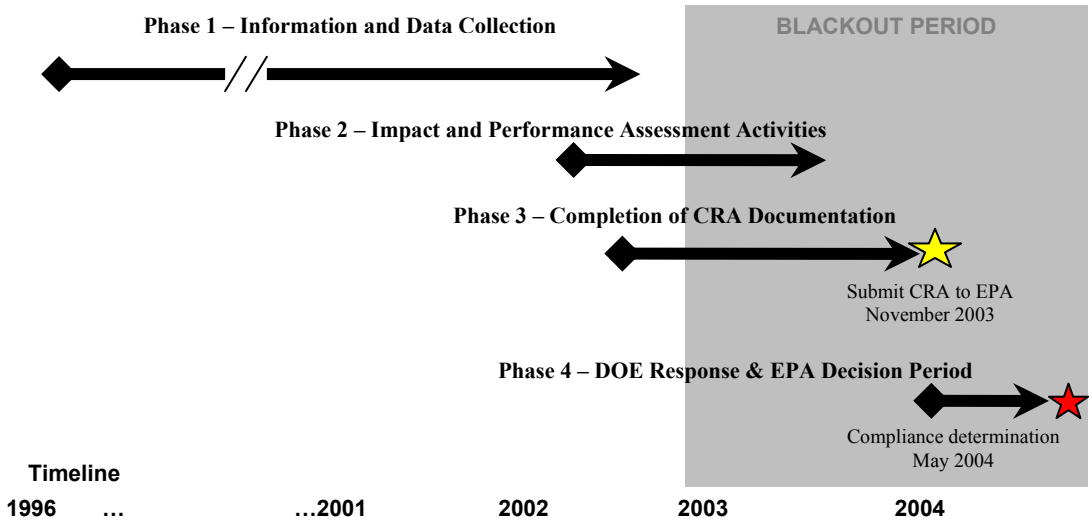

Figure 1. Recertification project timeline

The depiction in Figure 2 represents the general steps involved in the first three project phases.

[a] Although a cut-off point has to be established each time a CRA is prepared, the collection of data and information will continue for the life of the WIPP operational period (35 years) and for an extensive duration after closure. The cut-off is merely an end point in the range of data and information considered in preparation of a recertification application.

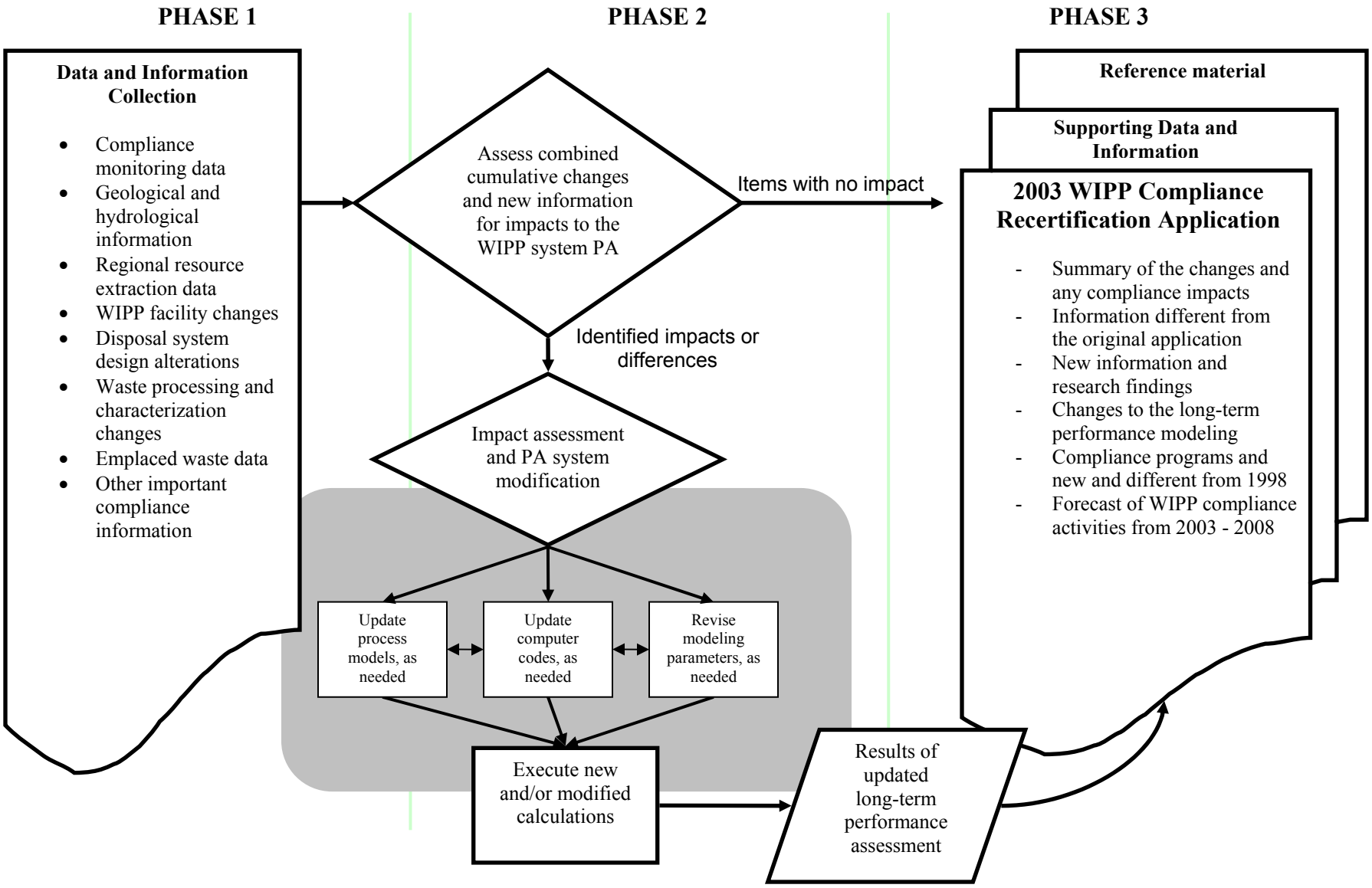

Figure 2. General representation of phases within the WIPP Recertification Project

NEW AND DIFFERENT INFORMATION

Information and data that have been compiled since the cut-off points provided in the CCA range from 1995 through end of September 2002. The types of data and information collected to support the 2003 WIPP CRA documentation will be as follows:

- Compliance monitoring data
- Updated geological and hydrological information
- Regional resource extraction
- WIPP facility changes
- Disposal system design alternations
- Waste processing and characterization changes
- Emplaced waste streams and components

In cases where comprehensive information has been compiled, the nature of the reporting allows the most current report to cover the entire range of data since the first year in which information was collected. In such instances, the data to be provided in the CRA may overlap that which was contained in the first compliance application.

Compliance Monitoring Data

Data collected on any monitored parameters is important to assessing the operational and post-closure behavior of the repository. The EPA requires that DOE provide a level of assurance in confirming the predicted behavior and the proper containment of the waste within the WIPP repository (5). In the early 1990's, DOE implemented several programs that monitored a wide range of parameters on a regular basis (ranging from daily to quarterly). From this information, DOE was able to determine the parameters most useful in assessing the repository behavior. Within the CCA, DOE identified ten key parameters important to evaluating and assessing the behavior of the repository during and after the WIPP operational period.

The ten parameters monitored and tracked on a regular basis are:

- Creep closure and stresses
- Extent of deformation
- Initiation of brittle deformation
- Displacement of deformation features
- Salado brine composition
- Castile brine reservoir location (based on brine encounters)
- Drilling rate (within the Delaware Basin)
- Waste activity
- Culebra groundwater levels
- Change in Culebra groundwater flow

Geological and Hydrological Information
In addition to the data gathered as part of the compliance monitoring, DOE also updates the described layout and behavior of the geological and hydrological units above and below the repository. The monitoring data provides critical information in determining the influences of such a dynamic system. All updated information on the understanding of the geology and hydrology in the WIPP vicinity is considered within the PA modeling activities.

Regional Resource Extraction
One of the most important components in locating the WIPP facility was the consideration of the natural resources. Also, based on current technology, drilling is the only technology in which an unintentional intrusion could occur. For these reasons, Congress decided to withdrawal the land surrounding the WIPP repository from resource extraction activities.(1) However, this did not relieve the obligation of DOE to consider the presence of mining and petroleum recovery activities within the area for purposes of predicting the long-term behavior of the disposal system. DOE tracks the activity of the mining and drilling activity within the Delaware Basin (part of the greater Permian Basin).

WIPP Facility Changes
As part of the CRA (or any compliance application), the EPA requires that DOE provide new or different information on the facility layout and the operational processes of the surface and underground. Most of this information will not influence the process of updating the PA modeling system. However, this information will be considered when evaluating the comprehensive and synergistic relationships of dependent data sets. At a minimum, the 2003 CRA will describe the updated WIPP facility and operational information, identify any influences, and provide a description of how the new or different information was utilized in the updated PA, if at all.

Disposal System Design Alternations
Over the course of four years, a few changes have been made to the repository configuration. One such change elevates the horizon for half of the repository (panels 3,4,5,6, and 9) by nearly 8 feet (2.4 meters). This change was made to improve the effectiveness of the ground control. The elevation of the original design resulted in the roof bolts, used for ground control, to intersect a layer of clay in between two anhydrite layers. Such occurrences of clay are common to the Salado formation, though not desired for bolting configurations due to the shearing effect that tends to occur when the salt creeps inward toward the void space. With the elevation increase of the repository horizon, roof bolts will intersect through a continuous layer of halite, thus allowing the bolt to remain in place longer while improving the ground control system.

The WIPP repository modeling will be modified to include the alterations over the last four years, such as the shift in elevation and any other changes, such that a more representative analysis of the long-term behavior of the disposal system can be conducted. Although such changes are deemed low impact, it is important that the process modeling represent the conditions and activities that influence the behavior of the disposal system.

Waste Processing and Characterization Changes
A substantial portion of the expense of TRU waste management is incurred when processing and characterizing the waste materials. Recognizing the need to ensure an efficient process, while adhering to regulatory requirements, DOE has and will continue to seek cost-effective methods of characterizing and processing the waste intended for shipment to WIPP. Although not part of the information considered for long-term performance of the repository, it is necessary to provide in the CRA information about and specification of waste characterization techniques, QA programs, and approved generator sites to ensure a positive recertification determination by the EPA. One item that can change the characterization program is the assessment of the inventory. This is further described in the next paragraph.

Emplaced Waste Streams and Components
As part of the WIPP Recertification Project, DOE has gathered information from each of the TRU waste generator facilities. Information will be broken down into the individual waste streams and will include estimates of:

- waste volume,
- waste mass,
- activity and mass of individual radionuclides,
- ferrous and non-ferrous metal content,
- cellulose, plastic, and rubber material,
- waste form (solid, sludge, debris, etc.)

If DOE determines that there are changes to the overall waste characteristics or components, then the new or additional information will be used to assess the impact (if any) on long-term behavior of the repository. This will include the consideration of the TRU waste received and emplaced in the repository from March 1999 through the end of September 2002.

CONCLUSION

The first WIPP Compliance Recertification Application (CRA) will comprised data and information current through September 30, 2002. The time between the data cut-off point and the submittal of the CRA – approximately 14 months – will be spent completing verification and validation, analyzing the comprehensive data and information over the past five or more years, while also producing the extensive amount of documentation necessary for recertification. Regulatory permission to proceed with major changes to the certified baseline will not be sought during the second and third phases of the project. This period of regulatory inactivity, known as the "blackout" period, will help minimize the risk posed by changes just prior to the submittal of the CRA. Future compliance applications for WIPP will be bound to comparable time constraints.

REFERENCES

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3. EPA (U.S. Environmental Protection Agency), 1998. *Criteria for the Certification and Recertification of the Waste Isolation Pilot Plant's Compliance with the Disposal Regulations: Certification Decision*; Final Rule, Federal Register, Volume 63, pages 27354 through 27406, May 18, 1998, Radiation Protection Division, Washington, D.C.

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5. EPA (U.S. Environmental Protection Agency), 1996. Title 40 CFR, Part 194. *Criteria for the Certification and Recertification of the Waste Isolation Pilot Plant's Compliance With the 40 CFR Part 191 Disposal Regulations.* 61 FR 5224, February 9, 1996.