

## **It Just Keeps Getting Better—TRU Waste Inventory - 8426**

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### **ABSTRACT**

The Waste Isolation Pilot Plant (WIPP) opened on March 26, 1999, becoming the nation's first deep geologic repository for the permanent disposal of defense-generated transuranic (TRU) waste. In May 1998, the U. S. Environmental Protection Agency (EPA) certified WIPP and recertified WIPP in March 2006. The knowledge of TRU waste inventory is fundamental to packaging, transportation, disposal strategies, resource allocation, and is also imperative when working in a regulatory framework. TRU waste inventory data are used to define the waste that will fill the WIPP repository in terms of volume, radionuclides, waste material parameters, other chemical components, and to model the impact of the waste on the performance of the WIPP over a 10,000-year evolution. The data that pertain to TRU waste is defined in the WIPP Land Withdrawal Act (LWA), as "... waste containing more than 100 nanocuries of alpha-emitting transuranic isotopes per gram of waste, with half-lives greater than 20 years..." Defining TRU waste further, the wastes are classified as either contact-handled (CH) or remote-handled (RH) TRU waste, depending on the dose rate at the surface of the waste container. CH TRU wastes are packaged with an external surface dose rate not greater than 200 millirem (mrem) per hour, while RH TRU wastes are packaged with an external surface dose rate of 200 mrem per hour or greater.

The Los Alamos National Laboratory—Carlsbad Operations (LANL-CO) Inventory Team has developed a powerful new database, the Comprehensive Inventory Database (CID), to maintain the TRU waste inventory information. The CID is intended to replace the Transuranic Waste Baseline Inventory Database (TWBID), Revision 2.1, as the central inventory information repository for tracking all existing and potential (TRU) waste generated across the Department of Energy (DOE) TRU waste complex. It is also the source for information submitted for the Annual TRU Waste Inventory Reports some of which will be used in future Compliance Recertification Applications (CRAs) for the WIPP. Currently, the DOE is preparing for the second recertification, CRA-2009. The CID contains comprehensive TRU waste inventory that is consistent, relevant, and easily accessible to support DOE needs, not only the CRAs and performance assessments, but also waste management planning activities and other regulatory needs (e.g., National Environmental Policy Act (NEPA) analyses). The comprehensive inventory contains information obtained via inventory updates and approved acceptable knowledge (AK) characterization information to ensure inventory data integrity is maintained and the inventory is current. The TRU waste inventory is maintained in the CID under configuration management as

defined in the LANL-CO Quality Assurance Program. The CID was developed using Microsoft™ Access Data Project™ (ADP) technology with a Microsoft SQL Server™ back end. The CID is user friendly, contains more fields, provides for easy upload of data, and has the capability to generate fully qualified data reports. To go along with the new database, the LANL-CO Inventory Team has developed an improved data collection/screening process and has excellent communications with the TRU waste site personnel.

WIPP has now received over 6,000 shipments, emplaced over 50,000 cubic meters of CH waste, and successfully completed one recertification. With a new robust qualified database, the CID, to maintain the inventory information, the TRU waste inventory information is continuously improving in quality, accuracy, and usability (better).

## **INTRODUCTION AND BACKGROUND**

The Waste Isolation Pilot Plant (WIPP), located near Carlsbad, New Mexico, is a deep geologic repository for the disposal of transuranic (TRU) wastes generated by atomic energy defense activities. The WIPP Land Withdrawal Act (LWA) [1] requires the U.S. Department of Energy (DOE) to submit documentation to the U.S. Environmental Protection Agency (EPA) that demonstrates WIPP's continuing compliance with the disposal regulations in Title 40 of the Code of Federal Regulations (CFR) Part 191 Subparts B and C [2] and Title 40 CFR Part 194.24(a) [3], not later than five years after initial receipt of waste for disposal at the repository, and every five years thereafter until the decommissioning of the facility is complete.

On May 18, 1998, after review of the Compliance Certification Application (CCA) (63 FR 27405), the EPA certified that the WIPP did comply with the final disposal regulations and criteria of 40 CFR parts 191 and 194. On March 26, 1999, the first receipt of contact-handled (CH) TRU waste was received at WIPP thus initiating the 5-year countdown to the first recertification.

Five years after the first receipt of waste at WIPP, on March 26, 2004, the DOE submitted the first recertification application, *Title 40 CFR Part 191 Subparts B and C Compliance Recertification Application* (CRA-2004) [4] to the EPA, and the WIPP was recertified in March 2006. Currently, the CBFO is preparing the Compliance Recertification Application - 2009.

The DOE is committed to honoring the federal government's obligation to clean up "legacy" TRU waste at sites across the nation that supported the production and testing of nuclear weapons and other defense activities. The CBFO has the responsibility for management of the National TRU Program (NTP), whose mission is implementation and management of a national system that safely and cost-effectively supports the disposal of TRU waste at the WIPP.

## **TRU WASTE INVENTORY DATABASE DEVELOPMENT**

For the preparation of the CCA, WIPP was not open, no TRU waste was characterized, and no TRU waste sites were certified to characterize waste.

At the time of the original issue of the WIPP Transuranic Waste Baseline Inventory Report (WTWBIR), Revision 0 [5], there was no centralized database to maintain the TRU waste

inventory data. This first TRU waste inventory was derived from existing information on the waste. Three primary sources of information were used: (1) the Mixed Waste Inventory Report database [6], the Integrated Data Base [7] and the Nonradioactive Inventory Database, developed in 1988-1989 to support initial PA calculations. Other resources used were the *Transuranic Package Transporter-II (TRUPACT-II) Content Codes* (TRUCON) [8], the *No-Migration Variance Petition* (NMVP) [9] and the *Resource Conservation Recovery Act (RCRA) Part B Permit Application* [10]. A database was set up to roll up the waste data, the WIPP Transuranic Waste Baseline Inventory Report (WTWBIR) Database. This early database was operated on the Microsoft™ Access System Version 2.00.

### **Development of the WIPP Transuranic Waste Baseline Inventory Database (WTWBID)**

For Revision 1 of the WTWBIR, a WIPP Transuranic Waste Baseline Inventory Database (WTWBID) was developed to store the TRU waste inventory information used in the preparation of the WIPP Transuranic Waste Baseline Inventory Report (WTWBIR), Revision 1. This database was operated on the Microsoft™ Access Version 2.0 system and consisted of two databases, one contained the original data from the WTWBIR Database and the second one was used to produce tables and figures for the WTWBIR Revision 1 [11]. Project quality control objectives for the TRU waste inventory were performed under the Waste Isolation Pilot Plant Baseline Inventory Report Database Management Procedure [12].

### **Development of the Transuranic Waste Baseline Inventory Database (TWBID)**

For Revisions 2 and 3 of the *Transuranic Waste Baseline Inventory Report*, the database, the TWBID, was upgraded to the Transuranic Waste Baseline Inventory Database (TWBID). This improved database was used to maintain and summarize the updated waste data and print out various tables and reports used in the TWBIR. This database was also operated on the Microsoft™ Access Version 2.0 system. The TWBID consists of two databases. The first, the TWBID.MDB, contains the original data submitted by the TRU waste sites or amended data as agreed upon by the sites through discussions with TWBIR personnel. The second database, REPORTS.MDB, was used to produce the tables and figures for the TWBIR. The activities performed to meet these objectives were described in the Transuranic Baseline Inventory Report Database Management Procedure (DOE, 1995). The waste-stream level radionuclide data reported in the waste profiles for TWBIR Revision 2 were insufficient to derive a WIPP radionuclide inventory because not all sites provided the radionuclide information for each waste stream. Therefore, the site-level radionuclide inventories collected in the joint IDB [13] and Revision 2 TWBIR data call were used.

### **Update of the Transuranic Waste Baseline Inventory Database**

The database used to generate TWBIR Revisions 2 and 3 [14, 15] (TWBIR.mdb, dated 1/29/1996) was used as the baseline for TWBID Revision 2.1 [16]. The TWBID database was originally provided in Microsoft® Access 2.0 format, and was subsequently converted to Microsoft® Access 2000 format for TWBID Revision 2.1. Structural changes were then made to the new version to accommodate new requirements. These changes were captured in Microsoft® Visual Source Safe. Development of the TWBID Revision 2.1 [16] was governed by the Sandia

National Laboratories (SNL) Quality Assurance (QA) procedure, NP 19-1 *Software Requirements* [17]. The TWBID Revision 2.1 [16] software was placed under configuration control on November 17, 2002 as version 3.01. TWBID Revision 2.1 underwent several iterative revisions and remained the inventory database of record until the development of the Comprehensive Inventory Database (CID). The TWBID Revision 2.1 and the data contained therein were qualified under the SNL QA program.

### **Development of the Comprehensive Inventory Database (CID)**

During the preparation of the CRA-2004, the Inventory Team recognized emerging inventory needs for management and technical projects. In addition, the Team recognized the value of also using characterization information for maintaining a current inventory. Also, the TWBID Revision 2.1 used to support the CRA-2004 was neither intended to be used as a tool for planning, nor to collect data on a TRU waste container basis. Hence, a new robust database for the TRU waste inventory was developed, the Comprehensive Inventory Database (CID) [18]. As part of the development of the CID, meetings were held with LANL-CO inventory project management and customers from CBFO to discuss data needs. These data needs covered strategic planning, transportation, disposal and general waste management. In addition to the data needs required to support future WIPP PAs, requirements for data related to general waste management were included in the requirements documentation for the CID.

The CID was developed using Microsoft® Access Data Project® (ADP) technology. This technology allowed multiple users to run “front-end” clients while simultaneously accessing a common data store, a database running on a Microsoft SQL Server® 2000 platform. ADP differs from the traditional distributed Microsoft Access Database (MDB) configuration in that it is a specific file type that stores user objects such as forms, reports, macros, and Visual Basic for Applications (VBA) code modules, while all the other objects – tables, procedures, user-defined functions, and views - are stored on the database server. The ADP technology allows a bulk of the processing to shift to the Server side of the network rather than burden the client. This configuration results in reduced network traffic and increased performance.

Another improvement implemented in the CID is the generation of several reports that have been qualified for generation by the CID. Reports that support PA include scaling calculations, radionuclide decay calculations, summations of scaled radionuclides and waste material parameters for sites and the full repository. Other reports that have been qualified are those that support management decisions, planning and status updating. These include reports on volumes shipped by sites, waste containers and volumes that are readily shippable, and other reports identifying TRU waste status. Previously, these reports were prepared manually using the data in the database. The capability of the CID to generate qualified reports saves a lot of time in the preparation and review of the final products (documents, presentations, etc.).

Information previously maintained in the TWBID database was transferred to the new qualified database, the CID, which utilizes a more efficient operating configuration. These data were the “starting point” for TRU waste sites to update their information for the first annual report with an inventory collection date of December 31, 2006. The CID database will be the information repository for TRU waste destined to WIPP, and the source for information submitted for annual Transuranic Waste Inventory Update Reports to be used in future repository performance

assessments (PAs). The information that has been collected will support a wider range of data needs including waste management, transportation and strategic planning.

The CID was qualified under the LANL-CO Quality Assurance Program. The LANL-CO QA Program is fully compliant with the requirements set forth in the DOE Carlsbad Field Office (CBFO) Quality Assurance Program Document [19]. The processes used by the LANL-CO Inventory Team to collect, maintain, and report TRU waste inventory information are implemented under the LANL-CO QA Program.

## **DATA COLLECTION METHODOLOGY**

### **WTWBIR Revision 0 Data Collection Methodology**

The WTWBIR Revision 0 described a methodology for grouping waste of similar physical and chemical properties from the TRU waste sites into waste profiles. The WTWBIR Revision 0 inventory was estimated using waste streams identified in the *Mixed Waste Inventory Report* (MWIR) [6] supplemented by information from the Nonradionuclide Inventory Database (NID), and the 1993 *Integrated Data Base* (IDB) [7]. A database was set up to roll up this waste data, the WIPP Transuranic Waste Baseline Inventory Report (WTWBIR) Database. Waste streams with waste matrix codes (WMCs) that had similar physical and chemical properties were combined into a waste matrix code group (WMCGs). This information was used to generate the WIPP Waste Profiles as shown in Table 1.

### **WTWBIR Revision 1 Data Collection Methodology**

For the first time, the data were collected directly from the TRU waste sites through a request made by the National TRU Program Office and used in producing WTWBIR Revision 1. Additional inventory information provided by the TRU waste sites was predominantly based on process knowledge since none of the requirements for disposal at WIPP were finalized. The WTWBIR team provided each TRU waste site data packages taken from the WTWBIR Revision 0 that defined the characterization of each TRU waste stream at their site. The TRU waste site reviewed, changed, and authorized the characterization as valid for use in developing the TRU waste inventory for WIPP. The information gathered from this data collection was entered into the WTWBID. Although the data call for Revision 1 requested the estimate of the radionuclide inventory on a waste stream basis, many sites did not provide the information; therefore, the site-wide radionuclide inventories reported in the IDB [13] were used.

### **WTWBIR Revision 2 Data Collection Methodology**

With each revision of the TRU waste inventory report, additional information was collected. For WTWBIR Revision 2, each TRU waste site was provided a questionnaire with instructions and data packages that contained the characterization information provided by these sites for WTWBIR Revision 1. Each site was asked to review the data packages and update the information as necessary. Some sites divided their WTWBIR Revision 1 waste streams into two or more sub-streams to provide greater characterization detail. Additionally, the sites were asked to include data packages for any waste streams that were not defined in WTWBIR Revision 1

Table 1. Sources of Information Used in the Development of the Initial WIPP Waste Profiles

Information Field	Source of Information	Explanation
Waste Matrix Code Group	DOE Waste Treatability Groups Guidance and MWIR Database	Grouped waste streams that had similar chemical and physical properties
DOE Site Volumes	1993 IDB and/or MWIR Database	Provided estimates of retrievably stored, projected, and total volumes of TRU and TRU mixed wastes by site
Waste Material Parameters	NID Database	Provides weight estimates of selected waste materials in a particular WMCG for the DOE TRU Waste Complex

Source: TWBIR, Revision 0, June 1994

(e.g., new waste streams or excluded waste streams). As noted earlier, additional inventory information provided by the TRU waste sites was predominantly based on process knowledge since none of the requirements for disposal at WIPP were finalized. The data submittal from the DOE TRU waste sites provided approximately 970 waste streams. The inventory collection date for Revision 2 of the TWBIR was December 31, 1994, over four years before the WIPP opened for operations.

### **CRA-2004 Collection Methodology**

The focus used in collecting data for the CRA-2004 from the TRU waste sites was to capture the changes that each site had undergone since the CCA [20] was submitted, keeping the original information from the CCA, wherever possible, since the EPA was mainly concerned with what the changes in the TRU waste inventory. To capture these changes, each TRU waste site was sent a copy of their data (in the form of waste profiles from the TWBIR Revision 2 [14] that they had submitted in 1995 for the CCA [14]. With this transmittal to the site, guidance was provided delineating what the TRU waste sites needed to address. The sites were requested to mark the changes on these profiles.

The data were provided by the TRU waste sites, followed by discussions focused on clarifying questions to ensure the data were correct. The data were entered into the electronic database, the TWBID Revision 2.1 [16], and qualified under SNL NP 19-1, *Software Requirements* [17]. Upon completion of data entry and internal independent verification, each TRU waste site was provided with a signature sheet requesting that the DOE site representative responsible for TRU waste verify the data. The methodology used to collect data and enter data into the TWBID Revision 2.1 [16] from DOE TRU waste sites was captured in procedure SP-9-6, *Baseline Inventory Report (BIR) Change Report Data Collection and Entry* [21]. The process described in this procedure was initiated by a data call based on a request for modification of waste profile information that was included in the TWBIR Revision 2 [14]. This data call was followed by a second data call specifically requesting data required by SNL. During the time these data calls were issued, LANL-CO visited sites to facilitate data collection and worked with the sites to assist with questions and issues as they came up.

## **2006 Annual Data Collection**

Although the 2007 Annual TRU Waste Inventory Report, using the inventory collection date of December 31, 2006, will not officially be used for the PA calculations for the CRA-2009, the EPA is concerned with changes in the TRU waste inventory since the CRA-2004. For this data collection, each DOE TRU waste site was sent their TRU waste inventory information that had been downloaded from the TWBID Revision 2.1 into a Microsoft™ Excel spreadsheet (template) containing fields found in the CID. The sites were requested to update any existing information and add information in the new fields. The TRU Waste Inventory Team visited all of the large quantity sites and several of the small quantity sites to assist them in completing the template. After the templates were completed, the TRU Waste Inventory Team checked the templates for accuracy and consistency in accordance with INV-SP-01, *Data Collection, Data Management and Control for the Comprehensive Inventory* [22]. If any discrepancies were found, they were corrected in accordance with INV-SP-02, *Entry, Verification and Validation of Inventory Information in the Comprehensive Inventory Database* [23]. The TRU waste inventory information was then uploaded into the CID. The uploaded information was verified by an independent TRU Waste Inventory Team member, one who did not upload the information. After this internal, independent verification, validation reports were prepared and sent to the DOE TRU waste site managers. A letter signed by each site manager validated the information in the database.

## **THE GENERATION OF TRU WASTE INVENTORY REPORTS**

### **Compliance Certification Application**

As discussed earlier, for the preparation of the CCA, WIPP was not open, no waste was characterized or certified and the data used in the CCA were the best available data estimates at the time of collection. These data originated predominantly from process knowledge. There were two revisions of the inventory report containing the information that was used to develop the PA models for compliance certification: *WIPP Transuranic Waste Baseline Inventory Report*, Revision 0 [5], issued in June 1994 and the *WIPP Transuranic Waste Baseline Inventory Report*, Revision 1 [11], issued in February 1995. The inventory information from these two revisions of the WTWBIR was used in the systems prioritization methodology (SPM) as well as PA modeling efforts performed by SNL/CPG.

The objectives for these two revisions of the WTWBIR were to: (1) establish a consistent DOE complex-wide methodology for grouping wastes of similar physical and chemical composition, (2) define the anticipated disposal inventory of TRU wastes destined to WIPP, and (3) calculate the disposal inventory in terms of waste material parameters.

The *Transuranic Waste Baseline Inventory Report* (TWBIR), Revision 2 [14], was an expansion of the original purpose of Revisions 0 and 1 because it provided an estimate of the total TRU waste inventory under the purview of the DOE. This expansion met WIPP LWA requirements, and included estimates for non-defense, commercial, polychlorinated biphenyl (PCB)-contaminated, and buried (predominately pre-1970) TRU wastes that were not planned at the time for disposal in the WIPP.

The TWBIR, Revision 3 [15], was based on Revision 2 data and was supplemented by data provided by several memoranda issued during early calendar year (CY) 1996. These memoranda summarize additional data requested from the DOE TRU waste sites to support PA modeling calculations that were used in the development of the WIPP *Compliance Certification Application* (CCA) [20]. The supplemental information was generated from specific data requests after the publication of Revision 2, and the data were published in appendices in TWBIR, Revision 3. The information included radionuclide data, estimates of complexing agents, estimates of nitrates, sulfates, phosphates, and cement content in the TRU waste.

The objectives of these two revisions of the TWBIR were to: (1) establish a consistent DOE complex-wide methodology for grouping wastes of similar physical and chemical composition, (2) define the anticipated disposal inventory of TRU wastes destined to WIPP, (3) calculate the disposal inventory in terms of waste material parameters, and (4) define the total DOE TRU waste inventory.

### **Compliance Recertification Application – 2004**

When the CRA-2004 was prepared, WIPP was open for operations and waste was being characterized, certified, shipped to WIPP and being emplaced. For the CRA-2004 and the Performance Assessment Baseline Calculation (PABC), the emplaced inventory was approximately 7,700 m<sup>3</sup>. The characterization data from the emplaced waste that were needed for the PA calculations were included in the CRA. By including the actual data from the emplaced TRU waste, the TRU waste inventory estimate used for PA was more accurate and representative.

For the preparation of the CRA-2004, a TRU waste inventory update was conducted and was issued as Attachment F of Appendix DATA of *Title 40 CFR Part 191 Subparts B and C Compliance Recertification Application 2004* [28]. The detailed inventory information required for the PA calculations for recertification had not been updated for over seven years; consequently, a lot of changes had occurred in the TRU waste inventory throughout the TRU waste complex. Knowing that the WIPP TRU waste inventory numbers had changed as a result of characterization activities and improved estimation processes, the EPA requested that an update to the CCA inventory be included in the CRA-2004. In a letter from the EPA dated August 6, 2002, one of the items requested was “Waste inventory (actual inventory to date plus revisions to the estimated inventory as expressed in the Baseline Inventory Report).”[24] Attachment F of Appendix DATA of the *Title 40 CFR Part 191 Subparts B and C Compliance Recertification Application 2004* provided those changes. The primary purpose of the CRA-2004 updated TRU waste inventory document was to provide the summary data and the supplemental information required for the PA in support of the CRA-2004.

The objectives of the Attachment F of Appendix DATA of the *Title 40 CFR Part 191 Subparts B and C Compliance Recertification Application 2004* were to: (1) define the DOE TRU waste inventory; (2) provide the required information and data for use in the calculations for the CRA-2004; and (3) maintain a consistent DOE complex-wide methodology for tracking TRU waste. A consistent methodology in support of the CRA-2004 provides a common frame of reference for discussion of TRU waste issues with regulatory organizations.



## **Performance Assessment Baseline Calculation (PABC)**

During the EPA's review of the CRA-2004, there were two significant changes in the TRU waste inventory. As a result of these two significant changes, the EPA requested an update to the TRU waste inventory and that a Performance Assessment Baseline Calculation (PABC) be performed, much like the preparation of the Performance Assessment Verification Test (PAVT) after the submittal of the CCA. These changes required a new data version from the TWBID Revision 2.1 [25]. The TWBIR-2004 contained the inventory update requested by the EPA and is a revision of Attachment F found in Appendix DATA of the CRA-2004. The primary purpose of the TWBIR-2004 was to provide the summary data, including these two significant changes from Hanford Richland Operations Office and the Idaho National Laboratory, required for the PA modeling calculations that were used in the PABC [26, 27].

As stated earlier, for the preparation of the CCA, WIPP was not open, no TRU waste was characterized, and no TRU waste sites were certified to characterize waste. For the CRA-2004 and PABC, the emplaced inventory was approximately 7,700 m<sup>3</sup> and waste was being characterized and certified for shipment to WIPP. Actual characterization data were being generated and included in the TRU waste inventory information that was used for recertification.

## **Preparation of the *Annual Transuranic Waste Inventory Report - 2007***

As mentioned earlier, the TRU waste inventory changed dramatically between the certification of WIPP and the CRA-2004. For that reason, the TRU waste inventory is being updated annually, beginning with the 2007 annual report (inventory collection date of December 31, 2006), even though the information in this first annual report will not be formally used in the preparation of the CRA-2009. There are 22 DOE TRU waste sites across the country that still store TRU waste, pending disposal at the WIPP, six of which are potential TRU waste sites as shown in Figure 1. The TWBIR-2004 provided TRU waste inventory information for the PABC [26, 27] of the CRA-2004 and was the "starting point" for the DOE TRU waste sites to update information for this first annual report. This data collection is the first TRU waste inventory information collected from the TRU waste sites that are maintained in the CID [18]. Site visits and onsite interviews facilitated data collection, and site validation of the data entered into the CID ensured accurate representation of data.

For the 2007 annual update of the TRU waste inventory, the emplaced TRU waste, as of December 31, 2006, totaled approximately 46,000 m<sup>3</sup>. The characterization information from this emplaced waste has been included in the CID, making the TRU waste inventory information much more comprehensive and accurate. TRU waste inventory information found in current approved AK documents has also been included in the CID as well as the references to these documents.

This work was performed under the LANL-CO Quality Assurance (QA) Program. The LANL-CO QA Program is fully compliant with the requirements set forth in the DOE Carlsbad Field Office (CBFO) Quality Assurance Program Document [19].

## **Preparation of the CRA-2009**

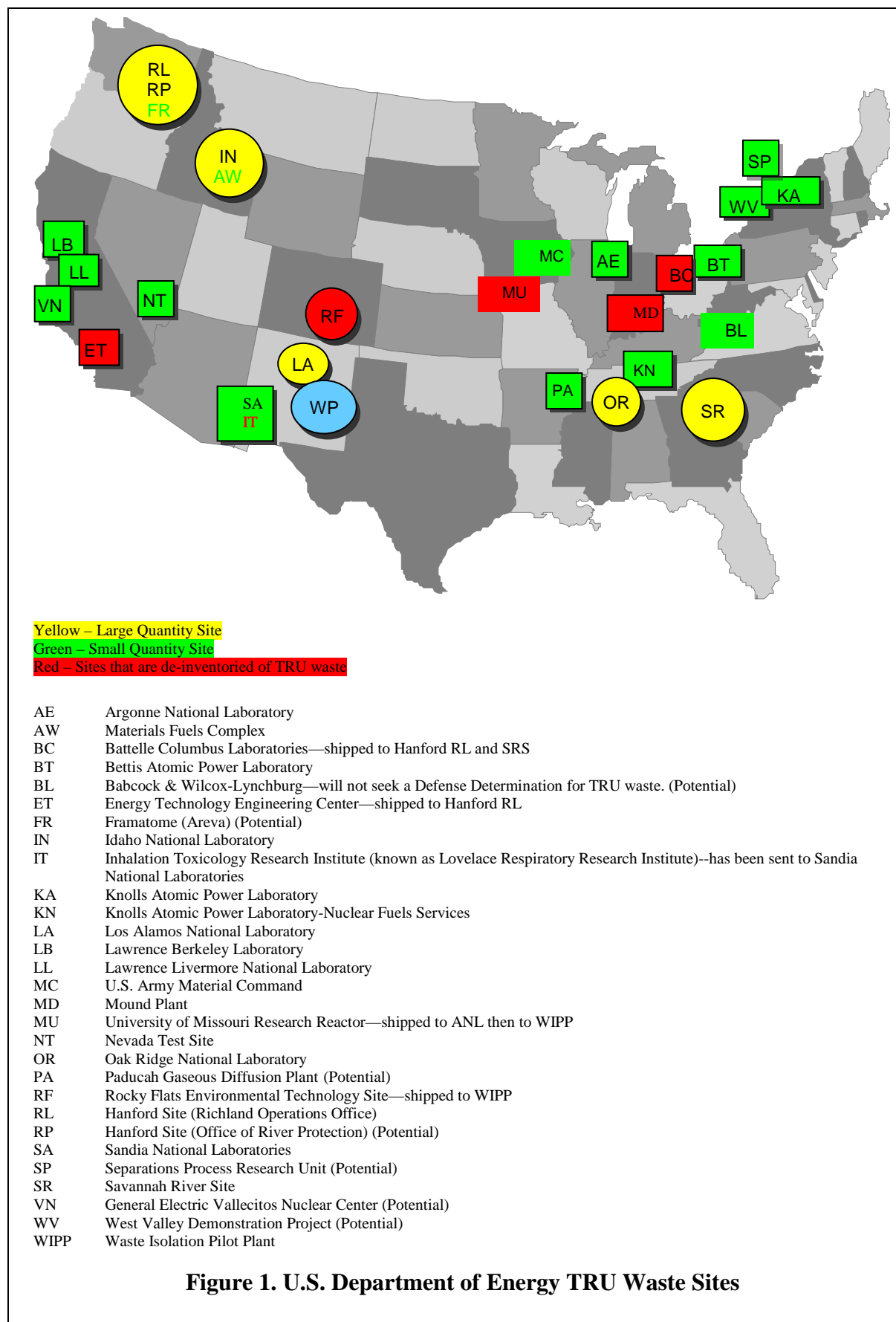
The Sandia National Laboratories/Carlsbad Program Group (SNL/CPG) is the group that performs the PA calculations and modeling. Soon after the CRA-2004's PABC was complete, the SNL/CPG decided to modify their model. At that time, it was decided that the PABC TRU waste inventory would be used for CRA-2009. Therefore, the inventory parameters would remain unchanged so that any effects from model changes could be observed. Since the TRU waste inventory is changing, the EPA is expected to request that a PABC-2 be performed. This PABC-2 will use an updated inventory that will be collected with the inventory collection date of December 31, 2007.

## **SUMMARY**

The TRU waste inventory was collected for the first time a couple of years prior to the preparation and submittal of the CCA. At that time, the WTWBIR database was developed but not qualified under the WIPP QA program. The TWBID was developed but it not qualified under a WIPP QA program. Then the TWBID was upgraded from the WTWBID, but still was not qualified. The TWBID database was transferred to LANL-CO a few months before data were needed to support the WIPP PA for the CRA-2004. This TWBID was migrated to a more current operating system and Access version for the CRA and became the TWBID Revision 2.1. In addition, the data structure of the TWBID was slightly modified to incorporate data important to PA. The updated inventory data were examined by LANL-CO, SNL, the WIPP M&O contractor, EPA, and the public. The TWBID Revision 2.1 database was the first TRU waste database qualified under QAPD software requirements. Inventory data from this database have now been transferred to the newly developed and qualified CID, which utilizes a more robust and efficient operating configuration and includes information collected from a process that incorporates lessons learned from previous inventory collection efforts. The information maintained in the CID includes additional fields important to management and strategic planning for WIPP, as well as to those important to future PAs. As the databases for the TRU waste inventory are enhanced, the TRU waste inventory information is improved.

Inventory estimates are intrinsically uncertain. These estimates are a compilation of both existing and projected waste volumes that are scaled to the repository volume limit. For the CCA, no waste had been emplaced in WIPP, and the entire repository scaled volume was highly uncertain. For the CRA-2004, uncertainty was reduced since the ratio of the emplaced and existing waste volume to the projected waste volume increases. By default, each recertification waste estimate will contain better inventory estimates than the previous. Inventory estimates provided in the CCA (Appendix BIR), the PAVT (TWBIR Revision 3), CRA-2004 [Appendix DATA Attachment F), and PABC (TWBIR-2004) represent the best information available to DOE about its TRU waste in 1995, 1996, 2002, and 2004 respectively. It has always been anticipated that WIPP TRU waste inventory estimates would change as the DOE characterizes the contents of waste containers prior to shipment to WIPP and as new TRU wastes are generated. However, as more characterization data become available TRU waste inventory uncertainty goes down.

The TRU waste inventory obtained for the CRA-2004 was based on the best estimate that the TRU waste sites could provide as of September 30, 2002. Between the time of the CCA and September 30, 2002, some of the sites had developed plans for managing waste more cost



effectively through waste compression. Some sites had obtained additional characterization information that helped to better define the characteristics of their TRU waste. Other sites had discovered TRU waste that was not reported for the CCA. Finally, some sites embarking on decontamination and decommissioning (D&D) work found that their D&D waste volumes were actually larger than originally expected (as reported in the CCA).

The TRU waste inventory information progressively improves in accuracy and representativeness. Since its beginnings in 1994 when the TRU waste inventory information was compiled from three existing databases to the present information that includes emplaced and characterization data, inventory information quality and management have improved. Currently, the data are collected directly from the TRU waste sites and the process of the data collection, entering, verifying, and validating the data is performed under a qualified QA Program using the current robust Comprehensive Inventory Database. The estimate for the TRU waste inventory just keeps getting better.

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