Department of Energy
Field Office, Albuquerque
Los Alamos Area Office
Los Alamos, New Mexico 87544

OCT 14 1994

Benito - Coordinate response with Susan McM.

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NM ENVIRONMENT DEPARTMENT
OFFICE OF THE SECRETARY

TA 54

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Kathleen Sisneros, Director
Water and Waste Management Division
New Mexico Environment Department
P. O. Box 26110
Santa Fe, NM 87502

LANL XI

Dear Ms. Sisneros:

This letter transmits the Department of Energy's and the University of California's responses to Orders #1. and #2. of Compliance Order 94-12 issued by the New Mexico Environment Department on August 12, 1994. Order #1. required the submittal of a site characterization plan for Pit 37, Technical Area 54, Area G, in order to determine the vertical and horizontal extent of any hazardous waste contamination. Order #2. required the submittal of a corrective action plan addressing the use of knowledge of process to identify hazardous waste generated by the Environmental Restoration Project at the Los Alamos National Laboratory.

We hope these submittals are responsive to your request. If you should have any questions regarding these matters, please contact Jon Mack of my staff at (505) 665-5026.

Sincerely,

for

Joseph C. Vozella
Acting Assistant Area Manager
Office of Environment and Projects

LAAMEP:2JM-012

Enclosure

cc w/enclosure:
A. McMillan, ESH-DO, LANL, MS-K491
C. Soden, EPD, AL
M. Bange, WMD, AL

cc w/o enclosure:
J. White, ESH-19, LANL, MS-K498
J. Rochelle, LC General, LANL, MS-A187
HSWS File, (94-0353), LANL, MS-K498

16624

STATE OF NEW MEXICO
ENVIRONMENT DEPARTMENT

IN THE MATTER OF
U.S. DEPARTMENT OF ENERGY
AND THE REGENTS OF THE UNIVERSITY
OF CALIFORNIA, LOS ALAMOS NATIONAL
LABORATORY, LOS ALAMOS, NEW MEXICO,
RESPONDENTS

COMPLIANCE ORDER
NMHSWA 94-12

H SWA LANL 6/P/95

ORDER

THIS MATTER having come before the Hearing Officer by Motion of Respondents, the Department of Energy (DOE) and the Regents of the University of California (UC), and having been concurred in by Complainant the Water and Waste Management Division of the New Mexico Environment Department, and the Hearing Officer having been fully advised in the premises finds that the motion is well taken and should be granted.

THEREFORE, it is ordered, adjudged, and decreed that Respondents are granted an extension until October 14, 1994, within which to submit to Complainant a corrective action plan responsive to ordered action No. 2 of the above-captioned Compliance Order.

_____
Hearing Officer

Approved: _____
Joseph B. Rochelle, Esq.
Counsel for Respondent
UC

_____
for Lisa Cummings, Esq.
Counsel for Respondent
DOE

_____
Susan McMichael, Esq.
Counsel for Complainant
TELEPHONICALLY APPROVED 9/23/94

XV

RESPONSE TO COMPLIANCE ORDER REQUIREMENT 2 - KNOWLEDGE OF PROCESS CORRECTIVE ACTION PLAN

Introduction

This response provides the Los Alamos National Laboratory (the Laboratory) Environmental Restoration (ER) Project's corrective action plan to modify the method used for identifying hazardous wastes. The ER Project has used the term "knowledge of process" broadly in the past to describe all the existing information used to design sampling plans for ER Project site investigations, as well as all the existing information used to characterize the waste under Resource Conservation and Recovery Act (RCRA), Subtitle C. Because the broad use of this term has caused confusion in the past, it will no longer be used in relation to site investigation or waste characterization.

This response consists of two sections. Section 1 presents background information on how existing knowledge and acceptable knowledge have been used within the ER Project to make site characterization and waste management decisions. Section 1 is presented as background information to guide the New Mexico Environment Department (NMED) in its evaluation of the corrective action plan. Section 2 consists of the corrective action plan required by the Compliance Order NMHWA 94-12 that was issued by the NMED on August 12, 1994 and received by the Laboratory on August 15, 1994.

Definitions

The following terms will be used to describe the information used by the ER Project for site characterization and waste characterization.

Acceptable knowledge refers to information that is used for waste characterization in lieu of waste sampling and analysis. Acceptable knowledge includes process knowledge and previous chemical/analytical results associated with the waste, if any. Acceptable knowledge is a term used by the Environmental Protection Agency (EPA) in its guidance document, "Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Wastes," (OSWER 9938.4-03, April 1994).

Acceptable knowledge includes the component of "existing knowledge" as defined below, as it relates to waste characterization. In addition, acceptable knowledge includes any relevant information collected during the field activities (e.g., site investigation activities). For example, acceptable knowledge for wastes generated during a site investigation could include existing information that describes the disposal of listed hazardous wastes at the site plus the site investigation analytical results. For a corrective action, acceptable knowledge could include the results of the past sampling and analysis of soil that is to be excavated.

Existing knowledge refers to the body of information that existed about a site before an ER activity is undertaken. For ER site investigations, existing knowledge for a particular site will

include all of the historical information concerning past operations and waste disposal at the site, physical characteristics of the site, the environmental setting of the site, the identification of hazardous materials used at the site, and the results of previous environmental or waste sampling at the site (if any). The existing knowledge is obtained from archival record searches, personnel interviews, and visual site inspections. The primary purpose of this information is to design investigations needed to characterize potential contamination at the site and thus determine the need for corrective actions. For ER corrective actions, existing knowledge will include all of the information gathered before the investigation as well as all information collected during the investigation.

Potential contaminants of concern are any compounds or elements potentially present in environmental media or on structural debris at a concentration that may present a risk to human health or the environment. Potential contaminants of concern include, but are not limited to, hazardous constituents identified in the New Mexico Hazardous Waste Management Regulations (20 NMAC 4.1), Part 261, Appendix VIII.

Potential hazardous waste constituents are defined as constituents of listed or characteristic wastes that could potentially be present in ER Project waste. These constituents are identified in Appendix A and are among those constituents identified in 20 NMAC 4.1, Part 261, Subpart D or in Table 1 of Part 261.24. The potential hazardous waste constituents are a subset of the hazardous constituents identified in 20 NMAC 4.1, Part 261, Appendix VIII.

Previous chemical/physical analytical results are defined as existing, published, or documented waste analysis data, site characterization analytical results, or other previous analytical results or studies. A description of the previous chemical/physical analytical results will include the following information, if available: the sampling strategy (e.g., random sampling), the number of samples collected, sample collection technique (e.g., grab sampling using a pole-mounted beaker), analytical methods, quality assurance/quality control sample results, and detection limits. The description of previous analytical results must include all constituents identified in the past, not just those of concern for health risks.

Process knowledge refers to a subset of acceptable knowledge that describes the generation process for the wastes potentially managed at a site or that resulted in the contamination at a site. Process knowledge is used to identify specific constituents that may be present and the sources of these constituents. The latter information is especially important for determining whether associated wastes are RCRA-listed. Process knowledge will be described in the site specific waste management plan (WMP). Process knowledge is defined as the site history, which includes, to the extent possible, the start and end dates and a description of all previous and current activities affecting a specific site. Process knowledge could also include the processes generating the wastes that may have come to be located at a site, the raw materials used and associated material safety data sheets, products produced, and associated wastes.

1.0 BACKGROUND

This section presents background information on the current use of existing knowledge, acceptable knowledge, management of wastes generated by the ER Project, and potential limitations in the use of existing knowledge for waste management.

1.1 Existing Knowledge

Existing knowledge is used extensively in the ER Project for planning ER activities. Existing knowledge for individual solid waste management units (SWMU) is used to develop conceptual models describing site contamination and to design sampling plans. The existing knowledge for each SWMU is described in the RCRA Facility Investigation (RFI) Work Plans prepared by the ER Project for each Operable Unit (OU).

The evaluation of existing knowledge in the RFI Work Plan is used to identify potential contaminants of concern (PCOC) for each SWMU. If contaminants may be present, a sampling plan is developed to collect data on the presence or absence of PCOCs and the concentrations of PCOCs in order to make risk-based decisions to determine whether corrective actions are required at the site.

The completeness of existing knowledge is one factor that determines the level of investigation required at a SWMU. For example, if existing knowledge does not identify all specific PCOCs, which is typically the case for the Phase I investigations at most ER sites, screening-type analyses capable of quantifying a wide range of analytes will be used (i.e., gas chromatography/mass spectrometry [GC/MS] for volatile and semivolatile organics and inductively coupled plasma- emission spectroscopy [ICP-ES] for metals). Evaluation of the adequacy of existing knowledge is discussed in more detail in Section 2.2.

The evaluation of existing knowledge in the RFI Work Plan is specifically directed toward risk decisions rather than waste management decisions. Evaluation of existing knowledge in order to arrive at acceptable knowledge (i.e., process knowledge and previous chemical/physical analytical results) for waste management is first done during preparation of WMPs for ER field activities. The WMPs describe the wastes that will be generated by ER activities and how these wastes will be managed. The acceptable knowledge for WMPs may include any of the information evaluated for the RFI Work Plan plus any additional information collected since the work plan was prepared, such as results of environmental sampling and analysis. In preparing the WMP, acceptable knowledge is evaluated to assist in making a determination of the regulatory status of the waste that will be generated. The use of acceptable knowledge for waste characterization is described in Section 2.2.

1.2 Management of ER-Generated Wastes

Two general categories of ER Project activities are now generating wastes: site investigations and expedited cleanups. The general approach to managing wastes from these activities is discussed in subsection 1.2.1 and 1.2.2 below. This discussion includes the use of

acceptable knowledge, including process knowledge, for waste characterization. The incidence of waste management decisions based solely on process knowledge is very limited. In most cases, the acceptable knowledge used to make waste management decisions will include sampling and analysis data.

1.2.1 Site Investigations

Wastes generated during ER site investigations (investigation-derived wastes [IDW]) include such things as PPE, disposable sampling equipment, decontamination wastes, and borehole cuttings. Before a site investigation is begun, the wastes to be generated during the site investigation are characterized using acceptable knowledge contained in the RFI Work Plan. As the site investigation proceeds, the initial characterization is verified using field screening and analytical results from environmental samples. In most cases, analytical results from environmental samples and process knowledge should provide the waste generator with sufficient information to characterize the waste for RCRA. However, waste sampling and analysis is needed for potential RCRA-characteristic wastes if

- minimum detectable activity for field radiological methods is not low enough to determine whether the waste is nonradioactive, and/or
- analytical results for environmental samples are high enough to indicate that the waste could exceed RCRA characteristic limits.

Sampling of IDW to identify constituents of listed wastes is usually not necessary, because these constituents will have been previously identified by the analysis of environmental samples.

Site investigations being conducted as part of the ER Project generally fall into two categories: screening assessments and risk assessment sampling. As described below, data from both types of assessments are considered adequate for making proper waste management decisions.

Screening assessments are directed at quantifying concentrations of PCOCs at a site to determine whether they are above background and above risk-based screening action levels (SAL). (PCOCs include any contaminants that could pose a risk to human health and the environment). This type of sampling is performed at sites where little is known about the identity and concentrations of PCOCs. Analytical methods for screening assessment samples usually consist of GC/MS and ICP-ES.

Risk assessment sampling is implemented to collect data needed to perform a baseline risk assessment. This type of sampling is performed at sites where contaminants are known to be present. The technical approach for risk assessment sampling usually includes statistically based sampling designed to quantify contamination. Samples are analyzed using methods such as GC/MS and ICP-ES. Sufficient samples are collected to determine the representative concentrations of contaminants to which receptors would be exposed. If all contaminants at

the site have been identified by previous investigations, analytical methods focused to these constituents may be used.

Although RCRA waste characterization is not an immediate objective of either sampling approach, the data that are collected are considered adequate for characterizing the wastes generated by the investigation. The rationale for this determination is provided below.

Potential hazardous waste constituents comprise a subset of the constituents important for assessing site risk (e.g., PCOCs). The analytical methods used to detect constituents of concern for risk assessment would identify constituents of importance for waste characterization. ER investigations, including screening assessments, use best-available EPA-approved methods for analyzing environmental samples to determine concentrations of PCOCs. If constituents of importance for RCRA waste characterization decisions are present in environmental samples, they would be detected because the larger universe of PCOCs would be evaluated initially. Environmental sample data collected during the screening assessment or risk assessment sampling, along with other site-specific process knowledge, should be sufficient to determine whether IDW may ultimately be managed as characteristic or listed wastes.

The determination of whether the IDW is potentially characteristic due to toxicity is made by comparing measured concentrations of toxicity characteristic leaching procedures (TCLP) constituents in environmental media with TCLP regulatory levels. If these concentrations are high enough to indicate that TCLP levels could be exceeded, testing wastes using the TCLP may be necessary. The decision of whether sampling is necessary depends upon the levels present in the environmental media and the amount of environmental media present in the IDW. For example, if total concentrations are only slightly greater than TCLP levels and the contaminated environmental media constitutes only a small fraction of the IDW, TCLP analysis may not be needed (see Appendix B, RCRA Characteristic Wastes).

The determination of whether the IDW is potentially characteristic due to ignitability, corrosivity, or reactivity can also be made generally on the basis of results of process knowledge and/or environmental analyses (e.g., concentrations of explosives in soil). If not, waste sampling is conducted to make this determination.

If constituents of listed wastes are detected in environmental samples, the associated IDW may ultimately be managed as listed waste. In this case, identifying the source of these constituents is necessary. If process knowledge from the RFI Work Plan is not adequate to identify the source, it then becomes necessary to conduct additional interviews or otherwise collect additional information.

1.2.2 Expedited Cleanups

Expedited cleanups conducted after a site investigation is completed will use the results of the site investigation for RCRA waste characterization. As described for IDW, the site investigation identifies constituents important for RCRA waste characterization and their

concentrations. For some sites, it may be possible that the results at the investigation are sufficient to identify the need for a cleanup, but not sufficient for RCRA waste characterization. For these sites, a preliminary screening should be conducted for RCRA waste characterization prior to generation of the waste. Based on this information, a preliminary determination of the regulatory status of the waste is made before cleanup begins. Specific waste analyses for obtaining the data necessary for waste characterization and for ensuring proper management are identified in a cleanup plan. Waste disposal should not occur until waste analysis data have been received and reviewed. As described for IDW, additional information on the source of constituents of listed wastes may be needed to identify listed wastes. Collection of this additional process knowledge is done before the cleanup begins.

1.3 Limitations In Use Of Existing Knowledge For Waste Management

The major limitation with the use of existing knowledge for management of ER-generated wastes concerns not the type and quality of data but its evaluation. Data evaluation has tended to focus on risk assessment rather than waste management. Data may exist that have implications for waste management decisions not immediately relevant to site risk decisions. For example, constituents of listed wastes present below risk levels in environmental media may be considered irrelevant when evaluating data to plan cleanup activities. Although not important from a risk perspective, these constituents could be very important from a waste management perspective.

A related limitation concerns the adequacy of previously collected site characterization information as it relates to waste management decisions. For example, to assess the risk posed by contamination at a site, it is important to know the concentrations of constituents. From a site risk perspective, knowing the source of the constituent is not important. Information concerning the source of the constituent is very important, however, from a waste management perspective; this information is needed to determine whether listed wastes may be present.

To address these limitations, all existing knowledge needs to be evaluated with respect to waste management considerations in addition to site characterization considerations.

2.0 CORRECTIVE ACTION PLAN

The corrective action plan presented in this section describes the waste characterization process that will be used for identifying and characterizing hazardous or mixed wastes generated by the ER Project. The process is premised on the regulations currently in effect. In the event that diminimus levels are established for listed wastes or changed for characteristic wastes by the EPA or NMED, then the process will be amended to reflect these changes.

2.1 Corrective Action Plan Objectives

To ensure that the Laboratory properly characterizes ER Project wastes in accordance with 20 NMAC 4.1, the ER Project will implement the waste characterization process provided in this corrective action plan. This process will ensure that appropriate waste characterization data are used for decisions involving management of hazardous or mixed waste generated by the ER Project during the investigation phase and corrective action phase of the RCRA Corrective Action Program. This corrective action plan only addresses waste characterization required by RCRA Subtitle C and 20 NMAC 4.1.

2.2 Waste Characterization Process For ER Waste

The ER Project waste will be characterized for RCRA using

- acceptable knowledge, and/or
- waste-sample analytical results.

As discussed below (Step 4), waste samples will be collected and analyzed if the waste cannot be characterized for RCRA based solely on the acceptable knowledge.

A detailed explanation of the waste characterization process is provided below.

1. Evaluate the Acceptable Knowledge

   Before generating any ER waste, the acceptable knowledge (i.e., process knowledge and previous chemical/analytical results if available) will be described and evaluated in a site-specific WMP. References and any data gaps will be identified in the WMP.

   The acceptable knowledge will include a description of the site history and waste-generating activities. Based on the knowledge of the waste-generating activities, the potential hazardous waste constituents and potential RCRA waste classes will be identified (Appendix A).

   The WMP will be sent to the Hazardous and Solid Waste Group (ESH-19) and the Waste Services Group (CST-17) for review and comment.

2. Determine the RCRA Status of the Waste Based on Preliminary Information

   Based on the evaluation of the acceptable knowledge, a preliminary determination will be made on the RCRA status of each type of waste (Appendix B).

   If the acceptable knowledge is sufficient to determine that the waste is not RCRA, the waste will be classified as non-RCRA waste (Appendix B). If the acceptable knowledge is sufficient to determine that the waste is RCRA, the waste will be

classified as RCRA waste (Appendix B). If acceptable knowledge is not sufficient to determine that the waste is RCRA or non-RCRA, or the acceptable knowledge indicates that the waste is potentially RCRA waste, then additional acceptable knowledge will be compiled and reviewed as described in Step 4 below.

3. Manage Wastes Based on the Preliminary Determination

Management of the wastes will be based on this preliminary determination unless and until additional information described below is received that would change the RCRA status of the waste.

4. Identify and Review Additional Information and Reevaluate RCRA Status

After the waste-generating activities described in the WMP have begun, additional acceptable knowledge generated by these activities will be reviewed and the RCRA status of the waste re-evaluated. This additional acceptable knowledge may include site investigation or waste analytical results and/or evidence of contamination encountered during the field activities.

If this additional information does not adequately confirm the RCRA status of the waste, then the following information will be required:

Additional Interviews

Additional personnel interviews will be needed if a constituent of a listed waste is identified in the previous chemical/physical analytical results, including the site investigation or waste analytical results, but the existing acceptable knowledge does not provide sufficient information for determining whether the waste meets the listing description in 20 NMAC 4.1, Part 261, Subpart D.

A generic interview checklist (which is in the process of being developed) will be completed to ensure that the interviews are consistent, that they address the potential sources of the constituents of listed waste, and that they are properly documented. Before conducting interviews, the waste may be resampled to confirm the presence of constituents of listed wastes, especially in situations where the concentrations are slightly above the detection limits.

Additional Sampling and Analyses of the Waste

Additional waste sampling and analyses will be needed if any of the following situations occur:

- The site characterization analytical results are high enough to indicate that the waste could exceed RCRA characteristic limits.

- Constituents of listed waste are found to be near the detection limit.
- The site characterization samples or the waste samples, if any, are discovered to not have been analyzed for the potential hazardous waste constituents identified in Step 1.
- The site investigation samples or the waste samples, if any, were not analyzed using acceptable methods as described below.
- Evidence of contamination (e.g., organic vapors or visible contamination) that is not consistent with the site history is encountered during the field activities.
- The additional interviews identified waste-generating activities that could have produced potential hazardous waste constituents incapable of being detected by the previous analytical methods used.
- Additional sampling and analysis is required to ensure that the waste meets other applicable regulatory requirements, waste acceptance criteria (WAC), and/or waste analysis plan (WAP) requirements of the treatment, storage, or disposal facility that will receive the waste. The WAC/WAP criteria will be referenced in the WMP.

The waste must be sampled and analyzed using acceptable analytical methods. Acceptable methods are defined as methods in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) identified in Appendix A, other EPA-approved methods (e.g., Contract Laboratory Program methods), or other methods approved by NMED. Methods will be selected that will detect the potential hazardous waste constituents (Step 1) at the site.

If an EPA or NMED-approved method does not exist for a particular constituent or RCRA characteristic, then an industry-approved method may be used.

5. Determine Final RCRA Status

Based on the acceptable knowledge (including the additional information) and/or waste analytical results, a final determination will be made as to whether each type of waste is RCRA-regulated or not (Appendix B).

A determination of listed waste will be made after a reasonable effort has been made to identify the source of the listed-waste constituents (Step 4). To classify a waste as a listed waste, the source of the waste must be known, (i.e., it must be determined if the waste meets the listing descriptions). If the process knowledge has been thoroughly evaluated, and there is no indication that the waste meets the listing descriptions, the waste is not a listed waste and will be managed as a non-listed waste.

Based on the additional information described in Step 4 above (if any), the preliminary RCRA status of the waste will be reevaluated and a final determination of the RCRA status will be made.

6. Manage Waste According to RCRA Status

The wastes will be managed based on this final determination. The appropriate paperwork will be completed and submitted to ESH-19 and CST-17 so that the waste can be transported to the appropriate treatment, storage, or disposal facility.

If the waste is classified as a non-RCRA waste but poses a risk or threat to human health or the environment, the waste will be managed in a manner that protects human health or the environment.

APPENDIX A
POTENTIAL WASTESTREAM EVALUATION

Potential Waste Class	Potential Waste Constituents	Analytical Methods for Constituents	Comments
Spent halogenated solvents - F001, F002	Halogenated volatile alkanes	8010, 8240, or 8260	
Spent nonhalogenated ignitable solvents - F003	Nonhalogenated volatile aromatics and alkanes	8010, 8240, or 8260	
Spent nonhalogenated toxic solvents - F004	Nonhalogenated aromatics and alkanes	8250 or 8270	
Spent nonhalogenated toxic solvents - F005	Nonhalogenated aromatics and alkanes	8260	
Electroplating sludges and baths - F006-F012	Cyanide, cadmium, chromium, lead, nickel, silver	9010 (CN), and 6010 or 6020 (metals)	
TCLP metals - D004-D011	Arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver	6010 or 6020, and 7470 (may also include 7060 for As and 7740 for Se depending on required quantitation limit)	

Potential Waste Class	Potential Waste Constituents	Analytical Methods for Constituents	Comments
TCLP volatile organics - D018, D019, D021, D022, D027-D029, D035, D038, D039, D040, D043	Benzene, carbon tetrachloride, chlorobenzene, chloroform, 1,4-dichlorobenzene, 1,2-dichloroethane, 1,1-dichloroethylene, methyl ethyl ketone, pyridine, tetrachloroethylene, trichloroethylene, vinyl chloride	8240 or 8260	
TCLP semivolatile organics - D023-D026, D032-D034, D036, D037, D041, D042	Cresols, hexachlorobenzene, hexachlorobutadiene, hexachloroethane, nitrobenzene, pentachlorophenol, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol	8250 or 8270	
TCLP explosives - D030	2,4-Dinitrotoluene	8090, 8250, or 8270	
TCLP pesticides -D012, D013, D014, D015, D020, D031	Endrin, lindane, methoxychlor, toxaphene, chlordane, heptachlor,	8080, 8250, or 8270	
TCLP herbicides - D016, D017	2,4-D, 2,4,5-TP	8150	
Corrosives - D001	Acids, caustics	9040	

Potential Waste Class	Potential Waste Constituents	Analytical Methods for Constituents	Comments
Ignitables - D002	Ignitable liquids	ASTM D-93-79, D-93-80, or D-3278-78	
Reactive explosives - D003	High explosives	LANL HE field spot test	
Water reactive - D003	Alkali metals	No method	
Reactive sulfide - D003	Sulfide	9030	
Reactive cyanide - D003	Cyanide	9010	
Discarded chemical products - P and U lists (see HWMR-7, Part 261.33 for specific waste codes)	See HWMR-7, Part 261.33 for specific chemicals	See SW-846 for specific methods	

Note: Identification of a waste as an RCRA-listed waste requires documented archival information and/or personnel interviews.

APPENDIX B
DETERMINATION OF RCRA WASTES

To determine if a waste is a RCRA waste, it must first be determined whether it is a listed waste. Next, it will be determined if the waste is a RCRA characteristic waste.

RCRA Listed Waste

A waste will be classified as a RCRA listed waste if it meets the listing descriptions in 20 NMAC 4.1, Part 261, Subpart D or if the waste is "mixed with" or "derived from" a listed hazardous waste or listed mixed waste. The waste must be designated as listed waste if the source of a waste constituent of a listed waste is known to be any of the following:

- Wastes from non-specific sources listed in 20 NMAC 4.1, Part 261.31 (F-listed wastes)
- Wastes from specific sources listed in 20 NMAC 4.1, Part 261.32 (K-listed wastes)
- Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof listed in 20 NMAC 4.1, Part 261.33 (U- and P-listed wastes)

To determine that a waste is a F- or a K-listed waste, the following criteria must be met:

- There must be sufficient information to identify a waste-generating process listed in 20 NMAC 4.1, Part 261.31 and Part 261.32 at the particular site.
- A hazardous waste constituent identified in 20 NMAC 4.1, Part 261.31 and Part 261.32 must be detected in the waste associated with the waste-generating process. Table B.1 includes the constituents of listed wastes that may be present in the ER waste, based on the types of activities and materials historically used at the Laboratory.

Sufficient historical information dating back to the Manhattan Project is often available to determine the waste-generating processes at each site that may have produced F- or K-listed wastes. In addition, if a constituent of a listed waste is detected in the environmental or waste samples, additional interviews may need to be conducted to determine if the waste is listed. Based on an analysis of historical information, the only F-listed wastes that potentially were generated at the Laboratory in the past were F001-F005 solvent wastes and F006-F012 electroplating wastes. The only K-listed wastes that potentially were generated at the Laboratory in the past were K044-K047 explosive manufacturing wastes. Table B.1 includes the hazardous waste constituents expected to be present in F-listed and K-listed wastes and the hazardous waste constituents identified in 20 NMAC 4.1, Part 261.31 and Part 261.32 associated with these specific waste codes.

To determine that a waste is a P- or a U-listed waste, the following criteria must be met:

- There must be sufficient information to determine that commercial chemical products, off-specification species, and container residues listed in 20 NMAC 4.1, Part 261.33 were discarded or spilled at the site.
- A P- or U-listed substance must be detected in the waste.

Little information indicating historical spills or product disposal is available at the Laboratory. Therefore, at most sites it is unlikely that the ER waste will include P- and U-listed wastes. If a constituent of a listed waste is detected in the environmental or waste samples, additional interviews can be conducted to determine if the waste is RCRA-listed waste or non-RCRA waste.

RCRA Characteristic Waste

A waste will be classified as a RCRA characteristic waste if it exhibits any of the four characteristics (ignitability, reactivity, corrosivity, toxicity) described in 20 NMAC 4.1, Part 261, Subpart C.

To determine whether the waste exhibits the characteristic of toxicity, the samples must be analyzed using the TCLP. If the analytical results equal or exceed the toxicity characteristic (TC) regulatory levels (see Table B.2) in 20 NMAC 4.1, Part 261.24, the wastes must be designated as characteristic waste. In accordance with 20 NMAC 4.1, Part 261, Appendix II, a total analysis of a waste can be used to determine whether the waste exhibits the toxicity characteristic if the concentrations of the analytes are so low that the TC regulatory levels could not possibly be exceeded. Also, the total analyses of solid samples can be compared with "TC screening levels" (see Table B.2) to determine whether the TC regulatory levels could potentially be exceeded. The TC screening levels (mg/kg) are numerically equivalent to 20 times the TC regulatory levels (mg/L). The factor of 20 is based on the twenty-fold dilution that is incurred during the TCLP analyses. If the total analyses equal or exceed the TC screening levels, the samples should be analyzed using the TCLP. The comparison of the total analyses with the TC screening levels is valid only for solid samples or solid portions of sludge samples. This comparison is not valid for liquids or liquid portions of sludge samples. For liquids, the total analyses would be compared directly with the TC regulatory levels.

Use of Acceptable Knowledge to Determine the RCRA Status of the Waste

Acceptable knowledge can be used (in lieu of analyzing the waste) to determine that the waste is not RCRA if the following conditions are met:

- A complete site history has been compiled. A complete site history includes the start and end dates for the previous and current activities at a specific site. There must be no time gaps in the site history.

- The waste-generating activities have been identified. There must be sufficient information to identify the activities (e.g., using solvents to clean machinery, plating and etching, photo-processing, explosive manufacturing) at a site that could have generated RCRA wastes.

- The potential hazardous waste constituents at the site have been identified (Step 1).

- Acceptable analytical methods were used to analyze for the potential hazardous waste constituents identified in Step 1. Acceptable methods include SW-846 methods, other EPA-approved methods (e.g., Contract Laboratory Program Methods), or other methods approved by NMED.

- Based on process knowledge and previous chemical/physical analytical results, it can be determined that the waste

  - does not potentially contain any of the TCLP constituents (Table B.2);

  - does not potentially exhibit the characteristic of ignitability, corrosivity, or reactivity; and

  - is not potentially contaminated with solvents (including RCRA F-listed solvents), plating wastes (including RCRA F-listed plating wastes), explosive manufacturing wastes (including K-listed explosive manufacturing wastes), or discarded commercial chemical products, off-specification species, container residues, and spill residues thereof (i.e., potential RCRA P- or U-listed wastes).

Acceptable knowledge can be used to determine that the waste is RCRA if the conditions described in the first four bullets above are met and if the waste exhibits the characteristic of ignitability, corrosivity, reactivity, or toxicity or is a listed waste as defined above.

Use of Process Knowledge to Determine the RCRA Status of Disposable PPE and Disposable Sampling Equipment Waste

Process knowledge can be used to determine that the disposable PPE and disposable sampling equipment waste is not RCRA if the following conditions are met:

- The visible contamination is removed from contaminated or potentially contaminated items.
- The visibly uncontaminated items are segregated from the visibly contaminated items.

Note: If the visible contamination cannot be removed, the items will be segregated and characterized using the analytical results of the associated site characterization or waste samples.

Use of Process Knowledge to Determine the RCRA Status of Decontamination Liquids and Monitor Well Purge and Development Water Wastes

Rarely, will decontamination liquids and monitor-well purge and development water wastes exhibit the RCRA characteristics because of the dilution effects of the wash and rinse solutions or groundwater. In many cases, the concentrations of TC organics and metal constituents can be assumed to be present at very low concentrations and below the TC regulatory levels because they are diluted. The decontaminated items or the groundwater would have to be grossly contaminated for the decontamination liquids or the groundwater to equal or exceed the TC regulatory levels (which were developed by multiplying the federal drinking water standards by 100). If the process knowledge can be used to sufficiently demonstrate that these liquids are not listed wastes as described above and are not characteristic wastes because of dilution effects, sampling and analyzing these liquids to determine if they are RCRA-regulated may not be necessary. However, if the liquids are potentially contaminated with RCRA-listed waste, sampling and analyzing the liquids will be necessary. In addition,sampling and analyzing these liquids may be necessary if the decontamination liquids result from the cleaning of grossly contaminated items or if the groundwater is grossly contaminated.

Table B.1
Constituents of Listed "F" and "K" Wastes and Listing Description

EPA CODE	PROCESS DESCRIPTION	HAZARDOUS WASTE CONSTITUENTS
F001	The following spent halogenated solvents used in degreasing: tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of 10 percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, carbon tetrachloride, chlorinated fluorocarbons
F002	The following spent halogenated solvents: tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, a total of 10 percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane
F003	The following spent non-halogenated solvents: xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of 10 percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, methanol Note: Presence of these nonhalogenated organic compounds means the waste is a listed waste only if the waste also exhibits the characteristic of ignitability.

EPA CODE	PROCESS DESCRIPTION	HAZARDOUS WASTE CONSTITUENTS
F004	The following spent non-halogenated solvents: cresols and cresylic acid, and nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of 10 percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	cresols and cresylic acid, nitrobenzene
F005	The following spent non-halogenated solvents: toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, (before use) a total of 10 percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, 2-nitropropane
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) Sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum	cadmium, hexavalent chromium, nickel, cyanide (complexed)
F007	Spent cyanide-plating bath solutions from electroplating operations	Cyanide (salts)
F008	Plating bath residues from electroplating operations where cyanides are used in the process	Cyanide (salts)
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process	Cyanide (salts)

EPA CODE	PROCESS DESCRIPTION	HAZARDOUS WASTE CONSTITUENTS
F010	Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process	Cyanide (salts)
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations	Cyanide (salts)
F012	Quenching wastewater treatment sludges from metal heat-treating operations where cyanides are used in the process	Cyanide (complexed)
K044	Wastewater treatment sludges from the manufacturing and processing of explosives.	Note: Only constitutes a listed hazardous waste when the reactivity characteristic is exhibited. No hazardous waste constituents.
K045	Spent carbon from the treatment of wastewater containing explosives	Note: Only constitutes a listed hazardous waste when the reactivity characteristic is exhibited; no hazardous waste constituents
K046	Wastewater treatment sludges from the manufacturing, formulation, and loading of lead-based initiating compounds	Lead
K047	Pink/red water from TNT operations	Note: Only constitutes a listed hazardous waste when the reactivity characteristic is exhibited. No hazardous waste constituents

Table B.2 - 40 CFR Part 261.24 - Maximum Concentration of Contaminants for the Toxicity Characteristic

EPA CODE	CONTAMINANT	REGULATORY LEVEL (mg/L)	TC SCREENING LEVELS (mg/kg)
D004	Arsenic	5.0	100.0
D005	Barium	100.0	2000.0
D018	Benzene	0.5	10.0
D006	Cadmium	1.0	20.0
D019	Carbon tetrachloride	0.5	10.0
D020	Chlordane	0.03	0.60
D021	Chlorobenzene	100.0	2000.0
D022	Chloroform	6.0	120.0
D007	Chromium	5.0	100.0
D023	o-Cresol	[a]200.0	4000.0
D024	m-Cresol	[a]200.0	4000.0
D025	p-Cresol	[a]200.0	4000.0
D026	Cresol	[a]200.0	4000.0
D016	2,4,D	10.0	200.0
D027	1,4-Dichlorobenzene	7.5	150.0
D028	1,2-Dichloroethane	0.5	10.0
D029	1,1-Dichloroethylene	0.7	14.0
D030	2,4-Dinitrotoluene	[b]0.13	2.60
D012	Endrin	0.02	0.40
D031	Heptachlor (and its epoxide)	0.008	0.160
D032	Hexachlorobenzene	[b]0.13	2.60
D033	Hexachlorobutadiene	0.5	10.0
D034	Hexachloroethane	3.0	60.0

EPA CODE	CONTAMINANT	REGULATORY LEVEL (mg/L)	TC SCREENING LEVELS (mg/kg)
D008	Lead	5.0	100.0
D013	Lindane	0.4	8.0
D009	Mercury	0.2	4.0
D014	Methoxychlor	10.0	200.0
D035	Methyl Ethyl Ketone	200.0	4000.0
D036	Nitrobenzene	2.0	40.0
D037	Pentachlorophenol	100.0	2000.0
D038	Pyridine	[b]5.0	100.0
D010	Selenium	1.0	20.0
D011	Silver	5.0	100.0
D039	Tetrachloroethylene	0.7	14.0
D015	Toxaphene	0.5	10.0
D040	Trichloroethylene	0.5	10.0
D041	2,4,5,Trichlorophenol	400.0	8000.0
D042	2,4,6-Trichlorophenol	2.0	40.0
D017	2,4,5-TP	1.0	20.0
D043	Vinyl chloride	0.2	4.0

TC = Toxicity Characteristic

[a] If o-, m-, and p-cresol concentrations cannot be differentiated, the total cresol (D026) concentration is used. The regulatory level of total cresol is 200 mg/L.

[b] Quantitation limit is greater than the calculated regulatory level. The quantitation limit therefore becomes the regulatory level.