

LA-UR-16-21248

Approved for public release; distribution is unlimited.

Title: ADESH-AP-TOOL-115 Waste Compatability

Author(s): Martinez, Geraldine Emily

Intended for: Environmental Programs

Issued: 2016-03-01 (Rev.1) (Draft)

Disclaimer:

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the Los Alamos National Security, LLC for the National Nuclear Security Administration of the U.S. Department of Energy under contract DE-AC52-06NA25396. By approving this article, the publisher recognizes that the U.S. Government retains nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

ADESH-AP-TOOL-115

Revision: 0



Effective Date: 01/14/2016

Next Review Date: 01/14/2019

Environment, Safety, Health Directorate

Administrative Procedure

Waste Compatibility Determinations

Document Owner/Subject Matter Expert:

Name: Geri Martinez	Organization: ENV-CP	Signature: Signature on File	Date: 01-11-16
------------------------	-------------------------	---------------------------------	-------------------

Derivative Classifier: Unclassified or DUSA ENVPRO

Name: Gian Bacigalupa	Organization: ENV-CP	Signature: Signature on File	Date: 01-11-16
--------------------------	-------------------------	---------------------------------	-------------------

Approval Signatures:

Quality Assurance Reviewer: Doris Quintana	Organization: QPA-IQ/OIO	Signature: Signature on File	Date: 01-12-16
Responsible Line Manager: Raeanna Sharp-Geiger	Organization: ADESH	Signature: Signature on File	Date: 01-14-16

*This copy is uncontrolled.
Users are responsible for ensuring they work to the latest approved version.
To document a required read, Login to UTrain, and go to the Advanced Search.*

Waste Compatibility Determinations	No: ADESH-AP-TOOL-115	Page 2 of 8
	Revision: 0	Effective Date: 01/14/2016

REVISION HISTORY

Document Number and Revision <i>[Include revision number, beginning with Revision 0]</i>	Effective Date <i>[Document Control Coordinator inserts effective date]</i>	Description of Changes <i>[List specific changes made since the previous revision]</i>
ADESH-AP-TOOL-115, Rev. 0	01/14/2016	This is a new document.

Waste Compatibility Determinations	No: ADESH-AP-TOOL-115	Page 3 of 8
	Revision: 0	Effective Date: 01/14/2016

Table of Contents

Administrative Procedure	1
Revision History	2
Table of Contents	3
1.0 Introduction	4
1.1 Purpose	4
1.2 Scope	4
2.0 Precautions and Limitations	5
3.0 General Requirements	5
3.1 Data Collection	5
3.2 Compatibility of Materials in the Same Container.....	5
3.3 Waste and Packaging Compatibility.....	6
3.4 Container Segregation	6
3.5 Documentation	6
4.0 Definitions and Acronyms.....	7
5.0 Records	7
6.0 Training	7
7.0 References	7
8.0 Attachments or Appendices	8

Waste Compatibility Determinations	No: ADESH-AP-TOOL-115	Page 4 of 8
	Revision: 0	Effective Date: 01/14/2016

1.0 INTRODUCTION

The purpose of this document is to provide requirements for Waste Compatibility Determinations. This document is managed and owned by the Associate Directorate Environment, Safety and Health and provides instructions on the applicability of the requirement.

Generators and Treatment and Storage Facilities (TSFs) must collect characterization data and/or Acceptable Knowledge (AK) for generated and/or managed wastes and perform a compatibility determination on their wastes in order to prevent reactions or the potential for reactions between incompatible constituents, secondary job wastes, additives, waste streams and between the wastes and the packaging materials used to contain the wastes. Incompatible materials are materials which, when mixed, result in undesirable reactions that generate heat, fire, explosion, pressure, violent reaction, and/or toxic or flammable gasses, fumes, or dusts. Combining a waste with incompatible packaging materials can lead to the undesirable reactions listed above as well as degradation of the containers holding the waste. These potential reactions can occur instantaneously or slowly, over a period of time, and can be cumulative (i.e. a buildup of pressure or heat in a container or rust-through in a metal drum).

Three types of compatibility are of concern during management of wastes:

- Mixing of incompatible materials within a container is an important concern any time a generator is packaging wastes from different batches, sources, or processes into the same container, introducing other materials used to treat the waste such as neutralizers or sorbents, or adding secondary waste materials to a drum to prevent potential reactions that would be harmful to human health or the environment.
- Compatibility of waste with its packaging when waste is placed in a container. The waste must be compatible with inner and outer containers and liners, cushioning materials, bags, or any other materials used to package the waste. Waste must not be placed in an unwashed container that previously held an incompatible waste or material to ensure integrity of containers is maintained.
- Containers with incompatible waste materials must be segregated from each other in storage to prevent potential reactions that would be harmful to human health or the environment in the event of a leak or breach of the container(s).

Generators and TSFs must document all of the information used in making the compatibility determinations.

1.1 Purpose

The purpose of this document is to provide requirements and guidance for determining compatibility of hazardous waste for safe and compliant management and documenting the determination.

1.2 Scope

This document applies to any LANL employee, contractor, or sub-contractor who has been identified as a waste generator, is responsible for maintaining a waste storage area, or is responsible for packaging or repackaging waste.

Waste Compatibility Determinations	No: ADESH-AP-TOOL-115	Page 5 of 8
	Revision: 0	Effective Date: 01/14/2016

2.0 PRECAUTIONS AND LIMITATIONS

This document cannot establish new requirements; it may only summarize the requirements in federal or state statutes/regulations/permits, DOE Orders, and authorized Laboratory policies.

3.0 GENERAL REQUIREMENTS

The general process for making a waste compatibility determination consists of (1) collecting the data needed to perform the determination, (2) performing the determination, and then (3) documenting the results.

3.1 Data Collection

The generator must characterize the waste and prepare the waste characterization documentation as required by [ADESH-AP-TOOL-111](#). Characterization data and AK should provide enough information to perform the compatibility determination or at least identify the chemicals involved. Some information needed to make compatibility determinations is generic to the chemicals making up the waste. Such generic chemical data can be obtained from the following sources:

- Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) for the chemicals and/or products from which the waste is derived – available from the manufacturer, multiple online sources, or the LANL MSDS search page (from the LANL Homepage go to Safety/Industrial Hygiene and Safety/Chemical Safety/ Chemical Capability Tools/Material Safety Data Sheets Online)
- Online chemical information sources such as CAMEO (<http://www2.epa.gov/cameo>) or WISER (<http://wiser.nlm.nih.gov>)
- Standard industry references such as *Hawley's Condensed Chemical Dictionary* and *Sax's Dangerous Properties of Industrial Materials*

Data used in compatibility determinations can also come from analysis of waste streams. Testing used in compatibility determinations may include, for example, determining water reactivity, oxidation-reduction potential, testing for cyanides and sulfides, and pH determinations, among others.

Documentation obtained for the compatibility determination should be placed in the characterization record (i.e. as Acceptable Knowledge per ADESH-AP-TOOL-111 or as separate documentation per Section 3.5)

3.2 Compatibility of Materials in the Same Container

All wastes and other materials mixed or placed within a container must be compatible with each other to avoid potential reactions that could create hazards to people or the environment. Other materials mixed in waste containers could include neutralizers or absorbents added in accordance with ADESH-AP-Tools [901](#) and [902](#) as well as any secondary material added during treatment or processing of the waste. LANL Permit requirements ([Section 2.8.2](#)) and EPA Regulations (40 CFR 264.177) adopted by NMED do not allow mixing of incompatible wastes in containers unless certain conditions (40 CFR 264.17) are met. The following methods of performing inner-container compatibility determinations are recommended:

- 40 CFR 264 Appendix V or 40 CFR 265 Appendix V detail a method to classify waste materials into chemical groups and then compare the groups for adverse reactions listed in the groups. The records generated should include a listing of the chemical groups identified in a waste container and potential consequences of mixing identified, if any.

Waste Compatibility Determinations	No: ADESH-AP-TOOL-115	Page 6 of 8
	Revision: 0	Effective Date: 01/14/2016

- EPA guidance document, *A Method for Determining the Compatibility of Hazardous Wastes* (EPA 600-2/80-076, at <http://www.epa.gov/wastes/hazard/tsd/permit/tsd-regs/wap-refs/compat-haz-waste.pdf>), which provides the complete guidance on how to use this chart for qualitative evaluation of the compatibility of various waste types. The record generated is the worksheet from the method.
- For uncomplicated mixtures with only several components, a direct comparison of data may suffice but should still be documented as a note or memo to file.

NOTE: Chemical compatibility determinations involving radiological constituents is no different than non-radiological chemical constituents, however, compatibility due to radiolysis may require involvement of an SME.

3.3 Waste and Packaging Compatibility

Waste must be compatible with packaging materials to prevent potential reactions and to maintain the integrity of the containers to avoid releases during storage and transportation. Packaging includes not only outer packaging such as drums, boxes, or sacks, but also inner packaging such as bags, boxes, cans, fiberboard containers and any cushioning or filler materials. Most manufacturers of packaging materials can provide chemical compatibility information for their products. The EPA guidance document above, *A Method for Determining the Compatibility of Hazardous Wastes* (EPA 600-2/80-076) can also be used to provide packaging compatibility information. Records should include any manufacturer documentation obtained and the determination documentation.

3.4 Container Segregation

EPA storage regulations 40 CFR 264.177 adopted by NMED and LANL Permit requirements Section 2.8.2 require segregation of incompatible materials in containers during storage. Segregation is required to prevent commingling of incompatible wastes during storage or in the event of a release or spill and requires that incompatible wastes are not stored within or on the same secondary containment structure or are not stored so that a release or spill of these wastes might commingle in a fire suppression water holding area or tank. The LANL Permit incorporates the segregation and compatibility requirements from Department of Transportation (DOT) Regulations at 49 CFR 177.848. Records for a compatibility determination under the DOT method should include documentation of the class or division of the materials and the segregation table designation, if any.

3.5 Documentation

EPA regulations at 262.40 and 264.73, as adopted by NMED and LANL's hazardous waste permit require that compatibility determinations be documented. When applicable the documentation should include:

- MSDSs or SDSs for the product or chemicals making up the waste
- Copies of pages from standard references with chemical data for the chemical constituents
- Printouts of chemical data from online chemical information sources
- Manufacturer information or cut sheets for the products
- Analytical data for the materials

Waste Compatibility Determinations	No: ADESH-AP-TOOL-115	Page 7 of 8
	Revision: 0	Effective Date: 01/14/2016

- Copies of pertinent portions of procedures used to produce the waste that describe the waste or reactions and/or processes that generated the waste
- Written notes on composition, reactions, or processes that generated the waste
- Any other AK documentation available for the waste stream
- Completed charts and results from determination methods described above

Documentation should include manufacturer or supplier names, model or product numbers, and specific quantities or other identifying descriptors as available. The documentation should be complete enough so that an independent auditor can re-create the compatibility determination without obtaining any additional information or data. Documentation that shows compatibility within a container and with the packaging materials should be included in WCATS. If the determination can be shown with simple statement, it should be included as text in the Waste Description panel or Additional Information Panel of WCATS. If the determination involves stand-alone documents, the documents should be uploaded into the Documentation Panel of WCATS. Compatibility documentation for segregation of different containers in storage should be accessible at the storage area during inspections and/or audits.

4.0 DEFINITIONS AND ACRONYMS

Compatibility – means that waste, including secondary job waste, can be safely mixed with materials and the resultant waste mixture will not react in a manner that produces effects which are harmful to human health and the environment including: heat or pressure, fire, explosions, or violate reactions; uncontrolled toxic mists, dusts, fumes, or gases in sufficient quantities to pose a risk of fire or explosions; or damage the structural integrity of the container, including the inner liner, in a manner that can cause corrosion or decay (see 40 CFR §264.17 and §264.172).

See LANL [Definition of Terms](#).

See LANL [Acronym Master List](#).

5.0 RECORDS

Records generated by this document will be submitted for records management in accordance with [P1020-1, Laboratory Records Management](#) and if applicable, with the [ADESH-AP-006, Records Management Plan](#).

Forms provided in the determination method or, at a minimum, user-generated documentation of the compatibility determination must be uploaded into the WCATS system where it will be maintained as part of the operating record.

6.0 TRAINING

See Waste Management Procedure P409, Section 6.0.

7.0 REFERENCES

Larranaga, Michael D., and Richard J. Lewis Sr. and Robert Lewis, *Hawley's Condensed Chemical Dictionary*, 15th ED, Wiley and Sons.

Los Alamos National Laboratory, *P409 LANL Waste Management*.

Waste Compatibility Determinations	No: ADESH-AP-TOOL-115	Page 8 of 8
	Revision: 0	Effective Date: 01/14/2016

Los Alamos National Laboratory, *ADESH-Tool-111 Waste Characterization*.

Los Alamos National Laboratory, *ADESH-AP-Tool-206.2 Management of Hazardous Waste by Generators*.

Los Alamos National Laboratory, *ADESH-Tool-802 Permitted Storage Requirement*, Los Alamos National Laboratory, *Hazardous Waste Permit*.

Los Alamos National Laboratory – MSDS Online, MSDS Search, <int.lanl.gov/safety/industrial_hygiene_and_safety/Chemical-safety/chemical-capability-tools.shtml>

New Mexico State University, Example Compatibility Chart, <int.lanl.gov/safety/industrial_hygiene_and_safety/Chemical-safety/chemical-capability-tools.shtml>

Princeton University, Chemical Compatibility, <int.lanl.gov/safety/industrial_hygiene_and_safety/Chemical-safety/chemical-capability-tools.shtml>

Richard J. Lewis Sr., *Sax's Dangerous Properties of Industrial Materials*, John Wiley and Sons, U.S. Department of Transportation, 49 CFR 177.848, *Segregation of Hazardous Materials*

U.S. Environmental Protection Agency, 40 CFR 264 Appendix V and 265 Appendix V, *Examples of Potentially Incompatible Waste*

U.S. Environmental Protection Agency, 40 CFR 264.177, *Special Requirements for Incompatible Wastes*

U.S. Environmental Protection Agency, 40 CFR 264.17, *General Requirements for Ignitable, Reactive, and Incompatible Wastes*

U.S. Environmental Protection Agency, *A Method for Determining the Compatibility of Hazardous Wastes*, EPA 600-2/80-076

U.S. Environmental Protection Agency, Computer Aided Management of Emergency Operations (CAMEO), <<http://www2.epa.gov/cameo>>

U.S. National Library of Medicine, Wireless Information System for Emergency Responders, <<http://wiser.nlm.nih.gov>>

8.0 ATTACHMENTS OR APPENDICES

None