INEEL/EXT-98-01213

Rev. 1

February 1999

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A Regulatory Analysis and Reassessment of U.S. Environmental Protection Agency Listed Hazardous Waste Numbers for Applicability to the INTEC Liquid Waste System

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A Regulatory Analysis and Reassessment of U.S. Environmental Protection Agency Listed Hazardous Waste Numbers for Applicability to the INTEC Liquid Waste System

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Published February 1999

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**Prepared for the
U.S. Department of Energy
Under DOE Idaho Operations Office
Contract DE-AC07-94ID13223**

EXECUTIVE SUMMARY

This report concludes that there are four listed hazardous waste numbers (F001, F002, F005, and U134) applicable to the waste in the Process Equipment Waste Evaporator (PEWE) liquid waste system. The chemical constituents associated with these listed hazardous waste numbers, including those listed only for ignitability are identified in Table 4. For F- or U-listed constituents listed only for ignitability, when mixed with water at the point of generation or upon entering and mixing with waste within the PEWE liquid waste system, lost the characteristic of ignitability; thus, the listing (either F- or U-listed) for that constituent would no longer carry the listing per 40 CFR 261.3(a)(2)(iii).

This report was based on information provided in the DRAFT "Listed Waste Determination Report," WINCO-1132, June 1993, (hereafter, *WINCO-1132*), interviews with INEEL/INTEC personnel familiar with the PEWE liquid waste system and/or waste management operations, background documentation, and other current information identifying any chemical constituents and their associated listed hazardous waste numbers that may have entered the PEWE liquid waste system.

The "Conclusions" section of *WINCO-1132* identified the apparent purpose of the document as to providing a basis to determine which, if any, of the listed hazardous waste numbers included in the Resource Conservation and Recovery Act (RCRA) Part A permit application should be requested for removal by the Division of Environmental Quality (DEQ) and not as a mechanism by which listed hazardous waste numbers would be applied to wastes in the PEWE liquid waste system or secondary waste streams generated in the management of that system. For example, *WINCO-1132* retained listed hazardous waste numbers based on *confirmed use/inferred disposal* [italics added for emphasis].

The RCRA Part A permit application hazardous waste numbers identify chemical constituents that either as a result of a particular characteristic (40 CFR 261, Subpart C) or as a result of a specific process (40 CFR 261, Subpart D) may be treated or stored by the PEWE liquid waste system. The RCRA Part A permit application for the PEWE liquid waste system identifies the universe of Environmental Protection Agency (EPA) hazardous waste numbers [23 characteristic (hazardous waste codes) numbers and 105 listed numbers (four F-listed hazardous waste numbers, 20 P-listed hazardous waste numbers, and 81 U-listed hazardous waste numbers)] deemed acceptable for storage and treatment. This evaluation, however, identifies only listed waste (and their chemical constituents) that have actually entered the PEWE liquid waste system and would, therefore, be assigned to the PEWE liquids and treatment residuals. This report reevaluated *WINCO-1132's* 101 chemical constituents (comprising 105 listed hazardous waste numbers) to the point of identifying only those listed hazardous waste numbers applicable to waste generated from the PEWE liquid waste system based on *confirmed use/confirmed disposal*.

This report is not intended to be a full characterization document, but to provide a rational approach for assignment of listed hazardous waste numbers to waste generated from the PEWE liquid waste system. Assessment of characteristic and applicable land disposal restrictions (LDRs), including underlying hazardous constituents, will be based on testing source waste and/or process knowledge.

Neither does this report address, nor is it intended to address, issues associated with the Idaho Nuclear Technology and Engineering Center (INTEC) liquid waste or secondary waste streams for "delisting" purposes.

CONTENTS

ACRONYMS	vii
1. INTRODUCTION	1
1.1 Historical	1
1.2 Analysis Methodology	2
1.3 Information Presented	3
2. PURPOSE	4
2.1 Listed Waste Evaluations	4
2.2 Characteristic Waste, LDRs, and Underlying Hazardous Waste Evaluations	4
3. EXPLANATION OF TABLES 1, 2, AND 3 CONTENTS	5
4. RATIONALE AND DECISIONS FOR GENERATION OF TABLES 1, 2, AND 3	6
5. USE AND COMMENTS FOR TABLES 1, 2, AND 3 INFORMATION	7
6. FOOTNOTES	35
7. REFERENCES	36

TABLES

1. Regulatory Evaluation of Constituents Known or Suspected of Having Entered the PEWE System.	8
2. Constituents Listed Only for Ignitability.	19
3. Constituents Never Having Entered the PEWE System or Not Listed Upon Entering the PEWE System.	24
4. Summary of Constituents and Applicable Listed Hazardous Waste Numbers.	34

ACRONYMS

CAS	Chemical Abstract Service
CFR	Code of Federal Regulations
DEQ	Division of Environmental Quality
DOE-ID	U.S. Department of Energy, Idaho Operations Office
EPA	U.S. Environmental Protection Agency
ICPP	Idaho Chemical Processing Plant
IDAPA	Idaho Administrative Procedures Act
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
LDRs	land disposal restrictions
LMITCO	Lockheed Martin Idaho Technologies Company
NWCF	New Waste Calcining Facility
PEWE	Process Equipment Waste Evaporator
RCRA	Resource Conservation and Recovery Act
TSDF	treatment, storage, and disposal facility
WINCO	Westinghouse Idaho Nuclear Company

A Regulatory Analysis and Reassessment of U.S. Environmental Protection Agency Listed Hazardous Waste Numbers for Applicability to the INTEC Liquid Waste System

1. INTRODUCTION

1.1 Historical

This report is a major revision of the Regulatory Analysis of INTEC Liquid Waste Stream U.S. Environmental Protection Agency Hazardous Waste Numbers, Rev. 2, July 1998. Comments from Lockheed Martin Idaho Technologies Company (LMITCO) and Department of Energy Idaho Operations Office (DOE-ID) personnel resulted in text and table revisions to provide more information and clarity to the document.

Development of the *Regulatory Analysis of INTEC Liquid Waste Stream U.S. Environmental Protection Agency Hazardous Waste Numbers*, Rev. 2, July 1998, was originally the result of a request from the Idaho Department of Health and Welfare, Division of Environmental Quality (DEQ), in a letter to Donald N. Rasch, DOE-ID, dated October 20, 1997, for DOE-ID to provide to DEQ "a 1992 Listed Waste Determination Report" that "may address several concerns" relevant to permitting the New Waste Calcining Facility (NWCF) under the provisions of Idaho Administrative Procedures Act (IDAPA) 16.01.05.008 [Title 40, Code of Federal Regulations (CFR), Part 264, Subpart X or Subpart O].

Information in Revisions 0 and 1 of the *Regulatory Analysis of INTEC Liquid Waste Stream U.S. Environmental Protection Agency Hazardous Waste Numbers*, was based on operational information up to and including 1993 and changes incorporated in Revision 2 were a result of operational information acquired after 1993 up to July 1998. This report provides the applicable hazardous waste numbers as to the date of publication.

Confusion as to the applicable hazardous waste numbers to be assigned to the Idaho Nuclear Technology and Engineering Center (INTEC) liquid waste and secondary waste streams existed for years at the (INTEC).^a The September 1990, Resource Conservation and Recovery Act (RCRA) Part A permit application identified 101 "F," "P," and "U" hazardous waste numbers.^b As of July 1998, there were 105 "F," "P," and "U" hazardous waste numbers and 23 characteristic hazardous waste numbers on the RCRA Part A permit application for the PEWE liquid waste system.^c

The RCRA Part A permit application hazardous waste numbers identify chemical constituents that either as a result of a particular characteristic (40 CFR 261, Subpart C), or as a result of a specific process (40 CFR 261, Subpart D), may be treated or stored by the system. RCRA Part A permit application hazardous waste numbers (either characteristic or listed), however, do not indicate which listed wastes have actually entered the system for treatment or storage. Determination of the applicable listed hazardous waste number to be assigned to chemical wastes entering the system is the sole responsibility of the generator discharging wastes to the system.^d

As early as September 1991, efforts were initiated by Westinghouse Idaho Nuclear Company (WINCO) Environmental Compliance, based on research of processes and generator information, to have 32 listed hazardous waste numbers removed from the RCRA Part A permit application.^e The DRAFT "Listed Waste Determination Report," WINCO-1132, June 1993, (hereafter, *WINCO-1132*) provided a

basis for the elimination of more RCRA Part A permit application listed hazardous waste numbers over the original 32 hazardous waste numbers proposed in September 1991.

The lack of a definitive policy as to which listed hazardous waste numbers should be applied to the liquid and secondary waste streams of the PEWE liquid waste system commenced during the WINCO operational period and continued for many years.^f Assignment of listed hazardous waste numbers (primarily to secondary waste streams of the PEWE liquid waste system) has resulted in applying to these streams anywhere from the maximum 105 listed hazardous waste numbers of the RCRA Part A permit application to a list of 33 listed hazardous waste numbers that have been erroneously misconstrued from WINCO-1132's Table 1 information.

Section 5.0, "Conclusions," of WINCO-1132 stated the following:

"The chemicals listed in Table 1 were identified as 'Confirmed use, Confirmed disposal' or 'Confirmed use, Inferred disposal,' and will be retained in the Part A permit application. Chemicals listed in Table 2 were identified as 'Inferred use, Inferred disposal,' 'No confirming documentation,' or 'Listed solely for ignitability,' and are *recommended for removal* [italics added for emphasis] from the Part A permit application for the following TSD units: CPP-659 NWCF Evaporator Storage Tanks; CPP-633 WCF HLW Evaporator Storage Tanks; CPP-659 NWCF Storage Tanks; CPP-604 PEW Condensate/Feed Storage Tanks; CPP-1618 LET&D Nitric Acid Recycle Tank; CPP-604 PEW Evaporator; CPP-659 NWCF Calciner; WINCO Tank Farm; CPP-604 PEW Storage Tanks; CPP-601 WG/WH Cells Storage and Treatment Tanks; WINCO Calcine Bin Sets; CPP-633 WCF Evaporator; CPP-659 NWCF Evaporator; WINCO Percolation Ponds; and CPP-1618 LET&D Evaporators."

From the "Conclusion" it is apparent the purpose of WINCO-1132 was to provide a basis to determine which, if any, of the listed hazardous waste numbers included in the RCRA Part A permit application should be requested for removal by the DEQ and not as a mechanism by which listed hazardous waste numbers would be applied to wastes in the PEWE liquid waste system or secondary waste streams generated in the management of that system. WINCO-1132, however, still retained listed hazardous waste numbers based on *confirmed use/inferred disposal* [italics added for emphasis]. In this report, the authors reevaluated WINCO's 101 chemical constituents (comprising 105 listed hazardous waste numbers) to the point of identifying only those listed hazardous waste numbers applicable to waste generated from the PEWE liquid waste system based on *confirmed use/confirmed disposal*.

1.2 Analysis Methodology

In preparing this report, the authors:

- Reassessed information and language in WINCO-1132 from a technical/regulatory framework to determine the manner of use of chemical constituents potentially received by the PEWE liquid waste system.
- Compared information in supporting documentation for WINCO-1132 for additional information and clarification associated with listed waste identification criteria.
- Performed interviews with personnel either involved with past chemical use or those highly familiar with laboratory and operation processes to confirm the method and use of chemicals to assess correct

application of 40 CFR 261 Subpart D listing criteria. These interviews included assessment of waste shipments to INTEC for disposal and/or testing.⁸

- Applied hazardous waste listing criteria identified in 40 CFR 261 Subpart D to determine proper assignment of listed hazardous waste numbers; i.e., whether the chemical constituent had been disposed to the PEWE liquid waste system as spent material requiring a listing, as spent material not requiring a listing, or as an unused material, including "sole active ingredient" formulations.
- Had a review of the final decisions made in this report with a committee of cognizant Resource Conservation and Recovery Act (RCRA) professionals.

1.3 Information Presented

This report presents information in four tables:

- Table 1, "Regulatory Evaluation of Constituents Known or Suspected of Having Entered the PEWE System," has listed hazardous waste numbers and constituents primarily taken from WINCO-1132's Table 1, "Chemicals Concluded to Have Entered the PEW System," with the exception of bromoform and 2-nitropropane, which were added as a result of information presented in a DOE-ID document.¹
- Table 2, "Constituents Listed Only for Ignitability," presents listed hazardous waste numbers and constituents that are listed only for ignitability. Mixed with water at the point of generation or upon entering and mixing with waste within the PEWE liquid waste system, these constituents lost the characteristic of ignitability; thus, the listing (either F- or U-listed) for that constituent would no longer carry the listing per 40 CFR 261.3(a)(2)(iii).
- Table 3, "Constituents Never Having Entered the PEWE System or Not Listed Upon Entering the PEWE System," represents constituents that never entered the PEWE liquid waste system or entered as listed waste.
- Table 4, "Summary of Constituents and Applicable Listed Hazardous Waste Numbers," provides the final decision of this report based on *confirmed use/confirmed disposal*.

2. PURPOSE

2.1 Listed Waste Evaluations

Evaluation of *WINCO-1132*, the background documents used to develop *WINCO-1132*, and additional operational information obtained from 1993 to the current 1998 publication date, has resulted in the information presented in Tables 1, 2, and 3. The information in these tables provides the rationale for whether or not to apply an Environmental Protection Agency (EPA) hazardous waste listed number^b associated with the hazardous waste constituent to the waste.

This report identifies chemical constituents added to the PEWE liquid waste system and those EPA listed hazardous waste numbers (40 CFR 261.31 and 261.33) based on confirmed use/confirmed disposal. Hazardous waste numbers identified in this report differ from the hazardous waste numbers enumerated in the RCRA Part A permit application [EPA Form 8700-23 (Rev. 10/01/96) Item XIV - Description of Hazardous Wastes]. The RCRA Part A permit application identifies the universe of EPA hazardous waste numbers [23 characteristic (hazardous waste codes) numbers and 105 listed numbers (four F-hazardous waste numbers, 20 P, and 81 U)] deemed acceptable for storage and treatment. This report, however, identifies only listed waste (and their chemical constituents) that have actually entered the PEWE liquid waste system and would, therefore, be assigned to the PEWE liquids and treatment residuals.

2.2 Characteristic Waste, LDRs, and Underlying Hazardous Waste Evaluations

This report does not address application of characteristic numbers, also known as "hazardous waste codes" (40 CFR 261 Subpart C). Rather, this report addresses only relevant hazardous waste listed numbers for the PEWE liquid waste system. Assignment of listed hazardous waste numbers will be applied to waste undergoing storage and treatment based on actual listed wastes that have entered the PEWE liquid waste system.

It was suggested that sampling and analysis be used to identify listed constituents. Sampling and analysis should be used to determine if the waste is characteristic (40 CFR 261 Subpart C) or to provide information for a petition to amend Part 261 to exclude a waste produced at a particular facility (40 CFR 260.22). This report neither addresses characteristic issues associated with the INTEC liquid waste or secondary waste streams, nor is it intended for "delisting" purposes. Therefore, sampling and analysis for purposes of this report is not applicable. Listed hazardous waste numbers are initially assigned to waste streams based on known receipt of listed waste into a system and not based on sampling and analysis.

This report is not intended to be a full characterization document, but to provide a rational approach for initial assignment of listed hazardous waste numbers to waste generated from the PEWE liquid waste system. Assessment of characteristic and applicable land disposal restrictions (LDRs), including underlying hazardous constituents, will be based on testing source waste and/or process knowledge.

3. EXPLANATION OF TABLES 1, 2, AND 3

Table 1, "Regulatory Evaluation of Constituents Known or Suspected of Having Entered the PEWE System," Table 2, "Constituents Listed Only for Ignitability," and Table 3, "Constituents Never Having Entered the PEWE System or Not Listed Upon Entering the PEWE System," designates the following:

- The first column identifies the "Chemical Constituent" being evaluated.
- Immediately adjacent to that column is the Chemical Abstract Service Number (CAS #), which provides a unique identification number for the chemical constituent. The CAS # eliminates ambiguity created when a particular chemical constituent may be referred to by various other names.
- The "Regulatory Position" column summarizes the justification for the decision to either apply an EPA hazardous waste listed number or not.
- The *WINCO-1132* "Suspected Listed Hazardous Waste Number Information" column lists hazardous waste numbers taken from *WINCO-1132* that were recommended for retention on the RCRA Part A permit based on confirmed use/confirmed disposal and/or confirmed use/inferred disposal.
- The final column, "Final EPA Waste Number or Not Applicable (N/A)," states the applicable hazardous waste listed number or, if a hazardous waste listed number is not applicable, an N/A is placed in the column.

4. RATIONALE AND DECISIONS FOR GENERATION OF TABLES 1, 2, AND 3

The rationale and decisions for completing Tables 1, 2, and 3 were based on the following:

- Each piece of information in *WINCO-1132* and background documents used to develop *WINCO-1132* was evaluated on its own merit.
- The documents were reviewed for conflicting statements and/or purely speculative statements.
- Additional research, such as interviews with personnel that had long-time working experience at the INTEC, was performed to resolve certain ambiguities arising from the analysis of the *WINCO-1132*, as presented in Tables 1, 2, and 3.
- *WINCO-1132* discussions were evaluated on their own merits to help support the regulatory decision section of Tables 1, 2, and 3. "Confirmed use, confirmed disposal" and "Confirmed use, inferred disposal" were carefully scrutinized and validated.
- Consideration was given as to the purpose and objective of *WINCO-1132*. *WINCO-1132* was intended to reduce the number of listed hazardous waste numbers on the RCRA Part A permit application. Also, *WINCO-1132* was evaluating chemicals to be included on Part A permit applications for facilities such as the Radioactive Mixed Waste Staging Facility and the Hazardous Chemical and Radioactive Waste Storage Facility. The purpose of *WINCO-1132* was not to provide a baseline inventory of chemicals that had been potentially discharged to the PEWE liquid waste system, but for those chemicals that would potentially be discharged to the PEWE liquid waste system in the future.
- Confirmation of the first removal of excess or outdated chemicals at the Idaho National Engineering and Environmental Laboratory (INEEL) through lab packing and subsequent shipping to off-Site RCRA treatment, storage, and disposal facilities (TSDFs) occurred in late 1984 to early 1985. A major removal of excess or outdated chemicals commenced at INTEC in the latter part of 1988, with the first shipment being completed in 1989. This INTEC "cleanout" was a result of a walk-through by Idaho DEQ and U.S. EPA Region 10 personnel. This resulted in the removal of a significant number of U- and P-listed chemicals and a large number of nonregulated chemicals.¹
- Before the rigorous management of wastes in laboratories and operations, the possibility that minute portions of unused chemical discharges to the PEWE liquid waste system could have occurred cannot be definitively ruled out. However, significant efforts to confirm that such discharges did in fact occur met with negative results. Rather, based on interviews with laboratory personnel and the volumes and types of unused chemicals shipped in lab packs, it became clear that discharge to the PEWE liquid waste system for waste disposal does not appear to have been a practice. This information was factored in the final decision for Table 1.

5. USE AND COMMENTS FOR TABLES 1, 2, AND 3 INFORMATION

The number of initial hazardous waste numbers identified in *WINCO-1132* represented by the applicable hazardous waste numbers in Tables 1, 2, and 3 is significantly smaller than the number of listed hazardous waste numbers identified on the RCRA Part A permit application for the PEWE liquid waste system (as previously stated in Section 2). Tables 1 and 2 information, however, identifies listed hazardous waste numbers for the PEWE liquid waste system based on waste streams that have actually entered the system. Actual listed hazardous waste numbers and associated constituents known to have been disposed to the PEWE liquid waste system are summarized in Table 4. Although the RCRA Part A permit application hazardous waste numbers and the Waste Acceptance Criteria for the PEWE liquid waste system allow for acceptance of additional EPA hazardous waste numbers into the PEWE liquid waste system, acceptance of these additional EPA hazardous waste numbers can (a) complicate treatment and disposal of the waste in the system (e.g., require specialized treatment technologies unless a determination of equivalent treatment per 40 CFR 268.42[b] is obtained), (b) complicate treatment and disposal of other (secondary) wastes generated in the management of this system, and (c) affect future closure of the system by increasing the cost of chemical analysis and complicate risk approach to closure.

Specifically, by controlling the introduction of new or additional chemical constituents beyond what has been identified to date in this evaluation into the PEWE liquid waste system, petitions submitted to the regulatory agencies for LDR variances and determination of equivalent treatment can be minimized or eliminated. Likewise, the need to provide a facility necessary to handle unique hazardous waste codes and associated LDR treatment technologies can be eliminated. Additionally, minimization of hazardous waste codes reduces the complexity of a delisting petition (if pursued) for the final form of the waste, e.g., calcine, and provides less complex management of secondary waste streams associated with the waste (i.e., satellite accumulation areas from a maximum of 1 liter to 55 five gallons).

Table 4 information is to be used to assign listed hazardous waste numbers to the PEWE system waste and secondary wastes generated from the PEWE liquid waste system.

The RCRA Part A permit application hazardous waste numbers is the set of all potential hazardous waste numbers that are authorized for receipt into the system and does not reflect the actual EPA hazardous waste numbers that have actually been discharged into the PEWE liquid waste system. Tables 1 and 2, unlike Item XIV, "Description of Hazardous Wastes," EPA Form 8700-23 (Rev. 10/01/96) of the RCRA Part A permit application, identifies only waste codes known to have been disposed of into the system.

Although some hazardous waste numbers (e.g., F003) may no longer be applicable, the LDR treatment standard for certain hazardous waste number categories would be required and will carry on through to final treatment [40 CFR 261.3(a)(2)(iii)].

If new information or data indicate the addition or elimination of hazardous waste numbers assigned to PEWE and secondary waste streams, Tables 1 and 2 will be modified to reflect the new information or data.

Recommendations have been made to the laboratories to establish controls prohibiting the disposal listed wastes not identified in Table 4 to the PEWE liquid waste system.

Table 1. Regulatory evaluation of constituents known or suspected of having entered the PEWE System.

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Acetonitrile	75-05-8	No written or verifiable oral information indicates unused, pure, or sole active ingredient formulations of acetonitrile were disposed of to the PEWE waste system. However, verbal statements indicate acetonitrile was disposed of as a used, spent chemical to the PEWE. Spent acetonitrile or spent solutions of acetonitrile do not require a U-listed hazardous waste number and neither is acetonitrile a constituent listed in F001, F002, F003, F004, or F005.	U003	N/A
Ammonium vanadate	7803-55-6	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of ammonium vanadate being disposed of to the PEWE waste system exists. Although there appears to be conflicting information concerning procedure statements in <i>WINCO-1132</i> , it is apparent that the stock solutions did not contain ammonium vanadate as a sole active ingredient. Spent ammonium vanadate or spent solutions of ammonium vanadate do not require a U-listed hazardous waste number and neither is ammonium vanadate a constituent listed in F001, F002, F003, F004, or F005	P119	N/A
Aniline	62-53-3	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of aniline being disposed of to the PEWE waste system exists. Spent aniline or spent solutions of aniline do not require a U-listed hazardous waste number and neither is aniline a constituent listed in F001, F002, F003, F004, or F005	U012	N/A
Benzene	71-43-2	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of benzene being disposed of to the PEWE waste system exists. However, sufficient information is available for assignment of F005 for benzene as a spent solvent.	U019 F005	F005

Table 1. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Bromoform	75-25-2	Verbal statements indicated that bromoform was combined with methanol and used as a standard. No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of bromoform being disposed of to the PEWE liquid waste system exists. Bromoform was identified solely on inferred disposal. Spent bromoform or spent solutions of bromoform do not require a U-listed hazardous waste number and neither is bromoform a constituent listed in F001, F002, F003, F004, or F005.	U225	N/A
Carbon disulfide	75-15-0	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of carbon disulfide being disposed of to the PEWE liquid waste system exists. However, sufficient information is available for assignment of F005 for carbon disulfide as a spent solvent.	F005	F005
Carbon tetrachloride	56-23-5	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of carbon tetrachloride being disposed of to the PEWE liquid waste system exists. One statement suggests that carbon tetrachloride had been used as an extractant; thus, the F002 listed hazardous waste number would apply. Another statement suggests that carbon tetrachloride had been used for a degreaser; thus, F001 listed hazardous waste number would apply.	U211 F002	F001 F002
Chloroform	67-66-3	Although chloroform was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists. Spent chloroform or spent solutions of chloroform do not require a U-listed hazardous waste number and neither is chloroform a constituent listed in F001, F002, F003, F004, or F005.	U044	N/A

Table 1. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
1,4-Dioxane	123-91-1	Written and oral information indicates 1,4-dioxane was disposed of as a spent solvent to the PEWE liquid waste system. No verified written or oral information indicating unused, pure, or sole active ingredient formulations of 1,4-dioxane were disposed of to the PEWE liquid waste system exists. Spent 1,4-dioxane or spent solutions of 1,4-dioxane do not require a U-listed hazardous waste number and neither is 1,4-dioxane a constituent listed in F001, F002, F003, F004, or F005.	U108	N/A
Formaldehyde	50-00-0	Used, spent portions of formaldehyde were confirmed to have been disposed of to the PEWE liquid waste system. A procedure from 1969 directed creation of excess chemical solutions in which formaldehyde was the sole active ingredient (0.5 mL of 40% formaldehyde solution diluted in 100 mL of water). A calculation in the information <i>postulated a possible generation of 25.2 grams of unused solution that could have been discharged to the PEWE liquid waste system</i> . Quality control laboratory, from the same information source, indicated that formaldehyde standards were never discharged to the PEWE drain. There is no information affirming disposal of unused formaldehyde to the PEWE liquid waste system. Spent formaldehyde or spent solutions of formaldehyde do not require a U-listed hazardous waste number and neither is formaldehyde a constituent listed in F001, F002, F003, F004, or F005.	U122	N/A

Table 1. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Formic acid	64-18-6	Used, spent portions of formic acid were confirmed to have been disposed of to the PEWE liquid waste system. However, verified, written information indicates no unused, pure, or sole active ingredient formulations of formic acid were disposed of to the PEWE liquid waste system. Spent formic acid or spent solutions of formic acid do not require a U-listed hazardous waste number and neither is formic acid a constituent listed in F001, F002, F003, F004, or F005.	U123	N/A
Hydrazine	302-01-2	Hydrazine reagents were made up with hydrazine sulfate (CAS # 10034-93-2) and hydrazine hydrate (CAS # 7803-57-8). No information that hydrazine (CAS # 301-01-2), the regulated form of hydrazine, was ever used by analytical, process development, or production exists. There is no confirmed documentation that would indicate unused hydrazine was disposed to the PEWE liquid waste system. WINCO-1132 disposal of hydrazine was based solely on inferred disposal. Had spent hydrazine or spent solutions of hydrazine been discharged to the PEWE liquid waste system, they would not require a U-listed hazardous waste number and neither is hydrazine a constituent listed in F001, F002, F003, F004, or F005.	U133	N/A
Hydrogen fluoride (hydrofluoric acid)	7664-39-3	Process knowledge exists from personnel involved in the use of hydrofluoric acid (hydrogen fluoride) in analytical, process development, or production to conclude that unused, pure, sole active ingredient hydrofluoric acid was discharged into the system as a result of quality control and quality assurance testing (approximately 400 – 900 mL per shipment) of incoming bulk loads of hydrofluoric acid. The residual hydrofluoric acid was, however, complexed with aluminum nitrate before discharge to the PEWE liquid waste system.	U134	U134

Table 1. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Isobutyl alcohol	78-83-1	Although isobutyl alcohol was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists. No information exists in the background information that would indicate that isobutyl alcohol was disposed of as either an F- or U- listed waste to the PEWE liquid waste system.	U140 F005	N/A
Lead acetate	301-04-2	Although lead acetate was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists. <i>WINCO-1132</i> listed this chemical constituent solely on inferred disposal.	U144	N/A
Mercury	7439-97-6	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of elemental mercury being disposed of to the PEWE liquid waste system exists. Sufficient information is available to indicate elemental mercury from broken instruments and from the oxidation-reduction of mercuric nitrate would have been disposed of to the PEWE liquid waste system. Spent elemental mercury does not require a U-listed hazardous waste number.	U151	N/A
Methylene chloride	75-09-2	Although methylene chloride was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists. <i>WINCO-1132</i> listed this chemical constituent solely on inferred disposal.	U080 F002	N/A

Table 1. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Methyl ethyl ketone (MEK or 2-butanone)	78-93-3	Methyl ethyl ketone was shipped away in a lab pack. No confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system as a spent solvent or as unused, pure, or in sole active ingredient formulations exists. Application by <i>WINCO-1132</i> of U159 and F005 was based solely on inferred disposal.	U159 F005	N/A
Methyl iodide	74-88-4	Although methyl iodide was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system as unused, pure, or in sole active ingredient formulations exists. Discussion in the background information for <i>WINCO-1132</i> does not support application of the U138 listed hazardous waste number. Spent methyl iodide or spent solutions of methyl iodide do not require a U-listed hazardous waste number and neither is methyl iodide a constituent listed in F001, F002, F003, F004, or F005.	U138	N/A
2-Nitropropane	70-46-9	Although 2-nitropropane was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system as unused, pure, or in sole active ingredient formulations exists. Discussion in the background information for <i>WINCO-1132</i> does not support application of either the U171 or F005 listed hazardous waste number. Spent 2-nitropropane or spent solutions of 2-nitropropane do not require a U-listed hazardous waste number. No evidence exists that would indicate that 2-nitropropane was used as a spent F005 solvent.	U171 F005	N/A

Table 1. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Phenol	108-95-2	Although phenol was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system as unused, pure, or in sole active ingredient formulations exists. Spent phenol or spent solutions of phenol do not require a U-listed hazardous waste number and neither is phenol a constituent listed in F001, F002, F003, F004, or F005.	U188	N/A
Potassium cyanide	151-50-8	No verified, written or oral information indicating unused, pure, or sole active ingredient formulations of potassium cyanide being disposed of to the PEWE liquid waste system exists. <i>WINCO-1132</i> based application of P098 solely on inferred disposal. An F-listing would apply only to a cyanide solution if it were part of a hard chrome/cyanide electroplating operation.	P098	N/A
Pyridine	110-86-1	Stock solutions of pyridine were confirmed as not being unused, pure, or sole active ingredient formulations of pyridine. Thus, disposal of unused stock solutions would not require a U-listed hazardous waste. Sufficient information is available for assignment of F005 for pyridine as a spent solvent. Pyridine was shipped off-Site in a lab pack to a TSDF.	U196 F005	F005
Selenium dioxide	7783-00-8	Records confirmed use of selenium dioxide and subsequent shipment off-Site to a TSDF. No verified, written or oral information indicating unused, pure, or sole active ingredient formulations of selenium dioxide being disposed of to the PEWE liquid waste system exists. <i>WINCO-1132</i> applied the U204 listed hazardous waste number solely on inferred disposal.	U204	N/A

Table 1. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Silver cyanide	506-64-9	Statements confirmed use of silver cyanide and records indicate subsequent shipment off-Site to a TSDF. No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of silver cyanide being disposed of to the PEWE liquid waste system exists. <i>WINCO-1132</i> applied the P104 listed hazardous waste number solely on inferred disposal.	P104	N/A
Sodium azide	26628-22-8	Statements confirmed use of sodium azide. Written information indicates no unused, pure, or sole active ingredient formulations of sodium azide were disposed of to the PEWE liquid waste system. Communications with laboratory personnel who are/were familiar with the use of sodium azide in performing analytical work clarified the status of this chemical. Spent sodium azide or spent solutions of sodium azide do not require a U-listed hazardous waste number and neither is sodium azide a constituent listed in F001, F002, F003, F004, or F005.	P105	N/A
Sodium cyanide	143-33-9	Although sodium cyanide was shipped away in a lab pack and statements indicate use of the chemical in the laboratory, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system as unused, pure, or in sole active ingredient formulations exists. <i>WINCO-1132</i> applied the P106 listed hazardous waste number solely on inferred disposal. Spent sodium cyanide or spent solutions of sodium cyanide do not require a U-listed hazardous waste number and neither is sodium cyanide a constituent listed in F001, F002, F003, F004, or F005.	P106	N/A

Table 1. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Tetrachloroethylene	127-18-4	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of tetrachloroethylene being disposed of to the PEWE liquid waste system exists. Records confirm disposal of tetrachloroethylene in a lab pack, which was sent to an off-Site TSDF. Based on one statement in the background documentation that could not be clearly disputed, the F002 listed hazardous waste number has been applied to tetrachloroethylene.	U210 F002	F002
Thiourea	62-56-6	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of thiourea being disposed of to the PEWE liquid waste system exists. Although <i>WINCO-1132</i> indicated that thioruea was identified as confirmed use/confirmed disposal, there was no supporting background documentation that justified assignment of the U210 listed hazardous waste number. Spent thiourea or spent solutions of thiourea do not require a U-listed hazardous waste number and neither is thiourea a constituent listed in F001, F002, F003, F004, or F005.	U219	N/A
Toluene	108-88-3	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of toluene being disposed of to the PEWE liquid waste system exists. However, sufficient information is available for assignment of F005 for toluene as a spent solvent.	U220 F005	F005

Table 1. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
1,1,1-Trichloroethane	71-55-6	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of 1,1,1-trichloroethane being disposed of to the PEWE liquid waste system exists. However, sufficient information in the background documentation is available for assignment of F001 and F002 for 1,1,1-trichloroethane used as a degreaser and in other solvent use applications.	U226 F002	F001 F002
1,1,2-Trichloroethane	79-00-5	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of 1,1,2-trichloroethane being disposed of to the PEWE liquid waste system exists. <i>WINCO-1132</i> applied the U227 listed hazardous waste number solely on the basis of inferred disposal. Background documentation does not support the application of the F002 listed hazardous waste number. Neither is there any information that would indicate the application of the F001 listed hazardous waste number.	U227 F002	N/A
Trichloroethylene	79-01-6	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of trichloroethylene (TCE) being disposed of to the PEWE liquid waste system exists. <i>WINCO-1132</i> applied the U228 listed hazardous waste number solely on the basis of inferred disposal. Information indicated that Test Area North samples with the listed hazardous waste number F001, containing TCE, had been tested by the INTEC laboratories and discharged to the PEWE liquid waste system. The total size of these samples, which carried an F001 waste hazardous waste number, was approximately 300 grams. The concentration of the TCE in the samples was approximately 250,000 parts per million. Based on background information, it also appears that the F002 listed hazardous waste number is also applicable.	U228 F002	F001 F002

Table 1. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Vanadium oxide (V ₂ O ₅)	1314-62-1	No written or verified oral information indicating unused, pure, or sole active ingredient formulations of vanadium oxide being disposed of to the PEWE liquid waste system exists. Spent vanadium oxide or spent solutions of vanadium oxide do not require a P-listed hazardous waste number and neither is thiourea a constituent listed in F001, F002, F003, F004, or F005.	P120	N/A
a. Hazardous waste numbers identified taken from <i>WINCO-1132</i> were recommended for retention on the RCRA Part A permit based on confirmed use/confirmed disposal and/or confirmed use/inferred disposal. Actual waste codes assigned to the waste are found in the immediate column to the right, "EPA Waste Number or Not Applicable." The hazardous waste numbers in the "EPA Waste Number or Not Applicable" column are based on <u>actual</u> confirmed use and confirmed disposal.				

Table 2. Constituents listed only for ignitability.

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Acetone	67-64-1	<p>Used and unused portions of acetone were confirmed to have been disposed of to the PEWE liquid waste system.</p> <p>Waste acetone is considered to have been used for its solvent properties at the point of generation. However, when mixed with water (i.e., PEWE liquid waste system) it lost the characteristic of ignitability. Thus, this mixture is not considered to be RCRA-listed, due to acetone being F-listed, based only on the characteristic of ignitability [40 CFR 261.3(a)(2)(iii)]. Likewise, pure, unused acetone would lose the characteristic of ignitability, and not carry the U002 RCRA-listed code.</p> <p>Although neither the F003 or U002 code would apply, LDR requirements remain applicable.</p>	U002	N/A
Cyclohexane	110-82-7	<p>Used and unused portions of cyclohexane were confirmed to have been disposed of to the PEWE liquid waste system.</p> <p>Waste cyclohexane is considered to have been used for its solvent properties at the point of generation. However, when mixed with water, either as a spent solvent or as a pure, unused, or sole active ingredient solution (i.e., PEWE liquid waste system), it lost the characteristic of ignitability. Thus, this mixture is not considered to be RCRA-listed, due to cyclohexane being U-listed, based only on the characteristic of ignitability [40 CFR 261.3(a)(2)(iii)].</p> <p>Although the U056 code would not apply, LDR requirements remain applicable.</p>	U056	N/A

Table 2. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Cyclohexanone	108-94-1	<p>Used and unused portions of cyclohexanone were confirmed to have been disposed of to the PEWE liquid waste system.</p> <p>Waste cyclohexanone is considered to have been used for its solvent properties at the point of generation. However, when mixed with water, either as a spent solvent or as a pure, unused, or sole active ingredient solution (i.e., PEWE liquid waste system), it lost the characteristic of ignitability. Thus, this mixture is not considered to be RCRA-listed, due to cyclohexanone being U-listed, based only on the characteristic of ignitability [40 CFR 261.3(a)(2)(iii)].</p> <p>Although the U057 code would not apply, LDR requirements remain applicable.</p>	U057	N/A

Table 2. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Ethyl acetate	141-78-6	<p>Used, spent portions of ethyl acetate were confirmed to have been disposed of to the PEWE liquid waste system. No verified written or oral information indicating unused, pure, or sole active ingredient formulations of ethyl acetate were disposed of to the PEWE liquid waste system exists.</p> <p>Waste ethyl acetate is considered to have been used for its solvent properties at the point of generation. However, when mixed with water (i.e., PEWE liquid waste system), it lost the characteristic of ignitability. Thus, this mixture is not considered to be RCRA-listed, due to ethyl acetate being F-listed, based only on the characteristic of ignitability [40 CFR 261.3(a)(2)(iii)]. Likewise, pure, unused ethyl acetate (had it been disposed of to the PEWE liquid waste system) would lose the characteristic of ignitability, and not carry the U112 RCRA-listed code.</p> <p>Although neither the F003 or U112 code would apply, LDR requirements remain applicable.</p>	U112	N/A

Table 2. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Methanol (Methyl alcohol)	67-56-1	<p>Used and (potentially) unused portions of methanol were confirmed to have been disposed of to the PEWE liquid waste system.</p> <p>Waste methanol is considered to have been used for its solvent properties at the point of generation. However, when mixed with water (i.e., PEWE liquid waste system), it lost the characteristic of ignitability. Thus, this mixture is not considered to be RCRA-listed, due to acetone being F-listed, based only on the characteristic of ignitability [40 CFR 261.3(a)(2)(iii)]. Likewise, pure, unused methanol would lose the characteristic of ignitability, and not carry the U154 RCRA-listed code.</p> <p>Although neither the F003 or U154 code would apply, LDR requirements remain applicable.</p>	U154	N/A
Methyl isobutyl ketone (Hexone or 4-Methyl-2-pentanone)	108-10-1	<p>Used and unused portions of methyl isobutyl ketone were confirmed to have been disposed of to the PEWE liquid waste system.</p> <p>Waste methyl isobutyl ketone is considered to have been used for its solvent properties at the point of generation. However, when mixed with water (i.e., PEWE liquid waste system), it lost the characteristic of ignitability. Thus, this mixture is not considered to be RCRA-listed, due to acetone being F-listed, based only on the characteristic of ignitability [40 CFR 261.3(a)(2)(iii)]. Likewise, pure, unused acetone would lose the characteristic of ignitability, and not carry the U161 RCRA-listed code.</p> <p>Although neither the F003 or U161 code would apply, LDR requirements remain applicable.</p>	U161	N/A

Table 2. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Xylene	1330-20-7	<p>Used and unused portions of xylene were confirmed to have been disposed of to the PEWE liquid waste system.</p> <p>Waste xylene is considered to have been used for its solvent properties at the point of generation. However, when mixed with water (i.e., PEWE liquid waste system), it lost the characteristic of ignitability. Thus, this mixture is not considered to be RCRA-listed, due to xylene being F-listed, based only on the characteristic of ignitability [40 CFR 261.3(a)(2)(iii)]. Likewise, pure, unused xylene would lose the characteristic of ignitability, and not carry the U239 RCRA-listed code.</p> <p>Although neither the F003 or U239 code would apply, LDR requirements remain applicable.</p>	U239	N/A
<p>a. Hazardous waste numbers identified taken from <i>WINCO-1132</i> were recommended for retention on the RCRA Part A permit based on confirmed use/confirmed disposal and/or confirmed use/inferred disposal. Actual waste codes assigned to the waste are found in the immediate column to the right, "EPA Waste Number or Not Applicable." The hazardous waste numbers in the "EPA Waste Number or Not Applicable" column are based on <u>actual</u> confirmed use and confirmed disposal.</p>				

Table 3. Constituents never having entered the PEWE System or not listed upon entering the PEWE System.

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Acetophenone	98-86-2	Although acetophenone was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U004	N/A
Acrylamide	70-06-1	No confirmed use of acrylamide by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U007	N/A
Acrylic acid	79-10-7	No confirmed use of acrylic acid by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U008	N/A
Acrylonitrile	107-13-1	Although acrylonitrile was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U009	N/A
Allyl alcohol	107-18-6	Although allyl alcohol was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	P005	N/A
Arsenic trioxide	1327-53-3	Verbal statements indicated arsenic trioxide was used in spectroanalysis as a standard. Records indicate lab pack shipment of arsenic trioxide off-Site to a TSDF. No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of arsenic trioxide being disposed of to the PEWE liquid waste system exists. Spent arsenic trioxide or spent solutions of arsenic trioxide do not require a U-listed hazardous waste number and neither is arsenic trioxide a constituent listed in F001, F002, F003, F004, or F005.	P012	N/A

Table 3. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Auramine	492-80-8	Although auramine was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U014	N/A
Benzenesulfonyl chloride	98-09-9	Although benzenesulfonyl chloride was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U020	N/A
Benzyl chloride	100-44-7	Although benzyl chloride was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	P028	N/A
n-Butyl alcohol (1-Butanol)	71-36-3	Although n-butyl alcohol (1-butanol) was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U031	N/A
Calcium chromate	13765-19-0	Although calcium chromate was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U032	N/A
p-Chloroaniline	106-47-8	Although p-chloroaniline was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	P024	N/A
Chlorobenzene	108-90-7	Although chlorobenzene was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U037 F002	N/A

Table 3. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
p-Chlorophenol	95-57-8	No evidence that o-chlorophenol was ever used at the INTEC exists.	U048	N/A
3-Chloropropionitrile	542-76-7	No evidence that 3-chloropropionitrile was ever used at the INTEC exists.	P027	N/A
Cresol (Cresylic acid)	1319-77-3	No evidence that cresol (cresylic acid) was ever used at the INTEC exists.	U052	N/A
Cumene	98-82-8	Although cumene was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U055	N/A
Cyanides (soluble cyanide salts), not otherwise specified	none	No verifiable confirmation of use or disposal of generic or nonspecific cyanides into the PEWE liquid waste system, either as spent, unused, pure, or sole active ingredient solutions exists.	P030	N/A
Cyanogen	460-19-5	No evidence that cyanogen (a gas) was ever used at the INTEC exists.	P031	N/A
Dibutyl phthalate	84-74-2	Although dibutyl phthalate was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U069	N/A
m-Dichlorobenzene	541-73-1	Although m-dichlorobenzene (seal on bottle intact) was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U071	N/A

Table 3. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
o-Dichlorobenzene	95-50-1	Although o-dichlorobenzene (seal on bottle intact) was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U070	N/A
p-Dichlorobenzene	106-46-7	Although p-dichlorobenzene (seal on bottle intact) was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U072	N/A
1,2-Dichloroethylene	156-60-5	Although 1,2-dichloroethylene was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U079	N/A
2,4-Dichlorophenol	87-65-0	No evidence confirming 2,4-dichlorophenol was ever used at the INTEC exists.	U081	N/A
1,2-Dichloropropane	78-87-5	Although 1,2-dichloropropane was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U083	N/A
1,3-Dichloropropene	542-75-6	Although 1,3-dichloropropene was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U084	N/A
Dimethyl phthalate	131-11-3	Although dimethyl phthalate was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U102	N/A

Table 3. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Dimethyl sulfate	77-78-1	Although dimethyl sulfate was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U103	N/A
Ethyl acrylate	140-88-5	Although ethyl acrylate was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U113	N/A
Ethyl methacrylate	97-63-2	Although ethyl methacrylate was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U118	N/A
Fluoranthene	206-44-0	Although fluoranthene was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U120	N/A
Fluorine	7782-41-4	It was physically impossible for unused, pure, or sole active ingredient formulations of fluorine gas to have entered the PEWE liquid waste system.	P056	N/A
Furfural	98-01-1	Although furfural was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U125	N/A

Table 3. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Hexachlorobenzene	118-74-1	Although hexachlorobenzene was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U127	N/A
Hexachlorobutadiene	87-68-3	Although hexachlorobutadiene was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U128	N/A
Hexachloroethane	67-72-1	Although hexachloroethane was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U131	N/A
Hydrogen sulfide	7783-06-4	It was physically impossible for unused, pure, or sole active ingredient formulations of hydrogen sulfide gas to have entered the PEWE liquid waste system. No confirming documentation that hydrogen sulfide was used at INTEC (Needed hydrogen sulfide for analysis would have been generated by use of thioacetamide.)	U135	N/A
2-Imidazolidinethione (ethylene thiourea)	95-45-7	Although 2-imidazolidinethione was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U116	N/A
Lead phosphate	7446-27-7	No evidence that lead phosphate was ever used at the INTEC exists.	U145	N/A

Table 3. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Maleic anhydride	108-31-6	Although maleic anhydride was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U147	N/A
Methyl methacrylate	80-62-6	Although methyl methacrylate was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U162	N/A
Naphthalene	91-20-3	Although naphthalene was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system as unused, pure, or in sole active ingredient formulations exists. Spent naphthalene or spent solutions of naphthalene do not require a U-listed hazardous waste number and neither is naphthalene a constituent listed in F001, F002, F003, F004, or F005.	U165	N/A
Nickel carbonyl	13463-39-3	No confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system as a spent material or as unused, pure, or in sole active ingredient formulations exists. Spent nickel carbonyl or spent solutions of nickel carbonyl do not require a U-listed hazardous waste number and neither is nickel carbonyl a constituent listed in F001, F002, F003, F004, or F005.	P073	N/A
Nicotine and salts	54-11-5	No evidence indicating nicotine and salts were ever used at the INTEC exists.	P075	N/A
p-Nitroaniline	100-01-6	No evidence indicating p-nitroaniline was ever used at the INTEC exists.	P077	N/A

Table 3. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
Nitrobenzene	98-95-3	Although nitrobenzene was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U169	N/A
p-Nitrophenol	100-02-7	No evidence indicating p-nitrophenol was ever used at the INTEC exists.	U170	N/A
Paraldehyde	123-63-7	Although paraldehyde was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U182	N/A
Phthalic anhydride	85-44-9	Although phthalic anhydride was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U190	N/A
2-Picoline	109-06-8	Although 2-picoline was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U191	N/A
Resorcinol	108-46-3	Although resorcinol was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U201	N/A
1,2,4,5-Tetrachlorobenzene	95-94-3	Although 1,2,4,5-tetrachlorobenzene as shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	F001	N/A

Table 3. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION ^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
1,1,1,2-Tetrachloroethane	630-20-6	Although 1,1,1,2-tetrachloroethane was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U208	N/A
Thallic oxide	1314-32-5	Although verbal statements confirm use and disposal of thallic oxide, no written or verifiable oral information exists that indicates unused, pure, or sole active ingredient formulations of the chemical were being disposed of to the PEWE waste system.	P113	N/A
Thallium (I) carbonate	6533-73-9	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of thallium (I) carbonate being disposed of to the PEWE waste system exists.	U215	N/A
Thallium (I) nitrate	10102-45-1	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of thallium (I) nitrate being disposed of to the PEWE waste system exists.	U217	N/A
Thioacetamide	62-55-5	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of thioacetamide being disposed of to the PEWE waste system exists.	U218	N/A
Thiosemicarbazide	79-19-6	No written or verifiable oral information indicating unused, pure, or sole active ingredient formulations of thiosemicarbazide being disposed of to the PEWE waste system exists. Spent thiosemicarbazide or spent solutions of thiosemicarbazide do not require a U-listed hazardous waste number and neither is thiosemicarbazide a constituent listed in F001, F002, F003, F004, or F005.	P116	N/A

Table 3. (continued).

CHEMICAL CONSTITUENT	CAS #	REGULATORY POSITION	WINCO-1132 SUSPECTED LISTED HAZARDOUS WASTE NUMBER INFORMATION^a	FINAL EPA WASTE NUMBER OR NOT APPLICABLE (N/A)
o-Toluidine	95-53-4	Although o-toluidine was shipped away in a lab pack, no confirmed use of this chemical by analytical, process development, or production indicating disposal to the PEWE liquid waste system exists.	U328	N/A
<p>a. Hazardous waste numbers identified taken from <i>WINCO-1132</i> were recommended for retention on the RCRA Part A permit based on confirmed use/confirmed disposal and/or confirmed use/inferred disposal. Actual waste codes assigned to the waste are found in the immediate column to the right, "EPA Waste Number or Not Applicable." The hazardous waste numbers in the "EPA Waste Number or Not Applicable" column are based on actual confirmed use and confirmed disposal..</p>				

Table 4. Summary of constituents and applicable listed hazardous waste numbers.

CHEMICAL CONSTITUENT	CAS #	FINAL EPA HAZARDOUS WASTE NUMBER^a
Acetone	67-64-1	N/A
Benzene	71-43-2	F005
Carbon disulfide	75-15-0	F005
Carbon tetrachloride	56-23-5	F001 F002
Cyclohexane	110-82-7	N/A
Cyclohexanone	108-94-1	N/A
Ethyl acetate	141-78-6	N/A
Hydrogen fluoride (hydrofluoric acid)	7664-39-3	U134
Methanol	67-56-1	N/A
Methyl isobutyl ketone (Hexone or 4-Methyl-2- pentanone)	108-10-1	N/A
Pyridine	110-86-1	F005
Tetrachloroethylene	127-18-4	F002
Toluene	108-88-3	F005
1,1,1-Trichloroethane	71-55-6	F001 F002
Trichloroethylene	79-01-6	F001 F002
Xylene	1330-20-7	N/A

a. Not applicable.

6. FOOTNOTES

- a. According to Kliss McNeel, LMITCO, Environmental Affairs, Manager of Compliance and Permitting, who was involved with early permitting/compliance activities at INTEC, RCRA Part A permit application codes were based not only on chemical constituents entering the INTEC liquid waste system (see also Footnote d) but, also, as a result of planning for off-Site work and "protective filings" protection.
- b. DRAFT "Listed Waste Determination Report," WINCO 1132, June 1993.
- c. The "INTEC liquid waste system" for this report consists of CPP-601 WG/WH Cells Storage and Treatment Tanks, CPP-604 PEW Condensate/Feed Storage Tanks, CPP-604 PEW Evaporators, CPP-604 PEW Feed/Storage and Treatment Tanks, CPP-659 NWCF Calcliner, CPP-659 NWCF Evaporator Tank System, CPP-659 NWCF Storage and Treatment Tanks, CPP-1618 LET&D Evaporators, CPP-1618 LET&D Nitric Acid Recycle Storage Tank, ICPP Tank Farm, CPP-640 Headend Holdup Storage Tanks*, CPP-641 Westside Holdup Storage Tanks,* and CPP-603 Storage Tank.* Those units marked by a "*" are ones that have only limited characteristic (40 CFR 261, Subpart C) hazardous waste numbers on their RCRA Part A permit applications.
- d. This is a 40 CFR 262.11(b) requirement to determine if the waste is listed and, further, the generator is required under 40 CFR 262.11(d) to "refer to Parts 261, 264, 265, 266, 268, and 273 of this chapter for possible exclusions or restrictions pertaining to the management of the specific waste."
- e. Notegram from K.L Shifty, WINCO RCRA Compliance and Regulations, to G.R. Franz, WINCO Manager of Environmental Permitting, September 26, 1991.
- f. Documents and letters have cited the DRAFT "Listed Waste Determination Report," WINCO 1132; and, have on occasion, erroneously miscited Table 1 information (e.g., Table 8-2, "Tank Farm Secondary Waste Codes," from *Regulatory Analysis and Proposed Path Forward for the Idaho National Engineering Laboratory High-level Waste Program*, DOE/ID-10544, October 1996). A letter, on the other hand, from R.E. Schindler to M.L. Abbott, "Transmittal of Upper-Envelope NWCF Emissions Source for Screening-level Risk Analysis - Schi-24-97" refers only to the information as "to have possibly entered the tank farm...." Many documents and letters may have cited *WINCO-1132* without a clear understanding of its format, intent, limitations, and purpose and may require revision as a result of this evaluation.
- g. Interviews (either in person, via telephone, or electronic mail) were conducted with the following: **Leroy Lewis**, Ph.D., laboratory manager at INTEC from 1977 through 1985; **Thomas R. Byrnes**, M.S., has worked for INTEC from 1977 to present, worked in Research & Development for 10 years at New Waste Calcining Facility & Fuel Dissolution Process, worked in process control development, spent 9 years in fuel processing/storage and for the last 2 years with NWCF; **Edward P. Wagner**, M.S., 1978-1982, design and instillation of plant monitoring computer system, 1982-1992, process engineer for CPP-601, 1992-1994, Waste Immobilization Facility project design, 1994-1998, lead engineer on Rover uranium recovery ; **Michael B. Heiser**, B.S., worked for the INEEL for the past 22 years, has been a foreman/supervisor in the fuel processing and waste processing, worked extensively in virtually every operational area at INTEC, 6 years as lead technical engineer at NWCF, and for the past 6 years has been involved in the Spent Nuclear Fuel program and Decon/Decommissioning activities; **Rodney L. Hand**, Ph.D., started at INTEC in 1974, has been a research chemist, supervisor, subsection supervisor, and department manager, has worked 23 of 24 years at INTEC; **Joseph R. Delmastro**, Ph.D., worked at the INEEL since 1967, INTEC analytical chemist 1967-1984, 1984-1998 INEEL Research Center; **David R. Trammell**, M.S., worked at

INTEC since 1966 in analytical, group leader for special analysis, and develops methods for analysis; **Richard D. Johnson**, started work at the INEEL in 1967 as health physics technician until 1984, worked for waste management since 1984 coordinating and removing waste from all over the INEEL including INTEC; **Thomas R. Winder**, started at INTEC in 1965 working in various capacities from rad con tech and to waste management technical specialist; **J. Chris Kent**, Ph. D., started at INTEC in 1985, worked in training until 1987 and since then in environmental either at INTEC or within the INEEL, was a coauthor of the *WINCO-1132*; **John Nicklas**, B.S., worked in INTEC shift lab (CPP-627) from 1983 to 1986, RAL (CPP-684) from 1986 to 1990, environmental from 1990 to 1995; **Mary Adamic**, M.S, worked as an analytical chemist at INTEC from 1983 to 1991, currently works for Argonne National Laboratory West as an analytical chemist.; **James Sailer**, worked in INTEC environmental from 1991 to 1994, was a coauthor of the *WINCO-1132*.

- h. Frequently, EPA hazardous waste numbers are referred to as "EPA waste codes" or just "waste codes."
- i. The numerous small containers (more than 100 containing approximately 5-10 ml each) of chemicals and a large number of chemicals (approximate volume of 100 to 4000 ml) that were placed into lab pack drums provides direct evidence that excess chemicals were neither automatically nor routinely placed into the PEWE liquid waste system. Also, a number of the containers had obviously been stored in the laboratory for a considerable length of time as demonstrated by old style labeling on containers, wear and degradation of the label, and lack of ZIP codes on the manufacture's address (Zone improvement [ZIP] codes went into effect in the early 1960's.)

7. REFERENCES

1. Regulatory Analysis and Proposed Path Forward for the Idaho National Engineering Laboratory High-level Waste Program, DOE-ID-10544, October 1996.