LA-13041-MS

Mixed Waste Treatment Model: Basis and Analysis

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory is operated by the University of California for the United States Department of Energy under contract W-7405-ENG-36.

LA-13041-MS

UC-902 and UC-940
Issued: September 1995

Mixed Waste Treatment Model: Basis and Analysis

Byron A. Palmer

Los Alamos
NATIONAL LABORATORY
Los Alamos, New Mexico 87545

DISCLAIMER

Contents

Tables

MIXED WASTE TREATMENT MODEL: BASIS AND ANALYSIS

by

Byron A. Palmer

ABSTRACT

The Department of Energy's Programmatic Environmental Impact Statement (PEIS) required treatment system capacities for risk and cost calculation. Los Alamos was tasked with providing these capacities to the PEIS team. This involved understanding the Department of Energy (DOE) Complex waste, making the necessary changes to correct for problems, categorizing the waste for treatment, and determining the treatment system requirements. The treatment system requirements depended on the incoming waste, which varied for each PEIS case. The treatment system requirements also depended on the type of treatment that was desired. Because different groups contributing to the PEIS needed specific types of results, we provided the treatment system requirements in a variety of forms.

In total, some 40 data files were created for the TRU cases, and for the MLLW case, there were 105 separate data files. Each data file represents one treatment case consisting of the selected waste from various sites, a selected treatment system, and the reporting requirements for such a case. The treatment system requirements in their most basic form are the treatment process rates for unit operations in the desired treatment system, based on a 10-year working life and 20-year accumulation of the waste. These results were reported in cubic meters and for the MLLW case, in kilograms as well.

The treatment system model consisted of unit operations that are linked together. Each unit operation's function depended on the input waste streams, waste matrix, and contaminants. Each unit operation outputs one or more waste streams whose matrix, contaminants, and volume/mass may have changed as a result of the treatment. These output streams are then routed to the appropriate unit operation for additional treatment until the output waste stream meets the treatment requirements for disposal. The total waste for each unit operation was calculated as well as the waste for each matrix treated by the unit.

The cost of a treatment system, determined by another group in the PEIS effort, was based on the unit operation volume/mass and the type of unit operation. The risk was determined from these same parameters but was based on chemical and radiological potential releases per mass/volume treated.

1. Introduction

This report discusses the calculation of the treatment system requirements for the DOE Mixed Waste portion of the Programmatic Environmental Impact Statement (PEIS). The PEIS approach to the mixed low-level waste was to

1. determine the treatment systems to be analyzed,
2. develop a model of each of these systems,
3. determine the waste to go to each site for each system,
4. calculate the requirements for each site and system,
5. determine the risks involved in each set of sites,
6. determine the costs involved in each set of sites, and
7. bring this information together into a cohesive package.

This report deals with Steps 2 and 4 above. Step 1 was determined by PEIS management. Step 2 was developed by the management team, and flow diagrams for the treatment system were generated by Burdon Musgrave (Analysis of Waste Treatment Requirements for DOE Mixed Wastes, Technical Basis). The high-level flow diagrams for each of the system are given in Appendix D. Step 3 was determined by the PEIS management team and is shown in Appendix B.

The results of Step 4 are passed to other participants for calculation. The amount of information needed by each of the other groups varied but, at a minimum, it consisted of the treatment requirement for each unit operation (see 3. Treatment System). Information needed for risk source terms were derived from treatment volumes split among the required units. This risk analysis is explained in the reports by Argonne National Laboratory and Oak Ridge National Laboratory. The cost analysis was based on the unit operation treatment requirements and is basically an interpolation of a cost *vs* capacity requirement for each treatment unit.

2. Waste Information

A major portion of the effort was directed toward understanding the waste information that was to be used in the analysis. The fundamental information about the waste that is needed for treatment process:

- radiological type [mixed low-level waste (MLLW) or TRU (MTRU and TRU)],
- handling [remote (RH) or contact (CH)],
- alpha designation if MLLW (>10 nCi/g and <100 nCi/g),
- matrix (the physical nature of the majority of the waste), and
- contaminants (EPA and state regulated).

Each of these factors determine the type of treatment system required and the method for processing the waste through the treatment system. The first three items concerning the radiological nature of the waste, impact the cost and risk because of the need for containment, shielding, and the worker protection. The various categories TRU, MTRU, MLLW CH, MLLW RH, MLLW alpha, etc. are treated in separate cases. The last two pieces of information, matrix and contaminants, determine the requirements for each of the treatment unit operations. Together, all of these factors determine the volume and mass for a particular unit operation in a particular analysis. Much of this information was present in the data collected, but some, such as the alpha designation, was not. Additional information concerning volumes, masses, and projected volumes are needed to determine the capacity requirements of the unit operations.

2.1. Mixed Low-Level Waste

The information on wastes for the MLLW waste streams came from the 1994 Mixed Waste Inventory Report (MWIR 94), Version 2 A, released in May 1994. The final version was not used for the calculations because it had not been released at the time that the preliminary calculations were needed. Because of this timing, we were unable to switch to the final version. However, the changes are minor and should not have a large impact on the overall results.

Some modifications to the data were necessary to correct for deficiencies in the data from some sites and to put the entire analysis on the same basis. The modifications consisted of expanding the projected volume and correcting some EPA codes that were incorrectly entered.

Some sites were not consistent in reporting future projections and the PEIS management team felt that to adequately project the maximum possible waste feeds, the volume should be corrected slightly. The data base contained multiple fields for projected volume. For the 5 years starting in 1993, there was a projected volume for each year. For the next 5 years, there was one projected volume. The following 20 years were combined in one additional field. The procedure that we used for each waste stream was as follows:

- If the projected volume was completed for all fields, the total projected volume was calculated as the sum of all of the fields, correcting for the last 20-year field so that the basis is 20 years instead of 30, as reported in MWIR 94.
- If the projected volume was complete for only the first 10 years, then the second 5-year projection was scaled to provide a 20-year projection by multiplying that 5-year projection by 4.
- If the projected volume was complete for only the first five years, and there was a value for the fifth year, that value was scaled by multiplying it by 15 and adding to the first 5 years to give a 20-year total.
- If only a few of the first 5 years were completed, no projection was done except where information from the sites indicated that they expected to continue to generate that waste. In such a case, this process involved looking at the waste generation termination date in the data base and reading the description and other fields.

For those wastes with incomplete information about projected volumes, we took the last value supplied and extended it for the full 20 years. If the last volume was zero, then no additional volume was added. If, however, the last volume was nonzero, then it was extended appropriately. Table C.2 of Appendix C lists the waste streams affected by this volume projection.

There were a number of waste streams for which there were no projected volumes, but only projected masses. To include those waste streams we used an estimated density for that particular matrix (a bulk density that included the containers as well) to calculate the project volume. Such waste streams are listed in Table C.3 of Appendix C.

Alpha-designated wastes are those that have transuranic radionuclides with >10 nCi/g of activity but less than the TRU designation of greater than 100 nCi/g. Alpha waste streams are designated because they require more care in handling and more shielding for the workers than ordinary MLLW waste streams do. The MWIR 94 database failed to collect adequately this particular piece of information. Because such alpha wastes affect the cost and risk of a treatment system, an effort was made to go through the data and identify such waste streams. Those waste streams (211) so designated are listed in Appendix C.1.

2.2. TRU and Mixed TRU Waste

The TRU and mixed TRU information came from the Interim Mixed Waste Inventory Report (IMWIR) of April 1993 (DOE-NBM-1100). Because the IMWIR does not contain information on the TRU waste (only the mixed TRU waste), Argonne National Laboratory provided scaling factors for the waste volumes. These factors were used to calculate the treatment requirements for the TRU waste based on the mixed TRU volumes and characteristics. This process was necessary because the TRU information did not have consistent matrices for use in the treatment system calculations.

Table 2.2 — TRU Volume Scale Factors from MTRU Volumes

SITE NAME	Inventory	Generation
Argonne National Laboratory - East	7.730	145.060
Argonne National Laboratory - West	1.000	1.000
Energy Technology Engineering Center	1.000	1.000
Idaho National Engineering Laboratory	1.000	32.560
Los Alamos National Laboratory	1.000	1.000
Lawrence Berkeley Laboratory	0.000	0.000
Lawrence Livermore National Laboratory	105.260	97.370
Mound Plant	82.260	1,321.560
Nevada Test Site	1.000	1.000
Oak Ridge National Laboratory	1.010	1.880
Paducah Gaseous Diffusion Plant	1.000	1.000
Rocky Flats Plant	1.000	4.350
Hanford Site	59.400	1.770
Sandia National Laboratory-New Mexico	1.000	1.000
Savannah River Site	1.070	21.600
Waste Isolation Pilot Project	1.000	1.000
West Valley Demonstration Project	1.000	1.000

The TRU and mixed-TRU waste was handled differently than the MLLW. The major difference was that only matrices, not contaminants, were used in the TRU calculations, whereas both contaminants and matrices drove the MLLW calculations. Also, the matrices were the original 20 IMWIR rather than the MWIR 94 values.

3. Treatment System

As shown in Appendix D, the treatment systems are composed of unit operations. Each unit operation performs a function on the input waste stream and has output streams that go to other operations or to a final form that can be released or disposed of appropriately. These unit operations are connected in to perform a complete treatment of the waste, beginning with the receiving and sorting operation and capturing all aspects of the treatment process.

The six different treatment systems, three for MLLW and three for MTRU waste, are described below.

3.1. Base Case-MLLW

The base case for the PEIS is a treatment system that models closely what is presently in place for treating some of the waste within the DOE Complex. The primary unit operation for destruction of toxic organics is the incinerator module, which consists of unit operations 470 and 480. The primary stabilization unit operation is the grout unit (although there are two: one for ash-type wastes and one for debris).

3.2. Thermal Case-MLLW

The thermal case differs only slightly from the base case in that the primary toxic organic destruction unit is the incinerator. The major change is in the stabilization units, which employ vitrification for the glass-type wastes and metal melting for metallic-type wastes. These technologies reduce the amount of waste that would be sent to disposal and thus would reduce the disposal costs.

3.3. Nonthermal Case-MLLW

The nonthermal case uses only technologies that have temperatures <350°C. Of the three treatment systems modeled, this is the least understood. It is not clear what technologies would actually be used for the primary treatment units, and therefore the calculated values are based on very generic treatment operations.

3.4. RCRA Treatment-MTRU

For the MTRU and TRU cases, a treatment system was developed to treat the waste for hazardous contaminants similar to the base-case in MLLW. This process involved incineration and grouting as the primary treatment systems.

3.5. WIPP WAC-MTRU

Rather than treat the MTRU and TRU waste to RCRA treatment standards to meet land-disposal requirements (LDR), this treatment system was developed to only prepare the waste for acceptance at the Waste Isolation Pilot Plant (WIPP). This is a simpler treatment system.

3.6. Reduced-Gas-MTRU

One of the concerns of shipping untreated waste to WIPP is generation of potentially hazardous gas caused by the radiation acting upon the matrix and contaminants. This treatment system is designed to reduce the possibility of generating such gas as well as preparing the waste for WIPP.

4. Methodology

When the first model of the treatment system was built, it was done using a spreadsheet. The only criterion used for selection of the flow of the waste through the treatment system were based on the matrix. The waste stream "splits" at each unit operation were determined by a rough approximation of the contaminants that might be present. This resulted in predicted treatment systems where unit operations were not needed because that particular site had no waste with contaminants that required such a unit. One example is a site with no mercury-contaminated waste being required to have a mercury-stabilization unit. Because of the complexity caused by the different contaminants, we decided to use a more sophisticated model to predict treatment system requirements. However, because of the time frame for TRU information, we were not able to implement such a system for those calculations.

Modeling of the treatment system is based on the following assumptions:

1. each unit operation is complete in itself,
2. each unit operation has waste-acceptance criteria that list matrix and contaminants acceptable for treatment,
3. each unit operation has one or more output streams,
4. each output stream may have different characteristics (such as matrix and contaminants),
5. the output stream(s) matrix, contaminants, and volume depend on the unit's input characteristics (matrix and contaminants),
6. the total mass (volume) is conserved in each unit operation, and
7. the output waste streams are directed to the next unit operation as appropriate for that combination of matrix and contaminants.

For the MTRU and TRU calculations, our only consistent data were volumes, so volume conservation was used. For the MLLW where we predicted densities and where we had some mass information, we conserved both mass and volume except where it was clear that the process made a substantial change in the volume (for example, in the shredding operation).

The program used to calculate the treatment system requirements was based on treating each unit operation as an entity. The description of the treatment system was "compiled" into an interpreted language that drove each unit operation. In this way, different treatment systems could use the same unit operations (such as the receiving and sorting) without redefining each one. This also meant that treatment systems can include recycling and that a unit operation may treat different portions of the input waste stream differently, depending on the step of the process in which the waste is located.

4.1. Matrices

The following tables show the matrices used in the MLLW analysis. Because of the large number of matrices, Argonne National Laboratory, who handled the first phase of the risk calculations, asked us to reduce that number to a more manageable size by aggregating them (ANL codes). Because some of the matrix codes are more generic, those matrix numbers were assigned multiple ANL codes. For example: matrix 1000, which is the general heading for all aqueous liquids and slurries. But slurries, matrix 1200-1290 are treated differently than wastewaters, matrix 1100-1190. We assumed that such split matrix codes would proportion themselves to the ANL codes based on the relative volumes of the unambiguous waste streams being treated at that site. So if a site had a 1000 matrix code stream and the stream volumes of waste for ANL codes 1 and 2 were 60 and 40% respectively, the 1000 matrix code stream would be split 60% to ANL code 1 and 40% to ANL code 2. If no other waste was treated in ANL codes 1 and 2 at the site, the ratio would be set at 50% to each.

Table 4.1 — Matrix Codes for PEIS Analysis of MLLW

Name	Matrix Code	ANL Code
Aqueous Liquids/Slurries	1000	1-2
Wastewaters	1100	1
Acidic Wastewaters	1110	1
Basic Wastewaters	1120	1
Neutral Wastewaters	1130	1
Cyanide Wastewaters	1140	1
Uncategorized Wastewaters	1190	1
Aqueous Slurries	1200	2
Acidic Aqueous Slurries	1210	2
Basic Aqueous Slurries	1220	2
Neutral Aqueous Slurries	1230	2
Cyanide Aqueous Slurries	1240	2
Uncategorized Aqueous Slurries	1290	2
Organic Liquids	2000	3-6
Aqueous/Organic Liquids	2100	3-4
Aqueous/Halogenated Organic Liquids	2110	3
Aqueous/Nonhalogenated Organic Liquids	2120	4
Uncategorized Aqueous/Organic Liquids	2190	3-4
Pure Organic Liquids	2200	5-6
Halogenated Pure Organic Liquids	2210	5
Nonhalogenated Pure Organic Liquids	2220	6
Uncategorized Pure Organic Liquids	2290	5-6
Uncategorized Organic Liquids	2900	3-6
Solid Process Residues	3000	7-13
Inorganic Process Residues	3100	7-10
Inorganic Particulates	3110	7
Ash	3111	7
Sand Blasting Media	3112	7
Absorbed Aqueous Liquids	3113	7
Absorbed Organic Liquids	3114	7
Ion Exchange Media	3115	7
Calcined Solids	3116	7
Uncategorized Inorganic Particulates	3119	7
Inorganic Sludges	3120	8
Wastewater Treatment Sludges	3121	8
Pond Sludges	3122	8
Off-Gas Treatment Sludges	3123	8
Plating Waste Sludges	3124	8
Reprocessing Sludges	3125	8
Uncategorized Inorganic Sludges	3129	8
Paint Waste	3130	7
Paint Chips/Solids	3131	7
Paint Liquids/Sludge	3132	7

Name	Matrix Code	ANL Code
Uncategorized Paint Waste	3139	7
Salt Waste	3140	9
Chloride Salts	3141	9
Sulfate Salts	3142	9
Nitrate Salts	3143	9
Uncategorized Salt Waste	3149	9
Solidified Process Residues	3150	10
Uncategorized Inorganic Process Residues	3190	7-10
Organic Process Residues	3200	11-13
Organic Particulates nonhalogenated	3210	11
Activated Carbon nonhalogenated	3211	11
Organic Resins nonhalogenated	3212	11
Organic Absorbents nonhalogenated	3213	11
Uncategorized Organic Particulates nonhalogenated	3219	11
Organic Sludges nonhalogenated	3220	11
Biological Materials nonhalogenated	3221	11
Nonhalogenated Organic Sludges	3223	11
Uncategorized Organic Sludges nonhalogenated	3229	11
Organic Particulates halogenated	3210	12
Activated Carbon halogenated	3211	12
Organic Resins halogenated	3212	12
Organic Absorbents halogenated	3213	12
Uncategorized Organic Particulates halogenated	3219	12
Organic Sludges halogenated	3220	12
Biological Materials halogenated	3221	12
Halogenated Organic Sludges	3222	12
Uncategorized Organic Sludges halogenated	3229	12
Organic Chemicals nonhalogenated	3230	13
Organic Chemicals halogenated	3230	14
Uncategorized Organic Process Residues	3290	11-14
Uncategorized Process Residues	3900	7-14
Soils	4000	15-16
Contaminated Soils	4100	15
Contaminated Soils/Debris	4200	16
Uncategorized Soils	4900	15-16
Debris Waste	5000	17-20
Metal Debris	5100	17
Metal Debris without Pb or Cd	5110	17
Lead Containing Metal Debris	5120	17
Cadmium Containing Metal Debris	5130	17
Uncategorized Metal Debris	5190	17
Inorganic Nonmetal Debris	5200	18
Concrete Debris	5210	18
Glass Debris	5220	18

Name	Matrix Code	ANL Code
Ceramic/Brick Debris	5230	18
Rock Debris	5240	18
Asbestos Debris	5250	18
Uncategorized Inorganic Nonmetal Debris	5290	18
Combustible Debris	5300	19
Plastic/Rubber Debris	5310	19
Leaded Gloves/Aprons Debris	5311	19
Halogenated Plastic Debris	5312	19
Nonhalogenated Plastic Debris	5313	19
Uncategorized Plastic/Rubber Debris	5319	19
Wood Debris	5320	19
Paper/Cloth Debris	5330	19
Graphite Debris	5340	19
Biological Debris	5350	19
Uncategorized Combustible Debris	5390	19
Heterogeneous Debris	5400	20
Composite Filters	5410	20
Predominantly Metal Debris	5420	20
Predominantly Inorganic Nonmetal Debris	5430	20
Predominantly Combustible Debris	5440	20
Asphalt Debris	5450	20
Uncategorized Heterogeneous Debris	5490	20
Special Waste	6000	21-29
Lab Packs	6100	21-23
Organic Lab Packs	6110	21
Aqueous Lab Packs	6120	22
Solid Lab Packs	6130	23
Scintillation Cocktails	6140	21
Uncategorized Lab Packs	6190	21-23
Reactive Metals	6200	24
Bulk Reactive Metals	6210	24
Components Contaminated with Reactive Metals	6220	24
Pyrophoric Fines	6230	24
Uncategorized Reactive Metals	6290	24
Explosives/ Propellants	6300	25
Compressed Gases/Aerosols	6400	26
Inherently Hazardous Waste	7000	27-32
Elemental Mercury	7100	27
Elemental Lead	7200	28
Nonactivated Lead	7210	28
Activated Lead	7220	28
Beryllium Waste	7300	29
Batteries	7400	30
Lead Acid Batteries	7410	30

Name	Matrix Code	ANL Code
Cadmium Batteries	7420	30
Uncategorized Batteries	7490	30
Unknown Matrix	8000	31
Unknown Liquids	8100	31
Unknown Solids	8200	31
Uncategorized Unknown	8900	31
Final Waste Forms	9000	32
Cement Forms	9100	32
Vitrified Forms	9200	32
Metal Forms	9300	32
Polymer Forms	9400	32
Other Forms	9900	32

4.2. Contaminants

Contaminants are important in the treatment system calculations because they drive the treatment requirements. Because there are a large number of EPA defined contaminants, we decided to consolidate these into a number of basic categories, which are listed in Table 4.2. These contaminant groups were only used for the MLLW calculations, and not for the TRU calculations.

Table 4.2 — Contaminant Groups

Code	Description
O	Toxic Organics
I	Ignitable
C	Corrosive
A	Acid Reactive
M	Toxic Metals
H	Mercury
W	Water Reactive
R	Reactive
E	Explosive
F	Halogenated
S	Inorganic Ignitable

Most of the EPA and other codes listed in MWIR 94 were assigned one or more of the codes listed in Table 5.2.1 (See Appendix A). Then each waste was reviewed and the collection of contaminant codes was assembled. This process works fairly well as a grouping for the two treatment systems involving incinerators. For the nonthermal treatment system, the grouping is not really adequate for a detailed study; however, given the understanding and the level of modeling, they do not introduce much more uncertainty.

4.3. Unit Operations

The following list gives all of the unit operations and a brief description of their function. Many of the unit operations appear in all three treatment systems.

Table 4.3 — Unit Operations In PEIS Flow Sheets

Units 110, 210, 310, 410, 510, 610, 710, 810, 910 - Receive and Sort
Receive waste streams of the corresponding 1000-level matrix (that is unit 110 receives all aqueous 1000 streams) and route the streams to the appropriate initial treatment unit.

Units 140, 240, 340, 440 - Neutralization
Neutralize corrosive contaminants present in waste matrices 1000-4000, respectively.

Units 150, 250 - Solids Separation
Filtration units for aqueous and organic waste streams, respectively.

Unit 180 - Evaporator
Removes the salts and toxic metals from an aqueous waste stream through evaporation. The condensate goes on to a condenser unit (Unit 190) and the bottoms (sediments) are sent to a stabilization process.

Unit 190 - Condenser
Condenses the aqueous stream from the evaporator (180) for recycling or release. Mercury is also separated.

Unit 195 - Polymer Encapsulation
Encapsulates the solids with high salt content that cannot be grouted.

Unit 270 - Organic Destruction
Organic destruction unit for aqueous streams.

Unit 335 - Sludge Washing
Accepts solid wastes and performs nonthermal separation of organics.

Units 350, 450, 550, 650, 750 - Solid Separation
Large-scale separation processes (such as debris removal from soils) and route solid waste streams for further processing.

Unit 370 - Aqueous Organic Destruction
Treats concentrated organic liquids by oxidation.

Unit 435 - Soil Washer
Similar to Unit 335 for soils.

Unit 470 - Thermal Destruction
An incinerator or thermal destruction unit capable of handling solid and liquid feed.

Unit 480 - Secondary Burner
Receives the offgas from the thermal destruction unit (470) and subjects it to a second thermal oxidation for increased destruction of organics.

Unit 490 - Offgas Treatment
This represents the scrubbing and filtration operations of offgas treatment. Outputs are stack gas, particulates, and caustic aqueous blowdown.

Unit 535 - Debris Washing
Removes organics from debris feed stream.

Unit 540 - Shred
Shreds debris waste streams preparatory to pelletizing and grouting.

Unit 560 - Mercury Distillation
Distills waste to generate a mercury recycle stream.

Unit 570 - Thermal Desorption
Removes the volatile organics from debris wastes through heating.

Unit 595 - Mercury Solidification
Accepts elemental mercury and produces a solid mercury compound (for example, HgS).

Unit 640 - Chemical Oxidation/Reduction
Oxidizes or reduces special wastes, inherently hazardous wastes, and any other form requiring special treatment for reactive matrices or contaminants.

Unit 670 - Glass Melter
Accepts inorganic solids to produce a vitrified final form.

Unit 695 - Pelletize
Pelletizes debris waste preparatory to grouting. This unit is expected to halve the volume of the debris waste stream.

Unit 740 - Chemical/Physical Separation
Chemical or physical separation techniques to remove designated inherently hazardous materials (for example, mercury) from the waste matrix.

Unit 770 - Metals Melt/Slag
Melts metal debris to produce final form.

Unit 795 - Grout
Grouts solid wastes of the 3000 and 4000 series (solid process residues and soils).

Unit 796 - Grout
Grouts debris wastes. This unit is distinct from unit 795 based on the assumption of relaxed standards for debris grouting.

Units 850, 950 - Characterization
Characterize matrix 8000 and 9000 waste streams to determine what treatment, if any, is required. Further treatment was not defined for these streams.

Unit 895 - Recycle/Stabilization
Remove contaminants from inherently hazardous materials and recycle the remainder.

5. Results

Because of the large amount of data generated, it cannot all be presented in this report. Electronic files of all of the data files are available upon request or can be obtained at

`URL ftp://mwir.lanl.gov/public/peis/ .`

5.1. Mixed Low-Level Waste

The mixed low-level waste treatment systems were calculated for all sites with no shipment of waste, for 11 sites, for 7 sites, for 4 sites, and for 1 site. In all of these calculations, the aqueous waste (matrix 1000-type wastes) at a site was not shipped but the residues from aqueous waste treatment (such as evaporator bottoms (residues) and solids from separation processes) are shipped to an other site for treatment.

An example of a MLLW report is shown below (Table 5.1.1) for the MLLW CH nonalpha four-site case with the basic treatment system (debris-residue grouted). Because aqueous waste was not shipped in any of the analyses, the aqueous waste had to be treated at each site. The residues from the treatment were shipped for further treatment, however. Shown below is a report for the first site, Idaho National Engineering Laboratory, with shipments from Argonne West, General Atomics, Grand Junction, Los Alamos, and Pantex. The only treatment at these sites are for the water portion of the aqueous waste. All other portions, including the solids separated from the water and the evaporator solids, are shipped for further treatment to Idaho.

The first column of the report is the treatment unit; final waste forms have no number. Input waste streams are in the 1000s, and the unit operations are in the 100s. The second column is the name of the unit, the third column is the volume (in m^3) of the waste, and the fourth column is the mass of the waste (in kg). This example represents only the first such treatment site; there are three more sites for this particular case.

Table 5.1.1—MLLW Treatment Report Example

```
Treat Analysis v2.7 August 1, 1994

Written by Byron Palmer-Los Alamos

Fri Aug 19 14:19:38 1994
Workoff rate =10.0

Clear and Total  Aqueous General Atomics
--------------------------------
 1000  Aqueous Waste Streams                        2.5184        2420.2
  110  Receive and Sort                             2.5184        2420.2
  150  Solids Separation                            2.5184        2420.2
  140  Neutralize                                   2.1831        2098.0
  180  Evaporate                                    2.4932        2396.0
  190  Condenser                                    2.2398        2152.5
  270  Organic Destruction                          1.6280        1564.5
       Water Recycle                                2.2385        2151.2

Clear and Total  Aqueous Grand Junction Project Office
--------------------------------
 1000  Aqueous Waste Streams                        0.0701          67.4
  110  Receive and Sort                             0.0701          67.4
  150  Solids Separation                            0.0701          67.4
  140  Neutralize                                   0.0215          20.6
  180  Evaporate                                    0.0694          66.7
  190  Condenser                                    0.0621          59.7
  270  Organic Destruction                          0.0478          46.0
       Water Recycle                                0.0621          59.7

Clear and Total  Aqueous Los Alamos National Laboratory
--------------------------------
 1000  Aqueous Waste Streams                        4.1935        4030.0
  110  Receive and Sort                             4.1935        4030.0
  150  Solids Separation                            4.1935        4030.0
  140  Neutralize                                   4.1516        3989.7
  180  Evaporate                                    4.1516        3989.7
  190  Condenser                                    3.7322        3586.7
  270  Organic Destruction                          0.0000           0.0
       Water Recycle                                3.7322        3586.7
```

Clear and Total Aqueous Pantex Plant

1000	Aqueous Waste Streams	3.4790	3583.4
110	Receive and Sort	3.4790	3583.4
150	Solids Separation	3.4790	3583.4
140	Neutralize	2.9410	3029.2
180	Evaporate	2.9571	3045.9
190	Condenser	2.5937	2671.5
270	Organic Destruction	2.7923	2876.0
	Water Recycle	2.5904	2668.1

Total Idaho National Engineering Laboratory
PEIS Debris-Residue Grouted LLMW August 17, 1994
MLLW CH 4 Site

Unit	Volume(m^3/yr)	Name Mass(kg/yr)	
1000	Aqueous Waste Streams	13.4295	12928.7
2000	Organic Liquid Waste	138.9838	138643.4
3000	Solid Process Residues	124.7751	86816.1
4000	Soils	130.8151	143853.5
5000	Debris	161.7915	73453.1
6000	Lab Packs	10.8375	7611.5
7000	Inherently Hazardous Wastes	66.4046	131756.0
8000	Unknown Matrix	2.9200	5343.6
9000	Unknown Matrix	27.8280	79309.8
110	Receive and Sort	13.8535	13226.8
210	Receive and Sort	144.8953	142614.2
310	Receive and Sort	130.2023	91069.3
410	Receive and Sort	130.8151	143853.5
510	Receive and Sort	166.8264	76958.7
610	Receive and Sort	10.8375	7611.4
710	Sort and Receive	66.4046	131755.9
810	Sort and Receive	2.9200	5343.5
910	Sort and Receive	27.8280	79309.8
150	Solids Separation	19.3647	18761.3
250	Solids Separation	140.1790	139380.7
350	Solid separation	130.2023	91069.3
450	Solid separation	130.8151	143853.5
550	Solid separation	166.8264	76958.7
650	Solid separation	0.1835	179.8
750	Solids Separation	66.4046	131755.9
850	Characterize/Hold	2.9200	5343.5
950	Characterize/Hold	27.8280	79309.8
140	Neutralize	2.1364	2053.3
240	Neutralize	0.0585	57.9
340	Neutralize	3.0015	2210.2
540	Shred	93.9208	50686.4
640	Chemical Oxidation/Reduction	2.0098	2860.6
740	Chemical/Physical Separation	65.1504	129661.8
560	Mercury Distillation	0.0100	20.0
270	Organic Destruction	7.5975	7500.4
470	Thermal Destruction	429.8163	365712.0
570	Thermal Desorption	24.7278	11845.8
180	Evaporate	19.1811	18582.2
480	Secondary Burner	178.3280	162137.6
190	Condenser	17.2023	16664.1
490	Hg Solidification	0.1870	115.0

195	Polymer Solidification	19.0093	15966.5
695	Pelletize	92.6844	50094.1
795	Grout	218.2163	211226.9
796	Grout	46.3422	50094.1
895	Recycle/Stabilization	1.2442	2074.1
	Water Recycle	17.1895	16651.8
	Polymer	38.0186	31933.0
	Hg Solid	0.3741	229.9
	Hg Recycle	0.0075	15.0
	Pb Recycle	61.8929	123178.7
	Recycled/Stabilized	1.2442	2074.1
	Grout	343.9260	339717.3
	Stack	238.6058	177748.6

Table 5.1.2 contains the file names for all the cases analyzed. For each of the contact handled cases that are nonalpha, there are two files. The file with the x has three streams removed; the Hanford tank waste, and the Rocky Flats saltcrete and pondcrete. The To Calculation file has the volumes and masses going to a particular unit, and the From Calculation file has the waste streams from the particular unit. Using these numbers, Argonne could be more easily track the contaminants.

Table 5.1.2 — MLLW Treatment File Names

Treatment Case			Standard	To Calculation	From Calculation
Sites	Hand	alpha	File Names		
1	CH	No	lc1.out	lc11f.out	lc11t.out
1	CH	No	lc1x.out	lc1xf.out	lc1xt.out
4	CH	No	lc4.out	lc4f.out	lc4t.out
4	CH	No	lc4x.out	lc4xf.out	lc4xt.out
7	CH	No	lc7.out	lc7f.out	lc7t.out
7	CH	No	lc7x.out	lc7xf.out	lc7xt.out
11	CH	No	lc11.out	lc11xf.out	lc11xt.out
11	CH	No	lc11x.out	lc1f.out	lc1t.out
50	CH	No	lc50.out	lc50f.out	lc50t.out
50	CH	No	lc50x.out	lc50xf.out	lc50xt.out
1	CH	Yes	lac1.out	lac11f.out	lac11t.out
4	CH	Yes	lac1x.out	lac1xf.out	lac1xt.out
4	CH	Yes	lac4.out	lac4f.out	lac4t.out
4	CH	Yes	lac4x.out	lac4xf.out	lac4xt.out
7	CH	Yes	lac7.out	lac7f.out	lac7t.out
7	CH	Yes	lac7x.out	lac7xf.out	lac7xt.out
11	CH	Yes	lac11.out	lac11xf.out	lac11xt.out
11	CH	Yes	lac11x.out	lac1f.out	lac1t.out

Treatment Case			Standard	To Calculation	From Calculation
Sites	Hand	alpha	File Names		
50	CH	Yes	lac50.out	lac50f.out	lac50t.out
50	CH	Yes	lac50x.out	lac50xf.out	lac50xt.out
1	RH	---	lr1.out	lr11f.out	lr11t.out
4	RH	---	lr4.out	lr4f.out	lr4t.out
7	RH	---	lr7.out	lr7f.out	lr7t.out
11	RH	---	lr11.out	lr1f.out	lr1t.out
50	RH	---	lr50.out	lr50f.out	lr50t.out

5.2. Mixed TRU and TRU

For the mixed TRU and TRU analysis, the rollup of the cases was done for all (16) sites, for 5 sites, for 3 sites, and for 1 site. The three treatment systems for each of these are:

1. treat to LDR disposal standards,
2. treat for reduced gas, and
3. treat for WIPP Waste Acceptance Criteria.

Furthermore, the remote-handled waste was processed separately from the contact-handled waste. Table 5.2.1 contains the file names for the TRU and MTRU unit process operations. The waste type, TRU or MTRU is indicated by the M in front of the file. The number of sites is given by the digits following the TRU, and the case is given by the last letter: W for WIPP WAC, R for RCRA Compliant, and G for Reduced Gas WIPP WAC. For the remote handled wastes, there are only 3 cases, the 2 site, the 4 site and the 5 site. For these, only the 2 site RCRA and reduced gas cases were analyzed along with the treatment process rates. For the 4-site case, the RCRA and reduced gas cases were analyzed, and for the 5-site case, only the WIPP WAC case was analyzed.

Table 5.2.1 — TRU and MTRU Treatment Files

Treatment Cases/Reports				
WIPP WAC	RCRA Compliant	Reduced Gas WIPP WAC	Remote Handled	Treatment Process Rates
MTRU1W.out	MTRU1R.out	MTRU1G.out	TRURH2R.out	MTRU1TPR.TXT
MTRU3W.out	MTRU3R.out	MTRU3G.out	TRURH2G.out	MTRU3TPR.TXT
MTRU5W.out	MTRU5R.out	MTRU5G.out	RH2TPR.txt	MTRU5TPR.TXT
MTRU16W.out	MTRU16R.out	MTRU16G.out	RH4R.out	MTRU16TPR.TXT
TRU1W.out	TRU1R.out	TRU1G.out	TRURH4G.out	TRU1TPR.TXT
TRU3W.out	TRU3R.out	TRU3G.out	RH4TPR.txt	TRU3TPR.TXT
TRU5W.out	TRU5R.out	TRU5G.out	RH5W.out	TRU5TPR.TXT
TRU16W.out	TRU16R.out	TRU16G.out	RH5tpr.txt	TRU16TPR.TXT

An example of the file format for these cases is shown in Table 5.2.2. The first column gives the matrix input based on the IMWIR matrices, as named in the second column. The third column gives the treatment volume in cubic meters. The final form numbers that appear in these files are below 100. In this particular example the treatment site is Idaho National Engineering Laboratory, and the case is the Mixed TRU, a 3-site case, that was contact handled.

Table 5.2.2 — TRU and MTRU Treatment File Example

```
Flow Analysis
Written by Byron Palmer
April 8, 1994
Total   INEL MTRU CH
PEIS TRU Flowsheet WIPP WAC Alternative, January 31, 1994
Mixed TRU 3 Site
Treatment Facility Output
     2    Aqueous Liquids                                1.890
     3    Organic Solids/Sludges                       137.170
     4    Inorganic Sludges/Particulates               887.243
     5    Cemented Solids                               41.310
     7    Inorganic Debris                             268.173
     8    Heterogeneous Debris                        3833.095
    13    Reactive Metals                               27.901
    17    Elemental Lead                                 1.622
   110    Aqueous                                        1.890
   310    Receive Sort                                1065.723
   510    Receive Sort                                4101.268
   610    Receive Sort                                  29.523
   140    Neutralize                                   249.309
   640    Deactivate                                    92.683
   600    Special Processing                            29.523
   793    Repack for Wattage Control                  5364.851
   794    Organic Solidification                       208.296
   795    Grout                                        571.875
    91    Grout                                       1121.277
    92    Debris                                      4214.053
    93    Solids                                        29.523
```

The Table 5.2.3 is an example of the treatment process rates file for the TRU and MTRU files. This is a complex file, for each of the waste matrices it provides, the number of waste streams (# column) and the amount of waste to be treated for each of the following categories: NEUTR (neutralization of acid and basic wastes), ORDST (organic destruction), WWTOR (organic destruction in water), METRM (metal removal), DECON (decontamination), DEACT (deactivation), METRC (metal recovery), and STABL (stabilization). These categories were used in some of the risk calculations for treatment units, especially before the full modeling of the treatment system described above. The format of Table 5.2.3 has been altered so that a single line of the file spans two lines of the table.

Table 5.2.3 — TRU and MTRU Treatment Process Rates Example

#	3 site WWTOR	Handl METRM	Flow DECON	Matrix DEACT	SiteID METRC	HGSEP STABL	NEUTR Total	ORDST
1					RF	0	0	0
	0	1.89	0	0	0	1.8	1.8	
1				2		0	0	0
	0	1.89	0	0	0	1.8	1.8	
1			1000			0	0	0
	0	1.89	0	0	0	1.8	1.8	
2					IN	0	0	137.1
	0	0	0	0	0	79.2	137.1	
2				3		0	0	137.1
	0	0	0	0	0	79.2	137.1	
4					IN	496.9	0	511.7
	0	0	0	0	0	510.8	511.7	
2					LA	0	0	320.5
	0	0	0	0	0	320.5	320.5	
8					RF	23.4	0	44.8
	0	0	0	0	0	54.9	54.9	
14				4		520.3	0	877.1
	0	0	0	0	0	886.3	887.2	
1					LA	0	0	0
	0	0	0	0	0	11.73	11.73	
2					RF	0	0	18.9
	0	0	0	0	0	10.65	29.58	
3				5		0	0	18.9
	0	0	0	0	0	22.38	41.31	
19			3000			520.3	0	1033.
	0	0	0	0	0	987.9	1065.7	
3					IN	101.4	0	114.4
	0	0	13	0	0	114.4	114.4	
10					RF	2.5	0	137.2
	0	0	153.7	0	0	153.7	153.7	
13				7		103.9	0	251.6
	0	0	166.7	0	0	268.1	268.1	
8					IN	1872.3	0	3046.
	0	0	1173.7	0	0	3046.1	3046.1	
7					LA	0	0	373.1
	0	0	725.64	0	0	725.64	725.64	
1					NT	0	0	61.2
	0	0	61.2	0	0	61.2	61.2	
1					SA	0	0	0
	0	0	0.095	0	0	0.095	0.095	
17				8		1872.3	0	3480.
	0	0	1960.7	0	0	3833.0	3833.0	
30			5000			1976.3	3732.2	0
	0	2127.4	0	0	4101.2	4101.2		
1					LA	0	0	0
	0	0	0	12.25	0	0	12.25	
2					RF	0	0	0
	0	0	0	0.021	0	0	15.651	

3				13		0	0	0
	0	0	0	12.271	0	0	27.901	
3			6000			0	0	0
	0	0	0	12.271	0	0	27.901	
1					ET	0	0	0
	0	0	0	0	0.002	0.002	0.002	
1					RF	0	0	0
	0	0	0	0	1.6	1.6	1.62	
2				17		0	0	0
	0	0	0	0	1.6	1.6	1.6	
2			7000			0	0	0
	0	0	0	0	1.6	1.6	1.6	
55	IN					2496.72	0	4765.
	0	1.89	2127.4	12.2	1.6	5092.6	5198.4	

6. Conclusion

This report documents the changes, the corrections, and the analysis of the mixed waste for the Programmatic Environmental Impact Statement. Individual details of each treatment unit's operation is contained elsewhere. The full results are available on the internet or on disk as needed.

Appendix A-EPA Codes/Contaminants

Table A — EPA Codes and Contaminant Codes

EPA Code	Contaminant Code	EPA Code	Contaminant Code
141	Not Assigned	D006A	M
171	Not Assigned	D006B	M
172	Not Assigned	D006C	M
181	Not Assigned	D007	M
221	Not Assigned	D007A	M
261	Not Assigned	D007B	M
352	Not Assigned	D008	M
461	Not Assigned	D008A	M
551	Not Assigned	D008B	M
791	Not Assigned	D008C	M
792	Not Assigned	D008D	M
B001	OF	D009	MH
B002	OF	D009A	MH
B003	OF	D009B	MH
B004	OF	D009C	MH
B005	OF	D009D	MH
B007	OF	D009E	MH
CA 551	Not Assigned	D009F	MH
CA134	OF	D009X	MH
CA181	M	D010	M
CA221	O	D010A	M
CA352	O	D010B	M
D001	I	D011	M
D001A	I	D011A	M
D001B	I	D011B	M
D001C	S	D012	OF
D001E	I	D013	OF
D001X	I	D014	OF
D002	C	D015	OF
D002A	S	D016	OF
D002B	C	D017	OF
D002C	S	D018	O
D003	A	D018A	O
D003A	A	D019	OF
D003B	A	D020	OF
D003C	E	D021	OF
D003D	W	D022	OF
D003E	R	D023	O
D004	M	D024	O
D004A	M	D025	O
D004B	M	D026	O
D005	M	D027	OF
D005A	M	D028	OF
D005B	M	D029	OF
D006	M	D030	O

EPA Code	Contaminant Code
D031	OF
D032	OF
D033	OF
D034	OF
D035	O
D036	O
D037	OF
D038	O
D039	OF
D040	OF
D041	OF
D042	OF
D043	OF
D044	OM
DOMX	OM
DXXX	OM
F001	OF
F002	OF
F003	OF
F004	O
F005	O
F005A	O
F005B	O
F005C	O
F005X	O
F006	M
F007	A
F008	A
F009	A
F010	OA
F011	A
F012	A
F019	M
F020	OF
F021	OF
F022	OF
F023	OF
F024	OF
F025A	OF
F025B	OF
F026	OF
F027	OF
F028	OF
F032	OF
F034	O
F035	M
F037	O
F038	O

EPA Code	Contaminant Code
F039	OMHF
FOMX	OMHF
FXXX	OMF
K001	OF
K002	M
K003	M
K004	M
K005	M
K006A	M
K006B	M
K007	M
K008	M
K009	O
K010	O
K011	O
K013	O
K014	O
K015	OF
K016	OF
K017	OF
K044	O
K045	O
K069A	M
K069B	M
NA	OF
NC	OF
P004	OF
P005	O
P009	Not Assigned
P010	M
P011	M
P012	M
P014	O
P015	M
P016	OF
P017	OF
P018	O
P022	O
P023	OF
P024	OF
P027	OF
P028	OF
P029	MA
P030	OA
P031	O
P034	OM
P037	OF
P045	O

EPA Code	Contaminant Code
P046	O
P047	O
P048	O
P049	O
P050	OF
P051	OF
P054	Not Assigned
P056	OF
P059	OF
P060	OF
P063	A
P064	OA
P065A	H
P065B	H
P065C	H
P065D	H
P066	O
P067	O
P068	O
P069	O
P070	O
P071	O
P072	O
P073	MA
P074	MA
P075	O
P077	O
P081	Not Assigned
P087	M
P088	O
P089	O
P092A	OH
P092B	H
P092C	OH
P092D	OH
P093	O
P094	O
P095	F
P098	A
P102	O
P104	MA
P105	Not Assigned
P106	A
P108	O
P112	Not Assigned
P113	M
P116	O
P119	M

EPA Code	Contaminant Code
P120	M
P121	A
P122	M
P123	OF
PCB	OF
POMX	OMHF
Pxxx	OMHF
TSCA	OF
U001	O
U002	O
U003	O
U004	O
U005	O
U006	OF
U007	O
U008	O
U009	O
U010	O
U011	O
U012	O
U014	O
U017	OF
U018	O
U019	O
U020	OF
U021	O
U022	O
U023	OF
U024	OF
U025	OF
U026	OF
U027	OF
U028	O
U029	OF
U030	OF
U031	O
U032	M
U033	OF
U034	OF
U035	OF
U036	OF
U037	OF
U038	OF
U039	OF
U041	OF
U042	OF
U043	OF
U044	OF

EPA Code	Contaminant Code
U045	OF
U046	OF
U047	OF
U048	OF
U049	OF
U050	O
U051	O
U052	O
U053	O
U055	O
U056	O
U057	O
U058	OF
U059	O
U060	OF
U061	OF
U062	OF
U063	O
U064	O
U066	OF
U067	OF
U068	OF
U069	O
U070	OF
U071	OF
U072	OF
U073	OF
U074	OF
U075	OF
U076	OF
U077	OF
U078	OF
U079	OF
U080	OF
U081	OF
U082	OF
U083	OF
U084	OF
U085	O
U086	O
U087	O
U088	O
U089	O
U090	O
U091	O
U092	O
U093	O
U094	O

EPA Code	Contaminant Code
U095	O
U101	O
U102	O
U103	O
U105	O
U106	O
U107	O
U108	O
U109	O
U110	O
U111	O
U112	O
U113	O
U114	O
U115	O
U116	O
U117	O
U118	O
U119	O
U120	O
U121	OF
U122	O
U123	O
U124	O
U125	O
U126	O
U127	OF
U128	OF
U129	OF
U130	OF
U131	OF
U132	OF
U133	Not Assigned
U134	F
U135	A
U136	OM
U137	O
U138	OF
U140	O
U141	O
U142	OF
U143	O
U144	OM
U145	M
U146	OM
U147	O
U148	O
U149	O

EPA Code	Contaminant Code
U150	OF
U151	H
U151A	H
U151B	H
U151C	H
U151D	H
U151X	H
U152	O
U153	O
U154	O
U155	O
U156	OF
U157	O
U158	OF
U159	O
U160	O
U161	O
U162	O
U163	O
U164	O
U165	O
U166	O
U167	O
U168	O
U169	O
U170	O
U171	O
U172	O
U173	O
U174	O
U176	O
U177	O
U182	O
U183	OF
U184	OF
U185	OF
U186	O
U187	O
U188	O
U189	Not Assigned
U190	O
U191	O
U194	O
U196	O
U197	O
U201	O
U202	O
U204	M

EPA Code	Contaminant Code
U205	MA
U207	OF
U208	OF
U209	OF
U210	OF
U211	OF
U213	O
U214	OM
U215	OM
U216	MF
U217	MF
U218	O
U219	O
U220	O
U221	O
U222	OF
U223	O
U225	OF
U226	OF
U227	OF
U228	OF
U234	O
U235	OF
U236	O
U237	O
U238	O
U239	O
U240	OF
U246	OAF
U247	OF
U248	O
U328	O
U359	O
UNK	OF
UOMX	OMF
Uxxx	OMF
W001	Not Assigned
WC01	Not Assigned
WC02	Not Assigned
WL01	Not Assigned
WL02	Not Assigned
WP01	Not Assigned
WP02	Not Assigned
WP03	Not Assigned
WT01	Not Assigned
WT02	Not Assigned
WTL2	OF

Appendix B-Site/Case Assignments

Table B.1 gives the site shipment for each of the cases, and site appreviations follow in Table B.2. The type of waste by CH (contact handled), RH (remote handled), alpha (waste with the alpha characteristic), MLLW (mixed low-level waste) and MTRU (mixed TRU waste).

Table B.1–Site Shipment Assignments

Site	Type	50	11	7	5	4
AE	MLLW CH	AE	FM	PO	OR	OR
AE	MTRU	AE	SR	SR	SR	SR
AL	MLLW CH	AL	FM	PO	RF	OR
AL	MTRU	AL	SR	SR	SR	SR
AW	MLLW CH	IN	IN	IN	IN	IN
AW	MLLW RH	IN	IN	IN	IN	IN
AW	MTRU	IN	IN	IN	IN	IN
BC	MLLW CH	BC	PO	PO	OR	OR
BN	MLLW CH	BN	PO	PO	OR	OR
BT	MLLW CH Alpha	SR	SR	SR	SR	SR
BT	MLLW CH	BT	PO	PO	OR	OR
BT	MLLW RH	OR	OR	OR	OR	OR
CI	MLLW CH	CI	PO	PO	OR	OR
CN	MLLW CH	CN	SR	SR	SR	SR
DP	MLLW CH	OR	OR	OR	OR	OR
EH	MLLW CH	EH	LL	RL	RL	RL
ET	MLLW CH	ET	ET	IN	IN	IN
ET	MTRU	ET	ET	IN	IN	IN
FM	MLLW CH	FM	FM	PO	OR	OR
GA	MLLW CH	GA	LL	IN	IN	IN
GJ	MLLW CH	GJ	RF	RF	RF	IN
IN	MLLW CH Alpha	IN	IN	IN	IN	IN
IN	MLLW RH Alpha	IN	IN	IN	IN	IN
IN	MLLW CH	IN	IN	IN	IN	IN
IN	MLLW RH	IN	IN	IN	IN	IN
IN	MTRU	IN	IN	IN	IN	IN
IT	MLLW CH Alpha	LA	LA	LA	RF	IN
IT	MLLW CH	IT	LA	LA	RF	IN
KA	MLLW CH	KA	PO	PO	OR	OR
KA	MTRU	KA	SR	SR	SR	SR
KC	MLLW CH	KC	PA	RF	RF	OR
KK	MLLW CH	KK	PO	PO	OR	OR
KW	MLLW CH	KW	PO	PO	OR	OR
LA	MLLW CH Alpha	LA	LA	LA	RF	IN
LA	MLLW CH	LA	LA	LA	RF	IN
LA	MTRU	LA	LA	LA	RF	IN
LB	MLLW CH Alpha	LL	LL	IN	RL	IN
LB	MLLW CH	LB	LL	RL	RL	RL
LL	MLLW CH Alpha	LL	LL	RL	RL	RL
LL	MLLW CH	LL	LL	IN	RL	IN

Site	Type	50	11	7	5	4
LL	MTRU	LL	LL	RL	RL	RL
MD	MLLW CH Alpha	SR	SR	SR	SR	SR
MD	MLLW CH	MD	FM	PO	OR	OR
MD	MTRU	MD	SR	SR	SR	SR
MI	MLLW CH	MI	LL	RL	RL	RL
MS	MLLW CH	MS	MS	MS	MS	MS
MU	MLLW CH Alpha	SR	SR	SR	SR	SR
MU	MTRU	MU	SR	SR	SR	SR
NN	MLLW CH	NN	SR	SR	SR	SR
NT	MLLW CH	IN	IN	IN	IN	IN
NT	MTRU	NT	NT	IN	IN	IN
OR	MLLW CH	OR	OR	OR	OR	OR
OR	MLLW RH	OR	OR	OR	OR	OR
OR	MTRU	OR	SR	SR	SR	SR
PA	MLLW CH	PA	PA	OR	OR	OR
PA	MTRU	PA	SR	SR	SR	SR
PH	MLLW CH	PH	RL	RL	RL	RL
PI	MLLW CH	PI	SR	SR	SR	SR
PN	MLLW CH	PN	PO	PO	OR	OR
PO	MLLW CH	PO	PO	PO	OR	OR
PP	MLLW CH	PP	PO	PO	OR	OR
PS	MLLW CH	PS	RL	RL	RL	RL
PX	MLLW CH	PX	PX	LA	RF	IN
RF	MLLW CH Alpha	RF	RF	RF	RF	IN
RF	MTRU	RF	RF	RF	RF	IN
RL	MLLW CH Alpha	RL	RL	RL	RL	RL
RL	MLLW CH	RL	RL	RL	RL	RL
RL	MLLW RH	RL	RL	RL	RL	RL
RL	MTRU	RL	RL	RL	RL	RL
RM	MLLW CH	RM	PO	PO	OR	OR
SA	MLLW CH	SA	LA	LA	RF	IN
SA	MTRU	SA	LA	LA	RF	IN
SL	MLLW CH	LL	LL	IN	RL	IN
SR	MLLW CH Alpha	SR	SR	SR	SR	SR
SR	MLLW CH	SR	SR	SR	SR	SR
SR	MLLW RH	SR	SR	SR	SR	SR
SR	MTRU	SR	SR	SR	SR	SR
WS	MLLW CH	WS	WS	WS	WS	WS
WV	MLLW CH Alpha	SR	SR	SR	SR	SR
WV	MLLW CH	WV	PO	PO	OR	OR
WV	MTRU	WV	SR	SR	SR	SR
YP	MLLW CH	OR	OR	OR	OR	OR

Table B.2 — Site Identification Abbreviation, Name, and Location

Site ID	Site Name	State
AE	Argonne National Laboratory-East	Illinois
AL	Ames Laboratory	Iowa
AW	Argonne National Laboratory-West	Illinois
BC	Battelle Columbus Laboratories	Ohio
BN	Brookhaven Naional Laboratory	New York
BT	Bettis Atomic Power Laboratory	Pennsylvania
CI	Colonie Interim Storage Site	New York
CN	Charleston Naval Shipyard	South Carolina
DP	K-25 Oak Ridge National Laboratory	Tennessee
EH	Laboratory for Energy-Related Health Res	California
ET	Energy Technology Engineering Center	California
FM	Fernald Environmental Management Project	Ohio
GA	General Atomics	California
GJ	Grand Junction Project Office	Colorado
IN	Idaho National Engineering Labortory	Idaho
IT	Inhalation Toxicology Research Institute	New Mexico
KA	Knolls Atomic Power Laboratory Schenecta	New York
KC	Kansas City Plant	Missouri
KK	Knolls Atomic Power Laboratory Kesselrin	New York
KW	Knolls Atomic Power Laboratory Windsor	Connecticut
LA	Los Alamos National Laboratory	New Mexico
LB	Lawrence Berkeley Laboratory	California
LL	Lawrence Livermore National Laboratory	California
MD	Mound Plant	Ohio
MI	Mare Island Naval Shipyard	California
MS	Middlesex Sampling Plant	New Jersey
MU	Missouri University	Missouri
NN	Norfolk Naval Shipyard	Virginia
NT	Nevada Test Site	Nevada
OR	Oak Ridge National Laboratory	Tennessee
PA	Paducah Gaseous Diffusion Plant	Kentucky
PH	Pearl Harbor Naval Shipyard	Hawaii
PI	Pinellas Plant	Florida
PN	Portsmouth Naval Shipyard	Maine
PO	Portsmouth Gaseous Diffusion Plant	Ohio
PP	Princeton Plasma Physics Laboratory	New Jersey
PS	Puget Sound Naval Shipyard	Washington
PX	Pantex Plant	Texas
RF	Rocky Flats	Colorado
RL	Hanford Site	Washington
RM	RMI Titanium Inc.	Ohio
SA	Sandia National Laboratory-New Mexico	New Mexico
SL	Sandia National Laboratory-California	California
SR	Savannah River Site	South Carolina
WS	Weldon Spring Site Rmedial Action Projec	Missouri
WV	West Valley Demonstration Project	New York
YP	Y-12 Oak Ridge National Laboratory	Tennessee

Appendix C-Data Base Corrections

Table C.1–Alpha Waste Streams

Waste Stream ID	Name of Waste Stream	Inventory Volume (m^3)	Projected 20-Year Volume(m^3)
BT-W001	OIL CONTAINING HEAVY METALS #1	10.7	0.21
IN-W038	TAN DECON SOLVENTS WASTES	5.9	0
IN-W039	TAN DECON HEAVY METAL SOLIDS AND DEBRIS	0.32	0
IN-W158	COMBUSTIBLES (a-LLW): DRY PAPER AND RAGS	3150.63	0
IN-W160	COMBUSTIBLES (a-LLW): MOIST PAPER AND RAGS	1452.4	0
IN-W162	CONCRETE-BRICK (a-LLW): FIREBRICK	183.48	0
IN-W165	CEMENTED SLUDGES (a-LLW): SOLID INORGANIC PROCESS SOLUTION	4.03	0
IN-W168	CEMENTED SLUDGES (a-LLW): SOLID ORGANICS	5.09	0
IN-W173	COMBUSTIBLES (a-LLW): COMBUSTIBLES	33.71	0
IN-W175	CEMENTED SLUDGES (a-LLW): HIGH LEVEL ACID	39.86	0
IN-W176	CEMENTED SLUDGES (a-LLW): HIGH LEVEL CAUSTIC	178.93	0
IN-W178	CEMENTED SLUDGES (a-LLW): HIGH LEVEL SLUDGE/CEMENT	880.22	0
IN-W180	CEMENTED SLUDGES (a-LLW): BUILDING 776 PROCESS SLUDGE	63.82	0
IN-W182	CEMENTED SLUDGES (a-LLW): LAUNDRY SLUDGE	25.36	0
IN-W183	BENELEX, PLEXIGLASS (a-LLW): BENELEX AND PLEXIGLASS	3.82	0
IN-W184	BENELEX, PLEXIGLASS (a-LLW): BENELEX AND PLEXIGLASS	55.37	0
IN-W185	COMBUSTIBLES (a-LLW): COMBUSTIBLE WASTE	371.1	0
IN-W190	UNCEMENTED INORGANIC SLUDGE (a-LLW): FIRST STAGE SLUDGE	58.93	0
IN-W191	UNCEMENTED INORGANIC SLUDGE (a-LLW): SECOND STAGE SLUDGE	342.38	0
IN-W192	UNCEMENTED INORGANIC SLUDGE (a-LLW): BUILDING 374 DRY SLUDGE	464.28	0
IN-W194	UNCEMENTED INORGANIC SLUDGE (a-LLW): RESEARCH GENERATED WASTE NONCOMPACTIBLE SOLIDS OR SOLIDS WET S	285.33	0
IN-W195	UNCEMENTED INORGANIC SLUDGE (a-LLW): CERTIFIED SOLID LAB WASTE	2.54	0
IN-W196	UNCEMENTED INORGANIC SLUDGE (a-LLW): FILTER SLUDGE	0.21	0
IN-W215	UNCEMENTED INORGANIC SLUDGE (a-LLW): CEMENTED SLUDGE	4.88	0
IN-W217	COMBUSTIBLES (a-LLW): PLASTICS, TEFLON, WASH, PVC	352.94	0
IN-W223	CONCRETE - BRICK (a-LLW): OIL DRI RESIDUE FROM INCINERATOR	3.18	0
IN-W224	COMBUSTIBLES (a-LLW): WOOD	91.3	0

Waste Stream ID	Name of Waste Stream	Inventory Volume (m^3)	Projected 20-Year Volume(m^3)
IN-W226	COMBUSTIBLES (a-LLW): COMBUSTIBLE EQUIPMENT BOXES OR FLOOR SWEEPINGS AND RUST	9.93	0
IN-W227	COMBUSTIBLES (a-LLW): LOW SPECIFIC ACTIVITY PLASTICS, PAPER ETC.	92.37	0
IN-W229	CEMENTED SLUDGES (a-LLW): SPECIAL SET UPS (CEMENT)	103.88	0
IN-W231	CONCRETE - BRICK (a-LLW): INORGANIC SOLID WASTE	12.3	0
IN-W232	FILTERS (a-LLW): HEPA FILTER WASTE	69.16	0
IN-W233	FILTERS (a-LLW): FULFLO INCINERATOR FILTERS	0.21	0
IN-W234	FILTERS (a-LLW): ABSOLUTE 8X8 FILTERS	16.54	0
IN-W235	FILTERS (a-LLW): INSULATION AND CHEMICAL WARFARE SERVICE FILTER MEDIA	240.74	0
IN-W237	FILTERS (a-LLW): INSULATION	50.45	0
IN-W238	FILTERS (a-LLW): CEMENTED INSULATION AND FILTER MEDIA	94.74	0
IN-W239	FILTERS (a-LLW): CHEMICAL WARFARE SERVICE FILTERS	873.45	0
IN-W241	GLASS (a-LLW): GLASS WASTE	6.35	0
IN-W242	GLASS (a-LLW): GLASS	95.4	0
IN-W244	GLASS (a-LLW): UNLEACHED RASHIG RINGS	164.72	0
IN-W248	GLASS (a-LLW): LEACHED RASHIG RINGS	138.44	0
IN-W251	GLOVEBOX GLOVES (a-LLW): LEADED RUBBER	2.33	0
IN-W253	GLOVEBOX GLOVES (a-LLW): LEADED RUBBER GLOVES AND APRONS	4.88	0
IN-W255	GLOVEBOX GLOVES (a-LLW): LEADED RUBBER GLOVES AND APRONS	1.06	0
IN-W258	RADIOACTIVE SOURCES (a-LLW): ALPHA HOT CELL WASTE	47.81	0
IN-W261	PARTICULATE WASTES (a-LLW): DIRT	99.64	0
IN-W262	PARTICULATE WASTE (a-LLW): CONTAMINATED SOIL	85.59	0
IN-W264	PARTICULATE WASTES (a-LLW): BLACKTOP, CONCRETE, DIRT AND SAND	368.04	0
IN-W266	PARTICULATE WASTES (a-LLW): GRIT	0.85	0
IN-W268	PARTICULATE WASTES (a-LLW): LABORATORY WASTE	3.6	0
IN-W270	PARTICULATE WASTES (a-LLW): DIRT	28.62	0
IN-W273	NONMETAL MOLDS AND CRUCIBLES (a-LLW): GRAPHITE CORES	1.27	0
IN-W274	NONMETAL MOLDS AND CRUCIBLES (a-LLW): GRAPHITE	18.44	0
IN-W277	MISCELLANEOUS (PAPER, METAL, ETC.) (a-LLW): LOW SPECIFIC ACTIVITY METAL, GLASS, ETC.	1064.98	0
IN-W279	MISCELLANEOUS (PAPER, METAL, ETC.) (a-LLW): NONCOMBUSTIBLE EQUIPMENT BOXES	836.88	0
IN-W282	MISCELLANEOUS (PAPER, METAL, ETC.) (a-LLW):	24.17	0

Waste Stream ID	Name of Waste Stream	Inventory Volume (m³)	Projected 20-Year Volume(m³)
	AMERICIUM PROCESS RESIDUE		
IN-W284	MISCELLANEOUS (PAPER, METAL, ETC.) (a-LLW): NONCOMBUSTIBLE SOLIDS	80.5	0
IN-W286	MISCELLANEOUS (PAPER, METAL, ETC.) (a-LLW): DDW NONCOMBUSTIBLE SOLIDS	0.21	0
IN-W288	MISCELLANEOUS(PAPER, METAL, ETC.) (a-LLW): GENERAL PLANT WASTE	371	0
IN-W290	MISCELLANEOUS(PAPER, METAL, ETC.) (a-LLW): CUT UP GLOVE BOXES	38.5	0
IN-W292	METALS (a-LLW): METAL, EQUIPMENT, PIPES, VALVES, ETC.	2.76	0
IN-W293	METALS (a-LLW): LEACHED NON SPECIAL SOURCE METAL	164.33	0
IN-W295	METALS (a-LLW): NON SPECIAL SOURCE METAL	6688.03	0
IN-W297	METALS (a-LLW): TANTALUM	28.62	0
IN-W299	METALS (a-LLW): METAL WASTE	147.54	0
IN-W303	METALS (a-LLW): NONCOMPRESSIBLE, NONCOMBUSTIBLE	62.33	0
IN-W307	UNCATEGORIZED (a-LLW): NOT RECORDED - UNKNOWN	136.7	0
IN-W310	UNCEMENTED ORGANIC SLUDGE (a-LLW): ORGANIC SETUPS, OIL SOLIDS	1001.85	0
IN-W313	SALTS (a-LLW): EVAPORATOR SALTS	13.56	0
IN-W316	RESINS (a-LLW): LEACHED AND CEMENTED RESIN	8.9	0
IN-W318	RESINS (a-LLW): LEACHED RESIN	0.42	0
IN-W320	RESINS (a-LLW): UNLEACHED ION COLUMN RESIN	1.91	0
IN-W324	UNKNOWN (a-LLW):LOW SPECIFIC ACTIVITY<100 nCi/g NONCOMBUSTIBLE	27.14	0
IN-W326	UNKNOWN (a-LLW): <10 nCi/g NONCOMBUSTIBLE	0.21	0
IN-W328	UNKNOWN (a-LLW): LOW SPECIFIC ACTIVITY < 100 nCi/g COMBUSTIBLE	152.85	0
IN-W331	UNKNOWN (a-LLW): SOLIDIFIED SOLUTIONS	0.64	0
IN-W333	UNKNOWN (a-LLW): PAPER, METALS, GLASS	21	0
IN-W335	UNKNOWN (a-LLW): COMBUSTIBLE SOLIDS	14	0
IN-W343	UNKNOWN (a-LLW): CHEM CELL RIP-OUT	28.53	0
IN-W344	UNKNOWN (a-LLW): TRU SCRAP	4.44	0
IN-W346	UNKNOWN (a-LLW): ABSORBED LIQUIDS	13.46	0
IN-W352	UNCATEGORIZED (a-LLW): PRE 73 DRUMS	3004.19	0
IT-W001	ACTINIDE LSC VIAL WASTE	1.02	0.43
LA-W006	PROCESS RESIDUES - CHROMIUM	0.42	2.78
LA-W007	LEAD	163.33	972.62
LA-W010	SOLVENT CONTAMINATED DEBRIS - F002	21.84	113.06
LA-W012	IGNITABLE LIQUIDS	79.31	351.005
LA-W015	REACTIVE SOLUTIONS	2.04	12.335
LA-W017	ANALYTICAL LABORATORY WASTE - BARIUM	2.53	16.13
LA-W018	ANALYTICAL LABORATORY WASTE - CADMIUM	0.32	0.75
LA-W019	ANALYTICAL LABORATORY WASTE - CHROMIUM	4.59	3.055

Waste Stream ID	Name of Waste Stream	Inventory Volume (m^3)	Projected 20-Year Volume(m^3)
LA-W020	ANALYTICAL LABORATORY WASTE - LEAD	7.97	46.07
LA-W021	MERCURY	10.49	44.54
LA-W022	ANALYTICAL LABORATORY WASTE - SELENIUM	0.45	2.995
LA-W023	PHOTOGRAPHIC FIXER - SILVER	0.53	3.165
LA-W024	SPENT SOLVENTS - F001	8.85	53.34
LA-W025	SPENT SOLVENTS - F002	12.72	73.945
LA-W026	SPENT SOLVENTS - F003	16.16	84.775
LA-W033	U-WASTE LAB PACKS	3.57	13.03
LB-W007	ELEMENTAL LEAD (NONACTIVATED AND ACTIVATED LEAD)	0.4	4
LL-W001	LOW LEVEL MIXED ORGANIC FLUIDS AND GLASS	3	55.5
LL-W003	LOW LEVEL MIXED INORGANIC TRASH-1	0.4	7.4
LL-W004	LOW LEVEL MIXED WASH WATERS	25	462.5
LL-W005	LOW LEVEL MIXED SOIL AND SAND	4	74
LL-W006	LOW LEVEL MIXED SCRAP METAL	6	111
LL-W014	LOW LEVEL MIXED OILS	6	111
LL-W016	LOW LEVEL MIXED ORGANIC LIQUIDS	1.8	33.3
LL-W017	LOW LEVEL MIXED INORGANIC TRASH-3	25	462.5
LL-W023	Contaminated Soils	0.2	3.7
LL-W025	Stabilized Sludges and Particulates	30	555
MD-W001	SCINTILLATION COCKTAIL	43.2	0
MD-W004	LEAD - LLW	5	0
MD-W007	LEAD WASTE DRAINED BATTERIES	0.85	0.0792
MD-W010	LAB PACKS WITH METALS	0.06	0
MD-W011	LAB PACKS WITHOUT METALS	0.1072	0
MD-W012	LEAD LOADED GLOVES --LLW	0.0204	0
MD-W013	WASTE OILS	25.99	4.2
MD-W014	NEWLY DISCOVERED POTENTIALLY MIXED WASTE	0	0
MU-W001	Mixed Low Level Waste	0.43	1.02
RF-W003	Cemented Composite Chips/LLM	90.6	0
RF-W005	Metal/LLM	28.1	160
RF-W006	Combustibles/LLM	410.4	1052.4
RF-W007	Roaster Oxide/LLM	82.74	0
RF-W009	Solidified Bypass Sludge/LLM	458.01	356
RF-W014	Cutoff Sludge/LLM	7.95	0
RF-W015	FBI Oil/LLM	109.64	0
RF-W016	Acid/LLM	9.5	0
RF-W018	Pondcrete/LLM	5905.15	1036.8
RF-W019	Saltcrete/LLM	3280.86	6980
RF-W020	Beryllium Fines/LLM	1.47	2.8
RF-W021	Electrochemical Milling Sludge/LLM	1.5	0
RF-W022	Incinerator Ash/LLM	8.82	0
RF-W023	Lead/LLM	31.92	35.8
RF-W024	Ground Glass/LLM	4.41	38.6
RF-W025	Used Absorbents/LLM	0.21	0
RF-W027	Paints/LLM	0.38	0
RF-W030	Leaded Gloves/LLM	2.73	11.2

Waste Stream ID	Name of Waste Stream	Inventory Volume (m^3)	Projected 20-Year Volume(m^3)
RF-W031	Leaded Gloves-Acid Contaminated/LLM	0.21	0
RF-W035	Glovebox Parts w/Lead/LLM	6.76	42.2
RF-W042	Heavy Metal (non-SS)/LLM	1.26	0
RF-W043	Glass/LLM	4.41	17.8
RF-W044	Solidified Process Solids/LLM	4.75	0
RF-W045	Insulation/LLM	1.89	11
RF-W046	Organics Discard Level/LLM	30.89	11.2
RF-W047	Analytical Lab Solutions/LLM	0.63	12.4
RF-W048	Sand From Button Breakout/LLM	0.21	0
RF-W049	Miscellaneous Liquids/LLM	19.11	0
RF-W050	Soil and Cleanup Debris/LLM	43.61	1150
RF-W051	Excess Chemicals/LLM	5.67	180
RF-W053	Silver Nitrate/LLM	0.84	0
RF-W054	Cyanides/LLM	1.05	0
RF-W055	Turnings/LLM	1.47	42
RF-W061	Misc Pu Recovery Byproducts/LLM	0.21	0
RF-W062	Solidified Organics/LLM	0.21	7
RF-W064	Solar Pond Water/LLM	45425	2000
RF-W071	Particulate Sludge/LLM	4.32	0
RF-W073	Organic Resins/LLM	0.63	0
RF-W074	Cemented Filters/LLM	23.2	36.4
RF-W075	Filters & Media/LLM	5.67	91.2
RF-W077	Acidic Oils/LLM	1.68	0
RF-W078	Wastewater / LLM	0	0
RF-W079	Wet Slurry / LLM	0	200
SR-W025	SOLVENT WASTE <100 NCI/G TRU RAD	2791.1	0
SR-W033	THIRDS WASTE < 100 N CI/G TRU RAD	8	644
SR-W045	TRI-BUTYL-PHOSPHATE & N-PARAFFIN	105.8	0
SR-W046	CONSOLIDATED INCINERATOR (CIF) ASH	0	527
SR-W048	WASTE SITES/SPILL SITE SOIL	18.1	0
WV-W002	LOW LEVEL RADIOACTIVE LEAD	1.2183	0.714
WV-W003	ORGANIC EXTRACTION WASTE	0.316	0.2
WV-W004	ZINC BROMIDE	0.114	10
WV-W005	DECON SOLUTION	0.0978	0.0973
WV-W006	PU SCINTILLATION	0.038	0
WV-W007	PYRIDINE/CYANIDE WASTE	0.038	0
WV-W008	INSTRUMENT OIL W/MERCURY	0.0038	0
WV-W009	METHANOL	0.0038	0.04
WV-W010	PAINT	0.844	0.1
WV-W012	PAINT W/ METALS	0.0232	0.0097
WV-W013	PU AQUEOUS WASTE	0.684	0.2
WV-W014	SR ORGANIC WASTE	0.156	0.2
WV-W015	LEAD ACID BATTERIES	0.208	0.48
WV-W016	TOLUENE	0.0005	0
WV-W017	TC AQUEOUS WASTE	0.017	0.48
WV-W018	DU SQUEEZE	0.03	0
WV-W019	FUELS, OILS, AND LUBRICATING FLUIDS	4.0739	13.334

Waste Stream ID	Name of Waste Stream	Inventory Volume (m^3)	Projected 20-Year Volume(m^3)
WV-W020	MERCURY WASTES	1.9633	0.008
WV-W021	ORGANIC LIQUID - IGNITABLE	0.019	0
WV-W022	SPENT DEGREASER MIXTURES	0.779	0
WV-W023	ACIDIC AQUEOUS WASTES	0.0048	0.0045
WV-W025	CAUSTIC WASTES	0.613	0
WV-W026	Acidic Organic Wastes	0.0022	0.0013
WV-W027	Oxidizers	0.6432	0.6432
WV-W028	Solids Contaminated with Oil	0.0445	0.0445
WV-W029	Immersion Bucket Solution	0.0343	0.1043
WV-W030	AQUEOUS LAB WASTE	0.0023	0.0023
WV-W031	Reactive chemicals	0.0005	0.0005
WV-W032	Commercial Chemical Products (Ignitable)	0	0.004
WV-W033	SOLID METAL WASTES	0.0008	0.0008
WV-W034	ACIDIC METAL AQUEOUS WASTES	0.0003	0.0003
WV-W035	SAMPLING WASTE	0.0145	0.0145
WV-W036	LOW LEVEL PAINT (DRY) WITH METALS	5.778	5.778
WV-W037	DECONTAMINATED SUPERNATANT	0	0.0390
WV-W038	FLUORESCENT LIGHTBULBS	0.0167	0.0167
MD-W009	ABSORBED OIL, PCB, PLUTONIUM	0.227	0
RF-W002	PCB (Solids)/LLM	10.5	0
RF-W017	PCB Liquids/LLM	1.05	0
WV-W039	PCB CAPACITORS	2.55	0.2682
WV-W040	PCB CONTAMINATED MATERIAL	2.55	0
IN-W193	UNCEMENTED INORGANIC SLUDGE (a-LLW): SOLIDIFIED GRINDING SLUDGE, ETC.	0.42	0
IN-W301	RADIOACTIVE SOURCES (a-LLW): COMBUSTIBLE LAB WASTE	5.94	0
IN-W340	UNKNOWN (a-LLW): ANL-W Analytical Chemistry Laboratory Glasswasre, paper, poly, and miscellaneous h	0.42	0

Table C-2: Projected Volume Corrections

Unique Identifier	20 Year	Calcu-lated Proj.	1993	1994	1995	1996	1997	1990-2002	2003-2022
AE-W011	25.6	6.4	1.2	1.2	1.2	1.2	1.2		
AE-W012	3.8	.9	.1	.1	.1	.1	.1		
AE-W013	2.5	1.4	1.2						
AE-W016	30	7.5	1.5	1.5	1.5	1.5	1.5		
AE-W017	1,850	462.5	92.5	92.5	92.5	92.5	92.5		
AE-W018	15.2	3.8	.7	.7	.7	.7	.7		
AE-W020	2.2	1.5			1.3				
AE-W021	6,000	1,500	300	300	300	300	300		
AE-W022	34	8.5	1.7	1.7	1.7	1.7	1.7		
AE-W024	8.2	2	.4	.4	.4	.4	.4		
AE-W026	1	.2							
AE-W027	.8	.2							
AE-W028	.2								
AE-W030	5.6	1.4	.2	.2	.2	.2	.2		
AE-W031	10.2	2.5	.5	.5	.5	.5	.5		
AE-W034	8	2	.4	.4	.4	.4	.4		
AE-W037	145.4	36.3	7.2	7.2	7.2	7.2	7.2		
AE-W038	4	1	.2	.2	.2	.2	.2		
AE-W039	.2								
AW-W001	1	.2							
AW-W002	1.4	.3							
AW-W006	3.4	.8	.1	.1	.1	.1	.1		
AW-W007	4.8	1.2	.2	.2	.2	.2	.2		
AW-W009	2	.5	.1	.1	.1	.1	.1		
AW-W012	2	.4		.1	.1	.1	.1		
AW-W013	.4	.1							
AW-W014	.4	.1							
AW-W015	.3								
AW-W016	4.1	.8		.2	.2	.2	.2		
AW-W018									
AW-W020	.8	.2							
AW-W021	2.8	.6		.1	.1	.1	.1		
AW-W022	.3								
BN-W001	1.8	.4							
BN-W002	2	.5	.1	.1	.1	.1	.1		
BN-W003	.4	.1							
BN-W004	.4	.1							
BN-W005	.4	.1							
BN-W006	2.9	.7	.1	.1	.1	.1	.1		
BN-W007	.4	.1							
BN-W008	.4	.1							
BN-W009	.6	.1							
BN-W010	100	25	5	5	5	5	5		
BT-W019	11.9	2.5		.6	.6	.6	.6		
GJ-W001	.2	.3							.2

Unique Identifier	20 Year	Calcu-lated Proj.	1993	1994	1995	1996	1997	1990-2002	2003-2022
GJ-W002	.3	.5							.3
GJ-W008	.2	.4							.2
GJ-W009	.1	.1							.1
IN-W002	.1								
IN-W018	.6	.2	.1						
IN-W027	25.6	6.4	1.2	1.2	1.2	1.2	1.2		
IN-W028	100	25	5	5	5	5	5		
IN-W053	8.4	2.1	.4	.4	.4	.4	.4		
IN-W060	25	6.2	1.2	1.2	1.2	1.2	1.2		
IN-W061	.4	.1							
IN-W072	20	5	1	1	1	1	1		
IN-W073	.1	.1							
IN-W074	50	12.5	2.5	2.5	2.5	2.5	2.5		
IN-W075	25.8	6.4	1.2	1.2	1.2	1.2	1.2		
IN-W076	1.6	.4							
IN-W078	32.7	12.6	2.5	2.5	2.5	2.5	2.5		
IN-W079	276	69	13.8	13.8	13.8	13.8	13.8		
IN-W082	8.4	9.2		.8	.8	.8	.8	4.2	1.6
IN-W087	1.1	1.3	.1	.1	.1	.1	.1	.5	.3
IN-W089									
IN-W104	4	1	.2	.2	.2	.2	.2		
IN-W106	19.5	12	1.5	4	4	2	.5		
IN-W109	80	120	4	4	4	4	4	20	80
IN-W110	140	210	7	7	7	7	7	35	140
IN-W111	504	756	25.2	25.2	25.2	25.2	25.2	126	504
IN-W112	136	204	6.8	6.8	6.8	6.8	6.8	34	136
IN-W113	14,000	21,000	700	700	700	700	700	3,500	14,000
IN-W114	9,300	13,950	465	465	465	465	465	2,325	9,300
IN-W115	3.2	4.8	.1	.1	.1	.1	.1	.8	3.2
IN-W117	2.9	4.4	.1	.1	.1	.1	.1	.7	2.9
IN-W119	7.3	10.5	.4	.4	.4	.4	.4	2.1	6.3
IN-W120	8.4	12.6	.4	.4	.4	.4	.4	2.1	8.4
IN-W121	4.2	6.3	.2	.2	.2	.2	.2	1	4.2
IN-W122	8,000	12,000	400	400	400	400	400	2,000	8,000
IN-W123	100	150	5	5	5	5	5	25	100
IN-W124	20	30	1	1	1	1	1	5	20
IN-W125	10	15	.5	.5	.5	.5	.5	2.5	10
IN-W126	10.8	16.2	.5	.5	.5	.5	.5	2.7	10.8
IT-W004	28.3	7.3	1.7	1.4	1.4	1.4	1.4		
IT-W005	.9	.2							
KA-W001	8	12	.4	.4	.4	.4	.4	2	8
KA-W002	.4	.6						.1	.4
KA-W004	.2	.3							.2
KA-W007	8	12		.5	.5	.5	.5	2	8
KA-W008	2.8	4.2	.1	.1	.1	.1	.1	.7	2.8
KA-W009	10	15		.6	.6	.6	.6	2.5	10
KA-W010	2	3		.1	.1	.1	.1	.5	2

Unique Identifier	20 Year	Calcu-lated Proj.	1993	1994	1995	1996	1997	1990-2002	2003-2022
KA-W011	3.8	5.8		.2	.2	.2	.2	1	4
KA-W012	1.6	2.4		.1	.1	.1	.1	.4	1.6
KA-W013	1.6	2.4		.1	.1	.1	.1	.4	1.6
KA-W014	1.6	2.4		.1	.1	.1	.1	.4	1.6
KA-W015	67.2	100.8		4.2	4.2	4.2	4.2	16.8	67.2
KA-W016	.7	1						.1	.7
KK-W002	.4	.6						.1	.4
KK-W003	4	6		.2	.2	.2	.2	1	4
KK-W004	5.2	7.8		.3	.3	.3	.3	1.3	5.2
KK-W005	14	21	.3	.8	.8	.8	.8	3.5	14
KK-W006	2.2	3.3		.1	.1	.1	.1	.5	2.2
KK-W007	2	3		.1	.1	.1	.1	.5	2
KK-W008	16.8	25.2		1	1	1.2	1	4.2	16.8
KK-W009	1.6	2.4		.1	.1	.1	.1	.4	1.6
KK-W010	4	6		.3	.2	.3	.2	1	4
KK-W011	1.6	2.4		.1	.1	.1	.1	.4	1.6
KK-W012	4	6		.2	.2	.2	.2	1	4
KK-W013	79.8	121.8		4.2	4.2	4.2	4.2	21	84
KW-W003	5.2	6		.5	.5	.2	.2	3	1.5
KW-W004	11.6	13.3		1.5	1.5	.2	.2	6.5	3.4
KW-W005	.5	.6						.2	.2
KW-W006	4	4.8		.5	.5	.3	.3	1.6	1.6
KW-W009	12.6	16.8			4.2			4.2	8.4
LA-W001	111.4	167.1	5.5	5.5	5.5	5.5	5.5	27.8	111.4
LA-W002	23.5	35.3	1.1	1.1	1.1	1.1	1.1	5.8	23.6
LA-W003	1.3	2						.3	1.3
LA-W004	39.1	58.7	1.9	1.9	1.9	1.9	1.9	9.7	39.1
LA-W005	19.4	29.1	.9	.9	.9	.9	.9	4.8	19.4
LA-W006	2.7	4.1	.1	.1	.1	.1	.1	.6	2.7
LA-W007	972.6	1,458.9	48.6	48.6	48.6	48.6	48.6	243.1	972.6
LA-W008	9.9	14.9	.5	.5	.5	.5	.5	2.4	9.9
LA-W010	113	169.6	5.6	5.6	5.6	5.6	5.6	28.2	113
LA-W011	12.1	18.2	.6	.6	.6	.6	.6	3	12.1
LA-W012	351	526.5	17.5	17.5	17.5	17.5	17.5	87.7	351
LA-W013	26.2	39.3	1.3	1.3	1.3	1.3	1.3	6.5	26.2
LA-W014	9.3	14	.4	.4	.4	.4	.4	2.3	9.3
LA-W015	12.3	18.4	.6	.6	.6	.6	.6	3	12.3
LA-W016	2.5	3.8	.1	.1	.1	.1	.1	.6	2.5
LA-W017	16.1	24.1	.8	.8	.8	.8	.8	4	16.1
LA-W018	.7	1.1						.1	.7
LA-W019	3	4.5	.1	.1	.1	.1	.1	.7	3
LA-W020	46	69.1	2.3	2.3	2.3	2.3	2.3	11.5	46.1
LA-W021	44.5	66.8	2.2	2.2	2.2	2.2	2.2	11.1	44.5
LA-W022	2.9	4.4	.1	.1	.1	.1	.1	.7	2.9
LA-W023	3.1	4.7	.1	.1	.1	.1	.1	.7	3.1
LA-W024	53.3	80	2.6	2.6	2.6	2.6	2.6	13.3	53.3
LA-W025	73.9	110.9	3.7	3.7	3.7	3.7	3.7	18.4	73.9

Unique Identifier	20 Year	Calcu-lated Proj.	1993	1994	1995	1996	1997	1990-2002	2003-2022
LA-W026	84.7	126.9	4.2	4.2	4.2	4.2	4.2	21.6	84.2
LA-W027	62.6	93.9	3.1	3.1	3.1	3.1	3.1	15.6	62.6
LA-W028									
LA-W029	.1	.1							.1
LA-W030	5.5	8.3	.2	.2	.2	.2	.2	1.3	5.5
LA-W031									
LA-W032									
LA-W033	13	19.5	.6	.6	.6	.6	.6	3.2	13
LA-W034	12.2	18.3	.6	.6	.6	.6	.6	3	12.2
LA-W036	1.3	2						.3	1.3
LA-W037	1,215.8	1,823.7	60.7	60.7	60.7	60.7	60.7	303.9	1,215.8
LA-W038	84.9	127.4	4.2	4.2	4.2	4.2	4.2	21.2	84.9
LA-W039	955.4	1,433.1	47.7	47.7	47.7	47.7	47.7	238.8	955.4
LA-W040	153.1	229.7	7.6	7.6	7.6	7.6	7.6	38.2	153.1
LB-W002	10	15	.5	.5	.5	.5	.5	2.5	10
LB-W005	8	12	.4	.4	.4	.4	.4	2	8
LB-W007	4	6	.2	.2	.2	.2	.2	1	4
LB-W010	162.5	175	25	25	25	25	25	25	25
LB-W011	.8	1.2						.2	.8
LB-W012	80	120	4	4	4	4	4	20	80
LL-W001	55.5	84	3	3	3	3	3	12	57
LL-W002	703	1,064	38	38	38	38	38	152	722
LL-W003	7.4	11.2	.4	.4	.4	.4	.4	1.6	7.6
LL-W004	462.5	700	25	25	25	25	25	100	475
LL-W005	74	112	4	4	4	4	4	16	76
LL-W006	111	168	6	6	6	6	6	24	114
LL-W007	60.7	81	4.5	4.5	4.5	4.5	4.5	18	40.5
LL-W008	185	280	10	10	10	10	10	40	190
LL-W009	925	1,400	50	50	50	50	50	200	950
LL-W010	74	112	4	4	4	4	4	16	76
LL-W011	9.2	14	.5	.5	.5	.5	.5	2	9.5
LL-W014	111	168	6	6	6	6	6	24	114
LL-W015	55.5	84	3	3	3	3	3	12	57
LL-W016	33.3	50.4	1.8	1.8	1.8	1.8	1.8	7.2	34.2
LL-W017	462.5	700	25	25	25	25	25	100	475
LL-W018	18.5	28	1	1	1	1	1	4	19
LL-W019	5.5	8.4	.3	.3	.3	.3	.3	1.2	5.7
LL-W020	11.1	16.8	.6	.6	.6	.6	.6	2.4	11.4
LL-W021	5.5	8.4	.3	.3	.3	.3	.3	1.2	5.7
LL-W022	55.5	84	3	3	3	3	3	12	57
LL-W023	3.7	5.6	.2	.2	.2	.2	.2	.8	3.8
LL-W025	555	840	30	30	30	30	30	120	570
LL-W026	5.5	8.4	.3	.3	.3	.3	.3	1.2	5.7
NN-W001	4	6		.2	.2	.2	.2	1	4
NN-W002	2	3		.1	.1	.1	.1	.5	2
OR-W039	1,160	1,740	58	58	58	58	58	290	1,160
OR-W040	132	198	6.6	6.6	6.6	6.6	6.6	33	132

Unique Identifier	20 Year	Calculated Proj.	1993	1994	1995	1996	1997	1990-2002	2003-2022
OR-W044	182	273	9.1	9.1	9.1	9.1	9.1	45.5	182
OR-W046	120	180	6	6	6	6	6	30	120
PH-W003	2	.5	.1	.1	.1	.1	.1		
PH-W004	1	.2							
PH-W007	.5	.1							
PN-W002	.8	1.2						.2	.8
PO-W001	42	63	2.1	2.1	2.1	2.1	2.1	10.5	42
PO-W003	12.6	18.9	.6	.6	.6	.6	.6	3.1	12.6
PO-W004	1,880	2,820	94	94	94	94	94	470	1,880
PO-W005	4.2	6.3	.2	.2	.2	.2	.2	1	4.2
PO-W006	4.2	6.3	.2	.2	.2	.2	.2	1	4.2
PO-W007	56	84	2.8	2.8	2.8	2.8	2.8	14	56
PO-W008	300	450	15	15	15	15	15	75	300
PO-W009	32	48	1.6	1.6	1.6	1.6	1.6	8	32
PO-W010	8.4	12.6	.4	.4	.4	.4	.4	2.1	8.4
PO-W011	3.6	5.4	.1	.1	.1	.1	.1	.9	3.6
PO-W012	4.2	6.3	.2	.2	.2	.2	.2	1	4.2
PO-W015	300	450	15	15	15	15	15	75	300
PO-W016	300	450	15	15	15	15	15	75	300
PO-W017	126	189	6.3	6.3	6.3	6.3	6.3	31.5	126
PO-W018	168	252	8.4	8.4	8.4	8.4	8.4	42	168
PO-W019	420	630	21	21	21	21	21	105	420
PO-W020	100	150	5	5	5	5	5	25	100
PO-W021	20	30	1	1	1	1	1	5	20
PO-W022	48	72	2.4	2.4	2.4	2.4	2.4	12	48
PO-W024	300	450	15	15	15	15	15	75	300
PO-W025	2	3	.1	.1	.1	.1	.1	.5	2
PO-W026	54	81	2.7	2.7	2.7	2.7	2.7	13.5	54
PO-W028	16.8	25.2	.8	.8	.8	.8	.8	4.2	16.8
PO-W029	52	78	2.6	2.6	2.6	2.6	2.6	13	52
PO-W030	2	3	.1	.1	.1	.1	.1	.5	2
PO-W031	5.8	8.7	.2	.2	.2	.2	.2	1.4	5.8
PO-W032	7.2	10.8	.3	.3	.3	.3	.3	1.8	7.2
PO-W033	230	345	11.5	11.5	11.5	11.5	11.5	57.5	230
PO-W034	.6	.9						.1	.6
PO-W035	52	78	2.6	2.6	2.6	2.6	2.6	13	52
PO-W036	10.8	16.2	.5	.5	.5	.5	.5	2.7	10.8
PO-W037	8.4	12.6	.4	.4	.4	.4	.4	2.1	8.4
PO-W038	102	153	5.1	5.1	5.1	5.1	5.1	25.5	102
PO-W039	400	600	20	20	20	20	20	100	400
PO-W041	14	21	.7	.7	.7	.7	.7	3.5	14
PO-W042	204	300	12	12	12	12	12	48	192
PO-W043	12.8	19.2	.6	.6	.6	.6	.6	3.2	12.8
PO-W044	102	153	5.1	5.1	5.1	5.1	5.1	25.5	102
PO-W045	40	60	2	2	2	2	2	10	40
PO-W046	7	10	.5	.5	.5	.5	.5	1.5	6
PO-W047	60	90	3	3	3	3	3	15	60

Unique Identifier	20 Year	Calcu-lated Proj.	1993	1994	1995	1996	1997	1990-2002	2003-2022
PO-W048	50	75	2.5	2.5	2.5	2.5	2.5	12.5	50
PO-W049	.4	.6						.1	.4
PO-W050	334	501	16.7	16.7	16.7	16.7	16.7	83.5	334
PO-W051	12.6	18.9	.6	.6	.6	.6	.6	3.1	12.6
PO-W052	6,000	9,000	300	300	300	300	300	1,500	6,000
PO-W053	50	75	2.5	2.5	2.5	2.5	2.5	12.5	50
PO-W055	120	180	6	6	6	6	6	30	120
PO-W057	74	111	3.7	3.7	3.7	3.7	3.7	18.5	74
PO-W058	420	630	21	21	21	21	21	105	420
PO-W059	2	3	.1	.1	.1	.1	.1	.5	2
PO-W060	11,285	16,585	360	625	625	625	625	3,125	10,600
PO-W061	40	60	2	2	2	2	2	10	40
PO-W064	25	37.5	1.2	1.2	1.2	1.2	1.2	6.2	25
PO-W065	20	30	1	1	1	1	1	5	20
PO-W066	48	72	2.4	2.4	2.4	2.4	2.4	12	48
PO-W067	4.2	6.3	.2	.2	.2	.2	.2	1	4.2
PO-W068	46	69	2.3	2.3	2.3	2.3	2.3	11.5	46
PO-W069	780	1,170	39	39	39	39	39	195	780
PO-W070	2	3	.1	.1	.1	.1	.1	.5	2
PO-W071	6.8	10.2	.3	.3	.3	.3	.3	1.7	6.8
PO-W072	20	30	1	1	1	1	1	5	20
PO-W073	50	75	2.5	2.5	2.5	2.5	2.5	12.5	50
PO-W074	2	3	.1	.1	.1	.1	.1	.5	2
PO-W075	1	1.5						.2	1
PO-W076	.6	.9						.1	.6
PO-W077	36	54	1.8	1.8	1.8	1.8	1.8	9	36
PO-W078	124	186	6.2	6.2	6.2	6.2	6.2	31	124
PO-W079	6.4	9.6	.3	.3	.3	.3	.3	1.6	6.4
PO-W080	20	30	1	1	1	1	1	5	20
PO-W081	4.2	6.3	.2	.2	.2	.2	.2	1	4.2
PS-W001	71.3	15.8	1	3.7	3.7	3.7	3.7		
PS-W002	17.5	3.7		.9	.9	.9	.9		
PS-W003	17.5	3.7		.9	.9	.9	.9		
PS-W005	17.5	3.7		.9	.9	.9	.9		
PS-W007	34.2	7.2		1.8	1.8	1.8	1.8		
PS-W012	9.5	2		.5	.5	.5	.5		
PX-W010	.8	.8	.1	.1	.1	.1	.1	.2	.1
PX-W021	198	213	24.6	24.6	24.6	24.6	24.6	60	30
PX-W022	15.5	16.7	1.9	1.9	1.9	1.9	1.9	4.8	2.4
PX-W023	159.1	171.1	19.6	19.6	19.6	19.6	19.6	49	24
PX-W024	10.9	11.8	1.3	1.3	1.3	1.3	1.3	3.4	1.7
PX-W025	72	77.5	8.9	8.9	8.9	8.9	8.9	22	11
PX-W026	4.9	5.3	.6	.6	.6	.6	.6	1.5	.8
PX-W027	21	22.6	2.5	2.5	2.5	2.5	2.5	6.5	3.2
PX-W028	16.2	17.5	2	2	2	2	2	5	2.5
PX-W029	6.7	7.2	.8	.8	.8	.8	.8	2	1
PX-W030	1.4	1.5	.1	.1	.1	.1	.1	.4	.2

Unique Identifier	20 Year	Calcu-lated Proj.	1993	1994	1995	1996	1997	1990-2002	2003-2022
PX-W032	3.2	3.4	.4	.4	.4	.4	.4	1	.4
PX-W033	1.4	1.5	.1	.1	.1	.1	.1	.4	.2
PX-W034	25.1	27	3.1	3.1	3.1	3.1	3.1	7.7	3.8
PX-W035	12	12.9	1.5	1.5	1.5	1.5	1.5	3.6	1.8
PX-W036	1.3	1.4	.1	.1	.1	.1	.1	.4	.2
PX-W037	1.4	1.5	.1	.1	.1	.1	.1	.4	.2
PX-W038	1.6	1.7	.2	.2	.2	.2	.2	.5	.2
PX-W039	1.5	1.6	.1	.1	.1	.1	.1	.4	.2
PX-W040	1.4	1.5	.1	.1	.1	.1	.1	.4	.2
RF-W005	160	40	8	8	8	8	8		
RF-W006	1,052.4	263.1	52.6	52.6	52.6	52.6	52.6		
RF-W009	356	89	17.8	17.8	17.8	17.8	17.8		
RF-W010	56	14	2.8	2.8	2.8	2.8	2.8		
RF-W011	179	44.7	8.9	8.9	8.9	8.9	8.9		
RF-W012	497.6	124.4	24.8	24.8	24.8	24.8	24.8		
RF-W013	38	9.5	1.9	1.9	1.9	1.9	1.9		
RF-W018	1,036.8	259.2	51.8	51.8	51.8	51.8	51.8		
RF-W019	6,980	1,745	349	349	349	349	349		
RF-W020	2.8	.7	.1	.1	.1	.1	.1		
RF-W023	35.8	8.9	1.7	1.7	1.7	1.7	1.7		
RF-W024	38.6	9.6	1.9	1.9	1.9	1.9	1.9		
RF-W028	12.4	3.1	.6	.6	.6	.6	.6		
RF-W029	47.6	11.9	2.3	2.3	2.3	2.3	2.3		
RF-W030	11.2	2.8	.5	.5	.5	.5	.5		
RF-W032	23.4	5.8	1.1	1.1	1.1	1.1	1.1		
RF-W035	42.2	10.5	2.1	2.1	2.1	2.1	2.1		
RF-W036	4.2	1	.2	.2	.2	.2	.2		
RF-W038	105	26.2	5.2	5.2	5.2	5.2	5.2		
RF-W041	37.4	9.3	1.8	1.8	1.8	1.8	1.8		
RF-W043	17.8	4.4	.8	.8	.8	.8	.8		
RF-W045	11	2.7	.5	.5	.5	.5	.5		
RF-W046	11.2	2.8	.5	.5	.5	.5	.5		
RF-W047	12.4	3.1	.6	.6	.6	.6	.6		
RF-W050	1,150	287.5	57.5	57.5	57.5	57.5	57.5		
RF-W051	180	45	9	9	9	9	9		
RF-W055	42	10.5	2.1	2.1	2.1	2.1	2.1		
RF-W057	14	3.5	.7	.7	.7	.7	.7		
RF-W062	7	1.7	.3	.3	.3	.3	.3		
RF-W063	22	5.5	1.1	1.1	1.1	1.1	1.1		
RF-W064	2,000	500	100	100	100	100	100		
RF-W066	66.8	16.7	3.3	3.3	3.3	3.3	3.3		
RF-W067	18.6	4.6	.9	.9	.9	.9	.9		
RF-W074	36.4	9.1	1.8	1.8	1.8	1.8	1.8		
RF-W075	91.2	22.8	4.5	4.5	4.5	4.5	4.5		
RF-W079	200	50	10	10	10	10	10		
RL-W009	282302	78,512	8,229	18,817	20,384	17,496	13,586		
RL-W010	41,446	26,116	12,086		10,177	2,831	1,022		

Unique Identifier	20 Year	Calcu-lated Proj.	1993	1994	1995	1996	1997	1990-2002	2003-2022
RL-W017	28.5	44	.3	.3	1.4	1.5	1.5	7.7	31
RL-W018	305.6	469.8	3.9	3.8	16.2	17.1	17.1	83.2	328.2
RL-W019	44.7	68.7	.5	.5	2.3	2.5	2.5	12.1	48
RL-W020	1,035.3	1,591.3	13.4	12.9	54.9	58	58	282	1,111.8
RL-W021	13.7	21.2	.1	.1	.7	.7	.7	3.7	14.8
RL-W022	891.4	1,370	11.5	11.1	47.2	49.9	50	242.8	957.2
RL-W023	92.1	127.3	5.5	4.7	5.1	6.8	7.5	26.9	70.4
RL-W024	22.2	30.8	1.3	1.1	1.2	1.6	1.8	6.5	17
RL-W025	16	22.1	.9	.8	.9	1.2	1.3	4.7	12.2
RL-W026	28.6	39.6	1.7	1.4	1.6	2.1	2.3	8.4	21.9
RL-W027	63.7	88.1	3.8	3.3	3.5	4.7	5.1	18.6	48.8
RL-W028	18.9	26.2	1.1	.9	1	1.4	1.5	5.5	14.5
RL-W029	211.7	292.7	12.8	10.9	11.9	15.7	17.2	62	162
RL-W030	81.6	112.9	4.9	4.2	4.5	6	6.6	23.9	62.4
RL-W031	252.2	371.4	12.7	11.9	13.5	15.8	9.1	69.7	238.4
RL-W032	18.7	25.9	1.1	.9	1	1.4	1.5	5.5	14.3
RL-W033	4.1	5.7	.2	.2	.2	.3	.3	1.2	3.2
RL-W034	67.7	104	.8	.8	3.5	3.7	3.8	18.4	72.7
RL-W035	301.7	461.5	22.8	15.8	12.9	11.9	11.9	66.5	319.6
RL-W036	151.3	222.8	7.6	7.1	8.1	9.4	5.5	41.8	143
RL-W037	95.3	146.5	1.2	1.2	5	5.3	5.3	25.9	102.3
RL-W038	1.3	2						.3	1.4
RL-W039	745.4	1,145.7	9.6	9.3	39.5	41.7	41.8	203	800.5
RL-W040	1,449.5	2,227.8	18.8	18.1	76.8	81.2	81.3	394.8	1,556.6
RL-W041	79.2	109.5	4.8	4.1	4.4	5.9	6.4	23.2	60.6
RL-W042	344.4	529.4	4.4	4.3	18.2	19.3	19.3	93.8	369.9
RL-W043	777.6	1,195.2	10.1	9.7	41.2	43.5	43.6	211.8	835.1
RL-W044	44.7	68.7	.5	.5	2.3	2.5	2.5	12.1	48
RL-W045	13.7	21.2	.1	.1	.7	.7	.7	3.7	14.8
RL-W046	454.7	698.9	5.9	5.7	24.1	25.4	25.5	123.8	488.3
RL-W047	393.4	757.9	4.6	2.1	4	4.6	4.3	8.9	729.1
RL-W048	344.5	663.8	4	1.9	3.5	4	3.8	7.8	638.5
RL-W049	4,036.9	7,777.9	47.3	22.4	42	47.8	44.8	91.6	7,481.9
RL-W050	105.4	203.1	1.2	.5	1.1	1.2	1.1	2.3	195.3
RL-W051	54	104	.6	.3	.5	.6	.6	1.2	100
RL-W052	107	164.4	1.3	1.3	5.6	6	6	29.1	114.9
RL-W053	1.9	3			.1	.1	.1	.5	2.1
RL-W054	41.4	63.6	.5	.5	2.2	2.3	2.3	11.2	44.4
RL-W055	77.4	107.1	4.7	4	4.3	5.7	6.3	22.7	59.2
RL-W056	76.3	105.5	4.6	3.9	4.2	5.6	6.2	22.3	58.4
RL-W057	6,560.4	10,105.	127.4	143.3	293.2	363.4	358.8	1,729.3	7,089.7
RL-W058	58.9	81.4	3.5	3	3.3	4.3	4.8	17.2	45.1
RL-W059	41.6	57.5	2.5	2.1	2.3	3.1	3.3	12.1	31.8
RL-W060	114.1	157.7	6.9	5.9	6.4	8.5	9.2	33.4	87.3
RL-W061	69	106.1	.9	.8	3.6	3.8	3.8	18.8	74.1
RL-W062	2.2	3.4	.1	.1	.1			.5	2.3
RL-W063	216.9	333.4	2.8	2.7	11.5	12.1	12.1	59	232.9

Unique Identifier	20 Year	Calcu-lated Proj.	1993	1994	1995	1996	1997	1990-2002	2003-2022
RL-W064	2,364.6	3,634.2	30.7	29.6	125.3	132.4	132.6	644	2,539.3
RL-W065	1,363.1	2,095	17.7	17.1	72.2	76.3	76.4	371.2	1,463.8
RL-W066	541.6	832.5	7	6.8	28.7	30.3	30.3	147.5	581.7
RL-W067	13.7	21.2	.1	.1	.7	.7	.7	3.7	14.8
RL-W071	5	6.6		.3	.4	.2	.2	2	3.1
RL-W072	4.1	5.4		.3	.3	.1	.2	1.7	2.6
RL-W073	34.3	45.1	.4	2.4	2.9	1.4	1.9	14.2	21.6
RL-W074	15.8	20.7	.2	1.1	1.3	.6	.9	6.5	9.9
RL-W075	2.4	3.2		.1	.2	.1	.1	1	1.5
RL-W076	1.6	2.1		.1	.1			.6	1
RL-W077	2.4	3.1		.1	.2	.1	.1	1	1.5
RL-W078	25.7	33.4	.1	1.8	2.3	1.1	1.4	11.1	15.2
RL-W079	17.2	22.3		1.2	1.5	.7	.9	7.4	10.1
RL-W080	1.4	1.9	.9						.9
RL-W081	.2	.2							.1
RL-W084	86	111.4	.4	6.1	7.9	3.9	4.8	37.3	50.9
RL-W085	1	1.4						.4	.6
RL-W086	2.7	3.6		.2	.2	.1	.1	1.1	1.7
RL-W087	493.7	951.2	5.7	2.7	5.1	5.8	5.4	11.2	914.9
RL-W089	7.2	11.1			.3	.4	.4	1.9	7.7
RL-W090	1,104.4	1,697.4	14.3	13.8	58.5	61.8	61.9	300.8	1,186
RL-W091	13.7	21.2	.1	.1	.7	.7	.7	3.7	14.8
RL-W092	1.9	3			.1	.1	.1	.5	2.1
RL-W093	125.3	173.3	7.6	6.4	7	9.3	10.2	36.7	95.9
RL-W094	952.2	1,463.6	12.3	11.9	50.4	53.3	53.4	259.3	1,022.6
RL-W095	974.9	1,498.3	12.6	12.2	51.6	54.6	54.6	265.5	1,046.9
RL-W097	148.1	227.7	1.9	1.8	7.8	8.3	8.3	40.3	159.1
RL-W098	2,023.6	3,898.8	23.7	11.2	21	23.9	22.4	45.9	3,750.5
RL-W099	41.4	63.6	.5	.5	2.2	2.3	2.3	11.2	44.4
RL-W100	510.5	784.6	6.6	6.4	27	28.6	28.6	139	548.2
RL-W101	117.6	169.3	4	6	8	6	6.6	35.3	103.3
RL-W108	368.1	565.8	4.7	4.6	19.5	20.6	20.6	100.2	395.3
RL-W110	167.8	258.5	3.2	3.6	7.5	9.3	9.1	44.2	181.4
RL-W114	13.7	21.2	.1	.1	.7	.7	.7	3.7	14.8
RL-W115	41.4	63.8	.8	.9	1.8	2.3	2.2	10.9	44.8
RL-W116	38.2	58.8	.7	.8	1.7	2.1	2	10	41.2
RL-W117	9.8	15.2	.1	.2	.4	.5	.5	2.6	10.6
RL-W118	51.8	79.8	1	1.1	2.3	2.8	2.8	13.6	56
RL-W119	51.4	99	.6	.2	.5	.6	.5	1.1	95.3
RL-W120	51.4	99	.6	.2	.5	.6	.5	1.1	95.3
RL-W121	54	104	.6	.3	.5	.6	.6	1.2	100
RL-W122	617.1	1,189	7.2	3.4	6.4	7.3	6.8	14	1,143.7
RL-W123	211.8	408.2	2.4	1.1	2.2	2.5	2.3	4.8	392.6
RL-W124	82.8	127.3	1	1	4.3	4.6	4.6	22.5	88.9
RL-W125	51.8	79.8	1	1.1	2.3	2.8	2.8	13.6	56
RL-W126	9.8	15.2	.1	.2	.4	.5	.5	2.6	10.6
RL-W127	10.2	15.8	.2	.2	.4	.5	.5	2.7	11.1

Unique Identifier	20 Year	Calcu-lated Proj.	1993	1994	1995	1996	1997	1990-2002	2003-2022
RL-W128	10.2	15.8	.2	.2	.4	.5	.5	2.7	11.1
RL-W129	41.1	63.4	.8	.9	1.8	2.2	2.2	10.8	44.5
RL-W130	118.9	182.8	1.5	1.4	6.3	6.6	6.6	32.4	127.7
RL-W131	9.8	15.2	.1	.2	.4	.5	.5	2.6	10.6
RL-W132	13.7	21.2	.1	.1	.7	.7	.7	3.7	14.8
RL-W133	203.5	274	3	4	26	16	16	68	141
RL-W134	8.5	11		.6	.7	.3	.4	3.6	5
RL-W135	41.2	53.5	.2	2.9	3.7	1.9	2.3	17.9	24.4
RL-W139	324.5	448.7	19.6	16.8	18.2	24.1	26.4	95	248.3
SL-W001	4.4	4.5	.2	1.4	1.4	.6	.5	.2	.2
SL-W002	6.7	8.2	.4	.4	.5	.5	1	2	3
SL-W003	7.3	7.9	.5	.7	1	1.2	1.5	1.7	1.1
SL-W004	2.9	3.2	.3	.3	.4	.4	.5	.5	.6
SL-W005	75.8	83.1	8.5	9.7	11	12.2	13	14	14.5
SL-W006	5.3	6	.3	.5	.7	.9	1.1	1.2	1.3
SR-W001	8	2	.4	.4	.4	.4	.4		
SR-W002	12	3	.6	.6	.6	.6	.6		
SR-W003	8	12	.4	.4	.4	.4	.4	2	8
SR-W007	1,500	375	75	75	75	75	75		
SR-W008	1,500	375	75	75	75	75	75		
SR-W012	4	1	.2	.2	.2	.2	.2		
SR-W024	1.4	2.2			.2			.4	1.6
SR-W042	20	5	1	1	1	1	1		
SR-W043	10	2.5	.5	.5	.5	.5	.5		
SR-W046	527	837				31	31	155	620
SR-W047	3,400	5,400				200	200	1,000	4,000
SR-W050	1.9	.4		.1	.1	.1	.1		
WV-W002	.7	.1							
WV-W003	.2								
WV-W004	10	2.5	.5	.5	.5	.5	.5		
WV-W009									
WV-W010	.1								
WV-W013	.2								
WV-W014	.2								
WV-W015	.4	.1							
WV-W017	.4	.1							
WV-W019	13.3	3.3	.6	.6	.6	.6	.6		
WV-W020									
WV-W037									

Table C-3: Projected Volume Based on Mass Projections

Unique ID	20 Year
DP-W001	957.5
DP-W002	43.6
DP-W004	576.1
DP-W005	1,320.7
DP-W006	1,728.5
DP-W007	1,453.4
DP-W016	2.2
DP-W017	52.4
DP-W018	1
DP-W021	.2
DP-W026	22.1
DP-W027	400.8
DP-W030	67.9
DP-W032	198
DP-W033	213
DP-W034	187.5
DP-W035	124
DP-W038	37.2
DP-W039	6,110.2
DP-W042	8,260.1
DP-W043	8.2
DP-W050	
DP-W051	3
DP-W052	.1
DP-W053	.2
DP-W055	100.3
DP-W057	54.5
DP-W058	40.5
DP-W063	361.8
DP-W064	48.8
DP-W066	31.6
DP-W067	19.5
DP-W068	518.7
DP-W069	189.2
DP-W070	30.3
DP-W071	1
DP-W072	
DP-W073	
DP-W075	.5
DP-W076	3.8
DP-W079	3.5
DP-W080	2.6
DP-W083	101.5
DP-W084	22
FM-W010	4.3
FM-W011	18.9
FM-W012	.1

Unique ID	20 Year
FM-W013	.8
FM-W015	.5
FM-W016	.4
FM-W017	.2
FM-W018	.1
FM-W019	.5
FM-W020	.7
FM-W021	.5
FM-W022	.1
FM-W024	1.6
FM-W028	.1
FM-W030	1
FM-W031	.4
FM-W034	
FM-W035	.1
FM-W036	4.2
FM-W040	.4
FM-W050	1.1
FM-W082	.2
FM-W089	.7
FM-W094	2
FM-W101	1.3
FM-W107	3.3
FM-W117	.4
FM-W124	.2
FM-W288	2.5
FM-W289	.4
OR-W002	25.3
OR-W003	.2
OR-W004	1.4
OR-W005	162.6
OR-W006	.9
OR-W007	
OR-W009	220.2
OR-W010	23.4
OR-W011	91.8
OR-W013	198.4
OR-W014	4.1
OR-W015	18.8
OR-W016	.8
OR-W018	26.6
OR-W019	59.1
OR-W020	2.9
OR-W023	25.4
OR-W025	.3
OR-W026	.3
OR-W030	110.6

Unique ID	20 Year
OR-W031	
OR-W033	.7
OR-W034	31.2
OR-W035	2.1
OR-W036	76.1
YP-W003	68.7
YP-W004	.1
YP-W005	2,786.9
YP-W008	
YP-W009	221.7
YP-W010	
YP-W011	.4
YP-W012	3.2
YP-W013	51.3
YP-W014	
YP-W015	2.6
YP-W019	21.9
YP-W020	55.9
YP-W022	6.1
YP-W025	.7
YP-W027	8.1
YP-W028	.6
YP-W030	1.6
YP-W031	40.9
YP-W032	.9
YP-W035	.1
YP-W036	
YP-W037	2.1
YP-W040	2.4
YP-W041	3.9
YP-W042	1.8
YP-W043	.2
YP-W044	.3
YP-W045	.8
YP-W048	.1
YP-W049	8.8
YP-W050	
YP-W051	
YP-W052	1.6
YP-W054	1.6
YP-W056	1.8
YP-W058	1.1
YP-W059	.8
YP-W060	1
YP-W061	18.3
YP-W062	1,712.6
YP-W063	120.7

Unique ID	20 Year
YP-W064	
YP-W065	87.9
YP-W067	8
YP-W068	82.8
YP-W069	78.4
YP-W070	18.7
YP-W071	.2
YP-W072	269.8
YP-W073	98
YP-W074	3.2
YP-W076	
YP-W077	6.7
YP-W078	89.5
YP-W079	7.5
YP-W082	91.9
YP-W083	30.5
YP-W084	139.2
YP-W085	3.4
YP-W087	.4
YP-W088	.1
YP-W091	30.8
YP-W093	73.2
YP-W095	6.6
YP-W096	3.3
YP-W097	149.3
YP-W098	.6
YP-W102	7.2
YP-W105	.3
YP-W106	.1
YP-W107	25.9
YP-W108	.1
YP-W109	10.2
YP-W110	.8
YP-W111	1.9
YP-W112	
YP-W113	
YP-W114	.1
YP-W116	
YP-W117	5.1
YP-W120	.9
YP-W121	.6
YP-W124	4.2
YP-W125	1.3
YP-W126	2
YP-W129	34
YP-W135	7.7
YP-W136	21.1

Unique ID	20 Year
YP-W137	175.5
YP-W139	
YP-W140	4.3
YP-W141	5.9
YP-W143	12.5
YP-W144	3.2
YP-W145	409.8

Unique ID	20 Year
YP-W146	1.6
YP-W147	4.5
YP-W148	.8
YP-W149	8.9
YP-W151	97.1
YP-W152	4.1
YP-W153	6.8

Unique ID	20 Year
YP-W154	1.2
YP-W157	.1
YP-W158	.1
YP-W159	
YP-W161	.4
YP-W162	
YP-W163	7

Unique ID	20 Year
YP-W164	3.2
YP-W165	.6
YP-W168	11
YP-W170	.5

Appendix D — Process Flow Diagrams

The following set of figures includes the upper level flow diagrams for the three different MLLW cases as well as the TRU cases. These are better described in "Analysis of Waste Treatment Requirements for DOE Mixed Wastes: Technical Basis" by Burdon Musgrave. The diagrams show the connections between each of the unit operations but do not show how the waste moves through them and the splitting of the waste streams. In some places, values are noted for the portion of the waste sent to a location, but, this is a general condition and may vary for specific waste streams. The Argonne National Laboratory waste stream numbers are shown below each of the major inputs.

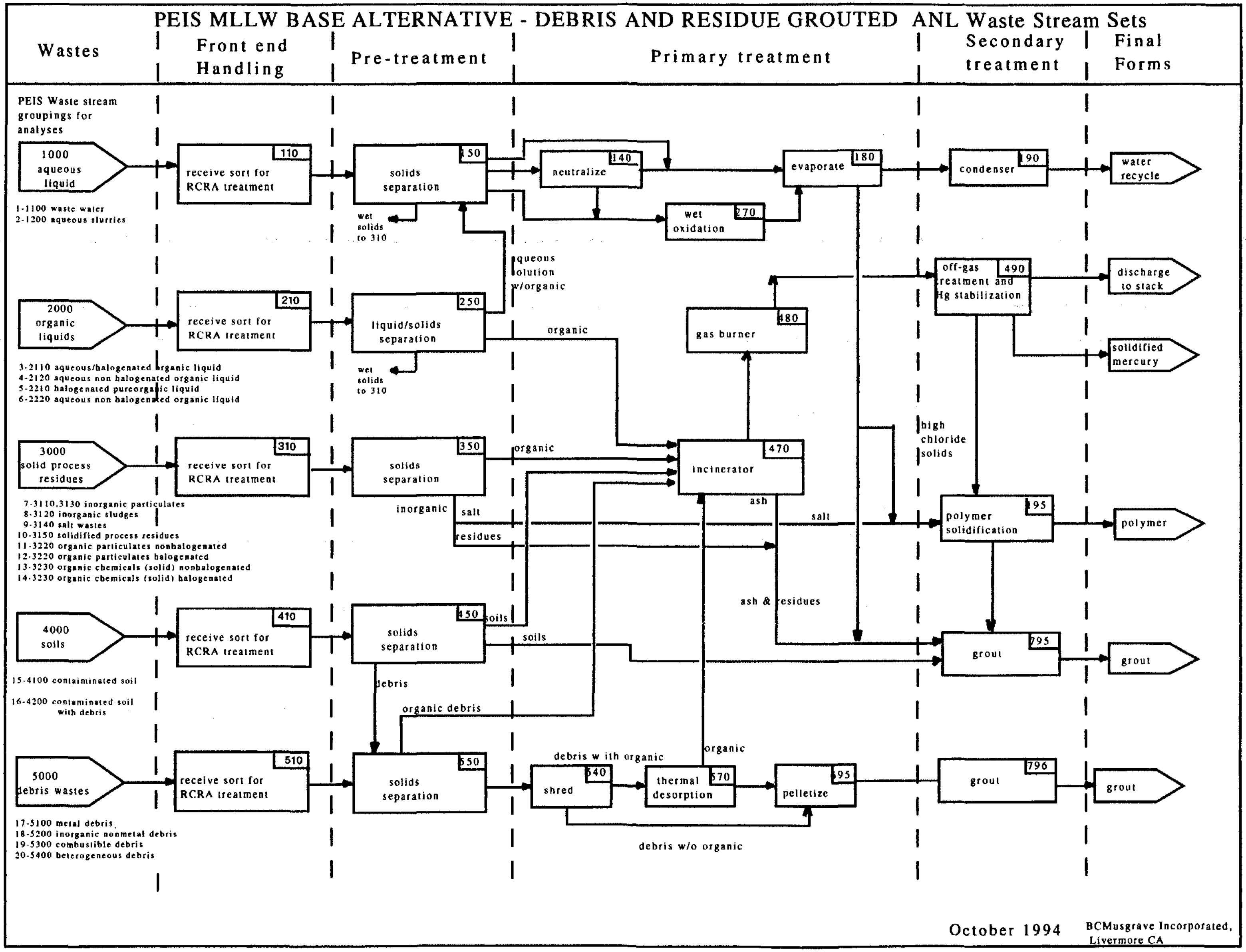

Figure D-1. Base Case Matrices 1000-5000

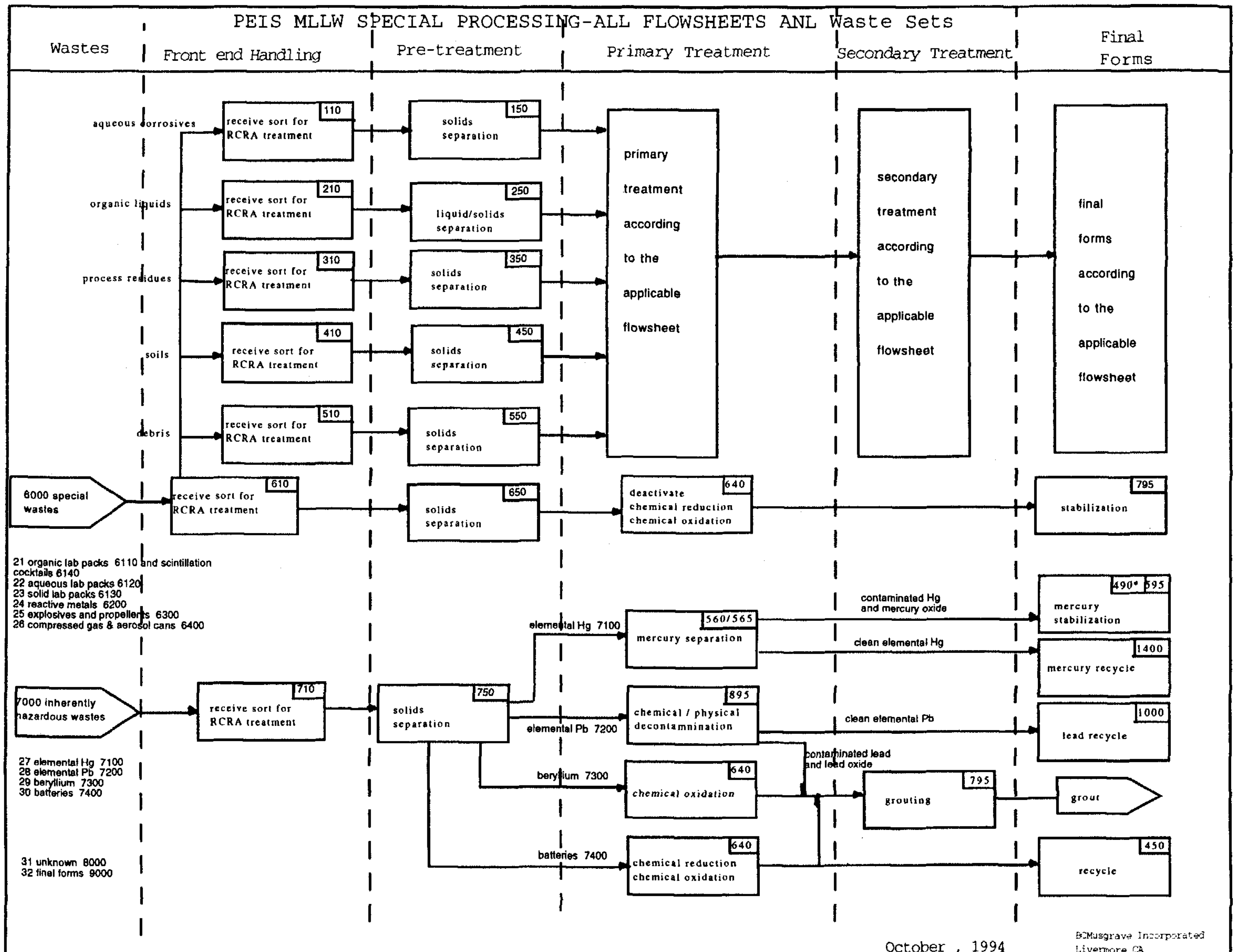

Figure D-2. Base Case Matrices 6000-8000

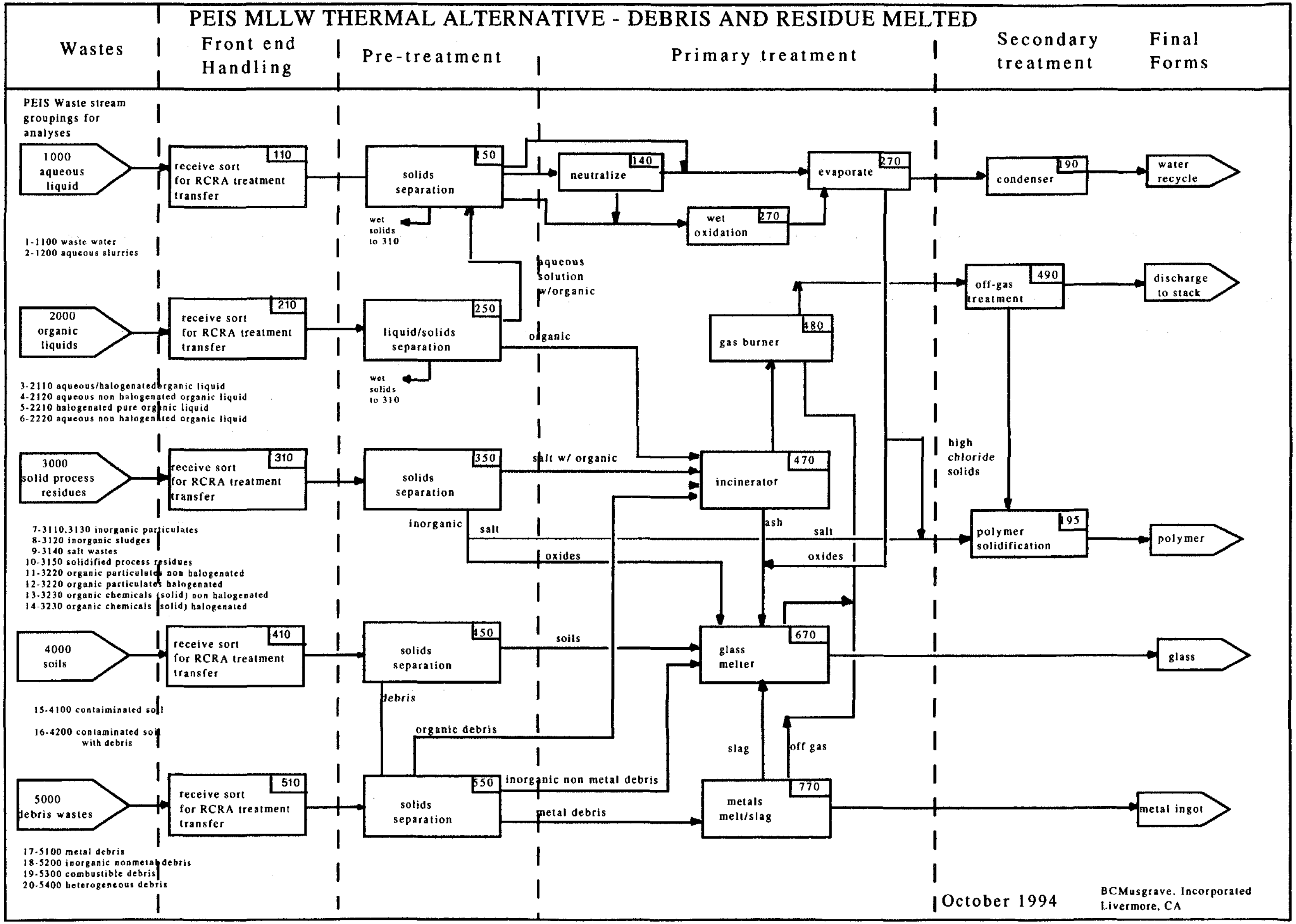

Figure D-3 Thermal Matrices 1000-5000

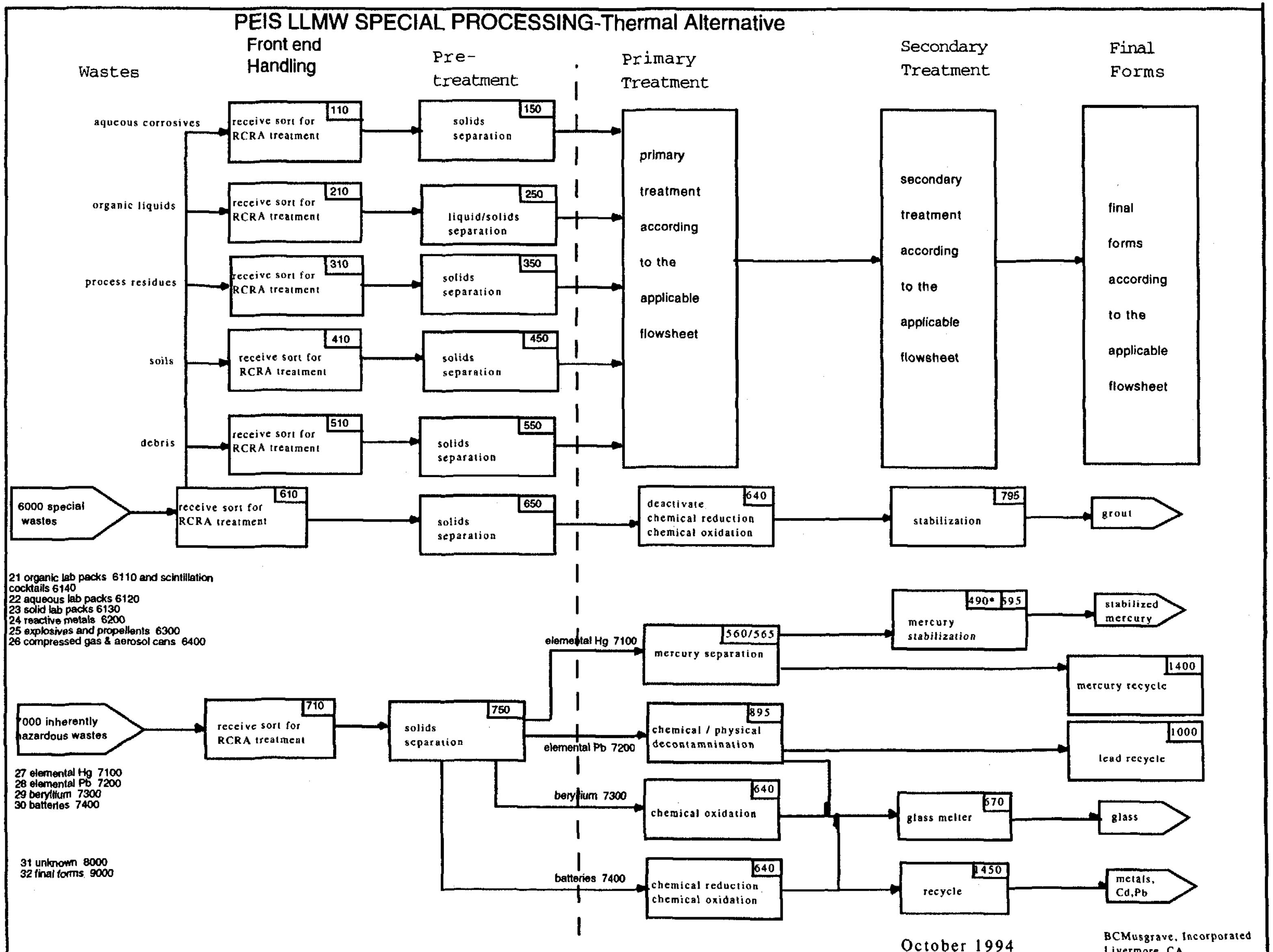

Figure D-4. Thermal Matrices Matrices 6000-8000

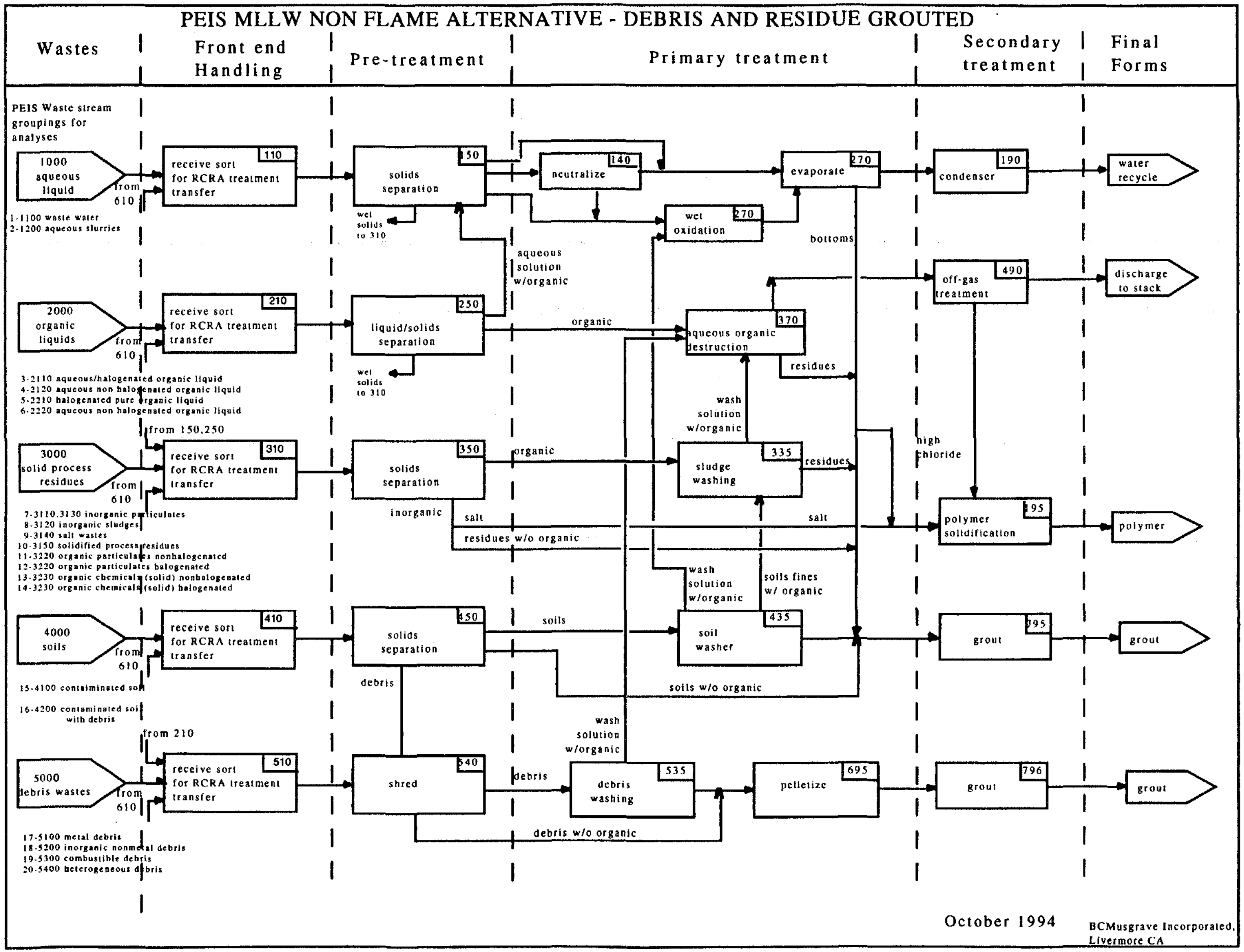

Figure D-5. Nonthermal Matrices 1000-5000

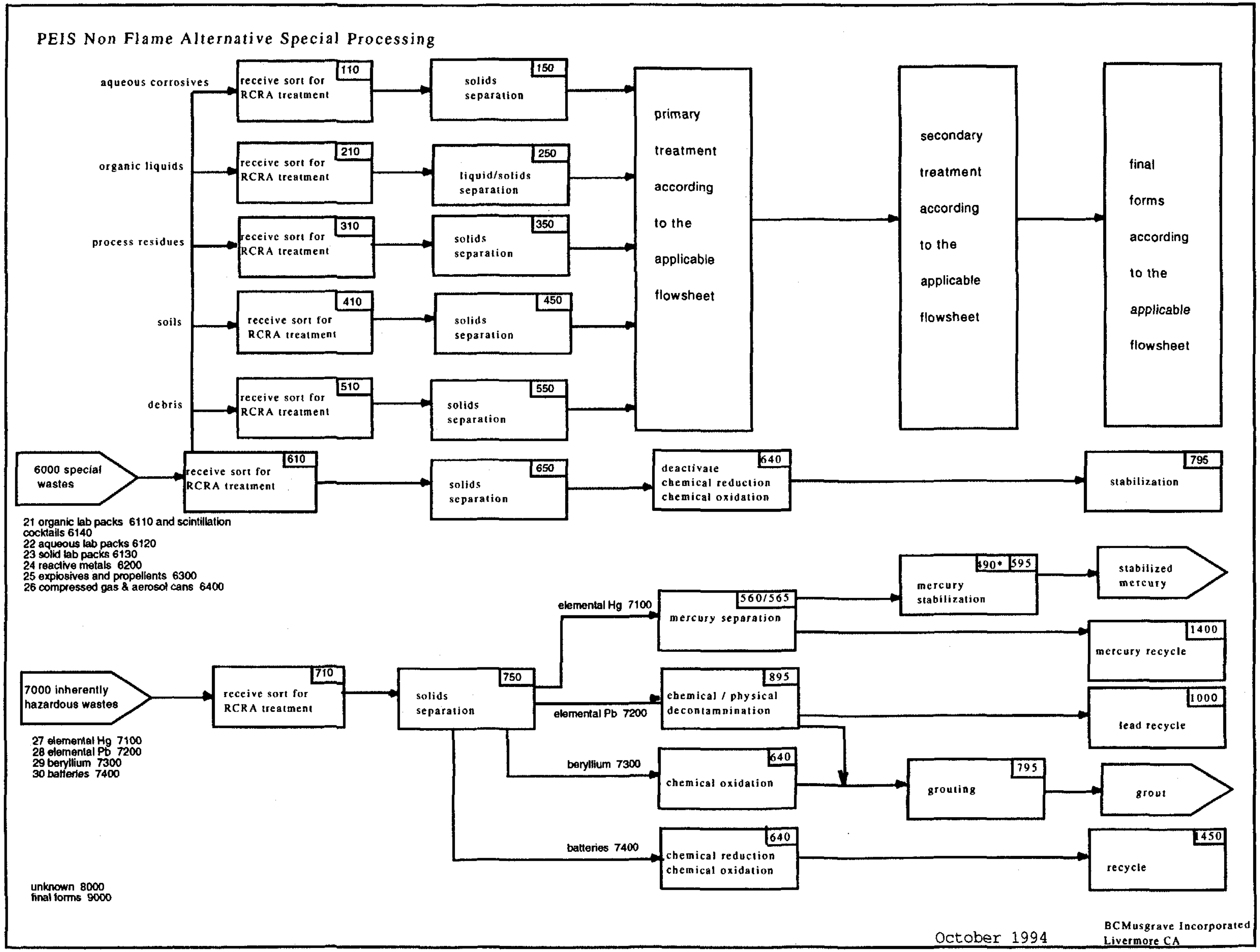

Figure D-6. Nonthermal Matrices 6000-8000

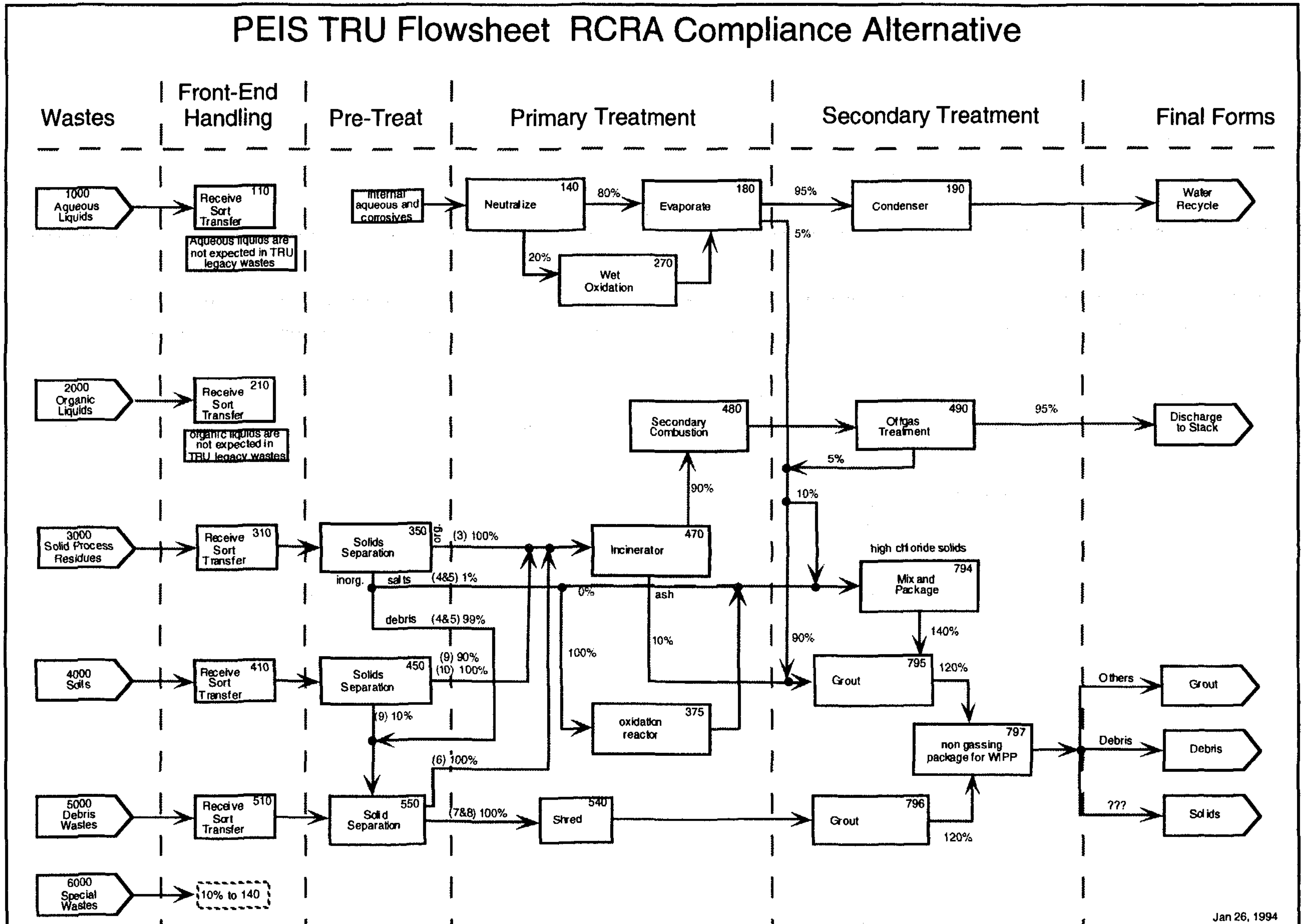

Figure D-7 PEIS TRU RCRA Compliance Alternative

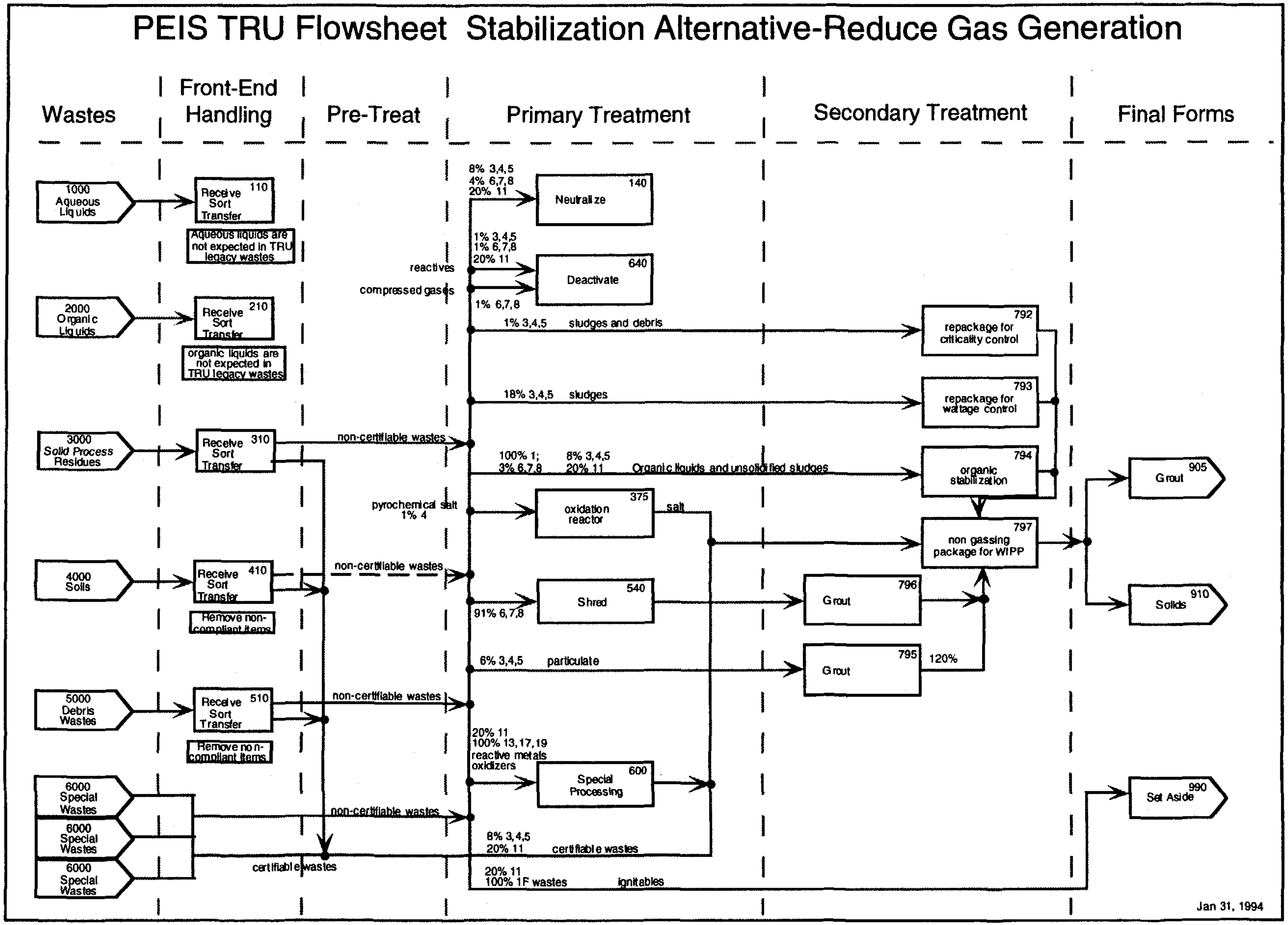

Figure D-8 WIPP Waste Acceptance Criteria

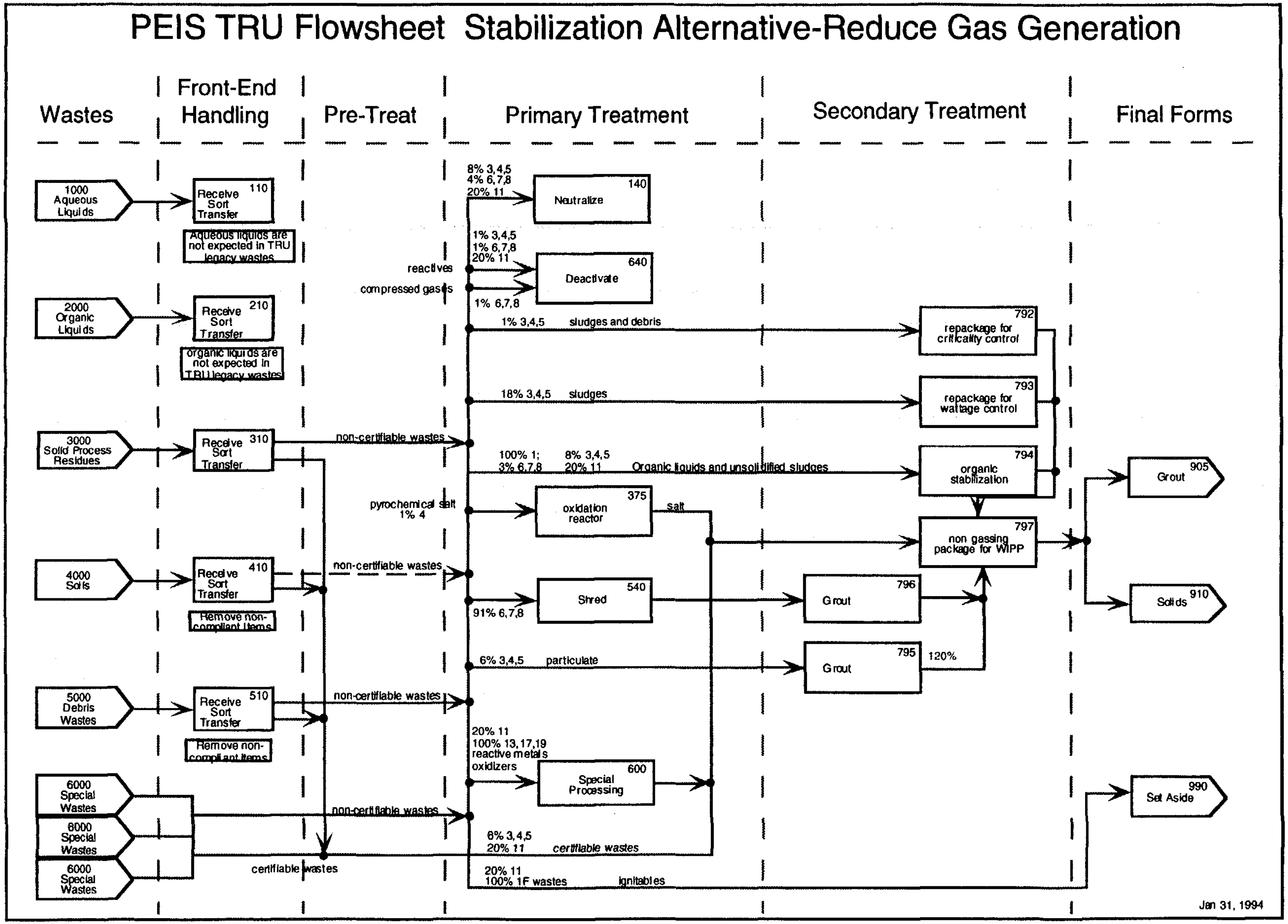

Figure D-9 WIPP WAC Reduced Gas Generation