# APPENDIX C12
# COMPARISON OF TRANSURANIC WASTE CHARACTERIZATION PROCEDURES WITH EPA-APPROVED WASTE CHARACTERIZATION METHODS

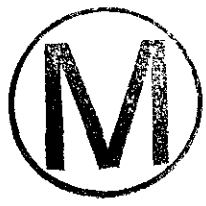
# APPENDIX C12
# COMPARISON OF TRANSURANIC (TRU) WASTE CHARACTERIZATION PROCEDURES WITH EPA-APPROVED WASTE CHARACTERIZATION METHODS

The Department of Energy (DOE) sites characterize waste in accordance with this Waste Analysis Plan (WAP) and the Transuranic Waste Characterization Quality Assurance Program Plan (QAPP), which specify waste characterization procedures found in the *Transuranic Waste Characterization Sampling and Analysis Methods Manual* (Methods Manual). The Methods Manual provides a unified source of information on the testing, sampling, and analytical techniques that enable sites to comply with this WAP. The Methods Manual includes all of the testing, sampling, and analytical methodologies accepted by DOE for use in transuranic (TRU) waste characterization requirements.

Many of the analytical procedures found in the Methods Manual are based on methods found in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, Third Edition, Final Update I, and Final Update II. Specifically, analytical procedures for solid phase waste in the Methods Manual are based on SW-846 methods. In these instances, the analyst is referred directly to the SW-846 method for the requirements of the procedure. Only information unique to the Program (e.g., target analytes, quality assurance objectives, quality control requirements) is included in the Methods Manual. The testing and sampling procedures included in the Methods Manual were developed specifically for characterizing TRU waste and equivalent methods are not found in SW-846.

The DOE has examined the consequence of modifying SW-846 methods for use in TRU waste characterization to ensure program specific changes do not compromise the integrity of the original SW-846 methods. This examination considered program-specific modifications (i.e., target analysis, quality assurance objectives, quality control requirements) to ensure: 1) these modifications could be met by the SW-846 method being referenced, and 2) these modifications do not compromise the integrity of the SW-846 method being referenced. DOE examined the following elements of each method:

- Scope and Application
- Summary of Procedure
- Interferences
- Safety
- Apparatus and Materials
- Reagents
- Sample Collection, Preservation, and Handling
- Procedure
- Calculations
- Quality Control
- Procedure Performance
- References



For each element, a comparison was made between the Methods Manual and the SW-846 method. Often, the Methods Manual procedure referred directly, and only, to the SW-846

method. In instances where this is not the case, the Methods Manual procedure requirements were evaluated for applicability and compliance with the requirements of the SW-846 method.

A comparison is made in Table C12-1 which indicates which Methods Manual procedures are based on SW-846 methods, and specifies the appropriate SW-846 method. Tables C12-2 through C12-16 are specific comparisons between SW-846 methods and Method Manual procedures. The "comments" column of Tables C12-2 through C12-16 includes reasoning as to why the differences in the SW-846 method and the Methods Manual procedure are non-impactive.

# TABLES

# TABLE C12-1
# CORRELATION BETWEEN SW-846 METHODS AND METHODS MANUAL METHODS

| Methods Manual Procedure | SW-846 Method |
|---|---|
| Procedure 110.1: Sampling Manifold Method to Collect Headspace Gas Samples From a TRU Waste Drum | Program specific procedure, no equivalent SW-846 method |
| Procedure 110.2: Direct Canister Method to Collect Headspace Gas Samples From a TRU Waste Drum | Program specific procedure, no equivalent SW-846 method |
| Procedure 110.3: Using a Side-Port Needle to Collect Headspace Gas Samples Through a TRU Waste Drum's Carbon Composite Filter | Program specific procedure, no equivalent SW-846 method |
| Procedure 110.4: Punching the Drum Lid to Collect Headspace Gas Samples from a TRU Waste Drum | Program specific procedure, no equivalent SW-846 method |
| Procedure 120.1: Collecting Samples from TRU Waste Drums Containing Homogenous Solids and Soil/Gravel (Sludge) | Program specific procedure, no equivalent SW-846 method |
| Procedure 210.1: SUMMA® Passivated Stainless Steel Canister Certification and Cleaning | Program specific procedure, no equivalent SW-846 method |
| Procedure 310.1: Physical Waste Form Characterization Using Radiography | Program specific procedure, no equivalent SW-846 method |
| Procedure 310.2: Physical Waste Form Characterization Using Visual Examination | Program specific procedure, no equivalent SW-846 method |
| Procedure 430.1: Modified Method TO-14 for the Gas Chromatography/Mass Spectrometry Determination of Volatile Organic Compounds in Waste Container Headspace | Program specific procedure, no equivalent SW-846 method |
| Procedure 430.2: Modified Method 8240/8260 for the Determination of Volatile Organic Compounds in Waste Container Headspace | Program specific procedure, no equivalent SW-846 method |

## TABLE C12-1 (CONTINUED)
## CORRELATION BETWEEN SW-846 METHODS AND METHODS MANUAL METHODS

| Methods Manual Procedure | SW-846 Method |
|---|---|
| Procedure 430.3: Method 8240B for the Determination of Total Volatile Organic Compounds in Homogenous Solids and Soil/Gravel | SW-846 Method 8240B: Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) – See Table C12-2 |
| Procedure 430.4: Method 8260A for the Determination of Total Volatile Organic Compounds in Homogenous Solids and Soil/Gravel | SW-846 Method 8260A: Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS): Capillary Column Technique – See Table C12-3 |
| Procedure 430.5: Method 8250A for the Determination of Total Semi-Volatile Organic Compounds in Homogenous Solids and Soil/Gravel | SW-846 Method 8250A: Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS) – See Table C12-4 |
| Procedure 430.6: Method 8270B for the Determination of Total Semi-Volatile Organic Compounds in Homogenous Solids and Soil/Gravel | SW-846 Method 8270B: Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS): Capillary Column Technique – See Table C12-5 |
| Procedure 440.1: Gas Chromatography/Flame Ionization Detector Determination of Alcohols and Ketones in Waste Container Headspace | Program specific procedure, no equivalent SW-846 method |
| Procedure 440.2: Direct Injection Gas Chromatography/Flame Ionization Detector Determination of Nonhalogenated Volatile Organic Compounds in Homogenous Solids and Soil/Gravel | Program specific procedure, no equivalent SW-846 method |
| Procedure 440.3: Gas Chromatography/Electron Capture Detection Determination of PCBs in Organic Sludge | SW-846 Method 8081: Organochlorine Pesticides and PCBs as Aroclors by Gas Chromatography: Capillary Column Technique; SW-846 Method 3550: Ultrasonic Extraction; SW-846 Method 3620: Florisil Column Cleanup. These methods have been optimized for the determination of PCBs only in TRU waste – See Table C-12-6 |

## TABLE C12-1 (CONTINUED)
## CORRELATION BETWEEN SW-846 METHODS AND METHODS MANUAL METHODS

| Methods Manual Procedure | SW-846 Method |
|---|---|
| Procedure 510.1: Mass Spectrometry Determination of Hydrogen and Methane in Waste Container Headspace | Program specific procedure, no equivalent SW-846 method |
| Procedure 520.1: Gas Chromatography Determination of Hydrogen and Methane in Waste Container Headspace | Program specific procedure, no equivalent SW-846 method |
| Procedure 610.1: Microwave Assisted Acid Digestion of Homogenous Solids and Soil/Gravel | SW-846 Method 3051: Microwave Assisted Acid Digestion of Sediments, Sludges, Soils, and Oils – See Table C-12-7 |
| Procedure 620.1: Extraction Chromatography Cleanup of Homogenous Solids and Soil/Gravel Samples Undergoing Total Metals Analysis | Program specific procedure, no equivalent SW-846 method |
| Procedure 630.1: Method 6020 for the Inductively Coupled Plasma-Mass Spectrometry Determination of Total Metals in Homogenous Solids and Soil/Gravel | SW-846 Method 6020: Inductively Coupled Plasma-Mass Spectrometry – See Table C-12-8 |
| Procedure 640.1: Method 6010A for the Inductively Coupled Plasma-Atomic Emission Spectroscopy Determination of Total Metals in Homogenous Solids and Soil/Gravel | SW-846 Method 6010A: Inductively Coupled Plasma-Atomic Emission Spectroscopy – See Table C-12-9 |
| Procedure 650.1: Flame Atomic Absorption Spectroscopy Determination of Total Metals in Homogenous Solids and Soil/Gravel | Various SW-846 Direct Aspiration Atomic Absorption Methods, including 7040 (antimony), 7080A (barium), 7090 (beryllium), 7130 (cadmium), 7190 (chromium), 7420 (lead), 7520 (nickel), 7760A (silver), 7840 (thallium), 7910 (vanadium), 7950 (zinc) – See Table C12-10 |

## TABLE C12-1 (CONTINUED)
## CORRELATION BETWEEN SW-846 METHODS AND METHODS MANUAL METHODS

| Methods Manual Procedure | SW-846 Method |
|---|---|
| Procedure 650.2: Graphite Furnace Atomic Absorption Spectroscopy Determination of Total Metals in Homogenous Solids and Soil/Gravel | Various SW-846 Graphite Furnace Atomic Absorption Methods, including 7041 (antimony), 7081 (barium), 7091 (beryllium), 7131A (cadmium), 7191 (chromium), 7421 (lead), 7761 (silver), 7841 (thallium), 7911 (vanadium), 7951 (zinc) – See Table C12-11 |
| Procedure 650.3: Cold Vapor Atomic Absorption Spectroscopy Determination of Total Mercury in Homogenous Solids and Soil/Gravel | SW-846 Method 7471A Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique) – See Table C12-12 |
| Procedure 650.4: Hydride Generation Atomic Absorption Spectroscopy Determination of Total Arsenic in Homogenous Solids and Soil/Gravel | SW-846 Method 7061A Arsenic (AA, Gaseous Hydride) – See Table C12-13 |
| Procedure 650.5: Borohydride Generation Atomic Absorption Spectroscopy Determination of Total Antimony and Arsenic in Homogenous Solids and Soil/Gravel | SW-846 Method 7062 Antimony and Arsenic (AA, Borohydride Reduction) – See Table C12-14 |
| Procedure 650.6: Hydride Generation Atomic Absorption Spectroscopy Determination of Total Selenium in Homogenous Solids and Soil/Gravel | SW-846 Method 7741A Selenium (AA, Gaseous Hydride) – See Table C12-15 |
| Procedure 650.7: Borohydride Generation Atomic Absorption Spectroscopy Determination of Total Selenium in Homogenous Solids and Soil/Gravel | SW-846 Method 7742 Selenium (AA, Borohydride Reduction) – See Table C12-16 |

# TABLE C12-2
# COMPARISON OF SW-846 METHOD 8240B AND METHODS MANUAL PROCEDURE 430.3

| Methods Manual Procedure 430.3 Section | Corresponding SW-846 Method 8240B Section | Comments |
|---|---|---|
| Section 1.0 Scope and Application<br>• Program analyte list and quality assurance objectives (QAOs) included *in Table 1*<br>• Analyte list is a subset of SW-846 Method 8240B analyte list except for 1,4-dichlorobenzene, ortho-dichlorobenzene, and 1,1,2-trichloro-1,2,2-trifluoroethane<br>• Refers directly and only to SW-846 Method 8240B<br>• Method detection limit of 1 mg/kg<br>• Requires samples to be analyzed in batches not to exceed 20 samples<br>  | Section 1.0 Scope and Application<br>• Analyte list does not include 1,4-dichlorobenzene, ortho-*dichlorobenzene, 1,1,2-trichloro*-1,2,2-trifluoroethane (Freon 113) and specifies total xylenes<br>• Estimated quantitation limit for soil/sediment samples is 0.5 mg/kg<br>• Batch not to exceed 20 samples as per SW-846 Chapter One | • SW-846 Method 8240B allows analysis of most volatile organic compounds with boiling points below *200 degrees C and are insoluble or* slightly soluble in water.<br>• Dichlorobenzenes can be analyzed as semivolatile organic compound as per Table 1 in the Methods Manual procedure.<br>• Freon 113 is very similar to other freon compound included on the analyte list of SW-846 Method 8240B.<br>• Program QAOs are derived based on SW-846 Method 8240B Table 6 *calibration and quality control* acceptance criteria (precision and accuracy) and regulatory requirements (MDL and PRQL)<br>• SW-846 Method is capable of quantitating at Procedure 430.3 method detection limit. |
| Section 2.0 Summary of Procedure<br>• Refers directly and only to SW-846 Method 8240B | Section 2.0 Summary of Method | |
| Section 3.0 Interferences<br>• Refers directly and only to SW-846 *Method 8240B* | Section 3.0 Interferences | |
| Section 4.0 Safety<br>• *Responsibilities for safety and health* and training. | *No equivalent section in SW-846 Method* 8240B | |

# TABLE C12-2 (CONTINUED)
# COMPARISON OF SW-846 METHOD 8240B AND METHODS MANUAL PROCEDURE 430.3

| Methods Manual Procedure 430.3 Section | Corresponding SW-846 Method 8240B Section | Comments |
|---|---|---|
| Section 5.0 Apparatus and Materials<br>• Refers directly and only to SW-846 Method 8240B | Section 4.0 Apparatus and Materials | |
| Section 6.0 Reagents<br>• Refers directly and only to SW-846 Method 8240B | Section 5.0 Reagents | |
| Section 7.0 Sample Collection, Preservation and Handling<br>• Requires sample collection according to Methods Manual Procedure 120.1<br>• Requires sample handling and chain-of-custody according to Section 6.0 of the QAPP | Section 6.0 Sample Collection, Preservation and Handling<br>• Refers to Chapter Four, Section 4.1 of SW-846 | • Procedure 120.1 is a program specific procedure developed specifically for the collection of samples from containers of TRU waste through coring and subsampling. Procedure 120.1 refers to SW-846 for guidance and requirements for sampling.<br>• Section 6.0 of the QAPP incorporates applicable sample handling and preservation requirements for VOC samples included in SW-846, Chapter Four, Section 4.1. |
| Section 8.0 Procedure<br>• Allows analyst to determine appropriate preparation techniques based on SW-846 or other nationally recognized standard methods<br>• Refers directly and only to SW-846 Method 8240B for initial calibration<br>• Refers directly and only to SW-846 Method 8240B continuing calibration<br>• All calibration requirements are summarized in Table 2<br>• Refers directly and only to SW-846 Method 8240B for analytical steps | Section 7.0 Procedure<br>• Subsection 7.2 addresses initial calibration<br>• Subsection 7.3 addresses continuing calibration<br>• Subsection 7.4.3 addresses the analysis of sediment/soil and waste samples | • Calibration requirements in Procedure 430.3 are the same as found in SW-846 Method 8240B except for the response factor for bromoform listed in Table 2 of Procedure 430.3. This error in Procedure 430.3 will be corrected. |

# TABLE C12-2 (CONTINUED)
# COMPARISON OF SW-846 METHOD 8240B AND METHODS MANUAL PROCEDURE 430.3

| *Methods Manual Procedure 430.3 Section* | *Corresponding SW-846 Method 8240B Section* | *Comments* |
|---|---|---|
| Section 9.0 Calculations<br>• Refers directly and only to SW-846 Method 8240B<br>• Specifies results reported in mg/kg wet-weight basis | Section 7.5 Data Interpretation<br>• Specifies waste reported in ug/kg wet-weight basis | • Conversion from ug/kg to mg/kg is a simple multiplication step. |

# TABLE C12-2 (CONTINUED)
# COMPARISON OF SW-846 METHOD 8240B AND METHODS MANUAL PROCEDURE 430.3

| Methods Manual Procedure 430.3 Section | Corresponding SW-846 Method 8240B Section | Comments |
|---|---|---|
| Section 10.0 Quality Control<br>• Requires formal quality control program<br>• Requires demonstration of acceptable performance prior to analyzing program samples<br>• Specifies equations for calculating analytical precision, accuracy, method detection limit, and percent recovery for quality control samples<br>• Method performance samples must be run initially and semiannually, acceptance criteria are Table 1 QAOs.<br>• Laboratory duplicates must be run once per batch, acceptance criteria are the Table 1 QAOs for precision<br>• Laboratory blanks must be run once per batch, acceptance criteria is <3 x MDLs in Table 1<br>• Matrix spikes must be run once per batch, acceptance criteria are the Table 1 QAOs for accuracy<br>• Matrix spike duplicates must be run once per batch, acceptance criteria are the Table 1 QAOs for precision and accuracy<br>• Laboratory control samples must be run once per batch, acceptance criteria are 80-120 %R<br>• Surrogate compounds required in each sample, acceptance criteria are average %R from at least 30 samples ±3 standard deviations<br>• Blind audit samples are distributed, analyzed and reported as part of the | Section 8.0 Quality Control<br>• SW-846 Method 8000A requires each laboratory to operate a formal quality control program<br>• Requires demonstration of acceptable accuracy and precision through the analysis of quality control reference sample<br>• SW-846 Chapter One includes equations for calculating precision, accuracy, and method detection limit<br>• Method performance samples not addressed, however SW-846 Chapter One requires demonstration of method performance prior to field sample analysis<br>• Laboratory duplicates required once per batch in SW-846 Method 8000A, acceptance criteria not addressed<br>• Method blanks required initially and once per batch in SW-846 Method 8000A and Chapter One, various acceptance criteria are recommended<br>• Matrix spikes required once per batch, no acceptance criteria specified for solid samples<br>• Matrix spike duplicates not required in addition to laboratory duplicates<br>• Laboratory control samples required once per batch in SW-846 Chapter One, minimum acceptance criteria 70-140 %R as indicated in Table 6 of SW-846 Method 8240B<br>• Surrogate compounds required in each | • Procedure 430.3 quality control requirements meet or exceed SW-846 Method 8240B quality control requirements<br>• Procedure 430.3 provides a better defined quality control program than SW-846 Method 8240B |

## TABLE C12-2 (CONTINUED)
## COMPARISON OF SW-846 METHOD 8240B AND METHODS MANUAL PROCEDURE 430.3

| Methods Manual Procedure 430.3 Section | Corresponding SW-846 Method 8240B Section | Comments |
|---|---|---|
| Section 11.0 Procedure Performance<br>• Refers directly and only to SW-846 Method 8240B | Section 9.0 Method Performance | |
| Section 12.0 References<br>• *Performance Demonstration Program Plan for the Analysis of Solidified Wastes for the Transuranic Waste Characterization Program* (DOE 1995a)<br>• *Transuranic Waste Characterization Quality Assurance Program Plan* (DOE 1995b)<br>• *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (EPA 1995) | Section 10.0 References<br>• See SW-846 Method 8240B | |

# TABLE C12-3
# COMPARISON OF SW-846 METHOD 8260A AND METHODS MANUAL PROCEDURE 430.4

| Methods Manual Procedure 430.4 Section | Corresponding SW-846 Method 8260A Section | Comments |
|---|---|---|
| Section 1.0 Scope and Application<br>• Program analyte list and quality assurance objectives (QAOs) included in Table 1<br>• Analyte list is a subset of SW-846 Method 8260A analyte list except for 1,1,2-trichloro-1,2,2-trifluoroethane<br>• Refers directly and only to SW-846 Method 8260A<br>• Method detection limit of 1 mg/kg<br>• Requires samples to be analyzed in batches not to exceed 20 samples | Section 1.0 Scope and Application<br>• Analyte list does not include 1,1,2-trichloro-1,2,2-trifluoroethane, (Freon 113)<br>• Estimated quantitation limit for soil/sediment samples is 0.5 mg/kg<br>• Batch not to exceed 20 samples as per SW-846 Chapter One | • SW-846 Method 8260A allows analysis of most volatile organic compounds with boiling points below 200 degrees C and are insoluble or slightly soluble in water.<br>• Freon 113 is very similar to other freon compounds included in the analyte list of SW-846 Method 8260A<br>• Program QAOs are derived based on SW-846 Method 8240B Table 6 calibration and quality control acceptance criteria (precision and accuracy) and regulatory requirements (MDL and PRQL)<br>• SW-846 Method 8260A is capable of quantitating at Procedure 430.4 method detection limit. |
| Section 2.0 Summary of Procedure<br>• Refers directly and only to SW-846 Method 8260A | Section 2.0 Summary of Method | |
| Section 3.0 Interferences<br>• Refers directly and only to SW-846 Method 8260A | Section 3.0 Interferences | |
| Section 4.0 Safety<br>• Responsibilities for safety and health and training. | No equivalent section in SW-846 Method 8260A | |
| Section 5.0 Apparatus and Materials<br>• Refers directly and only to SW-846 Method 8260A | Section 4.0 Apparatus and Materials | |

# TABLE C12-3 (CONTINUED)
# COMPARISON OF SW-846 METHOD 8260A AND METHODS MANUAL PROCEDURE 430.4

| Methods Manual Procedure 430.4 Section | Corresponding SW-846 Method 8260A Section | Comments |
|---|---|---|
| Section 6.0 Reagents<br>• Refers directly and only to SW-846 Method 8260A | Section 5.0 Reagents | |
| Section 7.0 Sample Collection, Preservation and Handling<br>• Requires sample collection according to Methods Manual Procedure 120.1<br>• Requires sample handling and chain-of-custody according to Section 6.0 of the QAPP | Section 6.0 Sample Collection, Preservation and Handling<br>• Refers to Chapter Four, Section 4.1 of SW-846 | • Procedure 120.1 is a program specific procedure developed specifically for the collection of samples from containers of TRU waste through coring and subsampling. Procedure 120.1 refers to SW-846 for guidance and requirements for sampling.<br>• Section 6.0 of the QAPP incorporates applicable sample handling and preservation requirements for VOC samples included in SW-846, Chapter Four, Section 4.1. |
| Section 8.0 Procedure<br>• Allows analyst to determine appropriate preparation techniques based on SW-846 or other nationally recognized standard methods<br>• Refers directly and only to SW-846 Method 8260A for initial calibration<br>• Refers directly and only to SW-846 Method 8260A continuing calibration<br>• All calibration requirements are summarized in Table 2<br>• Refers directly and only to SW-846 Method 8260A for analytical steps | Section 7.0 Procedure<br>• Subsection 7.3 addresses initial calibration<br>• Subsection 7.4 addresses continuing calibration<br>• Subsections 7.1, 7.2, and 7.5 address the analysis of sediment/soil and waste samples | • Calibration requirements in Procedure 430.4 are the same as found in SW-846 Method 8260A except for the response factor for bromoform listed in Table 2 of Procedure 430.4. This error in Procedure 430.4 will be corrected. |

# TABLE C12-3 (CONTINUED)
# COMPARISON OF SW-846 METHOD 8260A AND METHODS MANUAL PROCEDURE 430.4

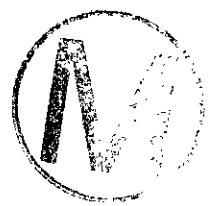
| Methods Manual Procedure 430.4 Section | Corresponding SW-846 Method 8260A Section | Comments |
|---|---|---|
| Section 9.0 Calculations<br>• Refers directly and only to SW-846 Method 8260A<br>• Specifies results reported in mg/kg wet-weight basis | Section 7.5 Data Interpretation<br>• Specifies waste reported in ug/kg wet-weight basis | • Conversion from ug/kg to mg/kg is a simple multiplication step. |

# TABLE C12-3 (CONTINUED)
# COMPARISON OF SW-846 METHOD 8260A AND METHODS MANUAL PROCEDURE 430.4

| Methods Manual Procedure 430.4 Section | Corresponding SW-846 Method 8260A Section | Comments |
|---|---|---|
| Section 10.0 Quality Control<br>• Requires formal quality control program<br>• Requires demonstration of acceptable performance prior to analyzing program samples<br>• Specifies equations for calculating analytical precision, accuracy, method detection limit, and percent recovery for quality control samples<br>• Method performance samples must be run initially and semiannually, acceptance criteria are Table 1 QAOs.<br>• Laboratory duplicates must be run once per batch, acceptance criteria are the Table 1 QAOs for precision<br>• Laboratory blanks must be run once per batch, acceptance criteria is <3 x MDLs in Table 1<br>• Matrix spikes must be run once per batch, acceptance criteria are the Table 1 QAOs for accuracy<br>• Matrix spike duplicates must be run once per batch, acceptance criteria are the Table 1 QAOs for precision and accuracy<br>• Laboratory control samples must be run once per batch, acceptance criteria is 80-120 %R<br>• Surrogate compounds required in each sample, acceptance criteria are average %R from at least 30 samples ±3 standard deviations<br>• Blind audit samples are distributed, analyzed and reported as part of the | Section 8.0 Quality Control<br>• SW-846 Method 8000A requires each laboratory to operate a formal quality control program<br>• Requires demonstration of acceptable accuracy and precision through the analysis of quality control reference sample<br>• SW-846 Chapter One includes equations for calculating precision, accuracy, and method detection limit<br>• Method performance samples not addressed, however SW-846 Chapter One requires demonstration of method performance prior to field sample analysis<br>• Laboratory duplicates required once per batch in SW-846 Method 8000A, acceptance criteria not addressed<br>• Method blanks required initially and once per batch in SW-846 Method 8000A and Chapter One, various acceptance criteria are recommended<br>• Matrix spikes required once per batch in SW-846 Method 8000A, no acceptance criteria specified for solid samples<br>• Matrix spike duplicates not required in addition to laboratory duplicates<br>• Laboratory control samples required once per batch in SW-846 Chapter One, minimum acceptance criteria 70-140 %R as indicated in Table 6 of SW-846 Method 8240B | • Procedure 430.4 quality control requirements meet or exceed SW-846 Method 8260A quality control requirements<br>• Procedure 430.4 provides a better defined quality control program than SW-846 Method 8260A |

## TABLE C12-3 (CONTINUED)
## COMPARISON OF SW-846 METHOD 8260A AND METHODS MANUAL PROCEDURE 430.4

| Methods Manual Procedure 430.4 Section | Corresponding SW-846 Method 8260A Section | Comments |
|---|---|---|
| Section 11.0 Procedure Performance<br>• Refers directly and only to SW-846 Method 8260A | Section 9.0 Method Performance | |
| Section 12.0 References<br>• *Performance Demonstration Program Plan for the Analysis of Solidified Wastes for the Transuranic Waste Characterization Program* (DOE 1995a)<br>• *Transuranic Waste Characterization Quality Assurance Program Plan* (DOE 1995b)<br>• *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (EPA 1995) | Section 10.0 References<br>• See SW-846 Method 8260A | |



# TABLE C12-4
# COMPARISON OF SW-846 METHOD 8250A AND METHODS MANUAL PROCEDURE 430.5

| Methods Manual Procedure 430.5 Section | Corresponding SW-846 Method 8250A Section | Comments |
|---|---|---|
| Section 1.0 Scope and Application<br>• Program analyte list and quality assurance objectives (QAOs) included as Table 1, which includes:<br>  • cresols (a mixture of all isomers of cresol (o, m, p))<br>  • ortho-dichlorobenzene<br>  • pyridine<br>• Analyte list is a subset of SW-846 Method 8250A analyte list, except pyridine<br>• Refers directly and only to SW-846 Method 8250A<br>• Requires samples to be analyzed in batches not to exceed 20 samples | Section 1.0 Scope and Application<br>• The table in Subsection 1.1 lists the applicable analytes, including:<br>  • 2-methylphenol and 4-methylphenol<br>  • 1,2-dichlorobenzene<br>• Subsection 1.2 includes pyridines as compounds that can be quantitated<br>• Batch not to exceed 20 samples as per SW-846 Chapter One | • The Methods Manual list is a subset of that in SW-846. Cresols are the same as methylphenols and ortho-dichlorobenzene is the same as 1,2-dichlorobenzene. The Methods Manual includes m-cresol (3-methylphenol) in its list (under cresols), which is not included in SW-846. SW-846 does not include pyridine in the analyte list, but allows for it in Subsection 1.2.<br>• Program QAOs are derived based on SW-846 Method 8250A Table 6 (accuracy and precision) and regulatory requirements (MDL and PRQL) |
| Section 2.0 Summary of Procedure<br>• Refers directly and only to SW-846 Method 8250A | Section 2.0 Summary of Method | |
| Section 3.0 Interferences<br>• Refers directly and only to SW-846 Method 8250A | Section 3.0 Interferences | |
| Section 4.0 Safety<br>• Responsibilities for safety and health and training | No equivalent section in SW-846 Method 8250A | |
| Section 5.0 Apparatus and Materials<br>• Refers directly and only to SW-846 Method 8250A | Section 4.0 Apparatus and Materials | |
| Section 6.0 Reagents<br>• Refers directly and only to SW-846 Method 8250A | Section 5.0 Reagents | |

# TABLE C12-4 (CONTINUED)
# COMPARISON OF SW-846 METHOD 8250A AND METHODS MANUAL PROCEDURE 430.5

| Methods Manual Procedure 430.5 Section | Corresponding SW-846 Method 8250A Section | Comments |
|---|---|---|
| Section 7.0 Sample Collection, Preservation and Handling<br>• Requires sample collection according to Methods Manual Procedure 120.1<br>• Requires sample handling and chain-of-custody according to Section 6.0 of the QAPP | Section 6.0 Sample Collection, Preservation and Handling<br>• Refers to SW-846 Chapter 4; Section 4.1 | • Procedure 120.1 is a program specific procedure developed specifically for the collection of samples from containers of TRU waste through coring and subsampling. Procedure 120.1 refers to SW-846 for guidance and requirements for sampling.<br>• Section 6.0 of the QAPP incorporates applicable sample handling and preservation requirements for samples included in SW-846, Chapter 4, Section 4.1. |
| Section 8.0 Procedure<br>• Refers directly and only to SW-846 Method 8250A for sample preparation and cleanup.<br>• Refers directly and only to SW-846 Method 8250A for GC/MS operating conditions<br>• Refers directly and only to SW-846 Method 8250A for initial calibration<br>• Refers directly and only to SW-846 Method 8250A for continuing calibration<br>• All calibration requirements are summarized in Table 2<br>• Refers directly and only to SW-846 Method 8250A for analytical steps | Section 7.0 Procedure<br>• Subsections 7.1 and 7.2 refer to other SW-846 methods for sample preparation and cleanup<br>• Subsection 7.3 addresses recommended GC/MS operating conditions<br>• Subsection 7.4 addresses initial calibration<br>• Subsection 7.5 addresses continuing (daily) calibration<br>• Subsection 7.6 addresses the analytical procedure | • Calibration requirements in Procedure 430.5 are the same as found in SW-846 Method 8250A, except for the %RSD for CCCs listed in Table 2 of Procedure 430.5. This error in Procedure 430.5 will be corrected.<br>• Procedure 430.5 includes accuracy criteria for surrogate compounds in its continuing calibration criteria; SW-846 Method 8250A provides this criteria in Subsection 8.9 and Table 8. |

## TABLE C12-4 (CONTINUED)
## COMPARISON OF SW-846 METHOD 8250A AND METHODS MANUAL PROCEDURE 430.5

| Methods Manual Procedure 430.5 Section | Corresponding SW-846 Method 8250A Section | Comments |
|---|---|---|
| Section 9.0 Calculations<br>• Refers directly and only to SW-846 *Method 8250A*<br>• Specifies results reported in mg/kg wet-weight basis | Subsection 7.7 Data Interpretation<br>• Specifies waste reported in µg/kg wet-*weight basis* | • Conversion from µg/kg to mg/kg is a simple multiplication step. |

# TABLE C12-4 (CONTINUED)
# COMPARISON OF SW-846 METHOD 8250A AND METHODS MANUAL PROCEDURE 430.5

| Methods Manual Procedure 430.5 Section | Corresponding SW-846 Method 8250A Section | Comments |
|---|---|---|
| Section 10.0 Quality Control<br>• Requires formal quality control program<br>• Requires demonstration of acceptable performance prior to analyzing program samples<br>• Specifies equations for calculating analytical precision, accuracy, method detection limit, and percent recovery for quality control samples<br>• Method performance samples must be run initially and semiannually, acceptance criteria are Table 1 QAOs<br>• Laboratory duplicates must be run once per batch, acceptance criteria are the Table 1 QAOs for precision<br>• Laboratory blanks must be run once per batch, acceptance criteria is $<3$ x MDLs in Table 1<br>• Matrix spikes must be run once per batch, acceptance criteria are the Table 1 QAOs for accuracy<br>• Matrix spike duplicates must be run once per batch, acceptance criteria are the Table 1 QAOs for precision and accuracy<br>• Laboratory control samples must be run once per batch, acceptance criterion is 80-120 %R<br>• Surrogate compounds must be included in every sample, acceptance criteria are average %R from at least 30 samples $\pm 3$ standard deviations<br>• Blind audit samples are distributed, | Section 8.0 Quality Control<br>• Requires each laboratory to operate a formal quality control program<br>• Requires demonstration of acceptable precision and accuracy through the analysis of quality control check standard<br>• SW-846 Chapter One includes equations for calculating precision, accuracy, and method detection limit<br>• Method performance samples not addressed, however SW-846 Chapter One requires demonstration of method performance prior to field sample analysis<br>• Laboratory duplicates not addressed<br>• Method blanks required initially and once per batch in SW-846 Method 8000A and Chapter One, various acceptance criteria are recommended<br>• Matrix spikes required once per batch, acceptance criteria are the accuracy ranges provided in Method 8250A Table 6<br>• Matrix spike duplicates required once per batch, acceptance criteria are not addressed<br>• Laboratory control samples required once per batch in SW-846 Chapter One, acceptance criteria are not addressed<br>• Surrogate compounds required in each sample, acceptance criteria are average | • Procedure 430.5 quality control requirements meet or exceed SW-846 Method 8250A quality control requirements<br>• Procedure 430.5 provides a better defined quality control program than SW-846 Method 8250A |

# TABLE C12-4 (CONTINUED)
# COMPARISON OF SW-846 METHOD 8250A AND METHODS MANUAL PROCEDURE 430.5

| Methods Manual Procedure 430.5 Section | Corresponding SW-846 Method 8250A Section | Comments |
|---|---|---|
| Section 11.0 Procedure Performance<br>• Refers directly and only to SW-846 Method 8250A | Section 9.0 Method Performance | |
| Section 12.0 References<br>• *Performance Demonstration Program Plan for the Analysis of Solidified Wastes for the Transuranic Waste Characterization Program* (DOE 1995a)<br>• *Transuranic Waste Characterization Quality Assurance Program Plan* (DOE 1995b)<br>• *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (EPA 1995) | Section 10.0 References<br>• See SW-846 Method 8250A | |

# TABLE C12-5
# COMPARISON OF SW-846 METHOD 8270B AND METHODS MANUAL PROCEDURE 430.6

| Methods Manual Procedure 430.6 Section | Corresponding SW-846 Method 8270B Section | Comments |
|---|---|---|
| Section 1.0 Scope and Application<br>• Program analyte list and quality assurance objectives (QAOs) included as Table 1, which includes:<br>  • cresols (a mixture of all isomers of cresol [o, m, p])<br>  • ortho-dichlorobenzene<br>  • pyridine<br>• Analyte list is a subset of SW-846 Method 8270B analyte list, except pyridine<br>• Refers directly an only to SW-846 Method 8270B<br>• Requires samples to be analyzed in batches not to exceed 20 samples | Section 1.0 Scope and Application<br>• The table in Subsection 1.1 lists the applicable analytes, including:<br>  • 2-methylphenol, 3-methylphenol, and 4-methylphenol<br>  • 1,2-dichlorobenzene<br>• Subsection 1.2 includes pyridines as compounds that can be quantitated<br>• Batch not to exceed 20 samples as per SW-846 Chapter One | • The Methods Manual list is a subset of that in SW-846. Cresols is the same as methylphenols and ortho-dichlorobenzene is the same as 1,2-dichlorobenzene. SW-846 does not include pyridine in the analyte list, but allows for it in Subsection 1.2.<br>• Program QAOs are derived based on SW-846 Method 8270B Table 6 quality control criteria (accuracy and precision) and regulatory requirements (MDL and PRQL) |
| Section 2.0 Summary of Procedure<br>• Refers directly and only to SW-846 Method 8270B | Section 2.0 Summary of Method | |
| Section 3.0 Interferences<br>• Refers directly and only to SW-846 Method 8270B | Section 3.0 Interferences | |
| Section 4.0 Safety<br>• Responsibilities for safety and health and training | No equivalent section in SW-846 Method 8270B | |
| Section 5.0 Apparatus and Materials<br>• Refers directly and only to SW-846 Method 8270B | Section 4.0 Apparatus and Materials | |

# TABLE C12-5 (CONTINUED)
# COMPARISON OF SW-846 METHOD 8270B AND METHODS MANUAL PROCEDURE 430.6

| Methods Manual Procedure 430.6 Section | Corresponding SW-846 Method 8270B Section | Comments |
|---|---|---|
| Section 6.0 Reagents<br>• Refers directly and only to SW-846 Method 8270B | Section 5.0 Reagents | |
| Section 7.0 Sample Collection, Preservation and Handling<br>• Requires sample collection according to Methods Manual Procedure 120.1<br>• Requires sample handling and chain-of-custody according to Section 6.0 of the QAPP | Section 6.0 Sample Collection, Preservation and Handling<br>• Refers to SW-846 Chapter 4, Section 4.1 | • Procedure 120.1 is a program specific procedure developed specifically for the collection of samples from containers of TRU waste through coring and subsampling. Procedure 120.1 refers to SW-846 for guidance and requirements for sampling.<br>• Section 6.0 of the QAPP incorporates applicable sample handling and preservation requirements for samples included in SW-846, Chapter 4, Section 4.1. |
| Section 8.0 Procedure<br>• Refers directly and only to SW-846 Method 8270B for sample preparation and cleanup<br>• Refers directly and only to SW-846 Method 8270B for initial calibration<br>• Refers directly and only to SW-846 Method 8270B for continuing calibration<br>• All calibration requirements are summarized in Table 2<br>• Refers directly and only to SW-846 Method 8270B for analytical steps | Section 7.0 Procedure<br>• Subsections 7.1 and 7.2 refer to other SW-846 methods for sample preparation and cleanup<br>• Subsection 7.3 addresses initial calibration<br>• Subsection 7.4 addresses continuing (daily) calibration<br>• Subsection 7.5 addresses the analytical procedure | • Calibration requirements in Procedure 430.6 are the same as found in SW-846 Method 8270B, except for the %RSD for CCCs listed in Table 2 of Procedure 430.6. This error in Procedure 430.6 will be corrected.<br>• Procedure 430.6 includes accuracy criteria for surrogate compounds in its continuing calibration criteria; SW-846 Method 8270B provides this criteria in Subsection 8.9 and Table 8. |

# TABLE C12-5 (CONTINUED)
# COMPARISON OF SW-846 METHOD 8270B AND METHODS MANUAL PROCEDURE 430.6

| Methods Manual Procedure 430.6 Section | Corresponding SW-846 Method 8270B Section | Comments |
|---|---|---|
| Section 9.0 Calculations<br>• Refers directly and only to SW-846 Method 8270B<br>• Specifies results reported in mg/kg wet-weight basis | Subsection 7.6 Data Interpretation<br>• Specifies waste reported in µg/kg wet-weight basis | • Conversion from µg/kg to mg/kg is a simple multiplication step. |

# TABLE C12-5 (CONTINUED)
# COMPARISON OF SW-846 METHOD 8270B AND METHODS MANUAL PROCEDURE 430.6

| Methods Manual Procedure 430.6 Section | Corresponding SW-846 Method 8270B Section | Comments |
|---|---|---|
| Section 10.0 Quality Control<br>• Requires formal quality control program<br>• Requires demonstration of acceptable performance prior to analyzing program samples<br>• Specifies equations for calculating analytical precision, accuracy, method detection limit, and percent recovery for quality control samples<br>• Method performance samples must be run initially and semiannually, acceptance criteria are Table 1 QAOs<br>• Laboratory duplicates must be run once per batch, acceptance criteria are the Table 1 QAOs for precision<br>• Laboratory blanks must be run once per batch, acceptance criteria is <3 x MDLs in Table 1<br>• Matrix spikes must be run once per batch, acceptance criteria are the Table 1 QAOs for accuracy<br>• Matrix spike duplicates must be run once per batch, acceptance criteria are the Table 1 QAOs for precision and accuracy<br>• Laboratory control samples must be run once per batch, acceptance criterion is 80-120 %R<br>• Surrogate compounds must be included in every sample, acceptance criteria are average %R from at least 30 samples ±3 standard deviations<br>• Blind audit samples are distributed, analyzed and reported as part of the | Section 8.0 Quality Control<br>• Requires each laboratory to operate a formal quality control program<br>• Requires demonstration of acceptable precision and accuracy through the analysis of quality control reference standard<br>• SW-846 Chapter One includes equations for calculating precision, accuracy, and method detection limit<br>• Method performance samples not addressed, however SW-846 Chapter One requires demonstration of method performance prior to field sample analysis<br>• Laboratory duplicates required once per batch, acceptance criteria are not addressed<br>• Method blanks required initially and once per batch in SW-846 Method 8000A and Chapter One, various acceptance criteria are recommended<br>• Matrix spikes required once per batch, acceptance criteria are not addressed for solid samples<br>• Matrix spike duplicates not required in addition to laboratory duplicates<br>• Laboratory control samples required once per batch in SW-846 Chapter One, acceptance criteria are not addressed<br>• Surrogate compounds required in each sample, acceptance criteria are average %R from at least 30 samples ± 3 | • Procedure 430.6 quality control requirements meet or exceed SW-846 Method 8270B quality control requirements<br>• Procedure 430.6 provides a better defined quality control program than SW-846 Method 8270B |

## TABLE C12-5 (CONTINUED)
## COMPARISON OF SW-846 METHOD 8270B AND METHODS MANUAL PROCEDURE 430.6

| Methods Manual Procedure 430.6 Section | Corresponding SW-846 Method 8270B Section | Comments |
|---|---|---|
| Section 11.0 Procedure Performance<br>• Refers directly and only to SW-846 Method 8270B | Section 9.0 Method Performance | |
| Section 12.0 References<br>• *Performance Demonstration Program Plan for the Analysis of Solidified Wastes for the Transuranic Waste Characterization Program* (DOE 1995a)<br>• *Transuranic Waste Characterization Quality Assurance Program Plan* (DOE 1995b)<br>• *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (EPA 1995) | Section 10.0 References<br>• See SW-846 Method 8270B | |

# TABLE C12-6
# COMPARISON OF COMBINED SW-846 METHODS (8081, 3550, 3620) AND METHODS MANUAL PROCEDURE 440.3

| Methods Manual Procedure 440.3 Section | Corresponding SW-846 Method(s) Section | Comments |
|---|---|---|
| Section 1.0 Scope and Application<br>• Program analyte list (limited to 7 PCB Aroclors) and quality assurance objectives (QAOs) included as Table 1<br>• Analyte list is a subset of SW-846 Method 8081 analyte list<br>• Refers directly SW-846 Methods 8000A, 8081, 3550, and 3620<br>• Requires samples to be analyzed in batches not to exceed 20 samples<br>• Method detection limit set at 5 mg/kg | Section 1.0 Scope and Application<br>• SW-846 Method 8081 analyte list includes numerous pesticides and PCB aroclors<br>• Batch not to exceed 20 samples as per SW-846 Chapter One<br>• Minimum reported method detection limits are 0.057-0.070 mg/kg for PCB aroclors | • Procedure 440.3 has been optimized for the determination of PCBs in TRU waste sludge<br>• Procedure 440.3 analyte list is a subset of SW-846 Method 8081 analyte list<br>• Program QAOs are derived based on SW-846 Method 8081 Tables 15 and 16 and procedure development work (precision and accuracy) and regulatory requirements (MDL and PRQL)<br>• SW-846 Method 8081 capable of quantitating at Procedure 440.3 method detection limit |
| Section 2.0 Summary of Procedure<br>• Sample preparation, hexane extraction with vortex mixing, Florisil cleanup, and quantitation by GC/ECD is summarized | Section 2.0 Summary of Method<br>• SW-846 Method 8081 requires appropriate extraction method, hexane-acetone extraction according to SW-846 Method 3550 allowed<br>• SW-846 Method 8081 allows for a variety of cleanup steps as discussed in Section 3.0<br>• SW-846 Method 8081 allows quantitation with GC/ECD |  |
| Section 3.0 Interferences<br>• General discussion of possible interferences<br>• Requires Florisil cleanup for spindle oil<br>• Refers directly to SW-846 Method 8081 | Section 3.0 Interferences<br>• SW-846 allows for a variety of cleanup methods, including Florisil cleanup according to SW-846 Method 3620 | |

# TABLE C12-6 (CONTINUED)
# COMPARISON OF COMBINED SW-846 METHODS (8081, 3550, 3620) AND METHODS MANUAL PROCEDURE 440.3

| Methods Manual Procedure 440.3 Section | Corresponding SW-846 Method(s) Section | Comments |
|---|---|---|
| Section 4.0 Safety<br>• Responsibilities for safety and health and training | No equivalent section in SW-846 Methods | |
| Section 5.0 Apparatus and Materials<br>• Refers directly to SW-846 Method 8081<br>• Specifies extraction and cleanup equipment and materials | Section 4.0 Apparatus and Materials<br>• Equivalent equipment specified in SW-846 Methods 3550 and 3620 | |
| Section 6.0 Reagents<br>• Refers directly to SW-846 Method 8081<br>• Requires certified standard solutions<br>• Stock standards limited to 6 months shelf life, or as required for purity<br>• Calibration standards must include all aroclors, individually and as mixes<br>• 5 standards required that encompass 5-500 ppm range<br>• Calibration standards limited to 2 months shelf life<br>• Surrogate standards are DCBP as primary, TCMX as secondary<br>• Surrogate final concentration in cleaned extract to be 0.05 ppm<br>• Refers to SW-846 Method 8081, Section 8.3 for corrective action for out-of-control surrogate recovery | Section 5.0 Reagents<br>• Stock standards limited to 1 year shelf life, or as required for purity<br>• Calibration standards to encompass expected concentration range of samples<br>• Calibration standards limited to 6 months shelf life, or as required for purity<br>• Surrogate standards are DCBP as primary, TCMX as secondary | • Procedure 440.3 should refer to SW-846 Method 8081, Section 8.2.2 for corrective action of out-of-control surrogate standards. This error will be corrected. |

# TABLE C12-6 (CONTINUED)
# COMPARISON OF COMBINED SW-846 METHODS (8081, 3550, 3620) AND METHODS MANUAL PROCEDURE 440.3

| Methods Manual Procedure 440.3 Section | Corresponding SW-846 Method(s) Section | Comments |
|---|---|---|
| Section 7.0 Sample Collection, Preservation and Handling<br>• Requires sample collection according to Methods Manual Procedure 120.1<br>• Requires sample handling and chain-of-custody according to Section 6.0 of the QAPP | Section 6.0 Sample Collection, Preservation and Handling<br>• Requires sample extracts to be stored under refrigeration and in dark and must be analyzed within 40 days of extraction<br>• Refers to SW-846 Chapter Four | • Procedure 120.1 is a program specific procedure developed specifically for the collection of samples from containers of TRU waste through coring and subsampling. Procedure 120.1 refers to SW-846 for guidance and requirements for sampling.<br>• Section 6.0 of the QAPP incorporates applicable sample handling and preservation requirements for samples included in SW-846 Method 8081 and Chapter Four. |
| Section 8.0 Procedure<br>• Requires hexane extraction and vortex mixing of 2.0 gram sample; surrogate must be added to each sample and blank<br>• Requires Florisil cleanup of all samples<br>• Refers directly to SW-846 Method 8000A for initial and continuing calibration<br>• Requires a 3 point calibration curve<br>• All calibration requirements are summarized in Table 2<br>• Refers directly to SW-846 Methods 8000A and 8081 for analytical steps | Section 7.0 Procedure<br>• SW-846 Method 8000A, Subsection 7.4.2 addresses calibration requirements and requires a 5 point calibration curve<br>• SW-846 Method 8000A, Subsection 7.6, and Method 8081, Subsection 7.5 addresses analysis | • Because Procedure 440.3 was developed to analyze PCBs in samples of radioactive organic sludge, extraction and cleanup steps are modified from SW-846 Methods 3550 and 3620. Extensive procedure performance documentation is included in Section 11.0 to support and justify modified techniques.<br>• Procedure 440.3 requires a 3 point calibration curve. Extensive procedure performance documentation is included in Section 11.0 to support and justify this calibration. |
| Section 9.0 Calculations<br>• Requires quantitation by summing 3-5 peaks associated with appropriate Aroclor(s) | Section 7.6.4 Quantitation of PCBs<br>• Allows quantitation by summing areas of 3-5 peaks associated with appropriate Aroclor | |

# TABLE C12-6 (CONTINUED)
# COMPARISON OF COMBINED SW-846 METHODS (8081, 3550, 3620) AND METHODS MANUAL PROCEDURE 440.3

| Methods Manual Procedure 440.3 Section | Corresponding SW-846 Method(s) Section | Comments |
|---|---|---|
| Section 10.0 Quality Control<br>• Refers directly to SW-846 Method 8081, Subsections 8.4 (GC/MS confirmation) and 8.5 (Florisil cleanup)<br>• Requires formal quality control program<br>• Requires demonstration of acceptable performance prior to analyzing program samples<br>• Specifies equations for calculating analytical precision, accuracy, method detection limit, and percent recovery for quality control samples<br>• Method performance samples must be run initially and semiannually, acceptance criteria are Table 1 QAOs<br>• Laboratory duplicates must be run once per batch, acceptance criteria are the Table 1 QAOs for precision<br>• Laboratory blanks must be run once per batch, acceptance criteria is < 3 x MDLs in Table 1<br>• Matrix spikes must be run once per batch, acceptance criteria are the Table 1 QAOs for accuracy<br>• Matrix spike duplicates must be run once per batch, acceptance criteria are the Table 1 QAOs for precision and accuracy<br>• Laboratory control samples must be run once per batch, acceptance criteria are 80-120 %R<br>• Surrogate compounds must be included in every sample, acceptance criteria are | Section 8.0 Quality Control<br>• SW-846 Method 8000A requires each laboratory to operate a formal quality control program<br>• Recommends demonstration of acceptable accuracy through the analysis of quality control reference standard once per batch, acceptance criteria is 80-120 %R<br>• SW-846 Chapter One includes equations for calculating precision, accuracy, and method detection limit<br>• Method performance samples not addressed, however SW-846 Chapter One requires demonstration of method performance prior to field sample analysis<br>• Laboratory duplicates required once per batch in SW-846 Method 8000A and Chapter One, acceptance criteria are not addressed<br>• Method blanks required initially and once per batch in SW-846 Method 8000A and Chapter One, various acceptance criteria are recommended<br>• Matrix spikes required once per batch in SW-846 Method 8000A, no acceptance criteria specified for solid samples<br>• Matrix spike duplicates not required in addition to laboratory duplicates<br>• Laboratory control samples not addressed | • The laboratory control sample required by Procedure 440.3 fulfills the quality control reference standard recommended by SW-846 Method 8081<br>• Procedure 440.3 quality control requirements meet or exceed SW-846 Method 8081 quality control requirements<br>• Procedure 440.3 provides a better defined quality control program than SW-846 Method 8081 |

# TABLE C12-6 (CONTINUED)
# COMPARISON OF COMBINED SW-846 METHODS (8081, 3550, 3620) AND METHODS MANUAL PROCEDURE 440.3

| Methods Manual Procedure 440.3 Section | Corresponding SW-846 Method(s) Section | Comments |
|---|---|---|
| Section 11.0 Procedure Performance<br>• Extensive documentation of performance of the optimized extraction, cleanup, and analytical procedure developed by Argonne National Laboratory | Section 9.0 Method Performance<br>• References extensive method performance work performed by Oak Ridge National Laboratory | • Because Procedure 440.3 was developed to analyze PCBs in samples of radioactive organic sludge, extraction and cleanup steps are modified from SW-846 Methods 3550 and 3620. Extensive procedure performance documentation is included in Section 11.0 of Procedure 440.3 to support and justify modified techniques. |
| Section 12.0 References<br>• *Determination of PCBs in Rocky Flats Type IV Waste Sludge by Gas Chromatography/Electron Capture Detection* (ANL 1993)<br>• *Performance Demonstration Program Plan for the Analysis of Solidified Wastes for the Transuranic Waste Characterization Program* (DOE 1995a)<br>• *Transuranic Waste Characterization Quality Assurance Program Plan* (DOE 1995b)<br>• *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (EPA 1995) | Section 10.0 References<br>• See SW-846 Method 8081 | |

# TABLE C12-7
# COMPARISON OF SW-846 METHOD 3051 AND METHODS MANUAL PROCEDURE 610.1

| Methods Manual Procedure 610.1 Section | Corresponding SW-846 Method 3051 Section | Comments |
|---|---|---|
| Section 1.0 Scope and Application<br>• Program analyte indicated (subset of analytes allowed by SW-846 Method 3051)<br>• List of analytical methods applicable to this preparation procedure<br>• Refers directly to SW-846 Method 3051<br>• Requires samples to be analyzed in batches not to exceed 20 samples | Section 1.0 Scope and Application<br>• Section 1.1, analyte list<br>• Section 1.2, addresses analytical methods applicable to this preparation procedure<br>• Batch not to exceed 20 samples as per SW-846 Chapter One | • Procedure 610.1 analyte list is a subset of the analyte list in SW-846 Method 3051<br>• The acceptable analytical procedures to be used for the digestates generated by this procedure are identical |
| Section 2.0 Summary of Procedure<br>• Refers directly and only to SW-846, Method 3051 | Section 2.0 Summary of Method | |
| Section 3.0 Interferences<br>• Refers directly and only to SW-846, Method 3051 | Section 3.0 Interferences | |
| Section 4.0 Safety<br>• Responsibilities for safety and health and training | No equivalent section in SW-846 Method 3051 | |
| Section 5.0 Apparatus and Materials<br>• Refers directly and only to SW-846, Method 3051 | Section 4.0 Apparatus and Materials | |
| Section 6.0 Reagents<br>• Refers directly and only to SW-846, Method 3051 | Section 5.0 Reagents | |

# TABLE C12-7 (CONTINUED)
# COMPARISON OF SW-846 METHOD 3051 AND METHODS MANUAL PROCEDURE 610.1

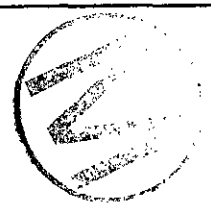
| Methods Manual Procedure 610.1 Section | Corresponding SW-846 Method 3051 Section | Comments |
|---|---|---|
| Section 7.0 Sample Collection, Preservation and Handling<br>• Requires sample collection according to Methods Manual Procedure 120.1<br>• Requires sample handling and chain-of-custody procedures in Section 6.0 of the QAPP | Section 6.0 Sample Collection, Preservation, and Handling<br>• Samples collected following sampling plan in SW-846 Chapter Nine<br>• Sample containers must be prewashed in SW-846 Chapter Three<br>• Samples must be refrigerated and analyzed as soon as possible | • Procedure 120.1 is a program specific procedure developed specifically for the collection of samples from containers of TRU waste through coring and subsampling. Procedure 120.1 refers to SW-846 for guidance and requirements for sampling.<br>• Section 6.0 of the QAPP incorporates applicable sample handling and preservation requirements in SW-846 Method 3051, Chapter Nine, and Chapter Three |
| Section 8.0 Procedure<br>• Refers to SW-846 Method 3051 for procedural requirements.<br>• Final acid concentration of digestate should be 4 M nitric acid if using *Procedure 620.1 for transuranic* element cleanup. | Section 7.0 Procedure | • *Procedure 620.1 does not have an* equivalent method in SW-846 because it is used to preferentially extract transuranic elements from the sample matrix to reduce interferences. |
| Section 9.0 Calculations<br>• Does not apply to procedure | Section 7.0 Procedure<br>• Section 7.0 of SW-846, Method 3051 includes all required calculations | • *Procedure 610.1 will be revised to* refer to Section 7.0 of SW-846, Method 3051 |

# TABLE C12-7 (CONTINUED)
# COMPARISON OF SW-846 METHOD 3051 AND METHODS MANUAL PROCEDURE 610.1

| Methods Manual Procedure 610.1 Section | Corresponding SW-846 Method 3051 Section | Comments |
|---|---|---|
| Section 10.0 Quality Control<br>• Laboratory blank must be included in analytical batch.<br>• Matrix spike must be included in analytical batch.<br>• Matrix spike duplicate must be included in analytical batch.<br>• Laboratory control sample must be included in analytical batch.<br>• Refers analyst to quality control section of the analytical procedure used for any additional requirements. | Section 8.0 Quality Control<br>• Method blank required once per batch in SW-846 Chapter One, various acceptance criteria are recommended<br>• Matrix spike required once per batch in SW-846 Method 3051, Section 8.3, acceptance criteria are not addressed<br>• Matrix spike duplicate or duplicate recommended once per batch in SW-846 Method 3051, Section 8.2, acceptance criteria are not addressed<br>• Laboratory control samples required once per batch in SW-846 Chapter One | • No acceptance criteria given in Procedure 610.1 for quality control samples. Acceptance criteria are found in the analytical methods<br>• Procedure 610.1 quality control requirements (as included in analytical procedures) meet or exceed SW-846 quality control requirements<br>• Methods Manual procedure provide a better defined quality control program than SW-846 |
| Section 11.0 Procedure Performance<br>• Refers directly and only to SW-846, Method 3051 | Section 9.0 Method Performance | |
| Section 12.0 References<br>• *Performance Demonstration Program Plan for the Analysis of Solidified Wastes for the Transuranic Waste Characterization Program* (DOE 1995a)<br>• *Transuranic Waste Characterization Quality Assurance Program Plan* (DOE 1995b)<br>• *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (EPA 1995) | Section 10.0 References<br>• See SW-846 Method 3051 | |

# TABLE C12-8
# COMPARISON OF SW-846 METHOD 6020 AND METHODS MANUAL PROCEDURE 630.1

| Methods Manual Procedure 630.1 Section | Corresponding SW-846 Method 6020 Section | Comments |
|---|---|---|
| Section 1.0 Scope and Application<br>• Program analyte list and quality assurance objectives (QAOs) included in Table 1<br>• Analyte list is a subset of SW-846 Method 6020 analyte list<br>• Refers directly to SW-846 Method 6020<br>• Requires samples to be analyzed in *batches not to exceed 20 samples* | Section 1.0 Scope and Application<br>• Analyte list included as Table 1<br>• Batch not to exceed 20 samples per SW-846 Chapter One | • Program QAOs are derived from SW-846 Method 6020 (precision and accuracy) and regulatory requirements (MDL and PRQL) |
| Section 2.0 Summary of Procedure<br>• *Refers directly and only to* SW-846 Method 6020 | Section 2.0 Summary of Method | |
| *Section 3.0 Interferences*<br>• Refers directly and only to SW-846 Method 6020 | *Section 3.0 Interferences* | |
| Section 4.0 Safety<br>• Responsibilities for safety and health and training | No equivalent section in SW-846 Method 6020 | |
| Section 5.0 Apparatus and Materials<br>• Refers directly and only to SW-846 Method 6020 | Section 4.0 Apparatus and Materials | |
| Section 6.0 Reagents<br>• Refers directly and only to SW-846 Method 6020 | Section 5.0 Reagents | |



# TABLE C12-8 (CONTINUED)
# COMPARISON OF SW-846 METHOD 6020 AND METHODS MANUAL PROCEDURE 630.1

| Methods Manual Procedure 630.1 Section | Corresponding SW-846 Method 6020 Section | Comments |
|---|---|---|
| Section 7.0 Sample Collection, Preservation and Handling<br>• Requires sample collection according to Methods Manual Procedure 120.1<br>• Requires sample handling and chain-of-custody according to Section 6.0 of the QAPP | Section 6.0 Sample Collection, Preservation, and Handling<br>• Samples collected following SW-846 Chapter Nine<br>• Reference to SW-846 Chapter Three, Section 3.1.3 for sample handling and preservation | • Procedure 120.1 is a program specific procedure developed specifically for the collection of samples from containers of TRU waste through coring and subsampling. Procedure 120.1 refers to SW-846 for guidance and requirements for sampling.<br>• Section 6.0 of the QAPP incorporates applicable sample handling and preservation requirements for samples included in SW-846 Chapter Three and Chapter Nine |
| Section 8.0 Procedure<br>• Sample preparation procedures must follow Procedure 610.1 of Methods Manual<br>• Sample cleanup Procedure 620.1 of the Methods Manual may be used<br>• Refers directly and only to SW-846 Method 6020 for initial and continuing calibration<br>• All calibration requirements are summarized in Table 2<br>• Refers directly and only to SW-846 Method 6020 for analytical steps | Section 7.0 Procedure<br>• Subsection 7.1 references sample preparation methods, SW-846 Method 3051, microwave assisted digestion, allowed<br>• Subsections 7.2 through 7.10 address calibration and analytical requirements | • Procedure 610.1 is based on SW-846 Method 3051 (see Table C-12-7) |

## TABLE C12-8 (CONTINUED)
## COMPARISON OF SW-846 METHOD 6020 AND METHODS MANUAL PROCEDURE 630.1

| *Methods Manual Procedure 630.1 Section* | *Corresponding SW-846 Method 6020 Section* | *Comments* |
|---|---|---|
| Section 9.0 Calculations<br>• Refers to Section 7.12 of SW-846 Method 6020 for required calculations.<br>• Sample dilution must be taken into account<br>• Results reported in mg/kg (wet weight basis)<br>• Percent solid content must be determined on a separate sample aliquot to convert analytical results into mg/kg dry weight | Section 7.0 Procedure<br>• Section 7.11 of SW-846 Method 6020 addresses required calculations | • Procedure 630.1 will be revised to reference Section 7.11 of SW-846 Method 6020 |

# TABLE C12-8 (CONTINUED)
# COMPARISON OF SW-846 METHOD 6020 AND METHODS MANUAL PROCEDURE 630.1

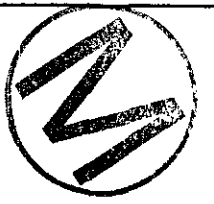
| Methods Manual Procedure 630.1 Section | Corresponding SW-846 Method 6020 Section | Comments |
|---|---|---|
| Section 10.0 Quality Control<br>• Refers to Section 8.1 through 8.5 of SW-846 Method 6020 and states that all quality control requirements are mandatory<br>• Requires formal quality control program<br>• Requires demonstration of acceptable performance prior to analyzing program samples<br>• Specifies equations for calculating analytical precision, accuracy, method detection limit, and percent recovery for quality control samples<br>• IDL must be at or below PRDL<br>• Method performance samples must be run initially and semiannually, acceptance criteria are Table 1 QAOs<br>• Laboratory blanks must be run once per batch, acceptance criteria are ≤5 x IDL<br>• Matrix spikes must be run once per batch, acceptance criteria are 80-120 %R<br>• Matrix spike duplicates must be run once per batch, acceptance criteria are 80-120 %R and ≤30 RPD<br>• Laboratory control samples must be run once per batch, acceptance criteria are 80-120 %R<br>• Blind audit samples are distributed, analyzed, and reported as part of the DOE Performance Demonstration Program | Section 8.0 Quality Control<br>• Subsection 8.1 requires the laboratory to establish a formal quality control program<br>• SW-846 Chapter One includes equations for calculating precision, accuracy and method detection limit<br>• Method performance samples not addressed, however SW-846 Chapter One requires demonstration of method performance prior to field sample analysis<br>• SW-846 Chapter One and SW-846 6020, Subsection 5.5 lists three blanks that must be included (calibration blank, preparation blank, and rinse blank), acceptance criteria is programmatic<br>• Matrix spike required once per batch, acceptance criteria are not addressed<br>• One duplicate (may be matrix spike duplicate) is required per batch, recommended acceptance criteria are ≤20 RPD for concentrations >100 x IDL<br>• Laboratory control sample recommended once per batch, acceptance criteria are not addressed<br>• Blind audit samples not addressed, however participation in an external performance evaluation program is addressed in SW-846 Chapter One | • Procedure 630.1 quality control requirements meet or exceed SW-846 Method 6020 quality control requirements<br>• Procedure 630.1 provides a better defined quality control program than SW-846 Method 6020 |

## TABLE C12-8 (CONTINUED)
## COMPARISON OF SW-846 METHOD 6020 AND METHODS MANUAL PROCEDURE 630.1

| Methods Manual Procedure 630.1 Section | Corresponding SW-846 Method 6020 Section | Comments |
|---|---|---|
| Section 11.0 Procedure Performance<br>• Refers directly and only to SW-846 Method 6020 | Section 9.0 Method Performance | |
| Section 12.0 References<br>• *Performance Demonstration Program Plan for the Analysis of Solidified Wastes for the Transuranic Waste Characterization Program* (DOE 1995a)<br>• *Transuranic Waste Characterization Quality Assurance Program Plan* (DOE 1995b)<br>• *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (EPA 1995) | Section 10.0 References<br>• See SW-846 Method 6020 | |

# TABLE C12-9
# COMPARISON OF SW-846 METHOD 6010A AND METHODS MANUAL PROCEDURE 640.1

| Methods Manual Procedure 640.1 Section | Corresponding SW-846 Method 6010A Section | Comments |
|---|---|---|
| Section 1.0 Scope and Application<br>• Program analyte list and quality assurance objectives (QAOs) included as Table 1<br>• Analyte list is a subset of SW-846 Method 6010A analyte list<br>• Refers directly SW-846 Method 6010A<br>• Requires samples to be analyzed in batches not to exceed 20 samples | Section 1.0 Scope and Application<br>• Analyte list included as Table 1<br>• Batch not to exceed 20 samples as per SW-846 Chapter One | • Program QAOs are derived from SW-846 Method 6010A (precision and accuracy) and regulatory requirements (MDL and PRQL) |
| Section 2.0 Summary of Procedure<br>• Refers directly and only to SW-846 Method 6010A | Section 2.0 Summary of Method | |
| Section 3.0 Interferences<br>• Refers directly and only to SW-846 Method 6010A | Section 3.0 Interferences | |
| Section 4.0 Safety<br>• Responsibilities for safety and health and training | No equivalent section in SW-846 Method 6010A | |
| Section 5.0 Apparatus and Materials<br>• Refers directly and only to SW-846 Method 6010A | Section 4.0 Apparatus and Materials | |
| Section 6.0 Reagents<br>• Refers directly and only to SW-846 Method 6010A | Section 5.0 Reagents | |



# TABLE C12-9 (CONTINUED)
# COMPARISON OF SW-846 METHOD 6010A AND METHODS MANUAL PROCEDURE 640.1

| Methods Manual Procedure 640.1 Section | Corresponding SW-846 Method 6010A Section | Comments |
|---|---|---|
| Section 7.0 Sample Collection, Preservation and Handling<br>• Requires sample collection according to Methods Manual Procedure 120.1<br>• Requires sample handling and chain-of-custody according to Section 6.0 of the QAPP | Section 6.0 Sample Collection, Preservation and Handling<br>• *Refers to SW-846 Chapter Three,* Section 3.1 through 3.3 for sample handling and preservation | • Procedure 120.1 is a program specific procedure developed specifically for the collection of samples from containers of TRU waste through coring and subsampling. Procedure 120.1 refers to SW-846 for guidance and requirements for sampling.<br>• Section 6.0 of the QAPP incorporates applicable sample handling and preservation requirements for samples included in SW-846, Chapters Three and Nine |
| Section 8.0 Procedure<br>• Procedure 610.1 of the Methods Manual must be followed<br>• Procedure 620.1 of the Methods Manual may be used if cleanup is required<br>• Refers directly and only to SW-846 Method 6010A for initial calibration<br>• Refers directly and only to SW-846 Method 6010A for continuing calibration<br>• All calibration requirements are *summarized in Table 2*<br>• Refers directly and only to SW-846 Method 6010A for analytical steps | Section 7.0 Procedure<br>• Subsection 7.1 references sample preparation methods, SW-846 Method 3051, microwave assisted digestion, allowed<br>• Subsections 7.2 through 7.5 address initial calibration, continuing calibration, and analytical steps | • Procedure 610.1 is based on SW-846 Method 3051 (see Table C-12-7) |
| Section 9.0 Calculations<br>• Specifies results reported in mg/kg wet-weight basis<br>• Use the calibration curve to determine analyte concentration | • Section 7.0 addresses quantitation | |

# TABLE C12-9 (CONTINUED)
# COMPARISON OF SW-846 METHOD 6010A AND METHODS MANUAL PROCEDURE 640.1

| Methods Manual Procedure 640.1 Section | Corresponding SW-846 Method 6010A Section | Comments |
|---|---|---|
| Section 10.0 Quality Control<br>• Refers to Section 8.1 through 8.5 of SW-846, Method 6010A and requires that all quality control requirements are mandatory<br>• Requires formal quality control program<br>• Requires demonstration of acceptable performance prior to analyzing program samples<br>• Specifies equations for calculating analytical precision, accuracy, method detection limit, and percent recovery for quality control samples<br>• Method performance samples must be run initially and semiannually, acceptance criteria are Table 1 QAOs<br>• Laboratory blanks must be run once per batch, acceptance criteria are ≤3 x IDL<br>• Matrix spikes required once per batch, acceptance criteria are 80-120 %R<br>• Matrix spike duplicates must be run once per batch, acceptance criteria are 80-120 %R and ≤30 RPD<br>• Laboratory control samples must be run once per batch, acceptance criteria are 80-120 %R<br>• Blind audit samples are distributed, analyzed and reported as part of the DOE Performance Demonstration Program | Section 8.0 Quality Control<br>• SW-846 Chapter One requires each laboratory to operate a formal quality control program<br>• SW-846 Chapter One requires demonstration of acceptable precision and accuracy through the analysis of quality control reference standard<br>• SW-846 Chapter One includes equations used for calculating accuracy, precision, and method detection limit<br>• Method performance samples not addressed, however SW-846 Chapter One requires demonstration of method performance prior to field sample analysis<br>• SW-846 Chapter One and SW-846 Method 6010A requires the method blank be run once per batch, acceptance criteria are ±3 standard deviations of mean blank value<br>• Matrix spikes required once per batch, acceptance criteria 80-120 %R<br>• Matrix spike duplicates required once per batch, acceptance criteria is ≤20 RPD and 80-120 %R<br>• Laboratory control samples required once per batch in SW-846 Chapter One, acceptance criteria are not addressed<br>• Blind audit samples not addressed, however participation in an external | • Procedure 640.1 quality control requirements meet or exceed SW-846 Method 6010A quality control requirements<br>• Procedure 640.1 provides a better defined quality control program than SW-846 Method 6010A |

## TABLE C12-9 (CONTINUED)
## COMPARISON OF SW-846 METHOD 6010A AND METHODS MANUAL PROCEDURE 640.1

| Methods Manual Procedure 640.1 Section | Corresponding SW-846 Method 6010A Section | Comments |
|---|---|---|
| Section 11.0 Procedure Performance<br>• Refers directly and only to SW-846 Method 6010A | Section 9.0 Method Performance | |
| Section 12.0 References<br>• *Performance Demonstration Program Plan for the Analysis of Solidified Wastes for the Transuranic Waste Characterization Program* (DOE 1995a)<br>• *Transuranic Waste Characterization Quality Assurance Program Plan* (DOE 1995b)<br>• *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (EPA 1995) | Section 10.0 References<br>• See SW-846 Method 6010A | |

# TABLE C12-10
# COMPARISON OF SW-846 METHODS 7000A, 7040, 7080A, 7090, 7130, 7190, 7420, 7520, 7760A, 7840, 7910, AND 7950 AND METHODS MANUAL PROCEDURE 650.1

| Methods Manual Procedure 650.1 Section | Corresponding SW-846 Methods Section | Comments |
|---|---|---|
| Section 1.0 Scope and Application<br>• Program analyte list and quality assurance objectives (QAOs) included as Table 2<br>• Analyte list is correlated directly to appropriate SW-846 Method<br>• Refers directly to SW-846 Methods listed in Table 1 and 7000A<br>• Requires samples to be analyzed in batches not to exceed 20 samples | Section 1.0 Scope and Application<br>• Table 1 analyte list, no specified QAOs in SW-846 Method 7000A<br>• Batch not to exceed 20 samples as per SW-846 Chapter One | • Each individual method refers to SW-846 Method 7000A for general requirements. However each method for a specific analyte may have additional requirements unique to the analyte<br>• Program QAOs are derived based on SW-846 Methods (precision and accuracy) and regulatory requirements (PRDL and PRQL) |
| Section 2.0 Summary of Procedure<br>• Refers directly and only to SW-846 Methods listed in Table 1 | Section 2.0 Summary of Method | |
| Section 3.0 Interferences<br>• Refers directly and only to SW-846 Methods listed in Table 1 | Section 3.0 Interferences | |
| Section 4.0 Safety<br>• Responsibilities for safety and health and training | No equivalent section in SW-846 Methods | |
| Section 5.0 Apparatus and Materials<br>• Refers directly and only to SW-846 Methods listed in Table 1 | Section 4.0 Apparatus and Materials | |
| Section 6.0 Reagents<br>• Refers directly and only to SW-846 Methods listed in Table 1 | Section 5.0 Reagents | |

# TABLE C12-10 (CONTINUED)
# COMPARISON OF SW-846 METHODS 7000A, 7040, 7080A, 7090, 7130, 7190, 7420, 7520, 7760A, 7840, 7910, AND 7950 AND METHODS MANUAL PROCEDURE 650.1

| Methods Manual Procedure 650.1 Section | Corresponding SW-846 Methods Section | Comments |
|---|---|---|
| Section 7.0 Sample Collection, Preservation and Handling<br>• Requires sample collection according to Methods Manual Procedure 120.1<br>• Requires sample handling and chain-of-custody according to Section 6.0 of the QAPP | Section 6.0 Sample Collection, Preservation and Handling<br>• Refers to SW-846 Chapter Nine for sampling plan considerations<br>• Requires all sample containers prewashed with detergents, acids, and reagents<br>• Allows for both glass and plastic containers<br>• Requires nonaqueous samples to be *refrigerated (when possible) and* analyzed as soon as possible | • Procedure 120.1 is a program specific procedure developed specifically for the collection of samples from containers of TRU waste through coring and subsampling. Procedure 120.1 refers to SW-846 for guidance and requirements for sampling.<br>• Section 6.0 of the QAPP incorporates applicable sample handling and preservation requirements for samples *included in SW-846 Chapter Nine* |
| Section 8.0 Procedure<br>• Procedure 610.1 of the Methods Manual must be followed<br>• Procedure 620.1 of the Methods Manual may be used if cleanup is required<br>• Refers directly to SW-846 Methods *listed in Table 1 for analytical steps* except for silver which refers to Section 7.4 through 7.6 of SW-846 Method 7760A<br>• Use of proven matrix modifiers other than those specified in SW-846 is acceptable<br>• All calibration requirements are summarized in Table 3 | Section 7.0 Procedure<br>• Subsection 7.1 addresses sample preparation, Section 5.0 addresses standard preparation Section 7.0 addresses analysis<br>• Calibration criteria are provided in SW-846 Method 7000A Subsections<br>• *Serial dilution and post-digestion spike* criteria are provided in SW-846 Method 7000A Subsection 8.6 | • Calibration requirements in Procedure 650.1 are the same as found in SW-846 Method 7000A.<br>• Procedure 650.1 requires 3 standards in the initial calibration; Method 7000A requires a minimum of three standards. |

## TABLE C12-10 (CONTINUED)
## COMPARISON OF SW-846 METHODS 7000A, 7040, 7080A, 7090, 7130, 7190, 7420, 7520, 7760A, 7840, 7910, AND 7950 AND METHODS MANUAL PROCEDURE 650.1

| Methods Manual Procedure 650.1 Section | Corresponding SW-846 Methods Section | Comments |
|---|---|---|
| Section 9.0 Calculations<br>• Allows for reading analyte concentration from calibration curve or directly from instrument readout<br>• Requires sample dilution taken into account<br>• Specifies results reported in mg/kg wet weight basis<br>• Provides for conversion to mg/kg dry weight | Subsection 7.4<br>• Subsection 7.4 in SW-846 Method 7000A addresses concentration determination calculations including sample dilution calculations | |

# TABLE C12-10 (CONTINUED)
# COMPARISON OF SW-846 METHODS 7000A, 7040, 7080A, 7090, 7130, 7190, 7420, 7520, 7760A, 7840, 7910, AND 7950 AND METHODS MANUAL PROCEDURE 650.1

| Methods Manual Procedure 650.1 Section | Corresponding SW-846 Methods Section | Comments |
|---|---|---|
| Section 10.0 Quality Control<br>• Refers to Subsection 8.6 and 8.7 of SW-846 Method 7000A and requires that all quality control requirements are mandatory<br>• Requires formal quality control program<br>• Requires demonstration of acceptable performance prior to analyzing program samples<br>• Specifies equations for calculating analytical precision, accuracy, instrument detection limit, and percent recovery for quality control samples<br>• Method performance samples must be run initially and semiannually, acceptance criteria are Table 2 QAOs<br>• Laboratory blanks must be run once per batch, acceptance criteria is ≤3 x IDL<br>• Matrix spikes must be run once per batch, acceptance criteria is 80-120 %R<br>• Matrix spike duplicates must be run once per batch, acceptance criteria are ≤30 RPD and 80-120 %R<br>• Laboratory control samples must be run once per batch, acceptance criteria is 80-120 %R<br>• Blind audit samples are distributed, analyzed and reported as part of the DOE Performance Demonstration Program | Section 8.0 Quality Control<br>• Refers to SW-846 Method 7000A Section 8.0<br>• SW-846 Method 7000A Section 8.0 recommends quality control data be maintained and available for easy reference or inspection<br>• SW-846 Chapter One includes equations for calculating precision, accuracy, and method detection limit<br>• Method performance samples not addressed, however SW-846 Chapter One requires demonstration of method performance prior to field sample analysis<br>• Method blanks required once per batch per SW-846 Chapter One, various acceptance criteria recommeded<br>• Matrix spikes required once per batch in SW-846 Method 7000A Section 8.0, acceptance criteria not addressed<br>• Matrix spike duplicates required once per batch in SW-846 Method 7000A Section 8.0, acceptance criteria not addressed<br>• Laboratory control samples (reference standard) required once per batch in SW-846 Method 7000A Section 8.0, acceptance criteria not addressed<br>• Blind audit samples not addressed, however participation in an external performance evaluation program is *addressed in SW-846 Chapter One* | • Procedure 650.1 quality control requirements meet or exceed SW-846 Methods quality control requirements<br>• Procedure 650.1 provides a better defined quality control program than the SW-846 Methods |

# TABLE C12-10 (CONTINUED)
# COMPARISON OF SW-846 METHODS 7000A, 7040, 7080A, 7090, 7130, 7190, 7420, 7520, 7760A, 7840, 7910, AND 7950 AND METHODS MANUAL PROCEDURE 650.1

| Methods Manual Procedure 650.1 Section | Corresponding SW-846 Methods Section | Comments |
|---|---|---|
| Section 11.0 Procedure Performance<br>• Refers directly and only to SW-846 Methods listed in Table 1 | Section 9.0 Method Performance | |
| Section 12.0 References<br>• *Performance Demonstration Program Plan for the Analysis of Solidified Wastes for the Transuranic Waste Characterization Program* (DOE 1995a)<br>• *Transuranic Waste Characterization Quality Assurance Program Plan* (DOE 1995b)<br>• *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (EPA 1995) | Section 10.0 References<br>• See SW-846 Methods 7000A, 7040, 7080, 7090,7130, 7190, 7420, 7520, 7760A, 7840, 7910, and 7950 | |

# TABLE C12-11
# COMPARISON OF SW-846 METHODS 7000A, 7041, 7081, 7091, 7131A, 7191, 7421, 7761, 7841, 7911, AND 7951 AND METHODS MANUAL PROCEDURE 650.2

| Methods Manual Procedure 650.2 Section | Corresponding SW-846 Methods Section | Comments |
|---|---|---|
| Section 1.0 Scope and Application<br>• Program analyte list and quality assurance objectives (QAOs) included as Table 2 (Nickel is listed as an analyte for analysis by GFAA)<br>• Refers directly to SW-846 Methods listed in Table 1 and 7000A<br>• Requires samples to be analyzed in batches not to exceed 20 samples | Section 1.0 Scope and Application<br>• SW-846 Method 7000A, Table 1 analyte list<br>• SW-846 does not list a GFAA method for nickel<br>• Batch not to exceed 20 samples as per SW-846 Chapter One | • Each individual method refers to SW-846 Method 7000A for general requirements. However each method for a specific analyte may have additional requirements unique to the analyte<br>• Program QAOs are derived based on SW-846 Methods (precision and accuracy) and regulatory requirements (PRDL and PRQL)<br>• Table 1 in Procedure 650.2 will be revised to reflect the correct SW-846 method numbers<br>• Analyte list for Procedure 650.2 will be revised to exclude nickel |
| Section 2.0 Summary of Procedure<br>• Refers directly and only to SW-846 Methods listed in Table 1 | Section 2.0 Summary of Method | |
| Section 3.0 Interferences<br>• Refers directly and only to SW-846 Methods listed in Table 1 | Section 3.0 Interferences | |
| Section 4.0 Safety<br>• Responsibilities for safety and health and training | No equivalent section in SW-846 Methods | |
| Section 5.0 Apparatus and Materials<br>• Refers directly and only to SW-846 Methods listed in Table 1 | Section 4.0 Apparatus and Materials | |

# TABLE C12-11 (CONTINUED)
# COMPARISON OF SW-846 METHODS 7000A, 7041, 7081, 7091, 7131A, 7191, 7421, 7761, 7841, 7911, AND 7951 AND METHODS MANUAL PROCEDURES 650.2

| *Methods Manual Procedure 650.2 Section* | *Corresponding SW-846 Methods Section* | *Comments* |
|---|---|---|
| Section 6.0 Reagents<br>• *Refers directly and only to SW-846 Methods listed in Table 1* | Section 5.0 Reagents | |
| Section 7.0 Sample Collection, Preservation and Handling<br>• Requires sample collection according to Methods Manual Procedure 120.1<br>• Requires sample handling and chain-of-custody according to Section 6.0 of the QAPP | Section 6.0 Sample Collection, Preservation and Handling<br>• Refers to SW-846 Chapter Nine for sampling plan considerations<br>• Requires all sample containers prewashed with detergents, acids, and reagents<br>• Allows for both glass and plastic containers<br>• Requires nonaqueous samples to be refrigerated (when possible) and *analyzed as soon as possible* | • *Procedure 120.1 is a program specific procedure developed specifically for the collection of samples from containers of TRU waste through coring and subsampling. Procedure 120.1 refers to SW-846 for guidance and requirements for sampling.*<br>• Section 6.0 of the QAPP incorporates *applicable sample handling and preservation requirements for samples included in SW-846 Chapter Nine* |

# TABLE C12-11 (CONTINUED)
# COMPARISON OF SW-846 METHODS 7000A, 7041, 7081, 7091, 7131A, 7191, 7421, 7761, 7841, 7911, AND 7951 AND METHODS MANUAL PROCEDURES 650.2

| Methods Manual Procedure 650.2 Section | Corresponding SW-846 Methods Section | Comments |
|---|---|---|
| Section 8.0 Procedure<br>• Procedure 610.1 of the Methods Manual must be followed<br>• Procedure 620.1 of the Methods Manual may be used if cleanup is required<br>• Refers directly to SW-846 Methods listed in Table 1 for analytical steps except for arsenic, selenium, and silver which refer to Sections of SW-846 Methods 7061, 7741, and 7761 respectively<br>• Use of proven matrix modifiers other than those specified in SW-846 is acceptable<br>• All calibration requirements are summarized in Table 3 | Section 7.0 Procedure<br>• Subsection 7.1 addresses sample preparation, Section 5.0 addresses standard preparation Section 7.0 addresses analysis<br>• Calibration criteria are provided in SW-846 Method 7000A Subsections<br>• Serial dilution and post-digestion spike criteria are provided in SW-846 Method 7000A Subsection 8.6 | • Calibration requirements in Procedure 650.1 are the same as found in SW-846 Method 7000A.<br>• Procedure 650.1 requires 3 standards in the initial calibration; Method 7000A requires a minimum of three standards. |
| Section 9.0 Calculations<br>• Allows for reading analyte concentration from calibration curve or directly from instrument readout<br>• Requires sample dilution taken into account<br>• Specifies results reported in mg/kg wet weight basis<br>• Provides for conversion to mg/kg dry weight | Subsection 7.4<br>• Subsection 7.4 in SW-846 Method 7000A addresses concentration determination calculations including sample dilution calculations | |

# TABLE C12-11 (CONTINUED)
# COMPARISON OF SW-846 METHODS 7000A, 7041, 7081, 7091, 7131A, 7191, 7421, 7761, 7841, 7911, AND 7951 AND METHODS MANUAL PROCEDURES 650.2

| Methods Manual Procedure 650.2 Section | Corresponding SW-846 Methods Section | Comments |
|---|---|---|
| Section 10.0 Quality Control<br>• Refers to Subsection 8.6 and 8.7 of SW-846 Method 7000A and requires that *all quality control requirements are* mandatory<br>• Requires formal quality control program<br>• Requires demonstration of acceptable performance prior to analyzing program samples<br>• Specifies equations for calculating *analytical precision, accuracy,* instrument detection limit, and percent recovery for quality control samples<br>• Method performance samples must be run initially and semiannually, acceptance criteria are Table 2 QAOs<br>• Laboratory blanks must be run once *per batch, acceptance criteria are* ≤3 x IDL<br>• Matrix spikes must be run once per batch, acceptance criteria are 80-120 %R<br>• Matrix spike duplicates must be run once per batch, acceptance criteria are ≤30 RPD and 80-120 %R<br>• Laboratory control samples must be run once per batch, acceptance criteria are 80-120 %R<br>• Blind audit samples are distributed, analyzed and reported as part of the DOE Performance Demonstration Program | Section 8.0 Quality Control<br>• Refers to SW-846 Method 7000A Section 8.0<br>• *SW-846 Method 7000A Section 8.0* recommends quality control data be maintained and available for easy reference or inspection<br>• SW-846 Chapter One includes equations for calculating precision, accuracy, and method detection limit<br>• *Method performance samples* not addressed, however SW-846 Chapter One requires demonstration of method performance prior to field sample analysis<br>• Method blanks required once per batch per SW-846 Chapter One, various *acceptance criteria recommended*<br>• Matrix spikes required once per batch in SW-846 Method 7000A Section 8.0, acceptance criteria not addressed<br>• Matrix spike duplicates required once per batch in SW-846 Method 7000A Section 8.0, acceptance criteria not addressed<br>• Laboratory control samples (reference standard) required once per batch in SW-846 Method 7000A Section 8.0, acceptance criteria not addressed<br>• Blind audit samples not addressed, however participation in an external performance evaluation program is | • Procedure 650.2 quality control requirements meet or exceed SW-846 Methods quality control requirements<br>• *Procedure 650.2 provides a better* defined quality control program than SW-846 Methods |

# TABLE C12-11 (CONTINUED)
# COMPARISON OF SW-846 METHODS 7000A, 7041, 7081, 7091, 7131A, 7191, 7421, 7761, 7841, 7911, AND 7951 AND METHODS MANUAL PROCEDURES 650.2

| Methods Manual Procedure 650.2 Section | Corresponding SW-846 Methods Section | Comments |
|---|---|---|
| Section 11.0 Procedure Performance<br>• Refers directly and only to SW-846 Methods listed in Table 1 | Section 9.0 Method Performance | |
| Section 12.0 References<br>• *Performance Demonstration Program Plan for the Analysis of Solidified Wastes for the Transuranic Waste Characterization Program* (DOE 1995a)<br>• *Transuranic Waste Characterization Quality Assurance Program Plan* (DOE 1995b)<br>• *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (EPA 1995) | Section 10.0 References<br>• See SW-846 Methods 7000A, 7041, 7081, 7091, 7131A, 7191, 7421, 7761, 7841, 7911, and 7951 | |

# TABLE C12-12
# COMPARISON OF SW-846 METHOD 7471A AND METHODS MANUAL PROCEDURE 650.3

| Methods Manual Procedure 650.3 Section | Corresponding SW-846 Method 7471A Section | Comments |
|---|---|---|
| Section 1.0 Scope and Application<br>• Program quality assurance objectives (QAOs) for mercury included as Table 1<br>• Refers directly to SW-846 Methods 7471A and 7000A<br>• Requires samples to be analyzed in batches not to exceed 20 samples | Section 1.0 Scope and Application<br>• Method 7471A is approved for measuring total mercury<br>• Batch not to exceed 20 samples as per SW-846 Chapter One | • Program QAOs are derived based on SW-846 Method 7471A (precision and accuracy) and regulatory requirements (PRDL and PRQL) |
| Section 2.0 Summary of Procedure<br>• Refers directly and only to SW-846 Method 7471A | Section 2.0 Summary of Method | |
| Section 3.0 Interferences<br>• Refers directly and only to SW-846 Method 7471A | Section 3.0 Interferences | |
| Section 4.0 Safety<br>• Responsibilities for safety and health and training | No equivalent section in SW-846 Method 7471A | |
| Section 5.0 Apparatus and Materials<br>• Refers directly and only to SW-846 Method 7471A | Section 4.0 Apparatus and Materials | |
| Section 6.0 Reagents<br>• *Refers directly and only to SW-846* Method 7471A | Section 5.0 Reagents | |

# TABLE C12-12 (CONTINUED)
# COMPARISON OF SW-846 METHOD 7471A AND METHODS MANUAL PROCEDURE 650.3

| Methods Manual Procedure 650.3 Section | Corresponding SW-846 Method 7471A Section | Comments |
|---|---|---|
| Section 7.0 Sample Collection, Preservation and Handling<br>• Requires sample collection according to Methods Manual Procedure 120.1<br>• Requires sample handling and chain-of-custody according to Section 6.0 of the QAPP | Section 6.0 Sample Collection, Preservation and Handling<br>• Refers to SW-846 Chapter Nine for sampling plan considerations<br>• Requires all sample containers prewashed with detergents, acids, and reagents<br>• Allows for both glass and plastic containers<br>• Requires nonaqueous samples to be refrigerated (when possible) and analyzed as soon as possible | • Procedure 120.1 is a program specific procedure developed specifically for the collection of samples from containers of TRU waste through coring and subsampling. Procedure 120.1 refers to SW-846 for guidance and requirements for sampling.<br>• Section 6.0 of the QAPP incorporates applicable sample handling and preservation requirements for samples included in SW-846 Chapter Nine |
| Section 8.0 Procedure<br>• Refers directly and only to SW-846 Method 7471A for sample and standard preparation and analysis<br>• Allows for use of fluorescence detection instead of absorption as long as all other method requirements are met<br>• All calibration requirements are summarized in Table 2 | Section 7.0 Procedure<br>• Subsections 7.1 through 7.4 address sample and standard preparation and analysis<br>• Calibration criteria are provided in SW-846 Method 7000A Subsections 8.2 and 8.3<br>• Serial dilution and post-digestion spike criteria are provided in SW-846 Method 7000A Subsection 8.6 | • Calibration requirements in Procedure 650.3 are the same as found in SW-846 Method 7000A.<br>• Procedure 650.3 requires 5 standards in the initial calibration; SW-846 Method 7000A requires a minimum of three standards. |
| Section 9.0 Calculations<br>• Allows for reading mercury concentration from calibration curve or directly from instrument readout<br>• Requires sample dilution taken into account<br>• Specifies results reported in mg/kg wet weight basis<br>• Provides for conversion to mg/kg dry weight | Subsections 7.5 and 7.6<br>• Subsections 7.5 and 7.6 address constructing a calibration curve and determining mercury concentration<br>• Subsection 7.6 requires sample dilution taken into account and concentrations appropriately qualified (e.g., dry weight) |  |

# TABLE C12-12 (CONTINUED)
# COMPARISON OF SW-846 METHOD 7471A AND METHODS MANUAL PROCEDURE 650.3

| Methods Manual Procedure 650.3 Section | Corresponding SW-846 Method 7471A Section | Comments |
|---|---|---|
| Section 10.0 Quality Control<br>• Refers to Subsections 8.5, 8.6, and 8.7 of SW-846 Method 7000A<br>• Requires formal quality control program<br>• Requires demonstration of acceptable performance prior to analyzing program samples<br>• Specifies equations for calculating analytical precision, accuracy, instrument detection limit, and percent recovery for quality control samples<br>• Method performance samples must be run initially and semiannually, acceptance criteria are Table 1 QAOs<br>• Laboratory blanks must be run once per batch, acceptance criterion is ≤3 x IDL<br>• Matrix spikes must be run once per batch, acceptance criterion is 80-120 %R<br>• Matrix spike duplicates must be run once per batch, acceptance criteria are ≤30 RPD and 80-120 %R<br>• Laboratory control samples must be run once per batch, acceptance criterion is 80-120 %R<br>• Blind audit samples are distributed, analyzed and reported as part of the DOE Performance Demonstration Program | Section 8.0 Quality Control<br>• Refers to SW-846 Method 7000 Section 8.0<br>• SW-846 Method 7000 Section 8.0 recommends quality control data be maintained and available for easy reference or inspection<br>• SW-846 Chapter One includes equations for calculating precision, accuracy, and method detection limit<br>• Method performance samples not addressed, however SW-846 Chapter One requires demonstration of method performance prior to field analysis<br>• Method blanks required once per batch per SW-846 Chapter One, various acceptance criteria recommended<br>• Matrix spikes required once per batch in SW-846 Method 7000 Subsection 8.4, acceptance criteria not addressed<br>• Matrix spike duplicates required once per batch in SW-846 Method 7000 Subsection 8.4, acceptance criteria not addressed<br>• Laboratory control samples required once per batch in SW-846 Method 7000 Subsection 8.4, acceptance criteria not addressed<br>• Blind audit samples not addressed, however participation on an external performance demonstration program is addressed in SW-846 Chapter One | • Procedure 650.3 quality control requirement meet or exceed SW-846 7471A quality control requirements<br>• Procedure 650.3 provides a better defined quality control program than SW-846 Method 7471A |

# TABLE C12-12 (CONTINUED)
# COMPARISON OF SW-846 METHOD 7471A AND METHODS MANUAL PROCEDURE 650.3

| Methods Manual Procedure 650.3 Section | Corresponding SW-846 Method 7471A Section | Comments |
|---|---|---|
| Section 11.0 Procedure Performance<br>• Refers directly and only to SW-846 Method 7471A | Section 9.0 Method Performance | |
| Section 12.0 References<br>• *Performance Demonstration Program Plan for the Analysis of Solidified Wastes for the Transuranic Waste Characterization Program* (DOE 1995a)<br>• *Transuranic Waste Characterization Quality Assurance Program Plan* (DOE 1995b)<br>• *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (EPA 1995) | Section 10.0 References<br>• See SW-846 Method 7471A | |

# TABLE C12-13
# COMPARISON OF SW-846 METHOD 7061A AND METHODS MANUAL PROCEDURE 650.4

| Methods Manual Procedure 650.4 Section | Corresponding SW-846 Method 7061A Section | Comments |
|---|---|---|
| Section 1.0 Scope and Application<br>• Program quality assurance objectives (QAOs) for arsenic included as Table 1<br>• Refers directly to SW-846 Methods 7061A and 7000A<br>• Requires samples to be analyzed in batches not to exceed 20 samples | Section 1.0 Scope and Application<br>• Method 7061A is approved for determining the concentration of arsenic in waste<br>• Batch not to exceed 20 samples as per SW-846 Chapter One | • Program QAOs are derived based on SW-846 Method 7061A (precision and accuracy) and regulatory requirements (PRDL and PRQL) |
| Section 2.0 Summary of Procedure<br>• Refers directly and only to SW-846 Method 7061A | Section 2.0 Summary of Method | |
| Section 3.0 Interferences<br>• Refers directly and only to SW-846 Method 7061A | Section 3.0 Interferences | |
| Section 4.0 Safety<br>• Responsibilities for safety and health and training | No equivalent section in SW-846 Method 7061A | |
| Section 5.0 Apparatus and Materials<br>• Refers directly and only to SW-846 Method 7061A | Section 4.0 Apparatus and Materials | |
| Section 6.0 Reagents<br>• Refers directly and only to SW-846 Method 7061A | Section 5.0 Reagents | |

# TABLE C12-13 (CONTINUED)
# COMPARISON OF SW-846 METHOD 7061A AND METHODS MANUAL PROCEDURE 650.4

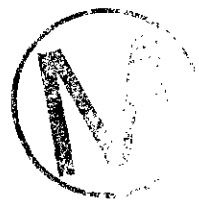
| Methods Manual Procedure 650.4 Section | Corresponding SW-846 Method 7061A Section | Comments |
|---|---|---|
| Section 7.0 Sample Collection, Preservation and Handling<br>• Requires sample collection according to Methods Manual Procedure 120.1<br>• Requires sample handling and chain-of-custody according to Section 6.0 of the QAPP | Section 6.0 Sample Collection, Preservation and Handling<br>• Refers to SW-846 Chapter Nine for sampling plan considerations<br>• Requires all sample containers prewashed with detergents, acids, and reagents<br>• Allows for both glass and plastic containers<br>• Requires nonaqueous samples to be refrigerated (when possible) and analyzed as soon as possible | • Procedure 120.1 is a program specific procedure developed specifically for the collection of samples from containers of TRU waste through coring and subsampling. Procedure 120.1 refers to SW-846 for guidance and requirements for sampling.<br>• Section 6.0 of the QAPP incorporates applicable sample handling and preservation requirements for samples included in SW-846, Chapter Nine |
| Section 8.0 Procedure<br>• Refers directly and only to SW-846 Method 7061A for procedural requirements<br>• All calibration requirements are summarized in Table 2 | Section 7.0 Procedure<br>• Provides sample and standard preparation and analytical procedures<br>• Calibration criteria are provided in SW-846 Method 7000A Subsections 8.2 and 8.3<br>• Serial dilution and post-digestion spike criteria are provided in SW-846 Method 7000A Subsection 8.6 | • Calibration requirements in Procedure 650.4 are the same as found in SW-846 Method 7000A.<br>• Procedure 650.4 requires 5 standards in the initial calibration; SW-846 Method 7000A requires a minimum of three standards. |
| Section 9.0 Calculations<br>• Allows for reading arsenic concentration from calibration curve or directly from instrument readout<br>• Requires sample dilution taken into account<br>• Specifies results reported in mg/kg wet weight basis<br>• Provides for conversion to mg/kg dry weight | • SW-846 Method 7061A does not address determining the concentration of arsenic<br>• SW-846 Method 7000A Subsection 7.4 addresses determining metal concentration |  |

# TABLE C12-13 (CONTINUED)
# COMPARISON OF SW-846 METHOD 7061A AND METHODS MANUAL PROCEDURE 650.4

| Methods Manual Procedure 650.4 Section | Corresponding SW-846 Method 7061A Section | Comments |
|---|---|---|
| Section 10.0 Quality Control<br>• Refers to SW-846 Method 7000A Subsections 8.5, 8.6, and 8.7<br>• Requires formal quality control program<br>• Requires demonstration of acceptable performance prior to analyzing program samples<br>• Specifies equations for calculating analytical precision, accuracy, instrument detection limit, and percent recovery for quality control samples<br>• Method performance samples must be run initially and semiannually, acceptance criteria are Table 1 QAOs<br>• Laboratory blanks must be run once per batch, acceptance criterion is ≤3 x IDL<br>• Matrix spikes must be run once per batch, acceptance criterion is 80-120 %R<br>• Matrix spike duplicates must be run once per batch, acceptance criteria are ≤30 RPD and 80-120 %R<br>• Laboratory control samples must be run once per batch, acceptance criterion is 80-120 %R<br>• Blind audit samples are distributed, analyzed and reported as part of the DOE Performance Demonstration Program | Section 8.0 Quality Control<br>• Refers to SW-846 Method 7000 Section 8.0<br>• SW-846 Method 7000 Section 8.0 recommends quality control data be maintained and available for easy reference or inspection<br>• SW-846 Chapter One includes equations for calculating precision, accuracy, and method detection limit<br>• Method performance samples not addressed, however, SW-846 Chapter One requires demonstration of method performance prior to field analysis<br>• Method blanks required once per batch per SW-846 Chapter One, various acceptance criteria recommended<br>• Matrix spikes required once per batch in SW-846 Method 7000 Subsection 8.4, acceptance criteria not addressed<br>• Matrix spike duplicates required once per batch in SW-846 Method 7000 Subsection 8.4, acceptance criteria not addressed<br>• Laboratory control samples required once per batch in SW-846 Method 7000 Subsection 8.4, acceptance criteria not addressed<br>• Blind audit samples not addressed, however participation on an external performance demonstration program is addressed in SW-846 Chapter One | • *Procedure 650.4 quality control* requirements meet or exceed SW-846 Method 7061A quality control requirements<br>• Procedure 650.4 provides a better defined quality control program than SW-846 Method 7061A |

## TABLE C12-13 (CONTINUED)
## COMPARISON OF SW-846 METHOD 7061A AND METHODS MANUAL PROCEDURE 650.4

| Methods Manual Procedure 650.4 Section | Corresponding SW-846 Method 7061A Section | Comments |
|---|---|---|
| Section 11.0 Procedure Performance<br>• Refers directly and only to SW-846 Method 7061A | Section 9.0 Method Performance | |
| Section 12.0 References<br>• *Performance Demonstration Program Plan for the Analysis of Solidified Wastes for the Transuranic Waste Characterization Program* (DOE 1995a)<br>• *Transuranic Waste Characterization Quality Assurance Program Plan* (DOE 1995b)<br>• *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (EPA 1995) | Section 10.0 References<br>• See SW-846 Method 7061A | |



# TABLE C12-14
# COMPARISON OF SW-846 METHOD 7062 AND METHODS MANUAL PROCEDURE 650.5

| Methods Manual Procedure 650.5 Section | Corresponding SW-846 Method 7062 Section | Comments |
|---|---|---|
| Section 1.0 Scope and Application<br>• Program quality assurance objectives (QAOs) for antimony and arsenic included as Table 1<br>• Refers directly to SW-846 Methods 7062 and 7000A<br>• Requires samples to be analyzed in batches not to exceed 20 samples | Section 1.0 Scope and Application<br>• Method 7062 is approved for determining 1 µg/L to 400 µg/L of antimony and arsenic in waste<br>• Batch not to exceed 20 samples as per SW-846 Chapter One | • Program QAOs are derived based on SW-846 Method 7062 (precision and accuracy) and regulatory requirements (PRDL and PRQL) |
| Section 2.0 Summary of Procedure<br>• Refers directly to SW-846 Method 7062<br>• *Requires sample preparation according* to Methods Manual Procedure 610.1 before evaporating the samples to near dryness at the end of the digestion | Section 2.0 Summary of Method<br>• Refers to SW-846 Method 3050 for digestion | • SW-846 Method 3051 is provided as an alternative to Method 3050<br>• Procedure 610.1 is based on SW-846 Method 3051 *(see Table C-12-7)* |
| Section 3.0 Interferences<br>• Refers directly and only to SW-846 Method 7062 | Section 3.0 Interferences | |
| Section 4.0 Safety<br>• Responsibilities for safety and health and training | No equivalent section in SW-846 Method 7062 | |
| Section 5.0 Apparatus and Materials<br>• Refers directly and only to SW-846 *Method 7062* | Section 4.0 Apparatus and Materials | |
| Section 6.0 Reagents<br>• Refers directly and only to SW-846 Method 7062 | Section 5.0 Reagents | |

# TABLE C12-14 (CONTINUED)
# COMPARISON OF SW-846 METHOD 7062 AND METHODS MANUAL PROCEDURE 650-5

| Methods Manual Procedure 650.5 Section | Corresponding SW-846 Method 7062 Section | Comments |
|---|---|---|
| Section 7.0 Sample Collection, Preservation and Handling<br>• Requires sample collection according to Methods Manual Procedure 120.1<br>• Requires sample handling and chain-of-custody according to Section 6.0 of the QAPP | Section 6.0 Sample Collection, Preservation and Handling<br>• Refers to SW-846 Chapter Nine for sampling plan considerations<br>• Requires all sample containers prewashed with detergents, acids, and reagents<br>• Allows for both glass and plastic containers<br>• Requires nonaqueous samples to be refrigerated (when possible) and analyzed as soon as possible | • Procedure 120.1 is a program specific procedure developed specifically for the collection of samples from containers of TRU waste through coring and subsampling. Procedure 120.1 refers to SW-846 for guidance and requirements for sampling.<br>• Section 6.0 of the QAPP incorporates applicable sample handling and preservation requirements for samples included in SW-846, Chapter Nine |
| Section 8.0 Procedure<br>• Refers directly and only to SW-846 Method 7062 for procedural requirements<br>• All calibration requirements are summarized in Table 2 | Section 7.0 Procedure<br>• Provides analytical procedures<br>• Calibration criteria are provided in SW-846 Method 7000A Subsections 8.2 and 8.3<br>• Serial dilution and post-digestion spike criteria are provided in SW-846 Method 7000A Subsection 8.6 | • Calibration requirements in Procedure 650.5 are the same as found in SW-846 Method 7000A.<br>• Procedure 650.5 requires 5 standards in the initial calibration; Method 7000A requires a minimum of three standards. |
| Section 9.0 Calculations<br>• Allows for reading antimony and arsenic concentration from calibration curve or directly from instrument readout<br>• Requires sample dilution taken into account<br>• Specifies results reported in mg/kg wet weight basis<br>• Provides for conversion to mg/kg dry weight | Subsections 7.6 and 7.7<br>• Addresses reading the concentration of antimony and arsenic from the calibration curve and using method of standard additions | |

# TABLE C12-14 (CONTINUED)
# COMPARISON OF SW-846 METHOD 7062 AND METHODS MANUAL PROCEDURE 650-5

| Methods Manual Procedure 650.5 Section | Corresponding SW-846 Method 7062 Section | Comments |
|---|---|---|
| Section 10.0 Quality Control<br>• Refers to SW-846 Method 7000A Subsections 8.5, 8.6, and 8.7<br>• Requires formal quality control program<br>• Requires demonstration of acceptable performance prior to analyzing program samples<br>• Specifies equations for calculating analytical precision, accuracy, instrument detection limit, and percent recovery for quality control samples<br>• Method performance samples must be run initially and semiannually, acceptance criteria are Table 1 QAOs<br>• Laboratory blanks must be run once per batch, acceptance criterion is ≤3 x IDL<br>• Matrix spikes must be run once per batch, acceptance criterion is 80-120 %R<br>• Matrix spike duplicates must be run once per batch, acceptance criteria are ≤30 RPD and 80-120 %R<br>• Laboratory control samples must be run once per batch, acceptance criterion is 80-120 %R<br>• Blind audit samples are distributed, analyzed and reported as part of the DOE Performance Demonstration Program | Section 8.0 Quality Control<br>• Refers to SW-846 Method 7000 Section 8.0<br>• SW-846 Method 7000 Section 8.0 recommends quality control data be maintained and available for easy reference or inspection<br>• SW-846 Chapter One includes equations for calculating precision, accuracy, and method detection limit<br>• Method performance samples not addressed, however SW-846 Chapter One requires demonstration of method performance prior to field analysis<br>• Method blanks required once per batch per SW-846 Chapter One, various acceptance criteria recommended<br>• Matrix spikes required once per batch in SW-846 Method 7000 Subsection 8.4, acceptance criteria not addressed<br>• Matrix spike duplicates required once per batch in SW-846 Method 7000 Subsection 8.4, acceptance criteria not addressed<br>• Laboratory control samples required once per batch in SW-846 Method 7000 Subsection 8.4, acceptance criteria not addressed<br>• Blind audit samples not addressed, however participation on an external performance demonstration program is addressed in SW-846 Chapter One | • Procedure 650.5 quality control requirements meet or exceed SW-846 Method 7062 quality control requirements<br>• Procedure 650.5 provides a better defined quality control program than SW-846 Method 7062<br>  |

# TABLE C12-14 (CONTINUED)
# COMPARISON OF SW-846 METHOD 7062 AND METHODS MANUAL PROCEDURE 650-5

| Methods Manual Procedure 650.5 Section | Corresponding SW-846 Method 7062 Section | Comments |
|---|---|---|
| Section 11.0 Procedure Performance<br>• Refers directly and only to SW-846 Method 7062 | Section 9.0 Method Performance | |
| Section 12.0 References<br>• *Performance Demonstration Program Plan for the Analysis of Solidified Wastes for the Transuranic Waste Characterization Program* (DOE 1995a)<br>• *Transuranic Waste Characterization Quality Assurance Program Plan* (DOE 1995b)<br>• *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (EPA 1995) | Section 10.0 References<br>• See SW-846 Method 7062 | |

# TABLE C12-15
# COMPARISON OF SW-846 METHOD 7741A AND METHODS MANUAL PROCEDURE 650.6

| Methods Manual Procedure 650.6 Section | Corresponding SW-846 Method 7741A Section | Comments |
|---|---|---|
| Section 1.0 Scope and Application<br>• Program quality assurance objectives (QAOs) for selenium included as Table 1<br>• Refers directly to SW-846 Methods 7741A and 7000A<br>• Requires samples to be analyzed in batches not to exceed 20 samples | Section 1.0 Scope and Application<br>• Method 7741A is approved for determining the concentration of selenium in waste<br>• Batch not to exceed 20 samples as per SW-846 Chapter One | • Program QAOs are derived based on SW-846 Method 7741A (precision and accuracy) and regulatory requirements (PRDL and PRQL) |
| Section 2.0 Summary of Procedure<br>• Refers directly and only to SW-846 Method 7741A | Section 2.0 Summary of Method | |
| Section 3.0 Interferences<br>• Refers directly and only to SW-846 Method 7741A | Section 3.0 Interferences | |
| Section 4.0 Safety<br>• Responsibilities for safety and health and training | No equivalent section in SW-846 Method 7741A | |
| Section 5.0 Apparatus and Materials<br>• Refers directly and only to SW-846 Method 7741A | Section 4.0 Apparatus and Materials | |
| Section 6.0 Reagents<br>• Refers directly and only to SW-846 Method 7741A | Section 5.0 Reagents | |

# TABLE C12-15 (CONTINUED)
# COMPARISON OF SW-846 METHOD 7741A AND METHODS MANUAL PROCEDURE 650.6

| Methods Manual Procedure 650.6 Section | Corresponding SW-846 Method 7741A Section | Comments |
|---|---|---|
| Section 7.0 Sample Collection, Preservation and Handling<br>• Requires sample collection according to Methods Manual Procedure 120.1<br>• *Requires sample handling and chain-of-*custody according to Section 6.0 of the QAPP | Section 6.0 Sample Collection, Preservation and Handling<br>• Refers to SW-846 Chapter Nine for sampling plan considerations<br>• *Requires all sample containers* prewashed with detergents, acids, and reagents<br>• Allows for both glass and plastic containers<br>• Requires nonaqueous samples to be refrigerated (when possible) and analyzed as soon as possible | • Procedure 120.1 is a program specific procedure developed specifically for the collection of samples from containers of TRU waste through *coring and subsampling. Procedure* 120.1 refers to SW-846 for guidance and requirements for sampling.<br>• Section 6.0 of the QAPP incorporates applicable sample handling and preservation requirements for samples included in SW-846, Chapter Nine |
| Section 8.0 Procedure<br>• Refers directly and only to SW-846 Method 7741A for procedural requirements<br>• All calibration requirements are summarized in Table 2 | Section 7.0 Procedure<br>• Provides sample and standard preparation and analytical procedures<br>• Calibration criteria are provided in SW-846 Method 7000A Subsections 8.2 and 8.3<br>• Serial dilution and post-digestion spike criteria are provided in SW-846 Method 7000A Subsection 8.6 | • Calibration requirements in Procedure 650.6 are the same as found in SW-846 Method 7000A.<br>• Procedure 650.6 requires 5 standards in the initial calibration; SW-846 Method 7000A requires a minimum of three standards. |
| Section 9.0 Calculations<br>• Allows for reading selenium concentration from calibration curve or directly from instrument readout<br>• Requires sample dilution taken into account<br>• Specifies results reported in mg/kg wet weight basis<br>• Provides for conversion to mg/kg dry weight | • SW-846 Method 7741A does not address determining the concentration of selenium<br>• SW-846 Method 7000A Subsection 7.4 addresses determining metal concentration |  |

# TABLE C12-15 (CONTINUED)
# COMPARISON OF SW-846 METHOD 7741A AND METHODS MANUAL PROCEDURE 650.6

| Methods Manual Procedure 650.6 Section | Corresponding SW-846 Method 7741A Section | Comments |
|---|---|---|
| Section 10.0 Quality Control<br>• Refers to SW-846 Method 7000A Subsections 8.5, 8.6, and 8.7<br>• Requires formal quality control program<br>• Requires demonstration of acceptable performance prior to analyzing program samples<br>• Specifies equations for calculating analytical precision, accuracy, instrument detection limit, and percent recovery for quality control samples<br>• Method performance samples must be run initially and semiannually, acceptance criteria are Table 1 QAOs<br>• Laboratory blanks must be run once per batch, acceptance criterion is ≤3 x IDL<br>• Matrix spikes must be run once per batch, acceptance criterion is 80-120 %R<br>• Matrix spike duplicates must be run once per batch, acceptance criteria are ≤30 RPD and 80- 120 %R<br>• Laboratory control samples must be run once per batch, acceptance criterion is 80-120 %R<br>• Blind audit samples are distributed, analyzed and reported as part of the DOE Performance Demonstration Program | Section 8.0 Quality Control<br>• Refers to SW-846 Method 7000 Section 8.0<br>• SW-846 Method 7000 Section 8.0 recommends quality control data be maintained and available for easy reference or inspection<br>• SW-846 Chapter One includes equations for calculating precision, accuracy, and method detection limit<br>• Method performance samples not addressed, however SW-846 Chapter One requires demonstration of method performance prior to field analysis<br>• Method blanks required once per batch per SW-846 Chapter One, various acceptance criteria recommended<br>• Matrix spikes required once per batch in SW-846 Method 7000 Subsection 8.4, acceptance criteria not addressed<br>• Matrix spike duplicates required once per batch in SW-846 Method 7000 Subsection 8.4, acceptance criteria not addressed<br>• Laboratory control samples required once per batch in SW-846 Method 7000 Subsection 8.4, acceptance criteria not addressed<br>• Blind audit samples not addressed, however participation on an external performance demonstration program is addressed in SW-846 Chapter One | • Procedure 650.6 quality control requirements meet or exceed SW-846 Method 7741A quality control requirements<br>• Procedure 650.6 provides a better defined quality control program than SW-846 Method 7741A |

# TABLE C12-15 (CONTINUED)
# COMPARISON OF SW-846 METHOD 7741A AND METHODS MANUAL PROCEDURE 650.6

| Methods Manual Procedure 650.6 Section | Corresponding SW-846 Method 7741A Section | Comments |
|---|---|---|
| Section 11.0 Procedure Performance<br>• Refers directly and only to SW-846 Method 7741A | Section 9.0 Method Performance | |
| Section 12.0 References<br>• *Performance Demonstration Program Plan for the Analysis of Solidified Wastes for the Transuranic Waste Characterization Program* (DOE 1995a)<br>• *Transuranic Waste Characterization Quality Assurance Program Plan* (DOE 1995b)<br>• *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (EPA 1995) | Section 10.0 References<br>• See SW-846 Method 7741A | |

# TABLE C12-16
# COMPARISON OF SW-846 METHOD 7742 AND METHODS MANUAL PROCEDURE 650.7

| Methods Manual Procedure 650.7 Section | Corresponding SW-846 Method 7742 Section | Comments |
|---|---|---|
| Section 1.0 Scope and Application<br>• Program quality assurance objectives (QAOs) for selenium included as Table 1<br>• Refers directly to SW-846 Methods 7742 and 7000A<br>• Requires samples to be analyzed in batches not to exceed 20 samples | Section 1.0 Scope and Application<br>• Method 7742 is approved for determining 3 µg/L to 750 µg/L of selenium in waste<br>• Batch not to exceed 20 samples as per SW-846 Chapter One | • Program QAOs are derived based on SW-846 Method 7742 (precision and accuracy) and regulatory requirements (PRDL and PRQL) |
| Section 2.0 Summary of Procedure<br>• Refers directly to SW-846 Method 7742<br>• Requires sample preparation according to Methods Manual Procedure 610.1 before evaporating the samples to near dryness at the end of the digestion | Section 2.0 Summary of Method<br>• Refers to SW-846 Method 3050 for digestion | • SW-846 Method 3051 is provided as an alternative to Method 3050<br>• Procedure 610.1 is based on SW-846 Method 3051 (see Table C-12-7) |
| Section 3.0 Interferences<br>• Refers directly and only to SW-846 Method 7742 | Section 3.0 Interferences | |
| Section 4.0 Safety<br>• Responsibilities for safety and health and training | No equivalent section in SW-846 Method 7742 | |
| Section 5.0 Apparatus and Materials<br>• Refers directly and only to SW-846 Method 7742 | Section 4.0 Apparatus and Materials | |
| Section 6.0 Reagents<br>• Refers directly and only to SW-846 Method 7742 | Section 5.0 Reagents | |

# TABLE C12-16 (CONTINUED)
# COMPARISON OF SW-846 METHOD 7742 AND METHODS MANUAL PROCEDURE 650.7

| Methods Manual Procedure 650.7 Section | Corresponding SW-846 Method 7742 Section | Comments |
|---|---|---|
| Section 7.0 Sample Collection, Preservation and Handling<br>• Requires sample collection according to Methods Manual Procedure 120.1<br>• Requires sample handling and chain-of-custody according to Section 6.0 of the QAPP | Section 6.0 Sample Collection, Preservation and Handling<br>• Refers to SW-846 Chapter Nine for sampling plan considerations<br>• Requires all sample containers prewashed with detergents, acids, and reagents<br>• Allows for both glass and plastic containers<br>• Requires nonaqueous samples to be refrigerated (when possible) and analyzed as soon as possible | • Procedure 120.1 is a program specific procedure developed specifically for the collection of samples from containers of TRU waste through coring and subsampling. Procedure 120.1 refers to SW-846 for guidance and requirements for sampling.<br>• Section 6.0 of the QAPP incorporates applicable sample handling and preservation requirements for samples included in SW-846, Chapter Nine |
| Section 8.0 Procedure<br>• Refers directly and only to SW-846 Method 7742 for procedural requirements<br>• All calibration requirements are summarized in Table 2 | Section 7.0 Procedure<br>• Provides analytical procedures<br>• Calibration criteria are provided in SW-846 Method 7000A Subsections 8.2 and 8.3<br>• Serial dilution and post-digestion spike criteria are provided in SW-846 Method 7000A Subsection 8.6 | • Calibration requirements in Procedure 650.7 are the same as found in SW-846 Method 7000A.<br>• Procedure 650.7 requires 5 standards in the initial calibration; Method 7000A requires a minimum of three standards. |
| Section 9.0 Calculations<br>• Allows for reading selenium concentration from calibration curve or directly from instrument readout<br>• Requires sample dilution taken into account<br>• Specifies results reported in mg/kg wet weight basis<br>• Provides for conversion to mg/kg dry weight | Subsections 7.6 and 7.7<br>• Addresses reading the concentration of selenium from the calibration curve and using method of standard additions | |

# TABLE C12-16 (CONTINUED)
# COMPARISON OF SW-846 METHOD 7742 AND METHODS MANUAL PROCEDURE 650.7

| Methods Manual Procedure 650.7 Section | Corresponding SW-846 Method 7742 Section | Comments |
|---|---|---|
| Section 10.0 Quality Control<br>• Refers to SW-846 Method 7000A Subsections 8.5, 8.6, and 8.7<br>• Requires formal quality control program<br>• Requires demonstration of acceptable performance prior to analyzing program samples<br>• Specifies equations for calculating analytical precision, accuracy, instrument detection limit, and percent recovery for quality control samples<br>• Method performance samples must be run initially and semiannually, acceptance criteria are Table 1 QAOs<br>• Laboratory blanks must be run once per batch, acceptance criterion is ≤3 x IDL<br>• Matrix spikes must be run once per batch, acceptance criterion is 80-120 %R<br>• Matrix spike duplicates must be run once per batch, acceptance criteria are ≤30 RPD and 80-120 %R<br>• Laboratory control samples must be run once per batch, acceptance criterion is 80-120 %R<br>• Blind audit samples are distributed, analyzed and reported as part of the DOE Performance Demonstration Program | Section 8.0 Quality Control<br>• Refers to SW-846 Method 7000 Section 8.0<br>• SW-846 Method 7000 Section 8.0 recommends quality control data be maintained and available for easy reference or inspection<br>• SW-846 Chapter One includes equations for calculating precision, accuracy, and method detection limit<br>• Method performance samples not addressed, however SW-846 Chapter One requires demonstration of method performance prior to field analysis<br>• Method blanks required once per batch per SW-846 Chapter One, various acceptance criteria recommended<br>• Matrix spikes required once per batch in SW-846 Method 7000 Subsection 8.4, acceptance criteria not addressed<br>• Matrix spike duplicates required once per batch in SW-846 Method 7000 Subsection 8.4, acceptance criteria not addressed<br>• Laboratory control samples required once per batch in SW-846 Method 7000 Subsection 8.4, acceptance criteria not addressed<br>• Blind audit samples not addressed, however participation on an external performance demonstration program is addressed in SW-846 Chapter One | • Procedure 650.7 quality control requirements meet or exceed SW-846 Method 7742 quality control requirements<br>• Procedure 650.7 provides a better defined quality control program than SW-846 Method 7742 |

# TABLE C12-16 (CONTINUED)
# COMPARISON OF SW-846 METHOD 7742 AND METHODS MANUAL PROCEDURE 650.7

| Methods Manual Procedure 650.7 Section | Corresponding SW-846 Method 7742 Section | Comments |
|---|---|---|
| Section 11.0 Procedure Performance<br>• Refers directly and only to SW-846 Method 7742 | Section 9.0 Method Performance | |
| Section 12.0 References<br>• *Performance Demonstration Program Plan for the Analysis of Solidified Wastes for the Transuranic Waste Characterization Program* (DOE 1995a)<br>• *Transuranic Waste Characterization Quality Assurance Program Plan* (DOE 1995b)<br>• *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846* (EPA 1995) | Section 10.0 References<br>• See SW-846 Method 7742 | |