ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1)
ECN-633338

16. Design Verification Required	17. Cost Impact				18. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION			
[] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[X] No	Savings	[] $	Savings	[] $	Delay	[]

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
N/A		

21. Approvals

Signature	Date	Signature	Date
Design Authority		Design Agent	
Cog. Eng. G. L. Miller	1/24/97	PE	
Cog. Mgr. A. D. Rice	4/15/97	QA	
QA T. L. Tung	1/15/97	Safety	
Safety		Design	
Environ.		Environ.	
Other		Other	
		DEPARTMENT OF ENERGY	
		Signature or a Control Number that tracks the Approval Signature	
		ADDITIONAL	

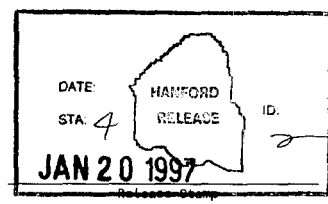
Final Characterization and Safety Screen Report of Double Shell Tank 241-AP-105 for Evaporator Campaign 97-1

George L. Miller
Rust Federal Services of Hanford, Inc., Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: ECN-633338 UC: 2070
Org Code: 7576B Charge Code: MD378
B&R Code: EW 3120074 Total Pages: 1068

Key Words: Final, Characterization, Safety Screen, Report, Double Shell, Tank 241-AP-105, 241-AP-105, AP-105, Evaporator, Campaign 97-1, 97-1

Abstract: N/A



Release Approval 1/20/97 Date

Approved for Public Release

RECORD OF REVISION

(1) Document Number: ~~HNF~~ WHC-SD-WM-DP-202

(2) Title

Final Characterization and Safety Screen Report of Double Shell Tank 241-AP-105 for Evaporator Campaign 97-1

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
		(5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) Initially released 11/06/96 on EDT-617498	G.L. Miller 1/2 9/97	A.D. Rice FOR 1/15/97
1 RS	Incorporate per ECN-633338	G.L. Miller 1/29/97	A.D. Rice FOR 1/9/97

HNF-SD-WM-DP-202, REV. 1

WHC-SD-WM-DP-202, REV. 1

ANALYTICAL SERVICES

FINAL CHARACTERIZATION AND SAFETY SCREEN REPORT OF DOUBLE SHELL TANK 241-AP-105 FOR EVAPORATOR CAMPAIGN 97-1

Project Coordinator: GEORGE L. MILLER

Prepared for the U.S. Department of Energy
Office of Environmental Restoration
and Waste Management

by

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Part I consists of pages 1 through 1002. Pages ii, 55, 78, 99, 107, 111, 268 and 607 were intentionally left blank.

Part II consists of pages 2-1 through 2-43. Pages 2-2, 2-12 and 2-19 were intentionally left blank.

TRADEMARKS:

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FINAL CHARACTERIZATION AND SAFETY SCREEN REPORT OF DOUBLE SHELL TANK 241-AP-105 FOR 242-A EVAPORATOR CAMPAIGN 97-1

CASE NARRATIVE

INTRODUCTION

SOURCE DOCUMENTATION

Evaporator candidate feed from tank 241-AP-105 (hereafter referred to as AP-105) was characterized for physical, inorganic, organic and radiochemical parameters by the 222-S Laboratory as directed by the Tank Sample and Analysis Plan (TSAP), References 1 through 4, and Engineering Change Notice, number 635332, Reference 5.

This data package satisfies the requirement for a format IV, final report as described in Reference 1. This data package is also a follow-up to the 45-Day safety screen results for tank AP-105, Reference 8, which was issued on November 5, 1996, and is attached as Section II to this report. Preliminary data in the form of summary analytical tables were provided to the project in advance of this final report to enable early estimation of evaporator operational parameters, using the Predict modeling program.

Analyses were performed at the 222-S Laboratory as defined and specified in the TSAP and the Laboratory's Quality Assurance Plan, References 6 and 7. Any deviations from the instructions documented in the TSAP are discussed in this narrative and are supported with additional documentation.

SAMPLING

The TSAP, section 2, provided sampling information for waste samples collected from tank AP-105. The "bottle-on-a-string" method was used to collect liquid grab samples from the tank. Each glass sample bottle was amber, precleaned, and contained approximately 100 milliliters. Each bottle was closed with a teflon seal cap (or teflon septum for volatile organic analysis samples).

Field blank samples were prepared by placing deionized water into sampling bottles, lowering the unclosed bottles into the riser for a period of time, retrieving them from the riser, and then closing the bottles with the same types of caps used for the tank samples.

None of the samples were preserved by acidification. Upon receipt, the sample bottles destined for organic analyses were placed in a refrigerator. No attempt was made during sampling to assure the complete filling of the bottles so as to exclude all headspace. These actions were consistent with safety procedures, which attempt to limit personnel exposure to hazardous ionizing radiation.

Chain-of-Custody forms were generated by the sample collector and delivered to 222-S Laboratory with the samples. Copies of these Chain-of-Custody forms are included in this data package beginning on page 78. Samples were transported to the 222-S laboratory receiving door in shielded pigs.

Sample collection and identification data are summarized in Table 1.

LABORATORY OPERATIONS

SAMPLE TRACKING

RECEIVING PROCEDURES/CHAIN-OF-CUSTODY

Tank AP-105 samples were received into the 222-S Laboratory by the laboratory's sample custodian, who signed the Chain-of-Custody form, becoming the new sample custodian. The Chain-of-Custody form, a legal document, tracks the transfer of samples between individuals or organizations to establish sample ownership.

The pigs containing the samples were transported to a hood where the sample bottles were removed, and visually inspected. A radioactive dose rate at one inch from the side of the samples was measured by a Health Physics Technician. The measured dose rate was multiplied by five as a correction factor to compensate for sample geometry. Samples were placed in shielded containers, relabeled to include the laboratory identification number, and transferred to metal storage cabinets (or refrigerators) for storage. Because the sample dose rate was not sufficiently high, it was determined that processing the samples through the hot cell was not required. Hot cell processing of samples is required when the sample dose rate measured at the laboratory exceeds 7 rem per hour or 25 rad per hour.

SAMPLE LOGGING/DATA HANDLING

At the 222-A Laboratory, a computerized Laboratory Information Management System (LIMS) called LABCORE was used by the project coordinator to log samples directly into a computer, assign analyses to be performed on each sample, and to assign quality control parameters. Chemists and Lab Leaders generated worklists, assigning samples to batches for analysis. As analytical data were generated, the results were entered into LABCORE either manually or through a direct data upload from the instrumentation. The LIMS was used to periodically track the complete/incomplete status of each sample.

The procedures for boildown and mixing/compatibility will be performed on a composite of samples from AP-105. As instructed in the TSAP, Reference 1, these data are to be reported independently, with data attached to an Internal Memo.

Table 1: Tank AP-104 Grab Sample Information

CUSTOMER SAMPLE NUMBER	DATE SAMPLED	SAMPLE SEAL NUMBER	LABORATORY ID NUMBER	ANALYSES TO BE PERFORMED ON WASTE	WASTE TYPE	SAMPLE LOCATION*	SAMPLE DEPTH** Centimeters	Date Sample Received
5-AP-1A	8/29/96	10524	S96V000039	Organic/VOA	Supernate	Riser 1, 330° N	587	8/30/96
5-AP-1B	8/29/96	10525	S96V000043	Organic/sVOA	Supernate	Riser 1, 330° N	587	8/30/96
5-AP-1C	8/29/96	10526	S96V000047, direct S96V000050, acid digestion	Inorg/Rad	Supernate	Riser 1, 330° N	587	8/30/96
5-AP-1D	8/29/96	10527	S96V000055	Mixing/Boildown	Supernate	Riser 1, 330° N	587	8/30/96
5-AP-2A	9/3/96	10528	S96V000040	Organic/VOA	Supernate	Riser 1, 90° N	221	9/4/96
5-AP-2B	9/3/96	10529	S96V000044	Organic/sVOA	Supernate	Riser 1, 90° N	221	9/4/96
5-AP-2C	9/3/96	10530	S96V000048 (direct) S96V000051 (acid digest)	Inorg/Rad	Supernate	Riser 1, 90° N	221	9/4/96
5-AP-2D	9/3/96	10531	S96V000056	Mixing/Boildown	Supernate	Riser 1, 90° N	221	9/4/96
5-AP-3A	9/3/96	10532	S96V000041	Organic/VOA	Supernate	Riser 1, 90° N	688	9/4/96
5-AP-3B	9/3/96	10534	S96V000045	Organic/sVOA	Supernate	Riser 1, 90° N	688	9/4/96
5-AP-3C	9/3/96	10533	S96V000049 (direct) S96V000052 (acid digest)	Inorg/Rad	Supernate	Riser 1, 90° N	688	9/4/96
5-AP-3D	9/3/96	10535	S96V000057	Mixing/Boildown	Supernate	Riser 1, 90° N	688	9/4/96
5-AP-4	9/3/96	10536	S96V000053 (direct) S96V000054 (acid digest)	TOC & Safety Screen	Surface	Riser 1, 90° N	approx. 1041	9/4/96
5-AP-1B1	9/3/96	10537	S96V000058 (direct)	Inorg/Rad	Field Blank	Riser 1, 90° N		9/4/96
5-AP-1B2	9/3/96	10538	S96V000059 (direct) S96V000060 (acid digest)	Inorg/Rad	Field Blank	Riser 1, 90° N		9/5/96
5-AP-0B1	9/3/96	10539	S96V000061	Organic/VOA	Field Blank	Riser 1, 90° N		9/5/96
5-AP-0B2	9/3/96	10540	S96V000062	Organic/sVOA	Field Blank	Riser 1, 90° N		9/4/96
5-AP-TB1	9/3/96	10541	S96V000042	Organic/VOA	Trip Blank	Trip Blank	n/a	9/4/96
5-AP-TB2	9/3/96	10542	S96V000046	Organic/sVOA	Trip Blank	Trip Blank	n/a	9/5/96

Sample Elevation is defined as the distance from the tank bottom to the mouth of the sample bottle.

SAMPLE IDENTIFICATION

Customer generated sample identification numbers for each sample were provided in the TSAP, Reference 1. New sample identification numbers were assigned by LABCORE to each sample when logged into the 222-S Laboratory. Table 1 relates the customer identification number and laboratory identification number to each sampling location. As can be seen in Table 1, multiple samples from each location were collected and given unique identification numbers to enable better sample handling and control within the laboratory, particularly with regard to organic analyses. Four bottles were provided from each of three subsurface locations to insure ample sample volume for analyses. An additional sample was collected from the waste surface for total organic carbon and safety screening analyses.

Two trip blanks were collected for organic analyses: one for VOA and one for Semi-VOA. Trip blank analyses were required by the TSAP only when those analytes required in the TSAP were observed in the field blanks.

QUALITY ASSURANCE OF THE ANALYTICAL SYSTEM AND DATA

CONTROLLED PROCEDURES

Each procedure used at 222-S for this project was a controlled procedure. All procedures were evaluated and approved for a maximum period of two years. Procedures may be revised, modified, or deleted as appropriate. Each time a procedure was revised or modified, however, a new revision/modification number was added to the procedure number. Upon review (at the end of the two year period), a procedure approval may be extended for another two year period without a change in the revision/modification number.

STATISTICAL EVALUATION

Performance data have been gathered historically on each analytical procedure for which a laboratory control standard was available. Summary statistics were calculated for the percent recovery from which estimates of the procedure precision and accuracy were obtained. These procedure control limits were/are statistically re-evaluated upon acquiring 100 additional data points, whichever occurs first. If necessary, new acceptance control limits were/are generated.

REVIEW OF DATA

Descriptive information was provided on the Worklist Data Entry sheets when unusual conditions occurred during analysis of a batch. These narrative comments were generally also noted in this case narrative unless the data were rejected and not reported.

Each analytical batch was reviewed for correctness of data at several levels. Chemists reviewed not only analytical calculations, but assured that the analytical system was performing appropriately and that the laboratory technicians were following written procedures. All analysis results, which had been entered into LABCORE, were reviewed by the cognizant chemist, verifying data accuracy and completeness. Once this process was completed, which was a step termed "validation" by LABCORE, then access to the data was

locked. Locked data may be unvalidated or corrected during subsequent reviews, where such modifications require an explanation plus the input of the initials of the person making the modifications as an audit trail.

All data were reviewed by the project coordinator to also verify that correct values had been entered to LABCORE from the hand written Worklist Data Entry sheets. Correctness of case narrative text and tables was reviewed by the project coordinator. Errors and unclear statements were subsequently corrected in the released data package.

The internal quality assurance group performed a general review of this data package, including at least a 10% review of the analytical data, where final analytical values were recalculated from the raw data to verify analytical accuracy and completeness. Case narrative text and tables were also examined for accuracy, clarity and completeness.

ANALYTICAL DATA REPORTING

LABCORE REPORTS

LABCORE has the capability of generating final reports from analytical data which were input to the system. The 45 Day Safety Screen Results report (Reference 8) was prepared using the system's "45-Day Report" format, in which all analytical results were presented per each individual sample. This format was acceptable for the Safety Screen Report, and the data were accurately presented.

The LABCORE system is currently unable to generate a complete report for all of the analytical parameters required by the TSAP. Consequently, all data were downloaded from LABCORE to spreadsheet format to enable the generation of summary data tables, where all data could be included. All data on the summary tables were checked against LABCORE hard copy data sheets to assure accuracy.

SAFETY SCREEN AND PRELIMINARY REPORTS

The TSAP, Reference 1, required delivery of a 45-day Safety Screen Report by October 20, 1996. This report (Reference 8) was released as a supporting document on November 6, 1996, which was 17 days after the required delivery date.

Preliminary summary analytical results were delivered by FAX to Treatment Systems Plant Engineering to enable early process control planning. The report format was the same as for this report. The data were considered to be preliminary because they had not been subjected to a final review. It was understood by the program that these data were neither final nor validated.

CASE NARRATIVE

This case narrative was prepared in accordance with TSAP, sections 3 and 6.

The intent of the case narrative within this data package is to:

- Present required analytical data,
- Evaluate the quality of these data,
- Document problems encountered while performing the analytical procedures,
- Characterize the nature of the constituents within tank AP-105, and
- Interpret, whenever possible, the relevance or impact of these findings on the evaporator program.

ANALYTICAL REQUIREMENTS AND PROCEDURES

SAMPLE PRESERVATION

The TSAP was silent regarding sample preservation requirements. No preservation of samples occurred prior to being received in the laboratory. Once the samples were "broken down" at the time of arrival at the 222-S Laboratory, all sample bottles, which were designated for organic analyses, were maintained at 4°C.

SAMPLE HOLDING TIME

The TSAP, section 3.2, states the following:

> "... the laboratory and sampling organization should strive to meet SW-846 (EPA 1986) holding times. However, adherence to SW-846 holding times is not strictly required if documented cases show that additional time was required to ship, process, and analyze the samples ..."

For inorganic and radiochemical analytes, the SW-846 maximum sample holding time limits that were applicable are found in volume IA, Table 2-21 (revision 1, July 1992). SW-846 sample holding times for organic analytes are specified in Volume IB, Chapter 4, Table 4-1. Table 2 presents these sample holding time limits.

Table 2. Maximum SW-846 Sample Holding Limits

Parameter	Maximum Holding Time	Preservation
Nitrate	48 hours	4°C
Sulfate	28 days	4°C
Aluminum	6 months	HNO_3 to pH <2
Sodium	6 months	HNO_3 to pH <2
pH	Analyze immediately	None
Total Organic Carbon	28 days	4°C
Volatile Organic Analysis	14 days	4°C, 0.008% $Na_2S_2O_3$
Semi-Volatile Organic Analysis	14 days for extraction, 40 days for analysis of extract	4°C, 0.008% $Na_2S_2O_3$
Total Alpha	6 months	HNO_3 to pH<2
Total Beta	6 months	HNO_3 to pH<2
Radium (radiological)	6 months	HNO_3 to pH<2

Agreement within the scientific community is divided with regard to reasonable sample holding times. SW-846 holding times are based on worst-case scenarios and in many cases are excessively short. Note that SW-846 protocol expects that samples are to be preserved at the time of collection for SW-846 holding times to be valid. However, tank AP-105 samples were intentionally not preserved so as to limit the exposure dosage of ionizing radiation to personnel.

Sample degradation can occur due to many factors. One of these factors, biological degradation, is typically controlled by the addition of a strong acid, creating a hostile biological environment due to extreme pH. Relative to biological degradation of tank AP-105 samples, it can be argued that sample preservation with the use of acid was unnecessary because of high level ionizing radiation lethal to micro-organisms, as well a pH in the high extreme (ranging from 13.3 to 13.5).

The actual sample holding time for each sample is discussed relative to each analyte in the Results of Analyses section in this narrative.

ANALYTICAL ALIQUOTS

Because multiple samples were collected from each sample point, the probability was low that the sample would be exhausted before all of the analyses could be analyzed and results accepted. Direction was given by the project coordinator in a pre-job briefing that analytical aliquots were to be optimized to achieve the lowest detection limits whenever the analyte concentration in the sample was expected to approach the detection limit.

PREPARATIVE METHODS

Table 2 of the TSAP specified which preparative method was to be used for each constituent. All sample preparations conformed to the TSAP specifications. Table 3 indicates the preparative procedures stated in the TSAP.

Table 3. TSAP Cited Preparation Procedures

Analytical Procedure	Preparative Procedure
Differential Scanning Calorimetry (DSC)	direct *
Thermal Gravimetric Analysis (TGA)	direct *
pH	direct *
Specific Gravity	direct *
Hydroxide	direct *
Ion Chromatography: F, NO_2, NO_3, SO_4, PO_4	direct *
Inductively Coupled Plasma/Optical Emission Spectrometry: Al, Na	acid digestion
Total Carbon (TC)	direct *
CO_3 (TIC)	direct *
Total Organic Carbon (TOC)	direct *
Ammonia	direct *
Volatile Organic Analysis (VOA): Acetone, 1-Butanol, 2-Butanone, 2-Hexanone, Methyl Isobutyl Ketone (4-Methyl-2-pentanone), 2-Pentanone, Tetrahydrofuran	direct *
Semi-Volatile Organic Analysis (Semi-VOA): 2-Butoxyethanol, n-Tributylphosphate	direct *
Uranium, gross (U-gross)	direct *
Total Alpha (AT)	acid digestion
Total Beta (TB)	acid digestion
^{238}Pu, $^{239/240}Pu$	acid digestion
^{237}Np	acid digestion
^{99}Tc	acid digestion
^{90}Sr	acid digestion
^{14}C	direct *
^{3}H	direct *
^{79}Se	acid digestion
^{129}I	direct *
Gamma Energy Analysis (GEA): ^{60}Co, ^{137}Cs, ^{106}Ru, ^{134}Cs, ^{144}Ce, ^{154}Eu, ^{155}Eu, ^{94}Nb, ^{226}Ra, ^{237}Np	acid digestion
$^{243/244}Cm$ (and ^{241}Am)	acid digestion

* The TSAP, Table 2 states, "Direct liquid samples may be diluted in acid or water to adjust to proper sample size and/or pH".

ANALYTICAL PROCEDURES

Table 4 summarizes the analytical procedures which were used for analyses of AP-105 samples. The procedures used were the same as those cited in TSAP, Table 2, except for plutonium analyses. At the time that the TSAP was being prepared, procedure LA-943-127 was a valid, active procedure, however that procedure was inactivated when it was replaced with procedure LA-943-128 on 11/28/95.

Table 4. AP-105 Procedure Listing

TSAP Cited Procedure		Actual Procedure Used		
Procedure #	Procedure Title	Procedure #	Rev #	Procedure Title
LA-519-151	Visual Check and Over-The-Top Reading	LA-519-151	F-0	Visual Check and Over-The-Top Reading
LA-514-113	Differential Scanning Calorimetry (DSC)	LA-514-113	C-1	Differential Scanning Calorimetry (DSC)
LA-560-112	Determination of Weight Loss as Percent Water by Thermogravimetric Analysis (TGA) - Mettler1 TG 50	LA-560-112	B-1	Determination of Weight Loss as Percent Water by Thermogravimetric Analysis (TGA) - Mettler1 TG 50
LA-212-106	pH Determination of Aqueous Wastes	LA-212-106	A-0	pH Determination of Aqueous Wastes
LA-510-112	Specific Gravity of High Beta Gamma Caustic Samples	LA-510-112	C-3	Specific Gravity of High Beta Gamma Caustic Samples
LA-211-102	Determination of Free OH^-/H^+ Using Metrohm 682 Titroprocessor	LA-211-102	C-0	Determination of Free OH^-/H^+ Using Metrohm 682 Titroprocessor (Hydroxide)
LA-631-001	Determination of Ammonia by Selective Ion Electrode Using a Double Increment Known Additions Method	LA-631-001	B-2	Determination of Ammonia by Selective Ion Electrode Using a Double Increment Known Additions Method
LA-342-100	Determination of Carbon by Hot Persulfate Oxidation and Coulometric Detection (Total Inorganic Carbon)	LA-342-100	E-0	Determination of Carbon by Hot Persulfate Oxidation and Coulometric Detection (Total Inorganic Carbon)
LA-344-105	Determination of Carbon in Solutions by Combustion and Coulometry (Total Carbon)	LA-344-105	D-1	Determination of Carbon in Solutions by Combustion and Coulometry (Total Carbon)
LA-344-105	Determination of Carbon in Solutions by Combustion and Coulometry (Total Organic Carbon)	LA-344-105	D-1	Determination of Carbon in Solutions by Combustion and Coulometry (Total Organic Carbon)
LA-533-105	Anion Analysis on Dionex Model 4000i and 4500i	LA-533-105	D-1	Anion Analysis on Dionex Model 4000i and 4500i
LA-505-161	Inductively Coupled Plasma (ICP) Emission Spectrometric Method for the Thermal Jarell Ash (TJA), Type 61E	LA-505-161	B-1	Inductively Coupled Plasma (ICP) Emission Spectrometric Method for the Thermal Jarell Ash (TJA), Type 61E
LA-505-151	Inductively Coupled Plasma (ICP) Emission Spectrometric Method for the Applied Research Laboratories Model 3580	Not Used		
LA-925-009	Determination of Uranium by Kinetic Phosphorescence	LA-925-009	A-1	Determination of Uranium by Kinetic Phosphorescence
LA-548-121	Preparation of Sample Mounts for GE(Li) GEA - Low Level	LA-548-121	E-0	Preparation of Sample Mounts for GE(Li) GEA - Low Level (preparation for LA-508-162)
	Not Cited	LA-508-162	B-0	Gamma Energy Analysis - The Genie System (subsequent to LA-548-121)
LA-508-101	Low Level Alpha and Beta in Water Samples (prep)	LA-508-101	E-1	Low Level Alpha and Beta in Water Samples (preparation for LA-508-114)
	Not Cited	LA-508-114	B-0	Operation of Gamma Products Alpha Beta Counting Systems Using PC Control (Subsequent to LA-508-101)

Table 4. AP-105 Procedure Listing

TSAP Cited Procedure		Actual Procedure Used		
Procedure #	Procedure Title	Procedure #	Rev #	Procedure Title
LA-953-103	Determination of Americium by Extraction with TRU·Spec Resin	LA-953-103	B-0	Determination of Americium by Extraction with TRU·Spec Resin (also Cm-243/244)
LA-943-128	Determination of Pu by Ion Exchange	LA-943-128	B-0	Determination of Plutonium by Extraction with TRU·Spec Resin (Pu-239/240 & Pu-238)
LA-218-114	Tritium by Lachat Micro-Dist. and Liquid Scintillation Counting (LS)	LA-218-114	B-0	Tritium by Lachat Micro-Dist. and Liquid Scintillation Counting (LS)
LA-348-104	C-14 in Small Volume Samples by Persulfate Oxidation and Liquid Scintillation	LA-348-104	C-0	C-14 in Small Volume Samples by Persulfate Oxidation and Liquid Scintillation
	Not Cited	LA-508-121	B-2	Operation of the Beckman Liquid Scintillation Counter (subsequent to LA-218-114 & LA-348-104)
LA-438-101	Determination of Tc-99 by Solvent Extraction and Liquid Scintillation Counting	LA-438-101	D-2	Determination of Tc-99 by Solvent Extraction and Liquid Scintillation Counting
LA-220-101	High Level Strontium-89,90 in Aqueous Samples	LA-220-101	D-1 & E-3	High Level Strontium-89,90 in Aqueous Samples
LA-365-132	Determination of Se-79	LA-365-132	C-1	Determination of Se-79
LA-933-141	Determination of Np-237 by TiOA/TTA Extraction and Alpha Counting	LA-933-141	H-1	Determination of Np-237 by TiOA/TTA Extraction and Alpha Counting
LA-378-103	Determination of Iodine-129 in Waste Tank Samples	LA-378-103	C-0	Determination of Iodine-129 in Waste Tank Samples
LA-523-405	Volatile Organics by Gas Chromatography/ Mass Spectrometry Using SW-846. (VOA)	LA-523-405	A-4	Volatile Organics by Gas Chromatography/ Mass Spectrometry Using SW-846. (VOA)
	Not Cited	LA-523-132	B-0	Semi-micro Continuous Liquid-Liquid Extraction of Semivolatiles based on SW-846 Methods
LA-523-406	Semivolatile Organics by Gas Chromatography/Mass Spectroscopy Based on SW-846, Method 8270A (Semi-VOA)	LA-523-406	A-0	Semivolatile Organics by Gas Chromatography/Mass Spectroscopy Based on SW-846, Method 8270A (Semi-VOA)
	Not Cited	LA-505-158	C-0	Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by FLAA and ICP Spectroscopy

DETECTION LIMITS

Detection limits were defined for each procedure without reference to a uniform laboratory protocol to determine such limits. Some of the procedures used the reagent blank value as the detection limit. Some procedures used the concentration of the lowest standard in the calibration curve as the detection limit, and others used the EPA replicate procedure. Generally, the sample matrix was not considered in generating the detection limit and therefore would be more indicative of an "instrument detection limit", rather than a "method detection limit". Wherever possible, the detection limit was modified by the typical dilution factor of the samples to provide a more representative value relative to the samples. All of the practices described above for estimation of the detection limit are allowed as estimated quantitation limits by SW-846 protocol.

SIGNIFICANT FIGURES

A review was made of each controlled procedure to assure compliance with any stated significant figure requirements. Generally three significant figures were reported because data were formatted into scientific notation. Specific gravity was the only procedure for which significant figures were specified for reporting. For this analysis, the reported value must have three digits to the right of the decimal in standard numerical notation (not scientific notation) format. Specific gravity results were reported with the specified number of significant digits.

CALIBRATION DATA

Raw calibration data can be found on instrumentation printouts, which were incorporated in the raw data portion of this data package for reference.

None of the 222-S analytical procedures that were required for this project specified a required correlation coefficient (r^2).

EVAPORATOR NOTIFICATION LIMITS

To evaluate compliance with safety requirements, limits were established, whereby if any analytical results exceeded these limits, the safety screen program was to be immediately notified. The analytical results are summarized in the sample Data Summary Tables section and evaluated in the Results of Analyses section. As stated in Reference 8, none of the notification limits were exceeded, consequently no notifications were made.

From an evaluation of the AP-105 data against the evaporator operational limits, it was determined that the only limits that were exceeded were for calculated total organic carbon and ^{226}Ra. Although all ^{226}Ra results were

less than the detection limit, the operational limit was exceeded only because that limit was less than the analytical detection limit.

Notification limits, as cited in the TSAP, Table 2, are shown in Table 5.

Table 5. Notification Limits for Tank AP-105	
Analytical Parameter	**Limit Which if Exceeded Requires Notification**
Differential Scanning Calorimetry (DSC)	Exotherms < 335°F, and Σ exotherms + Σ endotherms > 1
Visual Determination of Organic Layer	Presence of Organic Layer
Specific Gravity	> 1.41
Hydroxide	< 170 µg/ml, or > 170,000 µg/ml
Nitrite	< 506 or > 253,000 µg/ml
Nitrate	> 341,000 µg/ml
Phosphate	> 9,450 µg/ml
Sodium	> 184,000 µg/ml
Calculated Total Organic Carbon	Total Carbon - Total Inorganic Carbon > 87 µg/ml
Analytically Derived Total Organic Carbon (surface sample only)	> 2,600 µg/ml
Ammonia (NH_3)	> 5,000 µg NH_3/ml
Acetone	> 87,000 µg/L
1-Butanol	> 226,000 µg/L
2-Butoxyethanol	> 95,200 µg/L
2-Butanone	> 58,000 µg/L
n-Tributylphosphate	> 10,150,000 µg/L
U-gross	$^{239/240}Pu$ + (1.077E-10 x U-gross) > 0.005 g/L
Total Alpha	> (0.10 x Specific Gravity) as µCi/ml; > 41 µCi/ml (safety screen)
$^{239/240}Pu$	$^{239/240}Pu$ + (1.077E-10 x U-gross) > 0.005 g/L
^{14}C	> 0.26 µCi/ml
^{79}Se	> 0.078 µCi/ml
^{90}Sr	> 220 µCi/ml
^{60}Co	> 1.2 µCi/ml
^{137}Cs	> 800 µCi/ml
^{106}Ru	> 53 µCi/ml
^{134}Cs	> 15 µCi/ml
^{94}Nb	> 0.098 µCi/ml
^{154}Eu	> 5.0 µCi/ml
^{155}Eu	> 7.0 µCi/ml
^{226}Ra	> 0.033 µCi/ml
^{99}Tc	> 2 µCi/ml
^{129}I	> 0.0026 µCi/ml
^{238}Pu	> 0.0013 µCi/ml
^{241}Am	> 1 µCi/ml
^{244}Cm	> 0.013 µCi/ml

QUALITY CONTROL REQUIREMENTS

STANDARDS

Laboratory control standards (LCS) are required to be analyzed with each batch of analyses for SW-846 procedures. 222-S Laboratory analyzes such standards, whenever available, with each analytical batch. These standards were used as an independent confirmation of proper calibration of the analytical system. LCS standards were prepared from materials traceable to National Institute of Standards and Technology (NIST) standards and were not used for instrument calibration. The LCS standards which were analyzed were normally generated in house by a special group within 222-S Laboratory using controlled procedures. Analyte concentrations of these standards were known in advance to the analysts.

LCS control limits were typically defined as the statistical mean plus or minus three standard deviations of the existing values in the data base. For those procedures which didn't have a data base large enough to provide statistically significant data, an administratively set control limit was used.

If a standard failed to meet the control criteria, all data associated with that batch were invalidated. A new batch, including the appropriate standard and quality control analyses, was rerun. The standard associated with the new batch must pass the standard acceptance criteria before data from that batch are able to be reported.

No LCS standard was available for the following analytes: appearance, ^{106}Ru, ^{134}Cs, ^{144}Ce, ^{154}Eu, ^{155}Eu, ^{94}Nb, ^{79}Se, ^{226}Ra, ^{238}Pu and $^{243/244}Cm$.

BLANKS

A reagent blank was analyzed with each batch except for visual appearance, pH, specific gravity, TGA and DSC. A preparation blank was analyzed with each batch of acid digested samples.

Table 2 of the TSAP, required that field blanks be analyzed for all analytes except for DSC, TGA, pH, specific gravity, visual appearance, and total organic carbon (on the surface sample only).

The TSAP further required that the corresponding trip blank would be analyzed if any of the organic analytes, TC or TIC were observed in the field blanks.

The 242-A Evaporator Quality Assurance Project Plan (Reference 9), section 2.5, paragraph 13, defined blank contamination as follows.

"Contamination of blanks is indicated when any analyte exceeds 20% of the lowest sample concentration in that batch. This criterion is not valid when the sample concentration is less than 10 times the detection limit for an analyte."

Because the samples were not processed in a hot cell, a hot cell blank was neither required nor analyzed.

DUPLICATE ANALYSIS

Precision quality control criteria were specified in the TSAP for each analyte. Generally, precision was determined as the relative percent difference (RPD) between the percent recoveries of a spike and its corresponding spike duplicate. However, precision for analytes which were not able to be spiked (e.g. DSC, TGA, pH, Hydroxide, specific gravity, ^{79}Se, ^{60}Co, ^{137}Cs, ^{154}Eu, ^{106}Ru, ^{134}Cs, ^{144}Ce, ^{94}Nb, ^{155}Eu, ^{226}Ra, ^{238}Pu and $^{243/244}Cm$) was based on the RPD between the sample and its corresponding duplicate. Rerun requirements were not specified by the TSAP when its precision criteria were not met. No duplicate analytical data were provided for those analyses which were visually based, such as Appearance.

SPIKE/SPIKE DUPLICATE ANALYSIS

To evaluate accuracy of data, the TSAP, Table 2, specified that samples be spiked for the following analytes: NO_2, NO_3, F, PO_4, SO_4, Al, Na, Total Inorganic Carbon (TIC), Total Organic Carbon (TOC), NH_3, Acetone, 1-Butanol, 2-Butoxyethanol, 2-Butanone, 2-Hexanone, Methyl Isobutyl Ketone, 2-Pentanone, Tetrahydrofuran, Tributylphosphate, U-gross, total alpha, total beta, $^{239/240}Pu$, ^{241}Am, ^{3}H, ^{14}C, ^{99}Tc, ^{90}Sr, ^{129}I, and ^{237}Np.

A minimum of one spike and one spike duplicate was performed for each of the above procedures for the one sampling event. "Sampling event" was defined as all samples collected from one tank.

Accuracy criteria as determined by percent recovery were valid only when the analyte concentration in the spiked sample was increased by at least 25 percent more than the original sample concentration.

When precision criteria were based on the difference between the spike and spike duplicate, they were valid only when the analyte concentrations of the spike and spike duplicate were greater than ten times the detection limit. This allowed the precision evaluation to be made on analyte concentrations that were within the quantifiable range.

Because spiking standards were not available, neither spikes nor spike duplicates were performed for the following analytes: visual appearance, DSC, TGA, pH, specific gravity, hydroxide, ^{79}Se, ^{60}Co, ^{137}Cs, ^{106}Ru, ^{134}Cs, ^{144}Ce, ^{94}Nb, ^{154}Eu, ^{155}Eu, ^{226}Ra, and $^{243/244}Cm$.

Accuracy control limits were specified in the TSAP for DSC and TGA. Percent recovery of laboratory control standards was used to evaluate accuracy for these analytes.

RESULTS OF ANALYSES (DATA SUMMARY AND EVALUATION)

PHYSICAL ANALYSES

APPEARANCE/HOMOGENEITY

Observations were performed on the direct (unmodified) sample. No instruments were used, consequently there was no instrument calibration. No quality control criteria were specified in the TSAP.

Analyses were performed by procedure number LA-519-151/F-0 at approximately 24°C on 9/3/96 and 9/10/96. SW-846 does not define a holding time criteria for this parameter.

From the visual appearance, these liquid samples were essentially homogeneous. Each of the samples was clear with no observable solids. No organic phase was observed. Consequently the notification limit of "No Observable Organic Layer" was not exceeded. These samples did not require heating or dilution to maintain solubility. The samples were collected in amber glass bottles, making the observation of color not possible.

DIFFERENTIAL SCANNING CALORIMETRY (DSC)

Analyses were performed in duplicate on the direct sample using procedure/revision number LA-514-113/C-1.

No unusual instances or problems occurred during the analyses of DSC. SW-846 protocol do not specify a hold time for DSC. Sample holding times ranged from 13 to 25 days.

The TSAP requires an LCS percent recovery of 80 to 120 percent. DSC analyses of LCS standards yielded recoveries of 93.5 and 99.5 percent, meeting the TSAP accuracy quality control limits.

Endotherms were observed as expected in the standards, as well as in all samples. The sample endotherms were due mainly or wholly to the presence of water. No blank was run for DSC, because it was unnecessary. The DSC instrument is sufficiently stable that any occurrence of baseline aberration is observable on the sample thermogram. No baseline drift was seen.

No exotherms were observed in any of the samples or their duplicates, thus none of the samples exceeded the TSAP specified precision criterion of ±20 RPD for exotherms. Sample average endotherms ranged from 1203 to 1803 J/g, and

endotherm precision values were 27.5 RPD, 0.9 RPD , 14.2 RPD and 3.9 RPD for samples 1C, 2C 3C and 4, respectively.

Because no standard exists that can be spiked into the samples, the evaluation of spike accuracy was not possible.

No notification limit was exceeded. The TSAP notification limit for evaporator operations specified that the absolute value of the ratio of exotherm to endotherm could not exceed 1, nor could any exotherm exist which occurred at a temperature less than 335 °F (safety screen).

THERMOGRAVIMETRIC ANALYSIS (TGA)

All analyses were performed in a nitrogen atmosphere in duplicate on the direct sample, using procedure/revision number LA-560-112/B-1. No unusual instances or problems occurred during the analyses. SW-846 protocol do not specify a hold time for TGA. Sample holding times ranged from 13 to 25 days.

The TSAP requires an LCS percent recovery of 80 to 120 percent. TGA analyses of the LCS standard yielded recoveries for both batches of 100.1 percent, meeting TSAP accuracy quality control criteria.

Average weight percent of water in the samples ranged from 69.1 to 69.8. The grand mean TGA value of all samples was 69.4 weight percent.

The TSAP specified precision criterion of ±20 RPD was met with precision values ranging from 0.1 to 0.7 RPD. No blank was run for TGA.

Because no standard exists that can be spiked into the samples, the evaluation of spike accuracy was not possible.

SPECIFIC GRAVITY

Analyses were performed on the direct samples using procedure/revision number LA-510-112/C-3. No unusual instances or problems occurred during the analyses. SW-846 protocol does not specify a sample holding time for specific gravity. The sample holding times ranged from 61 to 66 days.

The TSAP did not specify an accuracy limit, however, the LCS standard for specific gravity yielded a reasonable recovery of 98.6 percent.

No blank was run for specific gravity. Precision of the sample duplicates was acceptable with values ranging from 0.5 RPD to 0.9 RPD. The TSAP precision criterion was ±20 RPD.

Because no standard exists that can be spiked into the samples, the evaluation of spike accuracy was not possible.

Average specific gravity of samples 1C, 2C, 3C and 4 was 1.226, 1.232, 1.231 and 1.242, respectively, with a mean of 1.233. The TSAP specified notification limit of >1.41 was not exceeded.

INORGANIC ANALYSES

HYDROGEN ION ACTIVITY, pH (by pH Meter/Electrode)

Analyses were performed on the direct samples using procedure/revision number LA-212-106/A-0. No unusual instances or problems occurred during the analyses. SW-846 protocol specify the hold time for pH as "analyze immediately", which could be met only as a field measurement. Sample holding times ranged from 73 to 78 days.

The TSAP did not specify an accuracy limit, but the LCS standard for pH yielded a recovery of 100.1 percent.

No blank was run for pH. The duplicate analyses resulted in acceptable precision values ranging from 0.01 to 0.04 pH units. The TSAP precision criterion was ± 0.3 pH units.

Because no standard exists that can be spiked into the samples, the evaluation of spike accuracy was not possible.

The pH of samples 1C, 2C and 3C was 13.31, 13.49 and 13.45, respectively. The TSAP notification limit of <8.0 was not exceeded.

HYDROXIDE (by Titration)

Hydroxide was performed by procedure/revision number LA-211-102/C-0 on direct samples. There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Sample holding times ranged from 59 to 64 days. SW-846 did not specify a sample holding time for hydroxide, consequently sample holding time requirements were met.

The autotitrator pH was calibrated using standards of pH 7.00 and 10.00. During sample analyses, all titration endpoints were within the calibration range of pH 7 to 10 (except for the blanks as expected, where the pH shift was extreme with a minute addition of HNO_3 titrant).

Typical titration curves were seen in the analyses of tank AP-105 samples despite the presence of sample ammonia in the samples. In earlier work (tank AP-101), it was found that a cause of major interference with the analysis of hydroxide was the presence of high ammonia concentration.

No spikes were required by the TSAP, and no spikes were analyzed. The TSAP did not specify accuracy control limits.

Precision between the samples and sample duplicates ranging from 0.3 to 1.6 RPD was acceptable (less than the TSAP specified maximum control limit of ±20 RPD).

Although reagent blanks were analyzed, the procedure uses them to correct sample values, consequently it is not possible to determine an independent analytical value for a reagent blank because it is subtracted from itself to yield a result of zero. The field blank hydroxide concentration was less than the detection limit, and was determined to not be contaminated.

Sample hydroxide concentrations ranged from 31,800 to 36,100 µg/ml. The mean hydroxide concentration of the three samples was 33,500 µg/ml.

AMMONIA (by Ion Selective Electrode)

Ammonia analyses were performed using procedure/revision number LA-631-001/B-2 on direct samples. There did not appear to be any analytical anomalies or difficulties during the analyses.

SW-846 does not specify a sample holding time for ammonia, but should be as short as possible to prevent losses due to a high pH sample matrix. Sample holding times ranged from 71 to 76 days. For ammonia, the accepted method of preservation is to acidify samples at the time of collection to pH <2 with nitric acid. Time was intentionally not spent to preserve these samples, so as to limit the exposure of sample collectors to excessive radiation dosage. Although biodegradation was not expected to be a significant factor for ammonia decomposition in these samples due to the high level of radioactivity, which is lethal to microorganisms, it was expected and quite likely that, due to the high pH of these samples, sample degradation could occur due to chemical reactions. At higher pH, ionic ammonia reacts with hydroxide to generate NH_3, which is volatile and is readily dissipated at ambient temperature. The hydroxide concentration of these samples was sufficient to cause such losses. Thus due to sample matrix conditions, it is possible that these ammonia data could be biased low.

LCS recovery was acceptable at 91.6 percent.

Spike accuracies were acceptable with percent recoveries ranging from 105 to 123, as evaluated against the TSAP specified accuracy criteria of 75 to 125 percent recovery.

Precision was determined to be acceptable with 5 RPD between the spike and its duplicate. The TSAP specified limit for precision was ±20 RPD.

Ammonia concentration was less than the detection limit for the field blank and for the reagent blank, indicating the absence of blank contamination.

Sample concentrations were low, ranging from 20 to 64.8 μg NH_3/ml, with a mean concentration of 49.3 μg NH_3/ml.

ION CHROMATOGRAPHY

All ion chromatography (IC) analyses were performed on the direct samples, using procedure/revision number LA-533-105/D-1. As was discussed above, tank AP-105 samples were not preserved. Due, however, to the characteristic high pH and radioactivity of the waste, the samples were not likely to be subject to biodegradation, which is generally the greatest source of nitrate deterioration.

The procedure detection limit, as shown in the summary tables for all of the IC analytes, was set at the concentration equivalent to the lowest standard within the calibration curve multiplied by the dilution factor. The *sample* detection limit was generated by multiplying the above detection limit by an additional factor based on the sample aliquot that was injected into the IC (that is to say, 11 or 101).

FLUORIDE

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte. Sample holding times ranged from 59 to 64 days. SW-846 does not specify a holding time for fluoride.

LCS recovery was acceptable with a value of 92.9 percent.

The accuracy control limits were 75 to 125 percent recovery. Fluoride accuracy was acceptable with a spike recovery of 112.2 percent.

Precision between the spike and spike duplicate was acceptable with a value of 12.4 RPD, meeting the TSAP acceptance limits of ±20%.

The reagent blanks and field blank fluoride concentrations were less than the detection limits of 0.012 and 0.072 μg/ml, respectively, indicating the absence of contamination.

Sample fluoride concentrations ranged from 254 to 348 μg/ml with a mean concentration of 308 μg/ml.

NITRATE

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte. Sample holding times ranged from 59 to 64 days. SW-846 specifies a holding time for nitrate of 48 hours, consequently none of the sample holding times were met. It should be noted that for handling high

radiation dosage samples, the required operational procedures make attaining analytical results on protocol analyses within 48 hours quite unlikely.

LCS recovery was acceptable with a value of 101.0 percent.

Spike accuracy was acceptable with a recovery of 100.5 percent recovery. The TSAP specified accuracy acceptance limits were 75 to 125 percent recovery.

Precision between the spike and spike duplicate met the program's precision criterion of ±20%, by yielding a value of 2.0 relative percent difference.

The reagent blank nitrate concentrations were less than the detection limit of 0.139 μg/ml, and were determined to not be contaminated. The field blank was very slightly greater than the detection limit with a concentration of 0.863 μg/ml. It was determined to not be contaminated.

Sample nitrate concentrations ranged from 95,000 to 102,000 μg/ml, with a mean of 99,300 μg/ml.

NITRITE

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Sample holding times ranged from 59 to 64 days. SW-846 does not specify a sample holding time for nitrite. It is known, nonetheless, that in the environment, nitrite is chemically less stable than nitrate, suggesting that at least for environmental samples, a sample holding time of short duration is reasonable. Tank AP-105 matrix is significantly different from that encountered environmentally, and may, however, have such conditions that nitrite could be chemically stable. Nitrite concentrations are expected to change through oxidation-reduction reactions as a corrosion inhibitor.

LCS recovery was acceptable with a value of 93.0 percent.

Accuracy, as indicated by recovery of the spike, was acceptable with a recovery of 99.8 percent. The accuracy control limits were 75 to 125 percent recovery.

Precision between the spike and spike duplicate met the acceptance criterion of ±20%, where the value was 9.7 RPD.

The reagent blanks and field blank nitrite concentrations were less than the detection limits of 0.108 and 0.648 μg/ml, respectively. These blanks were determined to not be contaminated.

Sample nitrite concentrations ranged from 45,700 to 48,100 μg/ml, with a mean of 46,900 μg/ml.

PHOSPHATE (ORTHO-PHOSPHATE)

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Sample holding times ranged from 59 to 64 days. SW-846 does not specify a holding time for phosphate.

LCS recovery was acceptable with a value of 99.4 percent.

Accuracy was acceptable as indicated by recovery of the spike with a value of 93.6 percent. The accuracy control limits were 75 to 125 percent recovery.

Precision between the spike and spike duplicate was acceptable with a value of 6.0 RPD. The TSAP specified precision acceptance limits were ±20 RPD.

The reagent blanks and field blank phosphate concentrations were less than the detection limits of 0.12 and 0.72 μg/ml, respectively, and were determined to not be contaminated.

Sample phosphate concentrations ranged from 1,150 to 1,540 μg/ml with a mean of 1,360 μg/ml.

SULFATE

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Sample holding times ranged from 59 to 64 days. The SW-846 holding time limit of 28 days was exceeded for the all samples.

LCS recovery was acceptable with a value of 103.0 percent.

Accuracy was acceptable as indicated by a percent recovery of 99.8 for the spike. The TSAP accuracy control limits were 75 to 125 percent recovery.

Precision between the spike and spike duplicate was acceptable with a value of 1.3 RPD. The TSAP specified precision acceptance limits were ±20 RPD.

The reagent blank sulfate concentration was less than the detection limit of 0.138 μg/ml. Although the field blank concentration was significantly greater than the detection limit, it was much less than 20% of the lowest sample concentration. Therefore, all blanks were determined to not be contaminated.

Sample sulfate concentrations ranged from 1,930 to 2,060 μg/ml with a mean of 2,180 μg/ml.

TOTAL CARBON, TC (by Combustion and Coulometry)

Total carbon (TC) analyses were performed on direct samples using procedure/revision number LA-344-105/D-1. Total carbon analysis is a subset of the procedure for total organic carbon. A maximum sample holding time for total carbon was not specified in SW-846 protocol, but is set at 28 days for total organic carbon. The actual sample holding times for TC ranged from 43 to 48 days.

The LCS recovery was acceptable with a value of 94.7 percent.

Accuracy for the spike was acceptable with a percent recovery of 107.7. The TSAP specified range of acceptance was 75 to 125 percent recovery.

Precision between the spike and spike duplicate was acceptable with a value of 0.7 RPD. The TSAP specified range of acceptance was ±20 RPD.

The field blank total carbon concentration was almost ten times the detection limit of 5.5 μg C/ml, however, it was much less than 20% of the lowest sample concentration. Therefore it was determined to not be contaminated. The reagent blank concentration was detectable at the detection limit. The detection limit shown on the data summary sheet was based on a standard volume of 0.20 milliliters (an optimal value). Generally the least amount of carbon detectable was 1 μg. Thus, one microgram of carbon divided by 0.20 ml equaled 5.00 μg C/ml.

Total carbon concentrations of the samples ranged from 4,650 μg C/ml to 4,810 μg C/ml. The mean concentration of the three samples was 4,710 μg/ml.

TOTAL INORGANIC CARBON, (CARBONATE) (by Coulometry)

Total inorganic carbon (TIC) analyses were performed on direct samples with procedure/revision number LA-342-100/E-0. There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

A maximum sample holding time for this analyte was not specified in SW-846 protocol, but the actual holding times ranged from 64 to 69 days.

The LCS recovery was acceptable with a value of 98.7 percent.

Accuracy for the spikes were acceptable with recoveries ranging from 100.6 to 105.3 percent. The TSAP specified range of acceptance was 75 to 125 percent recovery.

Precision between the spike and spike duplicate was acceptable with an RPD of 2.5. The TSAP specified range of acceptance was ±20 RPD.

The field blank carbon concentration was slightly greater than the detection limit of 5 μg C/ml. The reagent blanks had a TIC concentration of 1.90 μg

C/ml, which was much less than 20% of the lowest sample concentration. Consequently all blanks were determined to not be contaminated.

In calculating the sample concentrations, an instrument blank value was subtracted from the sample value. Values shown on the data summary sheet for each reagent blank were uncorrected because, if the result blank value was subtracted from the instrument blank, it could yield a corrected blank value less than zero.

Carbonate (TIC) concentrations of the samples ranged from 2,510 μg C/ml to 2,740 μg C/ml. The mean concentration of the three samples was 2,680 μg C/ml.

TOTAL ORGANIC CARBON, TOC (by Combustion and Coulometry)

Total organic carbon (TOC) analyses were performed on direct samples using procedure/revision number LA-344-105/D-1.

A maximum sample holding time of 28 days was specified in SW-846 protocol for total organic carbon. The sample holding time was not met with holding times ranging from 42 to 47 days.

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte

LCS recovery was acceptable with a value of 94.0 percent.

Accuracy for the spike was acceptable with a percent recovery of 90.2. The TSAP specified range of acceptance was 75 to 125 percent recovery.

Precision between the spike and spike duplicate was acceptable with an RPD of 0.8. The TSAP specified range of acceptance was ±20 RPD.

The reagent blank's total organic carbon concentration was 0.70 μg C/ml. Using the definition of contamination provided in Reference 9, as discussed in the "*Blanks*" section above, it was determined that the blank was not contaminated because the TOC concentration of the blank was less than 20% of the lowest sample concentration (1,440 μg C/ml). The field blank was only slightly greater than the detection limit. Therefore, both blanks were determined to not be contaminated.

TOC concentrations of the samples, including the tank surface sample, ranged from 1,440 μg C/ml to 1,530 μg C/ml. The mean concentration of the four samples was 1,490 μg C/ml.

CALCULATED TOTAL ORGANIC CARBON

The analysis of total organic carbon by direct oxidation is subject to potential underestimation of the total concentration of organic carbon due to

losses of purgable (volatile) organics (if present at a significant concentration) during the acidified sparging phase of sample preparation. The total organic carbon concentration of samples can also be obtained as the difference in concentrations between two individual analyses: total carbon and total inorganic carbon (carbonate). This calculation method is useful as a comparative check against TOC by direct oxidation, as shown in Table 6.

Table 6. Comparison of Calculated TOC with Analytically Derived TOC

Sample ID Number	Sample Description	Total Carbon μg C/ml	Total Inorganic Carbon μg C/ml	Calculated TOC (TC-TIC) μg C/ml	TOC by Direct Oxidation μg C/ml
S96V000058	5AP-96-IB field blank	50.6	7.0	46.6	7.7
S96V000047	5AP-96-1C	4670	2740	1930	1500
S96V000048	5AP-96-2C	4650	2780	1870	1480
S96V000049	5AP-96-3C	4810	2510	2300	1530

The notification limit for calculated TOC was >87 μg C/ml. The limit was exceeded by all tank samples. From Table 6, it appears that although the differences between calculated TOC and TOC analysis results were rather large, it is possible that they are within expected experimental error. It was inferred from these data that the amount of purgable (volatile) organic material lost during TOC analyses ranged from about 400 to 800 μg C/ml per sample.

INDUCTIVELY COUPLED PLASMA/EMISSION SPECTROSCOPY (by ICP)

An acid predigestion was performed on ICP samples prior to analysis. Analyses were performed by procedure/revision numbers LA-505-161/B-1. There did not appear to be any analytical difficulties during analysis of these analytes. The only anomaly that occurred for the ICP analysis was that a spike duplicate was not prepared nor analyzed. Although this is contrary to the direction of the TSAP, it did not cause the data for aluminum and sodium to be rejected. This occurred because both of these metals exceeded the concentration limit for which spiking was feasible. As an alternative, a serial dilution was provided for these analytes to give some measure of the test's accuracy.

All metals other than aluminum and sodium were reported voluntarily, and would have been required only if secondary safety screening analyses were required. Because these results were not required by the TSAP, there was no requirement to hold these data to TSAP's spike duplicate criterion. Duplicate sample

analyses were provided as a measure of precision for each sample, however there was no requirement to do so in the TSAP.

Sample holding times for ICP analyses ranged from 62 to 67 days. SW-846 protocol require that the holding time for these metals may not exceed six months. All ICP analyses were completed within the required holding time.

An undigested blank and standard was used to initially calibrate the ICP instrument and to check calibration on a continuing basis. A digested reagent blank included with each batch, however, was used to determine the extent of blank contamination introduced during sample preparation (and by inference, the estimated amount of sample contamination due to digestion).

ICP accuracy evaluation criteria for LCS standards were based on the undigested initial calibration verification (ICV) standards.

Interelement data corrections were automatically performed for spectral interferences from calcium on iron, manganese, and silicon; from chromium on iron, silicon and uranium; from iron on chromium, and manganese; from potassium on silicon; from sodium on silicon and nickel; from antimony on nickel; and from uranium on aluminum, chromium, iron, manganese, nickel, and silicon.

The linear concentration range was determined for ICP analytes. The maximum concentration within the linear range (defined as the highest concentration in which the percent recovery of a standard deviates less than five percent from 100 percent with a 5 second signal integration time) was 1,000 µg/ml for aluminum and 1000 µg/ml for sodium.

Although the elements, chromium, iron, Manganese, nickel, silicon and uranium, were not required to be analyzed (because they were not primary safety screening analytes), they were analyzed with aluminum and sodium to maximize analytical efficiency in the case that data for the secondary analytes would be required.

ALUMINUM

Percent recovery of the undigested LCS standard was acceptable with a value of 89.8 percent recovery.

Spike accuracy was not acceptable with value of 66.6 percent recovery, however this measure was invalid because the sample concentration exceeded 1000 µg/ml. The TSAP specified acceptance limits for a spike were 75 to 125 percent recovery. A serial dilution was provided as an alternative to the spike. The serial dilution was acceptable (<5% difference) with a 2.3 percent difference.

Precision between the samples and their duplicates was good with values ranging from 0.6 to 6.1 relative percent difference. The TSAP specified limit

for spike duplicate precision was ±20 RPD, but was not specified between the samples and their duplicates.

The aluminum concentration of the preparation blank was less than the detection limit, and was only slightly greater than the detection limit for the field blank, indicating the absence of contamination.

Average aluminum concentrations of the samples ranged from 17,200 to 17,500 µg/ml, with a mean of 17,400 µg/ml.

CHROMIUM

Percent recovery of the undigested LCS standard was acceptable with a value of 88.6 percent recovery.

Spike accuracy was acceptable with a value of 89.6 percent recovery. The TSAP was not explicit in specifying acceptance limits, however it was assumed that they were consistent with those for aluminum and sodium, which were 75 to 125 percent recovery.

Precision between the samples and their duplicates was good with values ranging from 0.0 to 5.2 relative percent difference. The TSAP did not specify precision acceptance limits between samples and their duplicates. It was also not explicit in specifying acceptance limits for spike duplicate precision, however it was assumed that they were consistent with those for aluminum and sodium, which were ±20 RPD.

The chromium concentrations of the field and preparation blanks were less than the detection limit, indicating the absence of contamination.

Average chromium concentrations of the samples ranged from 210 to 214 µg/ml, with a mean of 213 µg/ml.

IRON

Percent recovery of the undigested LCS standard was acceptable with a value of 91.0 percent recovery.

Spike accuracy was acceptable with a value of 91.8 percent recovery. The TSAP was not explicit in specifying acceptance limits, however it was assumed that they were consistent with those for aluminum and sodium, which were 75 to 125 percent recovery.

Precision between the samples and their duplicates was not able to be determined because all values were less than the detection limit. The TSAP was not explicit in specifying acceptance limits for spike duplicate precision, however it was assumed that they were consistent with those for aluminum and sodium, which were ±20 RPD.

The iron concentrations of the field and preparation blanks were also less than the detection limit, indicating the absence of contamination.

Because all sample concentrations were less than the detection limit, the average iron concentrations of the samples were not able to be calculated. All sample iron concentrations were less than 12.5 µg/ml.

MANGANESE

Percent recovery of the undigested LCS standard was acceptable with a value of 86.4 percent recovery.

Spike accuracy was acceptable with a value of 87.0 percent recovery. The TSAP was not explicit in specifying acceptance limits, however it was assumed that they were consistent with those for aluminum and sodium, which were 75 to 125 percent recovery.

Precision between the samples and their duplicates was not able to be determined because all values were less than the detection limit. The TSAP was not explicit in specifying acceptance limits for spike duplicate precision, however it was assumed that they were consistent with those for aluminum and sodium, which were ±20 RPD.

The manganese concentrations of the field and preparation blanks were also less than the detection limit, indicating the absence of contamination.

Because all sample concentrations were less than the detection limit, the average manganese concentrations of the samples were not able to be calculated. All sample manganese concentrations were less than 2.5 µg/ml.

SODIUM

Recovery of the undigested LCS standard was acceptable with a value of 104.6 percent recovery.

When sample sodium concentrations exceed 1000 µg/ml, the normal control limits for accuracy determination are not applicable. This occurs because the instrument's detector is overwhelmed with the intensity of the signal at extremely high analyte concentrations, causing detector insensitivity to even large concentration differences. The sodium concentration of each sample was determined to exceed 1000 µg/ml, consequently an alternative evaluation of accuracy was applied using serial dilution. Following serial dilution a dilution RPD value was determined. The formula for this calculation follows:

$$\text{Dilution RPD} = \frac{[\text{initial conc.}]-([\text{serial dil'n conc.}] \times \text{dilution factor})}{[\text{initial concentration}]} \times 100$$

Using a dilution rather than a spike has advantages and disadvantages as a data quality evaluation tool. Although an evaluation of the deviation between the actually derived concentration and the expected concentration following dilution does not definitively indicate the degree of matrix interference within a sample, it does establish whether or not the analysis was performed within the linear portion of the calibration curve. It should be understood, however, that matrix interference is generally insignificant when the analyte is present in such high concentrations in the sample. Conversely, a spike is not particularly useful when the initial sample concentration is very high. To be distinguishable above the initial sample concentration, spiking must generate a final concentration at least 25 percent greater than the initial concentration, yet this frequently places the analyte concentration within the region of calibration non-linearity. The result is that percent recovery is significantly underestimated. For example, accuracy for sample 1C was not acceptable as indicated by the spike recovery of -3.4 percent. As an alternative, the serial dilution method was applied to sodium (and to aluminum, the only ICP analytes in which the sample concentrations exceeded 1000 µg/ml). Dilution RPD values less than five percent indicate that measurements are within the linear portion of the calibration curve. Sample 1C had a serial dilution value of 2.7 percent difference, which was within the 5% acceptance limit.

Precision between the spike and spike duplicate was meaningless and was consequently not determined. The TSAP specified criterion for precision was ±20 RPD. Precision was determined, however, between the tank samples and their duplicates, where the values ranged from 0.0 to 11.5 RPD.

The preparation blank concentration was about five orders of magnitude less than the mean of sample values, indicating the absence of contamination. The field blank's sodium concentration was three orders of magnitude less than the lowest mean sample concentration, consequently it too was determined to not be contaminated.

Average sample sodium concentrations ranged from 112,000 to 113,000 µg/ml, with a grand mean of 113,000 µg/ml.

NICKEL

Percent recovery of the undigested LCS standard was acceptable with a value of 91.2 percent recovery.

Spike accuracy was acceptable with a value of 92.4 percent recovery. The TSAP was not explicit in specifying acceptance limits, however it was assumed that they were consistent with those for aluminum and sodium, which were 75 to 125 percent recovery.

Precision between the samples and their duplicates was not able to be determined because all values were less than the detection limit. The TSAP

was not explicit in specifying acceptance limits for spike duplicate precision, however it was assumed that they were consistent with those for aluminum and sodium, which were ±20 RPD.

The nickel concentrations of the field and preparation blanks were less than the detection limit, indicating the absence of contamination.

Because the concentrations for the samples were less than the detection limit, the grand average nickel concentration was not able to be calculated. All sample concentrations were less than 5.0 μg/ml.

SILICON

Percent recovery of the undigested LCS standard was acceptable with a value of 97.6 percent recovery.

Spike accuracy was unacceptable with a value of 65.4 percent recovery. The TSAP was not explicit in specifying acceptance limits, however it was assumed that they were consistent with those for aluminum and sodium, which were 75 to 125 percent recovery. Significant error can occur in this procedure due to digestion of the samples in glassware which contains silicone.

Precision between the samples 2C, 3C, 4 and IB and their duplicates was good, ranging from 1.0 to 8.6 relative percent difference. The RPD of 24.6 for sample 1C was not good. The TSAP was not explicit in specifying acceptance limits for precision, however it was assumed that they were consistent with those for aluminum and sodium, which were ±20 RPD for the spike duplicate.

The silicon concentration of the preparation blank was less than the detection limit, indicating the absence of contamination. The field blank was only 85 percent of the lowest sample concentration. This is interpreted to mean that the samples were impacted by the field conditions (presumably the glass container itself) and the true concentration is likely to be significantly less than the analytically determined value.

Average silicon concentrations of the samples ranged from 84.0 to 88.0 μg/ml, with a grand mean of 85.3 μg/ml.

URANIUM

Percent recovery of the undigested LCS standard was acceptable with a value of 85.6 percent recovery.

Spike accuracy was acceptable with a value of 88.2 percent recovery. The TSAP was not explicit in specifying acceptance limits, however it was assumed that they were consistent with those for aluminum and sodium, which were 75 to 125 percent recovery.

Precision between the samples and their duplicates was not able to be determined because all values were less than the detection limit. The TSAP was not explicit in specifying acceptance limits for spike duplicate precision, however it was assumed that they were consistent with those for aluminum and sodium, which were ±20 RPD.

The uranium concentrations of the field and preparation blanks were less than the detection limit, indicating the absence of contamination.

Because the concentrations of the samples were less than the detection limit, the grand average uranium concentration of all samples was not able to be calculated. All uranium concentrations were less than 125 µg/ml.

TOTAL URANIUM (by Kinetic Phosphorescence)

The chemical (not radiochemical) analyses for total uranium were performed on direct samples using procedure/revision number LA-925-009/A-1. There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Sample holding times for uranium ranged from 14 to 59 days. A maximum sample holding time was not specified for this analyte in SW-846 protocol.

The LCS standard recoveries were acceptable with values ranging from 100.2 to 104.5 percent.

Spike accuracy was determined for three samples. All spikes were acceptable with results ranging from 87.4 to 108.8 percent recovery. The TSAP specified requirement for spike accuracy was 70 to 130 percent recovery.

Precision between the three spikes and spike duplicates was acceptable with values ranging from 1.8 to 5.5 relative percent difference. The TSAP specified criterion for precision was ±20 RPD.

The preparation blank concentration was two orders of magnitude less than the mean of sample concentrations, and the field blank was less than the detection limit, indicating the absence of contamination.

Average sample concentrations for total uranium ranged from 14.1 µg/ml to 18.5 µg/ml, with a mean of 16.4 µg/ml. These data were consistent with the analytical results for uranium by ICP.

RADIOCHEMICAL ANALYSES

TOTAL ALPHA (by Proportional Counter)

Total alpha analyses were performed on acid predigested samples (assuring that the analyte was fully dissolved to facilitate analyte detection) using

procedure/revision number LA-508-101/E-1. Sample holding times ranged from 57 to 62 days. The required maximum sample holding time for total alpha activity as specified in SW-846 protocol is six months. Tank AP-105 analyses for total alpha were analyzed within the required holding time. There were no analytical anomalies or difficulties.

LCS standard recovery was acceptable with a value of 103.0 percent recovery.

The accuracy of the spike (performed on the field blank) was acceptable with a recovery of 87.7 percent. The TSAP specified criterion for spike recovery was 70 to 130 percent.

Precision between the spike and spike duplicate was acceptable with 4.1 RPD. Precision between the tank samples and their duplicates was not able to be calculated because all sample activities were less than the detection limit. The TSAP specified criteria for precision for both the spike/spike duplicate and the samples/sample duplicates was ±25 RPD.

Alpha activities of the field blank and reagent blanks for the tank samples were less than the detection limit, indicating the absence of contamination for all blanks.

All sample total alpha activities less than their detection limits, ranging from 0.00505 to 0.0102 µCi/ml. The notification limit specified in the TSAP was to be calculated as ">0.10 x specific gravity". Table 7 compares the calculated notification limit against sample alpha activities. The alpha notification limit was not exceeded for any of the samples.

Table 7. Comparison of Alpha Activities and Action Limits

Sample Number	Average Specific Gravity	Calculated Notification Limit	Sample Alpha Activity, µCi/ml
5AP-96-1C	1.226	0.1226	<0.0102
5AP-96-2C	1.232	0.1232	<0.0102
5AP-96-3C	1.231	0.1231	<0.00505
5AP-96-4	1.242	0.1242	<0.00505

TOTAL BETA (by Proportional Counter)

Total beta analyses were performed on acid predigested samples (assuring that the analyte was fully dissolved to facilitate analyte detection) using procedure/revision number LA-508-101/E-1. Sample holding times ranged from 57 to 62 days. The required maximum sample holding time for total beta activity

as specified in SW-846 protocol is six months. Tank AP-105 analyses for total beta were analyzed within the required holding time. There were no analytical anomalies or difficulties.

LCS standard recovery was acceptable with a value of 100.3 percent recovery.

Accuracy for the total beta spike (performed on the field blank) was acceptable with 101.3 percent recovery. The TSAP specified limits for accuracy were 70 to 130 percent recovery.

Precision between the spike and spike duplicate was acceptable with 3.9 relative percent difference. The TSAP specified limits for precision between spikes was ±25 RPD. Precision between the samples and their duplicates ranged from 0.0 to 5.5 RPD. Precision between the field blank and its duplicate yielded a 31.9 RPD, exceeding the ±25 RPD limit. However, the blank's activity was only slightly greater than the detection limit and may be attributable to counting error, thus the result is invalid.

The field blank had an activity that was slightly greater than the detection limit. The preparation blank beta activity was three orders of magnitude less than the sample activities. It was determined that neither blank was contaminated.

Average beta activities for the samples ranged from 108 to 111 μCi/ml, with an average activity of 109 μCi/ml.

GAMMA ENERGY ANALYSES (GEA)

Samples were acid predigested and analyzed using procedure/revision number LA-548-121/E-0. Sample holding times ranged from 77 to 82 days. Except for radium-226 with a maximum holding time of six months, there were no specified maximum holding times in SW-846 protocol. All GEA analytes were, therefore, within the required holding time criteria. There did not appear to be any analytical anomalies or difficulties during these analyses.

The GEA procedure does not use an LCS quality control standard for every isotope; the LCS standard contained only ^{60}Co and ^{137}Cs. Quality control parameters for all of the GEA analytes were expressed relative to these two isotopes.

The ^{137}Cs LCS standard recovery was acceptable with 96.3 percent recovery. The ^{60}Co LCS standard recovery was also acceptable with 99.2 percent recovery.

The GEA procedure is sufficiently free of matrix interference with analyte quantitation that the procedure does not require spiking to assess matrix effects. However, another quality control parameter, percent counting error, was of significance. It was determined and reported when the sample analyte activity was above the detection limit.

Precision evaluation was based on the difference between the samples and their corresponding duplicates. The TSAP specified control limit for precision for all GEA analytes was ±20 RPD.

CESIUM-137 (by GEA)

^{137}Cs precision value for sample 1C was acceptable with 1.8 RPD.

The counting error for all samples ranged was 0.3 percent.

^{137}Cs activities in the preparation blank and field blank were less than the detection limit, indicating the absence of contamination.

Sample ^{137}Cs activities ranged from 111 to 114 $\mu Ci/ml$, with a mean value of 112 $\mu Ci/ml$. These activities were less than the notification limit specified in the TSAP.

CESIUM-134 (by GEA)

^{134}Cs precision RPD between sample 1C and its duplicate was not able to be determined because the sample activity values were less than the detection limit.

Sample counting errors were not able to be determined because the samples had activities less than the detection limit.

Preparation blank activity was less than the detection limit, indicating the absence of contamination. ^{134}Cs activity in the field blank was also less than the detection limit, indicating the absence of ^{134}Cs contamination.

All sample ^{134}Cs activities were less than 0.0559 $\mu Ci/ml$. These activities were significantly less than the notification limit specified in the TSAP.

CERIUM/PRASEODYMIUM-144 (by GEA)

^{144}Ce is counted with ^{144}Pr because the two isotopes are indistinguishable by GEA analysis. ^{144}Pr is the decay daughter product of ^{144}Ce. The combined activity was determined from the ^{144}Pr gamma energy line when the parent and daughter were at secular equilibrium.

$^{144}Ce/Pr$ precision values between samples and their duplicates were not able to be determined. $^{144}Ce/Pr$ values for each sample and sample duplicate were less than the detection limit.

Sample counting errors were indeterminable because all sample activities were less than the detection limit.

^{144}Ce/Pr activities for the preparation blank and field blank were less than the detection limit, indicating the absence of contamination.

Average sample ^{144}Ce/Pr activities were not able to be calculated because all were less than the detection limit. The ^{144}Ce/Pr activity for all samples was less than 0.731 μCi/ml.

COBALT-60 (by GEA)

^{60}Co precision values between samples and their duplicates were not able to be determined because activities for each sample and sample duplicate were less than the detection limit.

Sample counting errors were indeterminable because all sample activities were less than the detection limit.

^{60}Co activities for the preparation blank and field blank were less than the detection limit, indicating the absence of contamination.

Average sample activities were not able to be calculated because all were less than the detection limit. The ^{60}Co activity for all samples was less than 0.00757 μCi/ml. These activities were significantly less than the notification limit specified in the TSAP.

EUROPIUM-154 (by GEA)

^{154}Eu precision values between samples and their duplicates were not able to be determined because activities for each sample and sample duplicate were less than the detection limit.

Sample counting errors were indeterminable because all sample activities were less than the detection limit.

^{154}Eu activities for the preparation blank and field blank were less than the detection limit, indicating the absence of contamination.

Average sample activities were not able to be calculated because all were less than the detection limit. ^{154}Eu activity for all samples was less than 0.0263 μCi/ml. These activities were significantly less than the notification limit specified in the TSAP.

EUROPIUM-155 (by GEA)

^{155}Eu precision values between samples and their duplicates were not able to be determined because activities for each sample and sample duplicate were less than the detection limit.

Sample counting errors were indeterminable because all sample activities were less than the detection limit.

^{155}Eu activities for the preparation blank and field blank were less than the detection limit, indicating the absence of contamination.

Average sample activities were not able to be calculated because all were less than the detection limit. ^{155}Eu activity for all samples was less than 0.204 μCi/ml. These activities were significantly less than the notification limit specified in the TSAP.

NIOBIUM-94 (by GEA)

^{94}Nb precision values between samples and their duplicates were not able to be determined because activities for each sample and sample duplicate were less than the detection limit.

Sample counting errors were indeterminable because all sample activities were less than the detection limit.

^{94}Nb activities for the preparation blank and field blank were less than the detection limit, indicating the absence of contamination.

Average sample activities were not able to be calculated because all were less than the detection limit. ^{94}Nb activity for all samples was less than 0.0141 μCi/ml. These activities were significantly less than the notification limit specified in the TSAP.

RUTHENIUM/RHODIUM-106 (by GEA)

^{106}Ru is detected in the presence of its daughter, ^{106}Rh because the two isotopes are indistinguishable by GEA analysis. Radioactivity values were shown in the spread sheet as the sum of Rh^{106} and Ru^{106} activities at secular equilibrium.

^{106}Ru/Rh precision values between samples and their duplicates were not able to be determined because activities for each sample and sample duplicate were less than the detection limit.

Sample counting errors were indeterminable because all sample activities were less than the detection limit.

^{106}Ru/Rh activities for the preparation blank and field blank were less than the detection limit, indicating the absence of contamination.

Average sample activities were not able to be calculated because all were less than the detection limit. ^{106}Ru/Rh activity for all samples was less than

1.13 μCi/ml. These activities were significantly less than the notification limit specified in the TSAP.

RADIUM-226 (by GEA)

^{226}Ra precision values between samples and their duplicates were not able to be determined because activities for each sample and sample duplicate were less than the detection limit. Because the detection limit for ^{226}Ra is characteristically very high by the GEA procedure, it is not the procedure of choice for samples with low activity.

Sample counting errors were indeterminable because all sample activities were less than the detection limit.

^{226}Ra activities for the preparation blank and field blank were less than the detection limit, indicating the absence of contamination.

Average sample activities were not able to be calculated because all were less than the detection limit. ^{226}Ra activity for all samples was less than 1.45 μCi/ml. Despite being less than the detection limit, all sample results exceeded the notification limit of >0.033 μCi/ml. Failure to provide sample results that were less that the notification limit occurred because of the relatively high ^{137}Cs activity in the samples. To minimize the excessive background, dilutions of the sample were required, causing the detection limits to be increased by the sample dilution factor.

TRITIUM (by Lachat/Liquid Scintillation)

This procedure was performed on the direct sample using procedure/revision number LA-218-114/B-0. Sample holding times ranged from 89 to 94 days. A required sample holding time was not specified in SW-846 protocol for this analyte.

Performance on the LCS standard was acceptable with a recovery of 114.5 percent.

Spike accuracy was acceptable, being within the TSAP specified acceptance criteria of 70 to 130 percent recovery, with a value of 101.9 percent recovery.

Precision, as measured by the relative percent difference between the spike and spike duplicate, was within the TSAP specified acceptance limit of ±25 RPD with a value of 2.7 RPD.

The counting error for all samples ranged from 0.5 to 5.3 percent.

The activities of the field and reagent blanks were only slightly greater than the detection limit, indicating the absence of contamination.

^{3}H activities for the tank samples ranged from 0.00104 to 0.0276 μCi/ml, with a mean activity of samples of 0.0111 μCi/ml.

CARBON-14 (by Liquid Scintillation)

This procedure was performed on the direct sample using procedure/revision number LA-348-104/C-0. Sample holding times ranged from 48 to 107 days. A required sample holding time was not specified in SW-846 protocol for ^{14}C. For the analytical run that included the field blank, the chemist noted,

> "Although (reagent) blank activity was high, it appears to have had no effect on the sample or duplicate results. Spike and Spike duplicate indicate no interferences."

The LCS standard recoveries were within acceptance limits with values of 90.2 and 75.2 percent. The statistically derived upper and lower control limits were 110.32% and 58.55%, respectively.

Spike accuracy was acceptable, being within the TSAP specified acceptance criteria of 70 to 130 percent recovery with values of 85.8 and 86.7 percent recovery.

Precision performance between the spikes and spike duplicates met the TSAP specified acceptance limit of ±25 RPD, having a values of 0.7 and 0.9 RPD. Precision between sample 1C and its duplicate was good with 6.3 RPD.

The counting error for tank samples was reasonable for liquid scintillation analyses, ranging from 1.0 to 1.3 percent.

The ^{14}C activity of the reagent blank for the tank samples was less than the detection limit. The activity of the field blank's reagent blank was slightly greater than the detection limit. Consequently is was determined that all blanks were not contaminated.

Average ^{14}C activities for the tank samples ranged from 0.000213 to 0.000398 μCi/ml, with a mean activity of samples of 0.000330 μCi/ml. These activities were significantly less than the notification limit specified in the TSAP.

SELENIUM-79 (by Ion Exchange/Dist/Liquid Scintillation)

^{79}Se analysis was performed on acid digestions of the samples. The digestion generated soluble selenium needed for full recovery of the analyte, and also produced an acid matrix which was required for this procedure.

^{79}Se analyses were performed using procedure/revision number LA-365-132/C-1. Sample holding times ranged from 99 to 104 days. A required maximum sample holding time was not specified in SW-846 protocol for this analyte. There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

^{79}Se activity was based upon calibration with a ^{14}C standard, since both nuclides have approximately the same beta energy. This was necessary because no ^{79}Se standard exists.

Isotopic recovery through the preparative procedure was estimated gravimetrically by the use of a carrier for both the sample and the blanks. Carrier recoveries were good for the field blank, samples and duplicate with values ranging from 79.5 to 93.5 percent.

The counting error of ^{79}Se for all samples ranged from 2.9 to 3.7 percent.

The ^{79}Se activities of the field blank and reagent blanks were less four times greater than the detection limit, indicating the absence of contamination.

The precision met the TSAP specified acceptance criteria of ±25, where the RPD for sample 1C was 12.6. Precision for ^{79}Se is based on the difference between a sample and its duplicate.

^{79}Se activities ranged from 0.0000331 μCi/ml and 0.000274 μCi/ml. The average ^{79}Se activity of all samples was 0.000211 μCi/ml. These activities were significantly less than the notification limit specified in the TSAP.

STRONTIUM-89/90 (by Separation/Proportional Counting)

This procedure was performed on acid digestions of the samples using procedure/revision numbers LA-220-101/D-1 and E-3. Sample holding times ranged from 96 to 101 days. A required sample holding time was not specified in SW-846 protocol for this analyte. There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

The $^{89/90}Sr$ LCS standard percent recovery of 97.9 was within acceptance limits.

Spike accuracy (measured on the field blank) was acceptable, being within the TSAP specified acceptance criteria of 75 to 125 percent recovery, with a value of 102.9 percent recovery.

Precision as measured by the relative percent difference between the spike and spike duplicate was within the TSAP specified acceptance limit of ±20 RPD with a value of 10.7 RPD.

The counting error was low for samples 1C and 2C with 2.6 to 2.5 percent, respectively. The counting error was high for sample 3C was high at 99.0 percent because the sample activity was less than the minimum detectable activity. For the field blank, the counting error was high with a value of 177.0 percent, which is expected because of the low number of counts detected for a blank. Sample carrier recoveries were acceptable, ranging from 89.5 to 91.7 percent.

The activity of the preparation blank was less than the detection limit, and the field blank activity was only slightly greater than the detection limit. Consequently, both blanks were determined to not be contaminated.

$^{89/90}Sr$ activities for the samples ranged from 0.00103 to 0.316 μCi/ml. The mean activity of all samples was 0.210 μCi/ml. These activities were significantly less than the notification limit specified in the TSAP.

TECHNETIUM-99 (by EXTRACTION/LIQUID SCINTILLATION)

^{99}Tc analyses were prepared by performing an acid predigestion of samples. Digestion was performed to fully dissolved the analyte, facilitating analyte detection. Analyses were performed using procedure/revision number LA-438-101/D-2. Sample holding times ranged from 94 to 99 days. A required maximum sample holding time was not specified in SW-846 protocol for this analyte.

There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

^{99}Tc LCS standard recovery was acceptable with 84.7 percent recovery.

Accuracy as evaluated by percent recovery of spike was acceptable, with a value of 98.7 percent. The TSAP specified limits for accuracy were 75 to 125 percent recovery.

Precision performance, as measured by the relative percent difference between the spike and its duplicate, was acceptable at 1.3 RPD. The TSAP specified limit for precision was ±20 RPD.

Sample tracer recoveries ranged from 70.7 to 72.2 percent, which were acceptable. The counting error for all samples ranged from 1.3 to 9.6 percent and was also of acceptable quality.

The ^{99}Tc activities of the field blank and preparation blank were less than the detection limit and were determined to not be contaminated.

^{99}Tc activities for the tank samples ranged from 0.0558 to 0.0644 μCi/ml (significantly less than the notification limit of >2 μCi/ml). The mean activity for all samples was 0.0598 μCi/ml.

IODINE-129 (by Distillation/Ion Exchange/GEA)

^{129}I analysis was performed on direct samples using procedure/revision LA-378-103/C-0. Sample holding times ranged from 93 to 120 days. Several reruns were performed for this analyte, causing the sample holding times to be extended significantly. Required maximum sample holding times are not specified in SW-846 protocol for this analyte.

Accuracy performance, as determined by the recovery of the LCS standard, was acceptable with values for the three runs of 75.0, 72.5 and 67.9 percent recovery. The statistically derived upper and lower control limits for acceptable LCS standard recovery were 121.84 and 49.19 percent, respectively.

The accuracy control limits specified in the TSAP were 75 to 125 percent recovery. Accuracy was acceptable for the spike for only sample 2C with a percent recovery of 79.3. For samples 1C and 1B, the spikes had slightly lower recoveries of 71.4 and 67.9 percent, respectively. Achieving percent recoveries for the spikes that are within the upper and lower LCS control limits is statistically probable because the standard recovery typically represents the best analytical results possible. Therefore, although two of the spikes representing different runs failed to meet the customer specified acceptance criteria, the data presented are within the laboratory's technical acceptance limits.

The precision control limit specified in the TSAP for spike duplicates was ±20 RPD. Precision between the spikes and their duplicates was acceptable with values of 8.3, 1.1 and 0.6 RPD. Two samples which were analyzed in duplicate also yielded comparable results with values of 3.5 and 2.8 RPD.

Sample carrier recoveries were marginally acceptable, ranging from 47.5 to 61.3 percent.

Counting errors were reasonably good, ranging from 0.0 to 3.3 percent.

Activities of the field blank and reagent blanks were less than the detection limit, indicating the absence of contamination.

^{129}I activity for the samples ranged from 0.000115 to 0.000140 μCi/ml, with an grand average of 0.000125, which did not exceed the notification limit of >0.0026 μCi/ml.

NEPTUNIUM-237 (by Extraction/Internal Proportional Counter)

^{237}Np analyses were performed on previously acid digested samples, using procedure/revision LA-933-141/H-1. Sample holding times ranged from 81 to 86 days. A required maximum sample holding time was not specified in SW-846 protocol for this analyte. There did not appear to be any analytical anomalies or difficulties during the analyses of this analyte.

Accuracy performance, as measured by percent recovery of the LCS standard, was acceptable with 67.0 percent recovery, despite seeming to be extremely low. Internal control limits for the ^{237}Np LCS standard were 43.78 percent to 114.25 percent. The limits are empirically derived and set at ±3 standard deviations from the mean of the historical data.

Accuracy for the spike was acceptable with a percent recovery of 82.6. The TSAP specified range of acceptance was 75 to 125 percent recovery. A rerun was neither requested nor performed.

Precision performance was acceptable between the spike and spike duplicate with a 0.6 relative percent difference. The TSAP specified acceptance limit was ±20 RPD.

The counting errors were quite high for all samples, ranging from 183 to 474 percent, because the sample activities were less than the detection limit.

Activities of the field blank and preparation blank were less than the detection limit, indicating the absence of contamination.

^{237}Np activities for the samples were less than the detection limit, ranging from <0.00120 to <0.00170 μCi/ml.

PLUTONIUM-239/240 (by Ion Exchange/Alpha Energy Analysis)

$^{239/240}Pu$ analyses were performed using procedure/revision LA-943-128/B-0 on samples which had been previously digested. There did not appear to be any analytical anomalies or difficulties for these analyses.

The sample holding times ranged from 71 to 76 days. A required maximum sample holding time was not specified in SW-846 protocol for this analyte.

Recovery of the LCS standard was acceptable with a result of 94.0 percent.

Accuracy performance was acceptable for the spikes with percent recoveries of 88.6 and 91.9 percent. The TSAP specified acceptance limits for $^{239/240}Pu$ accuracy were 70 and 130 percent recovery.

Precision between the spikes and their duplicates was acceptable with 2.3 and 3.7 RPD. The TSAP specified acceptance limit for precision was ±25 RPD.

^{236}Pu tracer recoveries were acceptable with values ranging from 81.3 to 91.3 percent. The sample counting error for tank samples ranged from 10.4 to 11.2 percent.

The field blank and preparation blank had activities less than the detection limit, indicating the absence of contamination.

The tank sample $^{239/240}Pu$ activities were all less than 0.000202 μCi/ml, and did not exceed the TSAP specified notification limit.

PLUTONIUM-238 (by Ion Exchange/Alpha Energy Analysis)

^{238}Pu analyses were generated concurrently with $^{239/240}Pu$ data in the $Pu^{239/240}$ procedure. Acid digested samples were prepared and then analyzed using procedure/revision LA-943-128/B-0. There did not appear to be any analytical anomalies or difficulties with these analyses.

The sample holding times ranged from 71 to 76 days. A required maximum sample holding time was not specified in SW-846 protocol for this analyte.

The assessment of accuracy for this method was based on the recovery of the ^{239}Pu LCS standard because no ^{238}Pu standard was available. Percent recovery of the ^{239}Pu LCS standard was acceptable with a result of 94.0.

An evaluation of accuracy and precision based on a spike and spike duplicate was not possible because a spiking standard was not available. A sample was not analyzed in duplicate as specified in the TSAP to evaluate the precision. However, because all sample results were less than the detection limit, a RPD could not have been calculated even if a duplicate analysis had been performed.

^{236}Pu tracer recoveries were acceptable with values ranging from 88.5 to 91.3 percent. The counting error for all samples ranged from 9.7 to 100.0 percent.

Field blank and preparation blank activities (based on $Pu^{239/240}$) were less than the detection limit, indicating the absence of contamination.

^{238}Pu activities of the tank samples were all less than 0.000202 μCi/ml. Reported "less than" values for the ^{238}Pu detection limit were generated using 20 dpm for the sample activity. Sample analytical values did not exceed the notification limit.

AMERICIUM-241 (by Extraction/Alpha Energy Analysis)

^{241}Am analyses were performed on acid digested samples using the newly developed procedure/revision LA-953-103/B-0. There did not appear to be any analytical anomalies or difficulties for these analyses.

The sample holding times ranged from 63 to 75 days. A required maximum sample holding time was not specified in SW-846 protocol for this analyte.

Percent recovery of the LCS standard was acceptable with a value of 88.2.

Accuracy performance was acceptable for the spikes with percent recoveries of 88.2 and 91.6 percent. The TSAP specified acceptance limits for ^{241}Am accuracy were 70 and 130 percent recovery.

Precision between the spikes and their duplicates was acceptable with 1.9 and 7.2 RPD. The TSAP specified acceptance limit for precision was ±20 RPD.

^{243}Am tracer recoveries were good, ranging from 84.1 to 91.9 percent.

The field blank and preparation blanks had activities less than the detection limit, indicating the absence of contamination.

^{241}Am activity was less than the detection limit for all samples, with all values less than 0.000308 μCi/ml. These "less than" values were determined using 5 percent of the ^{243}Am tracer peak as the ^{241}Am peak. The notification limit of >1 μCi/ml was not exceeded by any sample.

CURIUM-243/244 (by Extraction/Alpha Energy Analysis)

$^{243/244}$Cm analytical data were generated as an analytical by-product of ^{241}Am analysis, using the ^{241}Am procedure/revision LA-953-103/B-0 on acid digested samples. There did not appear to be analytical anomalies or difficulties for $^{243/244}$Cm analyses.

The sample holding times ranged from 63 to 75 days. A required maximum sample holding time was not specified in SW-846 protocol for this analyte.

$^{243/244}$Cm and ^{241}Am were analyzed simultaneously using the same procedure, however there was no ^{244}Cm standard or spike available for the evaluation of $^{243/244}$Cm accuracy. Because of this, ^{241}Am was used as a surrogate LCS standard, and ^{243}Am was used as a tracer to estimate accuracy. ^{241}Am standard recovery was acceptable with a value of 88.2.

To verify that the procedure could appropriately measure ^{244}Cm, the counter was calibrated for efficiency. It was determined that the counting efficiency was uniform across the entire energy counting spectrum.

The $^{243/244}$Cm counting error for the samples and field blank was 100.0 percent. ^{243}Am tracer recoveries were good, ranging from 84.1 to 91.9 percent.

Evaluations of accuracy and precision based on a spike and spike duplicate were not possible because a spiking standard was not available. All samples were analyzed in duplicate to assess $^{243/244}$Cm precision. An RPD value could not be calculated for any of the samples, however, because the activities for all samples and their duplicates were less than the detection limit.

The activities of the field and preparation blanks were less than the detection limit, indicating the absence of contamination.

The $^{243/244}$Cm activity of all samples was less than 0.000308 μCi/ml. These "less than" values were determined using 5 percent of the ^{243}Am tracer peak as the $^{243/244}$Cm and ^{241}Am peaks. No sample exceeded the notification limit of >0.013 μCi/ml.

ORGANIC ANALYSES

Although Total Organic Carbon is an organic analysis and would generally be discussed in this section, it was placed in the inorganic section. This placement enabled consolidating the discussion of total carbon, total inorganic carbon and total organic carbon and their interrelationships in the characterization of AP-105 waste.

The matrix for tank AP-105 samples as defined by SW-846 was concentrated aqueous waste. Sample holding times for both volatile organic analysis (VOA) and semi-volatile organics (Semi-VOA) were defined in volume 1, section B, chapter 4, table 4-1 of SW-846, as 14 days prior to extraction. For semi-volatiles, extracts must be analyzed within 40 days following extraction.

Analytical accuracy was based on the percent recovery of target compound spikes. Analytical precision was based on the relative percent difference between these spikes and their duplicates. Accuracy and precision acceptance criteria for each compound were given Table 2 of the TSAP.

To enable interpretation of summary data for VOA and Semi-VOA compounds, Table 8 defines the qualifiers, called Q-flags, shown on Form I in the Organic Raw Analytical Data section and on the Data Summary Tables.

Table 8. Data Qualifier Definitions

Q-FLAG	DEFINITION
U	Indicates the compound was analyzed for but not detected; the U-flagged concentration number is the quantitation limit.
J	Indicates an estimated value for the target or tentatively identified compounds; spectra meet criteria but response is below the quantitation limit for the target compounds.
B	Compound was found in the blank.
D	Analysis was performed on a diluted sample.
E	Indicates that quantitation was above the calibration range.
N	Indicates the presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search.
X	Indicates nitration product of the acid surrogate.

Raw data can be found in the Raw Analytical Data section under Organic Analyses.

VOLATILE ORGANIC ANALYSIS, VOA (by GC/MS)

The samples were analyzed using procedure LA-523-405/A-4, a purge and trap/gas chromatograph-mass spectrometer instrumental method. A narrative by the cognizant chemist was provided in the raw data section of the data package which gives additional information.

A 0.1 ml aliquot of the sample was combined with 4.9 ml of lab blank water in the purge vessel. Hanford wastes have historically been difficult to analyze because of the carry-over of foam into the trap from the VOA sparging vessel. As a consequence, the sample aliquot was limited to the largest aliquot (0.1 ml) that was not expected to produce foaming above the vessel during sparging. Sample holding times ranged from 22 to 26 days. The SW-846 holding time for VOA is 14 days.

The Internal Standard compounds (IS) were bromochloromethane, 1,4-difluorobenzene and chlorobenzene-d5.

The initial calibration data met all acceptance criteria for the SW-846 method except for the Bromoform response factor, which was slightly low. The Bromoform response factor did, however, meet CLP acceptance critera. The lower response factor for Bromoform does not impact the data generated for the target compounds specified by the program for this project.

None of the target compounds exceeded the maximum percent difference of ±40 percent for continuing calibration.

The System Monitoring Compounds (SMC), also called surrogates, were toluene-d8, bromofluorobenzene, and 1,2-dichloroethane-d4. The LCS control limits which were applied to VOA analyses were those specified in the Contract Laboratory Program (CLP) Statement of Work (SOW), August 1991, for System Monitoring Compounds (SMC). The LCS standard for VOA is defined as the method blank, which contains internal standards and surrogates and is analyzed at the start of each 12 hour analysis window. The acceptance criteria used are located on the Recovery Report page for each sample in the Raw Analytical Data section and in the Data Summary Tables section (shown as surrogates). Recovery of all surrogates was acceptable, meeting the recovery limit criteria.

The Matrix Spike compounds (MS), which were analyzed, were the same as the target analytes which were required by the TSAP in Table 2. All target analytes met the TSAP's spike accuracy acceptance limits. Table 9 indicates the control limits specified in the TSAP for the VOA compounds.

Precision performance was evaluated for each target compound as the relative percent difference between the matrix spike for sample 1A and its duplicate. The RPDs for all targets were acceptable with values less than or equal to 4.

The concentrations of all target compounds in the field blank, trip blank and reagent blank were less than the quantitation limit and consequently were determined to not be contaminated.

Table 9. TSAP Specified Control limits for VOA Compounds

Target Compound Name	Precision Control Limits	Accuracy Control Limits
Acetone	±25 RPD	40 - 110 % Recovery
1-Butanol	±25 RPD	30 - 110 % Recovery
2-Butanone	±25 RPD	40 - 110 % Recovery
2-Hexanone	±25 RPD	40 - 125 % Recovery
Methyl Isobutyl Ketone (4-Methyl-2-pentanone)	±25 RPD	40 - 110 % Recovery
2-Pentanone	±25 RPD	40 - 125 % Recovery
Tetrahydrofuran	±25 RPD	30 - 110 % Recovery

The compound Methyl Isobutyl Ketone (MIBK) is specified as an analyte in the TSAP. The preferred name for this compound is 4-Methyl-2-pentanone.

All raw data, including calibration information, were furnished as instrument printouts.

No target analytes were observed in any of the samples above the notification limit. Acetone was observed in all three samples with the concentrations ranging from 490 (estimated) to 550 µg/L. Information on Tentatively Identified Compounds (TIC) is available in the raw data section.

SEMI-VOLATILE ORGANIC ANALYSIS, Semi-VOA (by GC/MS)

The samples were extracted with a semi-micro continuous liquid/liquid extractor using procedure LA-523-132/B-0. The sample extracts were analyzed by a gas chromatograph/mass spectrometer instrument using procedure LA-523-406/A-0. A narrative by the cognizant chemist was provided in the raw data section of the data package which gives additional information. That narrative noted that there were difficulties with acid surrogate recoveries, recoveries of acid matrix spike compounds (non-target) in samples, and contamination by numerous non-target compounds of the blank. Several observations of color changes and precipitate formation were also recorded during the extractions.

The SW-846 specified holding time (Table 2) of 14 days for extraction was exceeded for all samples. The sample holding times for extraction ranged from

78 to 90 days. The SW-846 specified holding time of 40 days after extraction for analysis was not exceeded for any sample. The sample holding times for analyses ranged from 7 to 14 days. It was not possible to meet the SW-846 short holding time for extraction of Semi-VOAs because of the extra procedural steps necessary to handle radiological material. The TSAP required that the trip blank be analyzed only after target compounds were detected in the field blank. Because target compounds were detected in the tank samples, however, it was decided to also analyze the trip blank.

LCS control limits for the Semi-VOA compounds were administratively set to the criteria listed in procedure LA-523-406/A-0 for surrogates. The LCS standard for Semi-VOA is defined as the method blank, which contained internal standards and surrogates. The internal standards were 1,4-Dichlorobenzene-d4; Naphthalene-d8, Acenapthene-d10; Phenanthrene-d10; Chrysene-d12 and Perylene-d12. The surrogates (SMCs) were 2-Fluorophenol; Phenol-d5; 2-Chlorophenol-d4; 1,2-Dichlorobenzene-d4; Nitrobenzene-d5; 2-Fluorobiphenyl; 2,4,6-Tribromophenol and Terphenyl-d14. The surrogate acceptance criteria are located on Form II SV-1 in the Organic Raw Analytical Data section and on the data summary tables.

2-Butoxyethanol and tri-butylphosphate had acceptable percent differences of --4.7 and -4.2, respectively for the continuing calibration check.

All analytes had percent relative standard deviations which were acceptable (less than 15%) for the initial 5 point calibration except for 4-Nitrophenol.

The acid surrogate recoveries were affected by the sample matrices. The nitration of phenolic surrogates and other phenolic compounds in Hanford tank waste samples is expected. Such nitration does not occur in the blanks or other non-tank waste matrices. For example, 2-Fluorophenol can be seen to be nitrated to form 2-Fluoro-4-nitrophenol and 2-Fluoro-6-nitrophenol. Surrogate nitration products, flagged on form 1F with an X, were found in all three samples. Acid surrogate recoveries for the trip blank and field blank were acceptable.

Acceptable tributylphosphate (TBP) recoveries of 91.6% and 88.0% were obtained in the matrix spike (MS) and duplicate (MSD), respectively. The TSAP specified limits for accuracy for TBP were 40 to 125 percent recovery. Precision between the MS and MSD was 4 RPD. 2-Butoxyethanol had acceptable accuracy (with MS and MSD results of 88.0 and 100 percent recovery). The precision between the MS and MSD (with 13 RPD) was also acceptable, meeting the TSAP control limit of ±25 RPD.

All of the samples and blanks met the internal standard criteria, with the following exception: Perylene-d12 (the last eluting internal standard) was present below the lower acceptance limit for all three tank samples. The loss of this internal standard had no impact, however, on any of the surrogates or target analytes, because they used other internal standards for quantitation.

Raw data, including calibration information, were furnished in the Raw Data section.

Many Tentatively Identified Compounds (TIC's) were observed in the AP-105 samples. An attempt was made to identify some of the surrogate nitration products, which were flagged with an X on the 1F forms. The library was unable to produce even poor quality hits on many peaks. On the others, the library match was considered very tentative, and no attempt was made to verify the TIC with an external standard. The chemist's narrative notes that many of the contaminants which appear as TICs in the samples and blanks appear to be coming from degradation of the stabilizer in the methylene chloride extraction solvent. Consequently these compounds are artifacts of the procedure but are not true components of the tank samples. Sample TICs were flagged with the letter "B", when these TICs were also found in the method blank.

CONCLUSIONS

The major constituents in the samples taken from tank AP-105 were (not surprisingly) water, aluminum, sodium, hydroxide, nitrate, nitrite, phosphate, sulfate and carbonate. The concentration of total organic carbon was also present at significant concentration relative to other tank waste constituents. ^{137}Cs activity accounted for essentially all of the total beta activity.

No total alpha activity was detected in any of the samples, which was consistent with the observation that $^{239/240}Pu$, ^{238}Pu, ^{241}Am, $^{243/244}Cm$ and ^{237}Np were also not detected. Iron was not detected in any of the samples, whereas it is frequently found in tank samples.

Calculations were performed to evaluate the waste composition with respect to the waste compatibility corrosion rules. The data generated in Table 10 indicate that the waste in all three tank samples meets the waste compatibility corrosion specifications.

Table 10.
WASTE COMPATIBILITY CORROSION RULES

Sample ID	Analyte	Result (ug/mL)	Result (M)	Is [NO3]...	Is [OH]...	Is [NO2]...	Is [OH] + [NO2]...
				<= 1.0 M?	0.010 M <= [OH] <= 5.0 M?	0.011 M <= [NO2] <= 5.5 M	
5AP-96-1C S96V000047	NO3	9.50E+04	1.532				
	OH	3.18E+04	1.871				
	NO2	4.57E+04	0.993	1.0 M < [NO3] <= 3.0 M?	0.1 M * [NO3] <= [OH] < 10 M?		>= 0.4 * [NO3]?
				YES	YES		YES
				3.0 M < [NO3] <= 5.5 M?	0.3 <= [OH] < 10 M?		>= 1.2 M?

Sample ID	Analyte	Result (ug/mL)	Result (M)	Is [NO3]...	Is [OH]...	Is [NO2]...	Is [OH] + [NO2]...
				<= 1.0 M?	0.010 M <= [OH] <= 5.0 M?	0.011 M <= [NO2] <= 5.5 M	
5AP-96-2C S96V000048	NO3	1.01E+05	1.629				
	OH	3.27E+04	1.924				
	NO2	4.68E+04	1.017	1.0 M < [NO3] <= 3.0 M?	0.1 M * [NO3] <= [OH] < 10 M?		>= 0.4 * [NO3]?
				YES	YES		YES
				3.0 M < [NO3] <= 5.5 M?	0.3 <= [OH] < 10 M?		>= 1.2 M?

Sample ID	Analyte	Result (ug/mL)	Result (M)	Is [NO3]...	Is [OH]...	Is [NO2]...	Is [OH] + [NO2]...
				<= 1.0 M?	0.010 M <= [OH] <= 5.0 M?	0.011 M <= [NO2] <= 5.5 M	
5AP-96-3C S96V000049	NO3	1.02E+05	1.645				
	OH	3.61E+04	2.124				
	NO2	4.81E+04	1.046	1.0 M < [NO3] <= 3.0 M?	0.1 M * [NO3] <= [OH] < 10 M?		>= 0.4 * [NO3]?
				YES	YES		YES
				3.0 M < [NO3] <= 5.5 M?	0.3 <= [OH] < 10 M?		>= 1.2 M?

References

1. WHC-SD-WM-TSAP-091, REV. 0, "Tank 241-AP-105 Grab Sampling and Analysis Plan", dated April 18, 1996, Westinghouse Hanford Company, Richland, WA 99352.

2. WHC-SD-WM-TSAP-091, REV. 0-A, "Tank 241-AP-105 Grab Sampling and Analysis Plan", dated June 24, 1996, Westinghouse Hanford Company, Richland, WA 99352.

3. WHC-SD-WM-TSAP-091, REV. 0-B, "Tank 241-AP-105 Grab Sampling and Analysis Plan", dated August 27, 1996, Westinghouse Hanford Company, Richland, WA 99352.

4. WHC-SD-WM-TSAP-091, REV. 0-C, "Tank 241-AP-105 Grab Sampling and Analysis Plan", dated October 15, 1996, Lockheed Martin Hanford Company, Richland, WA 99352.

5. Engineering Change Notice, No. 635332, Albert A Kruger, Data Assessment and Interpretation, dated August 26, 1996, Westinghouse Hanford Company, Richland, WA 99352.

6. WHC-SD-CP-QAPP-016, Rev. 1, "222-S Laboratory Quality Assurance Plan", dated July 31, 1995, Westinghouse Hanford Company, Richland, WA 99352.

7. WHC-SD-CP-QAPP-016, Rev. 1A, "222-S Laboratory Quality Assurance Plan", dated August 31, 1995, Westinghouse Hanford Company, Richland, WA 99352.

8. WHC-SD-DP-202, Rev. 0, "Tank 241-AP-105, Grab Samples 5AP-96-1C, 5AP-96-2C, 5AP-96-3C, 5AP-96-4, and 5AP-96-IB2, Analytical Results for the 45 Day Report", dated, November 5, 1996, Rust Federal Services of Hanford, Inc., Richland, WA 99352.

9. WHC-SD-WM-QAPP-009, Rev. 2, "242-A Evaporator Quality Assurance Project Plan", dated May 4, 1995, Westinghouse Hanford Company, Richland, WA 99352.

Data Summary Tables

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DSC Exotherm using Mettler
Procedure: LA-514-113

Labcore Number	Customer Identification	Sample Result Joules/g	Duplicate Result Joules/g	Sample Precision RPD	Detection Limit Joules/g	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank Joules/g
S96V000047	AP-105, 5AP-96-1C	0.00E+00	0.00E+00	0	0.00E+00	93.5	n/a	n/a	n/a	n/a
S96V000048	AP-105, 5AP-96-2C	0.00E+00	0.00E+00	0	0.00E+00	99.5	n/a	n/a	n/a	n/a
S96V000049	AP-105, 5AP-96-3C	0.00E+00	0.00E+00	0	0.00E+00	99.5	n/a	n/a	n/a	n/a
S96V000053	AP-105, 5AP-96-4	0.00E+00	0.00E+00	0	0.00E+00	93.5	n/a	n/a	n/a	n/a

% Water by TGA using Mettler
Procedure: LA-560-112

Labcore Number	Customer Identification	Sample Result %	Duplicate Result %	Sample Precision RPD	Detection Limit %	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank %
S96V000047	AP-105, 5AP-96-1C	70.0	69.5	0.72	0.0	100.1	n/a	n/a	n/a	n/a
S96V000048	AP-105, 5AP-96-2C	69.3	69.4	0.14	0.0	100.1	n/a	n/a	n/a	n/a
S96V000049	AP-105, 5AP-96-3C	69.4	69.3	0.14	0.0	100.1	n/a	n/a	n/a	n/a
S96V000053	AP-105, 5AP-96-4	69.2	69.0	0.29	0.0	100.1	n/a	n/a	n/a	n/a

HNF
~~WHC~~-SD-WM-DP-202, REV. 1

Specific Gravity
Procedure: LA-510-112

Labcore Number	Customer Identification	Sample Result Sp. G.	Duplicate Result Sp. G.	Sample Precision RPD	Detection Limit Sp. G.	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank Sp. G.
S96V000047	AP-105, 5AP-96-1C	1.229	1.223	0.5	0.001	98.6	n/a	n/a	n/a	n/a
S96V000048	AP-105, 5AP-96-2C	1.235	1.228	0.6	0.001	98.6	n/a	n/a	n/a	n/a
S96V000049	AP-105, 5AP-96-3C	1.235	1.227	0.7	0.001	98.6	n/a	n/a	n/a	n/a
S96V000053	AP-105, 5AP-96-4	1.247	1.236	0.9	0.001	98.6	n/a	n/a	n/a	n/a

HNF
~~WHC~~-SD-WM-DP-202, REV. 1

OH- by Pot. Titration
Procedure: LA-211-102

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/mL
S96V000047	AP-105, 5AP-96-1C	3.18E+04	3.13E+04	1.6	2.50E+03	98.6	n/a	n/a	n/a	<4.20E+01
S96V000048	AP-105, 5AP-96-2C	3.27E+04	3.32E+04	1.5	2.50E+03	98.6	n/a	n/a	n/a	<4.20E+01
S96V000049	AP-105, 5AP-96-3C	3.61E+04	3.60E+04	0.3	2.50E+03	98.6	n/a	n/a	n/a	<4.20E+01
S96V000058	AP-105, 5AP-96-IB	<6.30E+01	<6.30E+01	n/a	6.25E+01	98.6	n/a	n/a	n/a	<4.20E+01

pH Direct
Procedure: LA-212-106

Labcore Number	Customer Identification	Sample Result pH	Duplicate Result pH	Sample Precision RPD	Detection Limit pH	Standard Recovery (Expected pH minus Observed pH)	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank pH
S96V000047	AP-105, 5AP-96-1C	13.31	13.35	0.3	0.01	0.01	n/a	n/a	n/a	n/a
S96V000048	AP-105, 5AP-96-2C	13.49	13.48	0.1	0.01	0.01	n/a	n/a	n/a	n/a
S96V000049	AP-105, 5AP-96-3C	13.45	13.46	0.1	0.01	0.01	n/a	n/a	n/a	n/a

Ammonia by ISE-Std Additions
Procedure: LA-631-001

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/mL
S96V000047	AP-105, 5AP-96-1C	2.00E+01	n/a	n/a	5.00E+00	91.6	123	n/a	n/a	1.36E+00
S96V000048	AP-105, 5AP-96-2C	6.32E+01	n/a	n/a	5.00E+00	91.6	116	122	5	1.36E+00
S96V000049	AP-105, 5AP-96-3C	6.48E+01	n/a	n/a	5.00E+00	91.6	121	n/a	n/a	1.36E+00
S96V000058	AP-105, 5AP-96-IB	<5.00E+00	n/a	n/a	5.00E+00	91.6	105	n/a	n/a	1.36E+00

HNF
~~WHC~~-SD-WM-DP-202, REV. 1

Ion Chromatography by Procedure: LA-533-105

Fluoride-IC-Dionex 4000/4500

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/mL
S96V000047	AP-105, 5AP-96-1C	3.23E+02	n/a	n/a	2.54E+01	92.9	n/a	n/a	n/a	<1.20E-02
S96V000048	AP-105, 5AP-96-2C	2.54E+02	n/a	n/a	4.97E+01	92.9	112.2	113.0	12.4	<1.20E-02
S96V000049	AP-105, 5AP-96-3C	3.48E+02	n/a	n/a	2.54E+01	92.9	n/a	n/a	n/a	<1.20E-02
S96V000058	AP-105, 5AP-96-IB	<7.20E-02	n/a	n/a	7.20E-02	92.9	n/a	n/a	n/a	<1.20E-02

Nitrite-IC - Dionex 4000/4500

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/mL
S96V000047	AP-105, 5AP-96-1C	4.57E+04	n/a	n/a	2.29E+02	93.0	n/a	n/a	n/a	<1.08E-01
S96V000048	AP-105, 5AP-96-2C	4.68E+04	n/a	n/a	4.47E+02	93.0	99.8	90.7	9.7	<1.08E-01
S96V000049	AP-105, 5AP-96-3C	4.81E+04	n/a	n/a	2.29E+02	93.0	n/a	n/a	n/a	<1.08E-01
S96V000058	AP-105, 5AP-96-IB	<6.48E-01	n/a	n/a	6.48E-01	93.0	n/a	n/a	n/a	<1.08E-01

Nitrate by IC-Dionex 4000/4500

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/mL
S96V000047	AP-105, 5AP-96-1C	9.50E+04	n/a	n/a	2.95E+02	101.0	n/a	n/a	n/a	<1.39E-01
S96V000048	AP-105, 5AP-96-2C	1.01E+05	n/a	n/a	5.76E+02	101.0	100.5	101.8	2.0	<1.39E-01
S96V000049	AP-105, 5AP-96-3C	1.02E+05	n/a	n/a	2.95E+02	101.0	n/a	n/a	n/a	<1.39E-01
S96V000058	AP-105, 5AP-96-IB	8.63E-01	n/a	n/a	8.34E-01	101.0	n/a	n/a	n/a	<1.39E-01

Phosphate-IC-Dionex 4000/4500

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/mL
S96V000047	AP-105, 5AP-96-1C	1.15E+03	n/a	n/a	2.54E+02	99.4	n/a	n/a	n/a	<1.20E-01
S96V000048	AP-105, 5AP-96-2C	1.39E+03	n/a	n/a	4.97E+02	99.4	93.9	93.9	6.0	<1.20E-01
S96V000049	AP-105, 5AP-96-3C	1.54E+03	n/a	n/a	2.54E+02	99.4	n/a	n/a	n/a	<1.20E-01
S96V000058	AP-105, 5AP-96-IB	<7.20E-01	n/a	n/a	7.20E-01	99.4	n/a	n/a	n/a	<1.20E-01

Sulfate by IC-Dionex 4000/4500

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/mL
S96V000047	AP-105, 5AP-96-1C	1.93E+03	n/a	n/a	2.93E+02	103.0	n/a	n/a	n/a	<1.38E-01
S96V000048	AP-105, 5AP-96-2C	2.54E+03	n/a	n/a	5.72E+02	103.0	99.8	101.1	1.3	<1.38E-01
S96V000049	AP-105, 5AP-96-3C	2.06E+03	n/a	n/a	2.93E+02	103.0	n/a	n/a	n/a	<1.38E-01
S96V000058	AP-105, 5AP-96-IB	1.47E+01	n/a	n/a	8.28E-01	103.0	n/a	n/a	n/a	<1.38E-01

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~~WHC~~-SD-WM-DP-202, REV. 1

Aluminium -ICP-Acid Digest-Liq
Procedure: LA-505-151/161

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µg/mL	Serial Dilution µg/mL	Serial Dilution % Difference
S96V000050	AP-105, 5AP-96-1C	1.74E+04	1.75E+04	0.6	1.25E+01	89.8	66.6	n/a	n/a	1.31E-01	1.78E+04	2.3
S96V000051	AP-105, 5AP-96-2C	1.77E+04	1.67E+04	5.8	1.25E+01	89.8	n/a	n/a	n/a	1.31E-01	n/a	n/a
S96V000052	AP-105, 5AP-96-3C	1.72E+04	1.76E+04	2.3	1.25E+01	89.8	n/a	n/a	n/a	1.31E-01	n/a	n/a
S96V000054	AP-105, 5AP-96-4	1.77E+04	1.73E+04	2.3	1.25E+01	89.8	n/a	n/a	n/a	1.31E-01	n/a	n/a
S96V000060	AP-105, 5AP-96-IB	7.42E+00	6.98E+00	6.1	2.50E+00	89.8	n/a	n/a	n/a	1.31E-01	n/a	n/a

Chromium -ICP-Acid Digest-Liq
Procedure: LA-505-151/161

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µg/mL	Serial Dilution µg/mL	Serial Dilution % Difference
S96V000050	AP-105, 5AP-96-1C	2.13E+02	2.13E+02	0.00	2.50E+00	88.6	89.6	n/a	n/a	<1.00E-02	2.18E+02	2.3
S96V000051	AP-105, 5AP-96-2C	2.16E+02	2.05E+02	5.2	2.50E+00	88.6	n/a	n/a	n/a	<1.00E-02	n/a	n/a
S96V000052	AP-105, 5AP-96-3C	2.11E+02	2.15E+02	1.9	2.50E+00	88.6	n/a	n/a	n/a	<1.00E-02	n/a	n/a
S96V000054	AP-105, 5AP-96-4	2.16E+02	2.11E+02	2.3	2.50E+00	88.6	n/a	n/a	n/a	<1.00E-02	n/a	n/a
S96V000060	AP-105, 5AP-96-IB	<5.00E-01	<5.00E-01	n/a	5.00E-01	88.6	n/a	n/a	n/a	<1.00E-02	n/a	n/a

Iron -ICP-Acid Digest-Liquid
Procedure: LA-505-151/161

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µg/mL	Serial Dilution µg/mL	Serial Dilution % Difference
S96V000050	AP-105, 5AP-96-1C	<1.25E+01	<1.25E+01	n/a	1.25E+01	91.0	91.8	n/a	n/a	<5.00E-02	<6.25E+01	n/a
S96V000051	AP-105, 5AP-96-2C	<1.25E+01	<1.25E+01	n/a	1.25E+01	91.0	n/a	n/a	n/a	<5.00E-02	n/a	n/a
S96V000052	AP-105, 5AP-96-3C	<1.25E+01	<1.25E+01	n/a	1.25E+01	91.0	n/a	n/a	n/a	<5.00E-02	n/a	n/a
S96V000054	AP-105, 5AP-96-4	<1.25E+01	<1.25E+01	n/a	1.25E+01	91.0	n/a	n/a	n/a	<5.00E-02	n/a	n/a
S96V000060	AP-105, 5AP-96-IB	<2.50E+00	<2.50E+00	n/a	2.50E+00	91.0	n/a	n/a	n/a	<5.00E-02	n/a	n/a

Manganese -ICP-Acid Digest-Liq
Procedure: LA-505-151/161

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µg/mL	Serial Dilution µg/mL	Serial Dilution % Difference
S96V000050	AP-105, 5AP-96-1C	<2.50E+00	<2.50E+00	n/a	2.50E+00	86.4	87.0	n/a	n/a	<1.00E-02	<1.25E+01	n/a
S96V000051	AP-105, 5AP-96-2C	<2.50E+00	<2.50E+00	n/a	2.50E+00	86.4	n/a	n/a	n/a	<1.00E-02	n/a	n/a
S96V000052	AP-105, 5AP-96-3C	<2.50E+00	<2.50E+00	n/a	2.50E+00	86.4	n/a	n/a	n/a	<1.00E-02	n/a	n/a
S96V000054	AP-105, 5AP-96-4	<2.50E+00	<2.50E+00	n/a	2.50E+00	86.4	n/a	n/a	n/a	<1.00E-02	n/a	n/a
S96V000060	AP-105, 5AP-96-IB	<5.00E-01	<5.00E-01	n/a	5.00E-01	86.4	n/a	n/a	n/a	<1.00E-02	n/a	n/a

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Sodium -ICP-Acid Digest-Liquid
Procedure: LA-505-151/161

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µg/mL	Serial Dilution µg/mL	Serial Dilution % Difference
S96V000050	AP-105, 5AP-96-1C	1.13E+05	1.13E+05	0.0	2.50E+01	104.6	-3.4	n/a	n/a	9.85E-01	1.16E+05	2.7
S96V000051	AP-105, 5AP-96-2C	1.16E+05	1.09E+05	6.3	2.50E+01	104.6	n/a	n/a	n/a	9.85E-01	n/a	n/a
S96V000052	AP-105, 5AP-96-3C	1.10E+05	1.13E+05	2.7	2.50E+01	104.6	n/a	n/a	n/a	9.85E-01	n/a	n/a
S96V000054	AP-105, 5AP-96-4	1.14E+05	1.12E+05	1.8	2.50E+01	104.6	n/a	n/a	n/a	9.85E-01	n/a	n/a
S96V000060	AP-105, 5AP-96-IB	4.90E+01	5.50E+01	11.5	5.00E+00	104.6	n/a	n/a	n/a	9.85E-01	n/a	n/a

Nickel -ICP-Acid Digest-Liquid
Procedure: LA-505-151/161

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µg/mL	Serial Dilution µg/mL	Serial Dilution % Difference
S96V000050	AP-105, 5AP-96-1C	<5.00E+00	<5.00E+00	n/a	5.00E+00	91.2	92.4	n/a	n/a	<2.00E-02	<2.50E+01	n/a
S96V000051	AP-105, 5AP-96-2C	<5.00E+00	<5.00E+00	n/a	5.00E+00	91.2	n/a	n/a	n/a	<2.00E-02	n/a	n/a
S96V000052	AP-105, 5AP-96-3C	<5.00E+00	<5.00E+00	n/a	5.00E+00	91.2	n/a	n/a	n/a	<2.00E-02	n/a	n/a
S96V000054	AP-105, 5AP-96-4	<5.00E+00	<5.00E+00	n/a	5.00E+00	91.2	n/a	n/a	n/a	<2.00E-02	n/a	n/a
S96V000060	AP-105, 5AP-96-IB	<1.00E+00	<1.00E+00	n/a	1.00E+00	91.2	n/a	n/a	n/a	<2.00E-02	n/a	n/a

Silicon -ICP-Acid Digest-Liq
Procedure: LA-505-151/161

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µg/mL	Serial Dilution µg/mL	Serial Dilution % Difference
S96V000050	AP-105, 5AP-96-1C	9.44E+01	7.37E+01	24.6	1.25E+01	97.6	65.4	n/a	n/a	1.17E+00	9.70E+01	2.8
S96V000051	AP-105, 5AP-96-2C	8.44E+01	8.36E+01	1.0	1.25E+01	97.6	n/a	n/a	n/a	1.17E+00	n/a	n/a
S96V000052	AP-105, 5AP-96-3C	8.36E+01	8.69E+01	3.9	1.25E+01	97.6	n/a	n/a	n/a	1.17E+00	n/a	n/a
S96V000054	AP-105, 5AP-96-4	9.09E+01	8.51E+01	6.6	1.25E+01	97.6	n/a	n/a	n/a	1.17E+00	n/a	n/a
S96V000060	AP-105, 5AP-96-IB	6.82E+01	7.43E+01	8.6	2.50E+00	97.6	n/a	n/a	n/a	1.17E+00	n/a	n/a

Uranium -ICP-Acid Digest-Liq
Procedure: LA-505-151/161

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µg/mL	Serial Dilution µg/mL	Serial Dilution % Difference
S96V000050	AP-105, 5AP-96-1C	<1.25E+02	<1.25E+02	n/a	1.25E+02	85.6	88.2	n/a	n/a	<5.00E-01	<6.25E+02	n/a
S96V000051	AP-105, 5AP-96-2C	<1.25E+02	<1.25E+02	n/a	1.25E+02	85.6	n/a	n/a	n/a	<5.00E-01	n/a	n/a
S96V000052	AP-105, 5AP-96-3C	<1.25E+02	<1.25E+02	n/a	1.25E+02	85.6	n/a	n/a	n/a	<5.00E-01	n/a	n/a
S96V000054	AP-105, 5AP-96-4	<1.25E+02	<1.25E+02	n/a	1.25E+02	85.6	n/a	n/a	n/a	<5.00E-01	n/a	n/a
S96V000060	AP-105, 5AP-96-IB	<2.50E+01	<2.50E+01	n/a	2.50E+01	85.6	n/a	n/a	n/a	<5.00E-01	n/a	n/a

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TIC by Acid/Coulometry
Procedure: LA-342-100

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/mL
S96V000047	AP-105, 5AP-96-1C	2.74E+03	n/a	n/a	5.00E+00	98.7	100.6	n/a	n/a	1.90E+00
S96V000048	AP-105, 5AP-96-2C	2.78E+03	n/a	n/a	5.00E+00	98.7	105.3	108.0	2.5	1.90E+00
S96V000049	AP-105, 5AP-96-3C	2.51E+03	n/a	n/a	5.00E+00	98.7	102.6	n/a	n/a	1.90E+00
S96V000058	AP-105, 5AP-96-IB	7.00E+00	n/a	n/a	5.00E+00	98.7	101.7	n/a	n/a	1.90E+00

Tot. Organic Carbon by Coul.
Procedure: LA-344-105

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/mL
S96V000047	AP-105, 5AP-96-1C	1.50E+03	n/a	n/a	5.50E+01	94.0	n/a	n/a	n/a	7.00E-01
S96V000048	AP-105, 5AP-96-2C	1.48E+03	n/a	n/a	5.50E+01	94.0	90.2	89.5	0.8	7.00E-01
S96V000049	AP-105, 5AP-96-3C	1.53E+03	n/a	n/a	5.50E+01	94.0	n/a	n/a	n/a	7.00E-01
S96V000053	AP-105, 5AP-96-4	1.44E+03	n/a	n/a	5.50E+01	94.0	n/a	n/a	n/a	7.00E-01
S96V000058	AP-105, 5AP-96-IB	7.70E+00	n/a	n/a	5.50E+00	94.0	n/a	n/a	n/a	7.00E-01

Total Carbon by Coulometry
Procedure: LA-344-105

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/mL
S96V000047	AP-105, 5AP-96-1C	4.67E+03	n/a	n/a	5.50E+01	94.7	n/a	n/a	n/a	5.00E+00
S96V000048	AP-105, 5AP-96-2C	4.65E+03	n/a	n/a	5.50E+01	94.7	107.7	107.0	0.7	5.00E+00
S96V000049	AP-105, 5AP-96-3C	4.81E+03	n/a	n/a	5.50E+01	94.7	n/a	n/a	n/a	5.00E+00
S96V000058	AP-105, 5AP-96-IB	5.06E+01	n/a	n/a	5.50E+00	94.7	n/a	n/a	n/a	5.00E+00

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Uranium by Phosphorescence
Procedure: LA-925-009

Labcore Number	Customer Identification	Sample Result µg/mL	Duplicate Result µg/mL	Sample Precision RPD	Detection Limit µg/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µg/mL
S96V000047	AP-105, 5AP-96-1C	1.42E+01	1.39E+01	2.13	3.70E-03	100.2	87.4	90.5	3.5	5.59E-02
S96V000048	AP-105, 5AP-96-2C	1.97E+01	1.73E+01	12.97	4.07E-02	100.5	94.2	92.6	1.8	<4.07E-02
S96V000049	AP-105, 5AP-96-3C	1.67E+01	n/a	n/a	4.07E-02	100.5	n/a	n/a	n/a	<4.07E-02
S96V000058	AP-105, 5AP-96-IB	<3.70E-03	<3.70E-03	n/a	3.70E-03	104.5	108.8	100.3	5.5	6.10E-03

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Alpha in Liquid Samples
Procedure: LA-508-101

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µCi/mL	Counting Error %
S96V000050	AP-105, 5AP-96-1C	<1.02E-02	<6.76E-03	n/a	1.21E-02	103.0	n/a	n/a	n/a	<1.02E-02	500
S96V000051	AP-105, 5AP-96-2C	<1.02E-02	<5.05E-03	n/a	1.21E-02	103.0	n/a	n/a	n/a	<1.02E-02	500
S96V000052	AP-105, 5AP-96-3C	<5.05E-03	<5.05E-03	n/a	1.21E-02	103.0	n/a	n/a	n/a	<1.02E-02	500
S96V000054	AP-105, 5AP-96-4	<5.05E-03	<5.05E-03	n/a	1.21E-02	103.0	n/a	n/a	n/a	<1.02E-02	500
S96V000060	AP-105, 5AP-96-IB	<2.50E-05	<4.19E-05	n/a	5.97E-05	103.0	87.7	91.4	4.1	<1.02E-02	500

Beta in Liquid Samples
Procedure: LA-508-101

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µCi/mL	Counting Error %
S96V000050	AP-105, 5AP-96-1C	1.08E+02	1.08E+02	0.0	3.71E-02	100.3	n/a	n/a	n/a	1.59E-01	1.2
S96V000051	AP-105, 5AP-96-2C	1.12E+02	1.06E+02	5.5	3.71E-02	100.3	n/a	n/a	n/a	1.59E-01	0.4
S96V000052	AP-105, 5AP-96-3C	1.07E+02	1.08E+02	0.9	3.71E-02	100.3	n/a	n/a	n/a	1.59E-01	0.4
S96V000054	AP-105, 5AP-96-4	1.11E+02	1.10E+02	0.9	3.71E-02	100.3	n/a	n/a	n/a	1.59E-01	0.4
S96V000060	AP-105, 5AP-96-IB	3.02E-04	2.19E-04	31.9	1.84E-04	100.3	101.3	97.4	3.9	1.59E-01	47.1

HNF ~~WHC~~-SD-WM-DP-202, REV. 1

Gamma Energy Analysis by Procedure LA-548-121

Ce/Pr-144 by GEA

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Co-60 Standard % Recovery	Cs-137 Standard % Recovery	Preparation Blank µCi/mL	Counting Error %
S96V000050	AP-105, 5AP-96-1C	<7.20E-01	<7.27E-01	n/a	7.20E-01	99.2	96.3	<1.22E-03	n/a
S96V000051	AP-105, 5AP-96-2C	<7.31E-01	n/a	n/a	7.31E-01	99.2	96.3	<1.22E-03	n/a
S96V000052	AP-105, 5AP-96-3C	<7.23E-01	n/a	n/a	7.23E-01	99.2	96.3	<1.22E-03	n/a
S96V000060	AP-105, 5AP-96-IB	<5.24E-02	n/a	n/a	5.24E-02	99.2	96.3	<1.22E-03	n/a

Cobalt-60 by GEA

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Co-60 Standard % Recovery	Cs-137 Standard % Recovery	Preparation Blank µCi/mL	Counting Error %
S96V000050	AP-105, 5AP-96-1C	<6.07E-03	<7.31E-03	n/a	6.07E-03	99.2	96.3	<1.14E-04	n/a
S96V000051	AP-105, 5AP-96-2C	<7.57E-03	n/a	n/a	7.57E-03	99.2	96.3	<1.14E-04	n/a
S96V000052	AP-105, 5AP-96-3C	<6.71E-03	n/a	n/a	6.71E-03	99.2	96.3	<1.14E-04	n/a
S96V000060	AP-105, 5AP-96-IB	<6.71E-03	n/a	n/a	6.71E-03	99.2	96.3	<1.14E-04	n/a

Cesium-134 by GEA

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Co-60 Standard % Recovery	Cs-137 Standard % Recovery	Preparation Blank µCi/mL	Counting Error %
S96V000050	AP-105, 5AP-96-1C	<5.50E-02	<5.46E-02	n/a	5.50E-02	99.2	96.3	<1.01E-04	n/a
S96V000051	AP-105, 5AP-96-2C	<5.59E-02	n/a	n/a	5.59E-02	99.2	96.3	<1.01E-04	n/a
S96V000052	AP-105, 5AP-96-3C	<5.55E-02	n/a	n/a	5.55E-02	99.2	96.3	<1.01E-04	n/a
S96V000060	AP-105, 5AP-96-IB	<4.18E-03	n/a	n/a	4.18E-03	99.2	96.3	<1.01E-04	n/a

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Gamma Energy Analysis by Procedure LA-548-121

Cesium-137 by GEA

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Co-60 Standard % Recovery	Cs-137 Standard % Recovery	Preparation Blank µCi/mL	Counting Error %
S96V000050	AP-105, 5AP-96-1C	1.10E+02	1.12E+02	1.8	0.00E+00	99.2	96.3	<2.91E-04	0.3
S96V000051	AP-105, 5AP-96-2C	1.14E+02	n/a	n/a	0.00E+00	99.2	96.3	<2.91E-04	0.3
S96V000052	AP-105, 5AP-96-3C	1.12E+02	n/a	n/a	0.00E+00	99.2	96.3	<2.91E-04	0.3
S96V000060	AP-105, 5AP-96-IB	<1.49E-02	n/a	n/a	1.49E-02	99.2	96.3	<2.91E-04	n/a

Europium-154 by GEA

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Co-60 Standard % Recovery	Cs-137 Standard % Recovery	Preparation Blank µCi/mL	Counting Error %
S96V000050	AP-105, 5AP-96-1C	<2.36E-02	<2.82E-02	n/a	2.36E-02	99.2	96.3	<3.45E-04	n/a
S96V000051	AP-105, 5AP-96-2C	<2.41E-02	n/a	n/a	2.41E-02	99.2	96.3	<3.45E-04	n/a
S96V000052	AP-105, 5AP-96-3C	<2.63E-02	n/a	n/a	2.63E-02	99.2	96.3	<3.45E-04	n/a
S96V000060	AP-105, 5AP-96-IB	<1.53E-02	n/a	n/a	1.53E-02	99.2	96.3	<3.45E-04	n/a

Europium-155 by GEA

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Co-60 Standard % Recovery	Cs-137 Standard % Recovery	Preparation Blank µCi/mL	Counting Error %
S96V000050	AP-105, 5AP-96-1C	<2.02E-01	<2.04E-01	n/a	2.02E-01	99.2	96.3	<3.02E-04	n/a
S96V000051	AP-105, 5AP-96-2C	<2.05E-01	n/a	n/a	2.05E-01	99.2	96.3	<3.02E-04	n/a
S96V000052	AP-105, 5AP-96-3C	<2.04E-01	n/a	n/a	2.04E-01	99.2	96.3	<3.02E-04	n/a
S96V000060	AP-105, 5AP-96-IB	<1.80E-02	n/a	n/a	1.80E-02	99.2	96.3	<3.02E-04	n/a

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~~WHG~~-SD-WM-DP-202, REV. 1

Gamma Energy Analysis by Procedure LA-548-121

Niobium-94 by GEA

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Co-60 Standard % Recovery	Cs-137 Standard % Recovery	Preparation Blank µCi/mL	Counting Error %
S96V000050	AP-105, 5AP-96-1C	<1.34E-02	<1.34E-02	n/a	1.34E-02	99.2	96.3	<1.03E-04	n/a
S96V000051	AP-105, 5AP-96-2C	<1.41E-02	n/a	n/a	1.41E-02	99.2	96.3	<1.03E-04	n/a
S96V000052	AP-105, 5AP-96-3C	<1.37E-02	n/a	n/a	1.37E-02	99.2	96.3	<1.03E-04	n/a
S96V000060	AP-105, 5AP-96-IB	<5.69E-03	n/a	n/a	5.69E-03	99.2	96.3	<1.03E-04	n/a

Radium-226 by GEA

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Co-60 Standard % Recovery	Cs-137 Standard % Recovery	Preparation Blank µCi/mL	Counting Error %
S96V000050	AP-105, 5AP-96-1C	<1.43E+00	<1.43E+00	n/a	1.43E+00	99.2	96.3	<2.08E-03	n/a
S96V000051	AP-105, 5AP-96-2C	<1.45E+00	n/a	n/a	1.45E+00	99.2	96.3	<2.08E-03	n/a
S96V000052	AP-105, 5AP-96-3C	<1.43E+00	n/a	n/a	1.43E+00	99.2	96.3	<2.08E-03	n/a
S96V000060	AP-105, 5AP-96-IB	<1.12E-01	n/a	n/a	1.12E-01	99.2	96.3	<2.08E-03	n/a

Ru/Rh-106 by GEA

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Co-60 Standard % Recovery	Cs-137 Standard % Recovery	Preparation Blank µCi/mL	Counting Error %
S96V000050	AP-105, 5AP-96-1C	<1.10E+00	<1.11E+00	n/a	1.10E+00	99.2	96.3	<2.17E-03	n/a
S96V000051	AP-105, 5AP-96-2C	<1.13E+00	n/a	n/a	1.13E+00	99.2	96.3	<2.17E-03	n/a
S96V000052	AP-105, 5AP-96-3C	<1.11E+00	n/a	n/a	1.11E+00	99.2	96.3	<2.17E-03	n/a
S96V000060	AP-105, 5AP-96-IB	<1.06E-01	n/a	n/a	1.06E-01	99.2	96.3	<2.17E-03	n/a

C-14 Small Volume
Procedure: LA-348-104

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µCi/mL	Counting Error %
S96V000047	AP-105, 5AP-96-1C	3.91E-04	3.67E-04	6.3	2.27E-06	90.2	86.7	85.9	0.9	<2.27E-06	1.0
S96V000048	AP-105, 5AP-96-2C	3.98E-04	n/a	n/a	2.27E-06	90.2	n/a	n/a	n/a	<2.27E-06	1.0
S96V000049	AP-105, 5AP-96-3C	2.13E-04	n/a	n/a	2.28E-06	90.2	n/a	n/a	n/a	<2.27E-06	1.3
S96V000058	AP-105, 5AP-96-IB	1.48E-05	<2.10E-06	n/a	2.10E-06	75.2	85.8	86.4	0.7	6.63E-05	3.4

Tritium By Lachat
Procedure: LA-218-114

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µCi/mL	Counting Error %
S96V000047	AP-105, 5AP-96-1C	4.65E-03	n/a	n/a	3.10E-05	114.5	101.9	104.7	2.7	3.92E-05	1.3
S96V000048	AP-105, 5AP-96-2C	1.04E-03	n/a	n/a	2.82E-06	114.5	n/a	n/a	n/a	3.92E-05	0.8
S96V000049	AP-105, 5AP-96-3C	2.76E-02	n/a	n/a	3.12E-05	114.5	n/a	n/a	n/a	3.92E-05	0.5
S96V000058	AP-105, 5AP-96-IB	8.98E-05	n/a	n/a	3.09E-05	114.5	n/a	n/a	n/a	3.92E-05	5.3

Selenium-79 by Liquid Scintillation
Procedure: LA-365-132

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µCi/mL	Counting Error %	Carrier Recovery %
S96V000050	AP-105, 5AP-96-1C	3.05E-04	3.46E-04	12.6	2.31E-05	n/a	n/a	n/a	n/a	1.97E-04	2.9	92.5
S96V000051	AP-105, 5AP-96-2C	3.31E-05	n/a	n/a	2.68E-05	n/a	n/a	n/a	n/a	1.97E-04	2.9	79.5
S96V000052	AP-105, 5AP-96-3C	2.74E-04	n/a	n/a	2.27E-05	n/a	n/a	n/a	n/a	1.97E-04	2.9	93.5
S96V000060	AP-105, 5AP-96-IB	1.07E-04	n/a	n/a	2.87E-05	n/a	n/a	n/a	n/a	1.97E-04	3.7	92.5

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~~WHC~~-SD-WM-DP-202, REV. 1

Strontium - 89/90 High Level
Procedure: LA-220-101

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µCi/mL	Counting Error %	Carrier Recovery %
S96V000050	AP-105, 5AP-96-1C	3.14E-01	n/a	n/a	1.33E-03	97.9	n/a	n/a	n/a	5.35E-05	2.6	90.3
S96V000051	AP-105, 5AP-96-2C	3.16E-01	n/a	n/a	1.32E-03	97.9	n/a	n/a	n/a	5.35E-05	2.5	89.5
S96V000052	AP-105, 5AP-96-3C	1.03E-03	n/a	n/a	1.31E-03	97.9	n/a	n/a	n/a	5.35E-05	99.0	90.4
S96V000060	AP-105, 5AP-96-IB	2.33E-04	n/a	n/a	5.13E-05	97.9	102.9	102.5	0.7	5.35E-05	23.9	91.7

Iodine-129 by Separation and GEA
Procedure: LA-378-103

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µCi/mL	Counting Error %	Carrier Recovery %
S96V000047	AP-105, 5AP-96-1C	1.15E-04	1.11E-04	3.5	4.47E-06	75.0	71.4	65.7	8.3	<1.09E-05	3.1	59.3
S96V000048	AP-105, 5AP-96-2C	1.40E-04	1.44E-04	2.8	5.22E-06	72.5	79.3	78.4	1.1	<1.46E-05	3.3	50.8
S96V000049	AP-105, 5AP-96-3C	1.19E-04	n/a	n/a	4.33E-06	72.5	n/a	n/a	n/a	<1.46E-05	3.3	61.3
S96V000058	AP-105, 5AP-96-IB	<1.63E-05	<1.53E-05	n/a	1.63E-05	63.6	67.9	67.5	0.6	<1.57E-05	0.0	47.5

Np237 by TTA Extraction
Procedure: LA-933-141

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µCi/mL	Counting Error %
S96V000050	AP-105, 5AP-96-1C	<1.02E-03	n/a	n/a	2.14E-03	67.0	82.6	83.1	0.6	<9.33E-04	474
S96V000051	AP-105, 5AP-96-2C	<1.70E-03	n/a	n/a	2.14E-03	67.0	n/a	n/a	n/a	<9.33E-04	192
S96V000052	AP-105, 5AP-96-3C	<1.20E-03	n/a	n/a	1.96E-03	67.0	n/a	n/a	n/a	<9.33E-04	445
S96V000060	AP-105, 5AP-96-IB	<1.74E-03	n/a	n/a	2.14E-03	67.0	n/a	n/a	n/a	<9.33E-04	183

Technetium-99 Liq. Scint.
Procedure: LA-438-101

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µCi/mL	Counting Error %	Tracer Recovery %
S96V000050	AP-105, 5AP-96-1C	5.58E-02	n/a	n/a	3.52E-04	84.7	98.7	100.0	1.3	<3.59E-04	1.3	72.2
S96V000051	AP-105, 5AP-96-2C	6.44E-02	n/a	n/a	3.60E-04	84.7	n/a	n/a	n/a	<3.59E-04	1.3	70.7
S96V000052	AP-105, 5AP-96-3C	5.96E-02	n/a	n/a	3.57E-04	84.7	n/a	n/a	n/a	<3.59E-04	1.3	71.2
S96V000060	AP-105, 5AP-96-IB	<3.58E-04	n/a	n/a	3.58E-04	84.7	n/a	n/a	n/a	<3.59E-04	9.6	71.0

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~~WHC~~-SD-WM-DP-202, REV. 1

Pu-238 by Ion Exchange
Procedure: LA-943-128

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Pu-239 Standard % Recovery	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µCi/mL	Counting Error %	Pu-236 Tracer % Recovery
S96V000050	AP-105, 5AP-96-1C	<1.77E-04	n/a	n/a	1.77E-04	94.0	n/a	n/a	n/a	<1.69E-04	9.7	91.3
S96V000051	AP-105, 5AP-96-2C	<2.02E-04	n/a	n/a	2.02E-04	94.0	n/a	n/a	n/a	<1.69E-04	6.9	81.3
S96V000052	AP-105, 5AP-96-3C	<1.87E-04	n/a	n/a	1.87E-04	94.0	n/a	n/a	n/a	<1.69E-04	100.0	88.5
S96V000060	AP-105, 5AP-96-IB	<1.77E-04	n/a	n/a	1.77E-04	94.0	n/a	n/a	n/a	<1.69E-04	11.5	90.5

Pu-239/240 by TRU-SPEC Resin
Procedure: LA-943-128

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Pu-239 Standard % Recovery	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µCi/mL	Counting Error %	Pu-236 Tracer % Recovery
S96V000050	AP-105, 5AP-96-1C	<1.77E-04	n/a	n/a	1.77E-04	94.0	91.9	88.6	3.7	<1.69E-04	11.2	91.3
S96V000051	AP-105, 5AP-96-2C	<2.02E-04	n/a	n/a	2.02E-04	94.0	n/a	n/a	n/a	<1.69E-04	10.4	81.3
S96V000052	AP-105, 5AP-96-3C	<1.87E-04	n/a	n/a	1.87E-04	94.0	88.6	86.6	2.3	<1.69E-04	10.5	88.5
S96V000060	AP-105, 5AP-96-IB	<1.77E-04	n/a	n/a	1.77E-04	94.0	n/a	n/a	n/a	<1.69E-04	100.0	90.5

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Am-241 by Extraction
Procedure: LA-953-103

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Standard Recovery %	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µCi/mL	Counting Error %	Am-243 Tracer % Recovery
S96V000050	AP-105, 5AP-96-1C	<2.69E-04	<3.00E-04	n/a	2.69E-04	88.2	n/a	n/a	n/a	<2.48E-04	100.0	88.3
S96V000051	AP-105, 5AP-96-2C	<3.08E-04	<3.56E-04	n/a	3.08E-04	88.2	n/a	n/a	n/a	<2.48E-04	10.1	84.3
S96V000052	AP-105, 5AP-96-3C	<2.61E-04	<3.58E-04	n/a	2.61E-04	88.2	88.2	82.1	7.2	<2.48E-04	100.0	91.9
S96V000060	AP-105, 5AP-96-IB	<3.02E-04	<3.04E-04	n/a	3.02E-04	88.2	91.6	89.9	1.9	<3.19E-04	100.0	84.1

Cm-243/244 by Extraction
Procedure: LA-953-103

Labcore Number	Customer Identification	Sample Result µCi/mL	Duplicate Result µCi/mL	Sample Precision RPD	Detection Limit µCi/mL	Am-241 Standard % Recovery	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Preparation Blank µCi/mL	Counting Error %	Am-243 Tracer % Recovery
S96V000050	AP-105, 5AP-96-1C	<2.69E-04	<3.00E-04	n/a	2.69E-04	88.2	n/a	n/a	n/a	<2.48E-04	100.0	88.3
S96V000051	AP-105, 5AP-96-2C	<3.08E-04	<3.56E-04	n/a	3.08E-04	88.2	n/a	n/a	n/a	<2.48E-04	100.0	84.3
S96V000052	AP-105, 5AP-96-3C	<2.61E-04	<3.58E-04	n/a	2.61E-04	88.2	n/a	n/a	n/a	<2.48E-04	100.0	91.9
S96V000060	AP-105, 5AP-96-IB	<3.02E-04	<3.04E-04	n/a	3.02E-04	88.2	n/a	n/a	n/a	<3.19E-04	100.0	84.1

VOA

1-Butanol
Procedure: LA-523-405

Labcore Number	Customer Identification	Sample Result µg/L	Sample Result Qualifier	Quantitation Limit µg/L	Continuing Calibration % Difference	Surrogate			Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/L	Blank Result Qualifier
						TOL % Recovery	BFB % Recovery	DCE % Recovery					
S96V000039	AP-105, 5AP-96-1A	2.50E+04	U	2.50E+04	8.6	104	99	106	100	100	0	5.00E+02	U
S96V000040	AP-105, 5AP-96-2A	2.50E+04	U	2.50E+04	8.6	99	100	107	n/a	n/a	n/a	5.00E+02	U
S96V000041	AP-105, 5AP-96-3A	2.50E+04	U	2.50E+04	8.6	100	100	106	n/a	n/a	n/a	5.00E+02	U
S96V000042	AP-105, 5AP-96-TB	2.50E+04	U	2.50E+04	8.6	100	100	106	n/a	n/a	n/a	5.00E+02	U
S96V000061	AP-105, 5AP-96-OB	2.50E+04	U	2.50E+04	8.6	100	100	105	n/a	n/a	n/a	5.00E+02	U

2-Hexanone
Procedure: LA-523-405

Labcore Number	Customer Identification	Sample Result µg/L	Sample Result Qualifier	Quantitation Limit µg/L	Continuing Calibration % Difference	Surrogate			Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/L	Blank Result Qualifier
						TOL % Recovery	BFB % Recovery	DCE % Recovery					
S96V000039	AP-105, 5AP-96-1A	5.00E+02	U	5.00E+02	7.4	104	99	106	92	96	4	1.00E+01	U
S96V000040	AP-105, 5AP-96-2A	5.00E+02	U	5.00E+02	7.4	99	100	107	n/a	n/a	n/a	1.00E+01	U
S96V000041	AP-105, 5AP-96-3A	5.00E+02	U	5.00E+02	7.4	100	100	106	n/a	n/a	n/a	1.00E+01	U
S96V000042	AP-105, 5AP-96-TB	5.00E+02	U	5.00E+02	7.4	100	100	106	n/a	n/a	n/a	1.00E+01	U
S96V000061	AP-105, 5AP-96-OB	5.00E+02	U	5.00E+02	7.4	100	100	105	n/a	n/a	n/a	1.00E+01	U

2-Pentanone
Procedure: LA-523-405

Labcore Number	Customer Identification	Sample Result µg/L	Sample Result Qualifier	Quantitation Limit µg/L	Continuing Calibration % Difference	Surrogate			Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/L	Blank Result Qualifier
						TOL % Recovery	BFB % Recovery	DCE % Recovery					
S96V000039	AP-105, 5AP-96-1A	5.00E+02	U	5.00E+02	-0.4	104	99	106	104	104	0	1.00E+01	U
S96V000040	AP-105, 5AP-96-2A	5.00E+02	U	5.00E+02	-0.4	99	100	107	n/a	n/a	n/a	1.00E+01	U
S96V000041	AP-105, 5AP-96-3A	5.00E+02	U	5.00E+02	-0.4	100	100	106	n/a	n/a	n/a	1.00E+01	U
S96V000042	AP-105, 5AP-96-TB	5.00E+02	U	5.00E+02	-0.4	100	100	106	n/a	n/a	n/a	1.00E+01	U
S96V000061	AP-105, 5AP-96-OB	5.00E+02	U	5.00E+02	-0.4	100	100	105	n/a	n/a	n/a	1.00E+01	U

4-Methyl-2-pentanone
Procedure: LA-523-405

Labcore Number	Customer Identification	Sample Result µg/L	Sample Result Qualifier	Quantitation Limit µg/L	Continuing Calibration % Difference	Surrogate			Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/L	Blank Result Qualifier
						TOL % Recovery	BFB % Recovery	DCE % Recovery					
S96V000039	AP-105, 5AP-96-1A	5.00E+02	U	5.00E+02	0.8	104	99	106	104	108	4	1.00E+01	U
S96V000040	AP-105, 5AP-96-2A	5.00E+02	U	5.00E+02	0.8	99	100	107	n/a	n/a	n/a	1.00E+01	U
S96V000041	AP-105, 5AP-96-3A	5.00E+02	U	5.00E+02	0.8	100	100	106	n/a	n/a	n/a	1.00E+01	U
S96V000042	AP-105, 5AP-96-TB	5.00E+02	U	5.00E+02	0.8	100	100	106	n/a	n/a	n/a	1.00E+01	U
S96V000061	AP-105, 5AP-96-OB	5.00E+02	U	5.00E+02	0.8	100	100	105	n/a	n/a	n/a	1.00E+01	U

Surrogates:

		QC Limits (CLP)
TOL	Toluene-d8	88-110%
BFB	Bromofluorobenzene	86-115%
DCE	1,2-Dichloroethane-d4	76-114%

Q (qualifiers):
U indicates the compound was analyzed for, but not detected. The U-flagged number is the quantitation limit, including applicable factors related to sample concentrating.
J indicates the estimated value. Spectra meet criteria, but response is below the quantitation limit for the target compound.

HNF
~~WHC~~-SD-WM-DP-202, REV. 1

VOA

Acetone
Procedure: LA-523-405

Labcore Number	Customer Identification	Sample Result µg/L	Sample Result Qualifier	Quantitation Limit µg/L	Continuing Calibration % Difference	Surrogate TOL % Recovery	Surrogate BFB % Recovery	Surrogate DCE % Recovery	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/L	Blank Result Qualifier
S96V000039	AP-105, 5AP-96-1A	5.50E+02		5.00E+02	0.9	104	99	106	82	82	0	1.00E+01	U
S96V000040	AP-105, 5AP-96-2A	4.90E+02	J	5.00E+02	0.9	99	100	107	n/a	n/a	n/a	1.00E+01	U
S96V000041	AP-105, 5AP-96-3A	4.40E+02	J	5.00E+02	0.9	100	100	106	n/a	n/a	n/a	1.00E+01	U
S96V000042	AP-105, 5AP-96-TB	5.00E+02	U	5.00E+02	0.9	100	100	106	n/a	n/a	n/a	1.00E+01	U
S96V000061	AP-105, 5AP-96-OB	5.00E+02	U	5.00E+02	0.9	100	100	105	n/a	n/a	n/a	1.00E+01	U

2-Butanone
Procedure: LA-523-405

Labcore Number	Customer Identification	Sample Result µg/L	Sample Result Qualifier	Quantitation Limit µg/L	Continuing Calibration % Difference	Surrogate TOL % Recovery	Surrogate BFB % Recovery	Surrogate DCE % Recovery	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/L	Blank Result Qualifier
S96V000039	AP-105, 5AP-96-1A	5.00E+02	U	5.00E+02	8.0	104	99	106	88	88	0	1.00E+01	U
S96V000040	AP-105, 5AP-96-2A	5.00E+02	U	5.00E+02	8.0	99	100	107	n/a	n/a	n/a	1.00E+01	U
S96V000041	AP-105, 5AP-96-3A	5.00E+02	U	5.00E+02	8.0	100	100	106	n/a	n/a	n/a	1.00E+01	U
S96V000042	AP-105, 5AP-96-TB	5.00E+02	U	5.00E+02	8.0	100	100	106	n/a	n/a	n/a	1.00E+01	U
S96V000061	AP-105, 5AP-96-OB	5.00E+02	U	5.00E+02	8.0	100	100	105	n/a	n/a	n/a	1.00E+01	U

Tetrahydrofuran
Procedure: LA-523-405

Labcore Number	Customer Identification	Sample Result µg/L	Sample Result Qualifier	Quantitation Limit µg/L	Continuing Calibration % Difference	Surrogate TOL % Recovery	Surrogate BFB % Recovery	Surrogate DCE % Recovery	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/L	Blank Result Qualifier
S96V000039	AP-105, 5AP-96-1A	5.00E+02	U	5.00E+02	2.2	104	99	106	96	100	4	1.00E+01	U
S96V000040	AP-105, 5AP-96-2A	5.00E+02	U	5.00E+02	2.2	99	100	107	n/a	n/a	n/a	1.00E+01	U
S96V000041	AP-105, 5AP-96-3A	5.00E+02	U	5.00E+02	2.2	100	100	106	n/a	n/a	n/a	1.00E+01	U
S96V000042	AP-105, 5AP-96-TB	5.00E+02	U	5.00E+02	2.2	100	100	106	n/a	n/a	n/a	1.00E+01	U
S96V000061	AP-105, 5AP-96-OB	5.00E+02	U	5.00E+02	2.2	100	100	105	n/a	n/a	n/a	1.00E+01	U

Surrogates:

		QC Limits (CLP)
TOL	Toluene-d8	88-110%
BFB	Bromofluorobenzene	86-115%
DCE	1,2-Dichloroethane-d4	76-114%

Q (qualifiers):
U indicates the compound was analyzed for, but not detected. The U-flagged number is the quantitation limit, including applicable factors related to sample concentrating.
J indicates the estimated value. Spectra meet criteria, but response is below the quantitation limit for the target compound.

HNF
~~WHC~~-SD-WM-DP-202, REV. 1

Semi-VOA

2-Butoxyethanol
Procedure: LA-523-406

Labcore Number	Customer Identification	Sample Result µg/L	Sample Result Qualifier	Quantitation Limit µg/L	Continuing Calibration % Difference	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/L	Blank Result Qualifier
S96V000043	AP-105, 5AP-96-1B	2.00E+03	U	2.00E+03	-4.7	88.0	100	13	2.00E+02	U
S96V000044	AP-105, 5AP-96-2B	2.00E+03	U	2.00E+03	-4.7	n/a	n/a	n/a	2.00E+02	U
S96V000045	AP-105, 5AP-96-3B	2.00E+03	U	2.00E+03	-4.7	n/a	n/a	n/a	2.00E+02	U
S96V000046	AP-105, 5AP-96-TB	2.00E+02	U	2.00E+02	-4.7	n/a	n/a	n/a	2.00E+02	U
S96V000062	AP-105, 5AP-96-OB	2.00E+02	U	2.00E+02	-4.7	n/a	n/a	n/a	2.00E+02	U

Tri-n-butylphosphate
Procedure: LA-523-406

Labcore Number	Customer Identification	Sample Result µg/L	Sample Result Qualifier	Quantitation Limit µg/L	Continuing Calibration % Difference	Spike Recovery %	Spike Duplicate % Recovery	Spike Dupl. Precision RPD	Blank µg/L	Blank Result Qualifier
S96V000043	AP-105, 5AP-96-1B	2.10E+03	B	2.00E+03	-4.2	91.6	88.0	4	2.70E+01	J
S96V000044	AP-105, 5AP-96-2B	2.40E+03	B	2.00E+03	-4.2	n/a	n/a	n/a	2.70E+01	J
S96V000045	AP-105, 5AP-96-3B	1.50E+03	JB	2.00E+03	-4.2	n/a	n/a	n/a	2.70E+01	J
S96V000046	AP-105, 5AP-96-TB	2.60E+01	JB	2.00E+02	-4.2	n/a	n/a	n/a	2.70E+01	J
S96V000062	AP-105, 5AP-96-OB	2.00E+02	U	2.00E+02	-4.2	n/a	n/a	n/a	2.70E+01	J

Surrogate Recovery

Labcore Number	Customer Identification	S1 %	S2 %	S3 %	S4 %	S5 %	S6 %	S7 %	S8 %
S96V000043	AP-105, 5AP-96-1B	0	0	0	42	91	65	0	94
S96V000044	AP-105, 5AP-96-2B	0	0	0	40	84	88	0	91
S96V000045	AP-105, 5AP-96-3B	0	0	0	38	84	67	0	84
S96V000046	AP-105, 5AP-96-TB	82	93	94	40	91	76	89	107
S96V000062	AP-105, 5AP-96-OB	74	88	89	34	90	70	80	108

Surrogates:		QC Limits (CLP)
S1	2-Fluorophenol-d5	21-110%
S2	Phenol-d5	10-110%
S3	2-Chlorophenol-d4	33-110%
S4	1,2-Dichlorobenzene-d4	16-110%
S5	Nitrobenzene-d5	35-114%
S6	2-Fluorobiphenyl	43-116%
S7	2,4,6-Tribromophenol	10-123%
S8	Terphenyl-d14	33-141%

Q (qualifiers):
U indicates the compound was analyzed for, but not detected. The U-flagged number is the quantitation limit, including applicable factors related to sample concentrating.
J indicates the estimated value. Spectra meet criteria, but response is below the quantitation limit for the target compound.

HNF
~~WHC~~-SD-WM-DP-202, REV. 1

Chain of Custody Forms

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CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

TF-9

(1) Shipment Number 200-E-08-TF (2) Sample Number SAP-96-1A (S) (3) Supervisor R.J. Penzinik

(4) Tank AP-105 (5) Riser 1 @ 330° (6) Cask/PIG Shipping Container Serial Number 6003-D

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	<.5 mr/hr	<0.5 mR/hr
Side Dose Rate	1.0 mr/hr	1.0
Bottom Dose Rate	0.8 mr/hr	0.5
Smearable Contamination (Alpha)	<20 dpm/100cm²	40 dpm/100cm² (Alpha)
(Beta-Gamma)	<1000 dpm/100cm²	4000 dpm/100cm² (Beta-Gamma)
RCT* (Signature)		RCT* (Signature)

(8) Shipment Description

A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10524
C. Date and Time Sample Removed from Tank	8-29-96/0849
D. Expected Liquid Content	100%
E. Expected Solid Content	0%
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	500 mR/hr
G. Expected Sample Length (Auger)/ Volume (GRAB)	125ml

(9) INFORMATION (Include statement of laboratory tests to be performed.)

67

(10) Field Comments

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
AP-105 R/1@330°	222-S	James Sickels JAMES SICKELS	0740 8-30-96	
(17) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
James Sickels JAMES SICKELS		Eustolio Salinas / EUSTOLIO SALINAS	0805 8-30-96	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
Eustolio Salinas Jr / EUSTOLIO SALINAS		Tim Knight Jr	9/30/96 0925	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

HNF WHC-SD-WM-DP-202, REV. 1

Sep. 6. 1996 10:04AM WHC 222S LAB ROOM 2F BACKSIDE No. 4767 P. 1/4

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

G-5

(1) Shipment Number 200-E-08-TF (2) Sample Number SAP-96-1B (T) (3) Supervisor R.J. Reznik

(4) Tank AP-105 (5) Riser 1 @ 330° (6) Cask/PIG Shipping Container Serial Number 6003-A

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	< .5 mr/hr	< 0.5 mr/hr
Side Dose Rate	0.7 mr/hr	0.5
Bottom Dose Rate	0.7 mr/hr	
Smearable Contamination	< 20 dpm/100cm² (Alpha)	< 20 dpm/100cm² (Alpha)
	< 1K dpm/100cm² (Beta-Gamma)	< 1000 dpm/100cm² (Beta-Gamma)
	RCT* (Signature)	RCT* (Signature)

(8) Shipment Description

A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10525
C. Date and Time Sample Removed from Tank	8-29-96 / 0857
D. Expected Liquid Content	100%
E. Expected Solid Content	0
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	500 mR/hr
G. Expected Sample Length (Auger)/ Volume (GRAB)	125 ml.

(9) INFORMATION (Include statement of laboratory tests to be performed.)

80

(10) Field Comments

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
AP105 riser 1 @ 330°	222-S	James Sickels JAMES Sickels	0940 8-30-96	
(17) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
James Sickels JAMES Sickels		Gustavo Subias Jr / Gustavo Subias Jr	0945 8-30-96	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
Gustavo Subias Jr / Gustavo Subias Jr		Jim Knight Jr	8/30/96 09:25	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

(1) Shipment Number 200E-08-TF (2) Sample Number SAP-96-1C (T) (3) Supervisor R.J. Prazniak

(4) Tank AP-105 (5) Riser 1 @ 330° (6) Cask/PIG Shipping Container Serial Number 6003E / TF-7

Radiation Survey Date For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	<0.5 mr/hr	0.5
Side Dose Rate	1.2 mr/hr	1
Bottom Dose Rate	0.8 mr/hr	1
Smearable Contamination	<20 dpm/100cm² (Alpha)	<20 dpm/100cm² (Alpha)
	<1000 dpm/100cm² (Beta-Gamma)	<1000 dpm/100cm² (Beta-Gamma)
	RCT* (Signature)	RCT* (Signature)

(8) Shipment Description

A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10526
C. Date and Time Sample Removed from Tank	8-29-96 / 0901
D. Expected Liquid Content	100 %
E. Expected Solid Content	0%
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	1 R/hr
G. Expected Sample Length (Auger)/ Volume (GRAB)	125ml.

(9) INFORMATION (Include statement of laboratory tests to be performed.)

81

(10) Field Comments

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
105 riser 1 @ 330°	222-S	James Sicket JAMES SICKET	0740 9-30-96	
(17) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
James Sicket JAMES SICKET		[illegible] MCDONNIGHTON	0740 8-30-96	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
[illegible] MCDONNIGHTON		G.B. Knight JIM KNIGHT JR	8/30/96 0900	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

WHC-SD-WM-DP-202, REV. 1

Sep. 6. 1996 10:05AM WHC 222S LAB ROOM 2F BACKSIDE No. 4767 P. 3/4

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

(1) Shipment Number: 200E-28-TF | (2) Sample Number: SAP-96-10 (TF-17 TF-18) | (3) Supervisor: R. J. Pranznik

(4) Tank: AP-105 | (5) Riser: 1 @ 330 | (6) Cask/PIG Shipping Container Serial Number: 60003B / TF-5

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	<0.5 mr/hr	0.5
Side Dose Rate	1.0 mr/hr	1
Bottom Dose Rate	0.7 mr/hr	1.5
Smearable Contamination (Alpha)	<20 dpm/100cm²	<20 dpm/100 cm² (Alpha)
(Beta-Gamma)	<1000 dpm/100cm²	4000 dpm/100 cm² (Beta-Gamma)
RCT* (Signature)		RCT* (Signature)

(8) Shipment Description

A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10527
C. Date and Time Sample Removed from Tank	8-29-96 / 0904 hr
D. Expected Liquid Content	100%
E. Expected Solid Content	0%
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	750 mR/hr
G. Expected Sample Length (Auger)/ Volume (GRAB)	125 ml

(9) INFORMATION (Include statement of laboratory tests to be performed.)

82

(10) Field Comments

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
AP 105 Rsr 1@330	222-S	James Sickels	0740 8-30-96	
(17) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
James Sickels		M L Dunnington Jr	0741 8-30-96	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
M L Dunnington		Jim Knight Jr	0900 8/30/96	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-5001-326 (01/96)

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

G-2

(1) Shipment Number: 200E0K-TF | (2) Sample Number: 5AP-96-2A(5) | (3) Supervisor: R.J. PRAZNIK

(4) Tank: AP-105 | (5) Riser: 1 @ 90° | (6) Cask/PIG Shipping Container Serial Number: 6003A

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	.5 mr/hr	.5
Side Dose Rate	1.4 mr/hr	1.3
Bottom Dose Rate	.8 mr/hr	.6
Smearable Contamination	<20 (Alpha)	<180 / <45 (Alpha)
	<1K (Beta-Gamma)	<1K / <45 (Beta-Gamma)
	RCT [signature] (Signature)	RCT* [signature] (Signature)

(8) Shipment Description

A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10528
C. Date and Time Sample Removed from Tank	9-3-96 / 1105 hrs
D. Expected Liquid Content	100%
E. Expected Solid Content	0%
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	600 mR/hr
G. Expected Sample Length (Auger)/ Volume (GRAB)	125 ml.

(9) INFORMATION (Include statement of laboratory tests to be performed.)

83

(10) Field Comments

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
AP-105 riser 1@90°	222-S	RJ PRAZNIK	9-4-96 / 1205	
(17) Relinquished By (Sign and PRINT)		**(18) Received By (Sign and PRINT)**	**(19) Date/Time**	**(20) Receiver Comments**
RJ PRAZNIK		Custody Seal	9.4.96 1205	
(21) Relinquished By (Sign and PRINT)		**(22) Received By (Sign and PRINT)**	**(23) Date/Time**	**(24) Receiver Comments**
Custody Seal / Custody Seal		Jim Knight Jr	9.4.96 1330	
(25) Relinquished By (Sign and PRINT)		**(26) Received By (Sign and PRINT)**	**(27) Date/Time**	**(28) Receiver Comments**

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-8001-326 (01/96)

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

B-24

(1) Shipment Number 200E-096-TF (2) Sample Number 5AP-96-2B(D) (3) Supervisor R.J. PRAZNIK

(4) Tank AP-105 (5) Riser 1@90° (6) Cask/PIG Shipping Container Serial Number 6003B

adiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	<0.5 mrem/hr	0.5 mR/HR
Side Dose Rate	1.2 mrem/hr	1 mR/HR
Bottom Dose Rate	1.4 mrem/hr	1.4 mR/hr
Smearable Contamination	<20 (Alpha)	<180/cm3 (Alpha)
	<1K (Beta-Gamma)	<1K/cm3 (Beta-Gamma)
	RCT D Gordon (Signature) RCT*	CBell (Signature)

(8) Shipment Description

A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10529
C. Date and Time Sample Removed from Tank	9-3-96 / 1110 hr
D. Expected Liquid Content	100%
E. Expected Solid Content	0%
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	900 mR/hr
G. Expected Sample Length (Auger)/ Volume (GRAB)	125 ml.

) INFORMATION (Include statement of laboratory tests to be performed.)

84

(9) Field Comments

(32) Laboratory Comments: Seal broke after entering lab

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
P-105 riser 1@90°	222-S	RJ PRAZNIK	9-4-96/1205	
(17) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
RJ PRAZNIK		Eustolio Salinas Jr	9/4/96/1205	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
Eustolio Salinas		L.S. Knight Jr	9.4.96 1330	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
X Yes ☐ No	X Yes ☐ No	X Yes ☐ No	X Yes ☐ No	X Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

(1) Shipment Number 200E-08-TF (2) Sample Number 5AP-96-2C(T) (3) Supervisor R.J. PRAZNIK

(4) Tank AP-105 (5) Riser 1 @ 90° (6) Cask/PIG Shipping Container Serial Number 6003E

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	<0.5 mr/hr	0.5 mR/HR
Side Dose Rate	1 mr/hr	1
Bottom Dose Rate	.8 MR/hr	.8
Smearable Contamination	<20 (Alpha)	L180/LAS (Alpha)
	L1K (Beta-Gamma)	L1K/LAS (Beta-Gamma)
	RCT* (Signature)	RCT* (Signature)

(8) Shipment Description

A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10530
C. Date and Time Sample Removed from Tank	9-3-96/1114 hrs
D. Expected Liquid Content	100%
E. Expected Solid Content	0%
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	900 mR/h
G. Expected Sample Length (Auger)/ Volume (GRAB)	125 ml.

(9) INFORMATION (Include statement of laboratory tests to be performed.)

(10) Field Comments

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
0-105 @ 90°	222-S	R J PRAZNIK	9-4-96/1310	
(17) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
R J PRAZNIK			9-4-96/1317	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
		Tom Knight Jr	9-4-96/1410	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
X Yes ☐ No	X Yes ☐ No	X Yes ☐ No	X Yes ☐ No	X Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-8001-326 (01/96)

WHC-SD-WM-DP-202, REV. 1
HNF

Sep. 4, 1996 2:09PM WHC 222S LAB ROOM 2F BACKSIDE No. 4724 P. 1/4

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

(1) Shipment Number 200E-96-TF (2) Sample Number 5AP-96-2D (3) Supervisor R.J. Penznik

(4) Tank AP-105 (5) Riser 1 @ 90° (6) Cask/PIG Shipping Container Serial Number 6003E

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	<0.5 mr/hr	0.5 mr/hr
Side Dose Rate	<0.5 mr/hr	1
Bottom Dose Rate	<0.5 mr/hr	2.5
Smearable Contamination	<20 (Alpha)	<180/LAS (Alpha)
	<1K (Beta-Gamma)	<1K/LAS (Beta-Gamma)
	RCT* D Gordon (Signature)	RCT* C Below (Signature)

(8) Shipment Description	
A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10531
C. Date and Time Sample Removed from Tank	9-3-96/1118 hrs
D. Expected Liquid Content	100%
E. Expected Solid Content	0%
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	800 mR/h
G. Expected Sample Length (Auger)/ Volume (GRAB)	125 ml.

(9) INFORMATION (Include statement of laboratory tests to be performed.)

96

(10) Field Comments

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
AP105 R/1@90°	222-S	RJ PENZNIK	9.4.96/0900	
(17) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
RJ PENZNIK		W Cunningham	9-4-96/0905	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
W Cunningham		John Knight	9.4.96 1005	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

HNF-SD-WM-DP-202, REV. 1

Sep. 4. 1996 10:08AM WHC 222S LAB ROOM 2F BACKSIDE No. 4709 P. 2/3

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

Shipment Number 200E-08-TF (2) Sample Number 5AP-96-3A (3) Supervisor R.J. Peaznik B-23

Tank AP-105 (5) Riser 1 @ 90° (6) Cask/PIG Shipping Container Serial Number 6003A

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY 9/4/96
Over Top Dose Rate	<0.5 mr/hr	0.7 ~~0.5~~ mr/hr
Side Dose Rate	1 mr/hr	1 ~~6~~ mr/hr
Bottom Dose Rate	1.8 mr/hr	2.0 ~~1.5~~ mr/hr
Smearable Contamination (Alpha)	<20	<180/LAS
(Beta-Gamma)	<1K	<1K/LAS
RCT* (Signature)	[signature]	RCT* CBeW (Signature)

(8) Shipment Description

A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10532
C. Date and Time Sample Removed from Tank	9-3-96/1149 hr
D. Expected Liquid Content	100%
E. Expected Solid Content	0%
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	900 mR/hr
G. Expected Sample Length (Auger)/ Volume (GRAB)	125 ml.

INFORMATION (include statement of laboratory tests to be performed.)

J 8

(9) Field Comments

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
AP-105 Riser 1 @ 90°	222-S	R J Peaznik	9-4-96/0935	
(16) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
R J Peaznik		Eustolio Salcedo / Eustolio Salcedo Jr	9-4-96/0935	
(17) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
Eustolio Salcedo / Eustolio Salcedo Jr		RL Chambers RL Chambers	1040 hr 9/4/96	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

TF-8

Shipment Number 200E-08-TF (2) Sample Number 5AP-96-3B (3) Supervisor R.J. PEARZNIK

Tank AP-105 (5) Riser 1 @ 90° (6) Cask/PIG Shipping Container Serial Number 6003B

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	<0.5	<0.5 0.7
Side Dose Rate	1	~~0.6~~ 1.0 mR/hr
Bottom Dose Rate	.8	9/4/96 ~~0.6~~ 1.0 mR/hr
Smearable Contamination (Alpha)	<20	<180/LAS (Alpha)
(Beta-Gamma)	<1K	<1K/LAS (Beta-Gamma)
RCT* (Signature)	D Gardner	RCT* (Signature) C Bell

(8) Shipment Description

A. Work Package Number	ES-96-002/9/0
B. Cask/PIG Seal Number	10534
C. Date and Time Sample Removed from Tank	9-3-96/1151 hrs
D. Expected Liquid Content	100 %
E. Expected Solid Content	0%
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	900 mR/hr
G. Expected Sample Length (Auger)/ Volume (GRAB)	125 ml.

INFORMATION (Include statement of laboratory tests to be performed.)

8
8

(9) Field Comments

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
AP-105 1@90°	222-S	RJ Pearznik	9-4-96/0735	
(17) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
RJ Pearznik		Gustavo Salazar Jr / Engineering Supervisor	9-4-96/0915	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
Gustavo Salazar Jr / Engineering Supervisor		RL Chambers	9-4-96/1045	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

WHC-SD-WM-DP-202, REV. 1 #NA

Sep. 4, 1996 11:45PM WHC 222S LAB ROOM 2F BACKSIDE No. 4720 P. 5/8

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

Shipment Number 200E-08-TF (2) Sample Number 5AP-96-3C (3) Supervisor R.J. Praznik

Tank AP-105 (5) Riser 1 @ 90° (6) Cask/PIG Shipping Container Serial Number 6003E

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	<0.5 mrem/hr	<0.5 mrem/hr
Side Dose Rate	1.1 mrem/hr	1 mrem/hr
Bottom Dose Rate	1 mrem/hr	1 mrem/hr
Smearable Contamination (Alpha)	<20	<20 (Alpha)
(Beta-Gamma)	<1K	<1K (Beta-Gamma)
RCT* (Signature)	D Gordon	RCT* (Signature)

(8) Shipment Description

A. Work Package Number: ES-96-00219/0

B. Cask/PIG Seal Number: 10533

C. Date and Time Sample Removed from Tank: 9-3-96/1154h

D. Expected Liquid Content: 100%

E. Expected Solid Content: 0%

F. Dose Rate Through Drill String (Auger)/On Contact (GRAB): 800 mR/h

G. Expected Sample Length (Auger)/ Volume (GRAB): 125 ml.

INFORMATION (Include statement of laboratory tests to be performed.)

68

(9) Field Comments

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
AP-105 Riser 1 @ 90°	222-S	R.J. Praznik	9-4-96/1030	
(17) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
R.J. Praznik		M.L. Dunnington	9-4-96/1035	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
M.L. Dunnington		Jim Knight Jr.	9-4-96 1240	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

Shipment Number 2000-08-TF (2) Sample Number SAP-96-3D (3) Supervisor R.J. PRAZNIK

Tank AP-105 (5) Riser 1 @ 90° (6) Cask/PIG Shipping Container Serial Number 6003D

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	0.5 mr/hr	0.5 mR/HR
Side Dose Rate	1.1 mr/hr	1 mR/HR
Bottom Dose Rate	.8 mr/hr	1 mR/HR
Smearable Contamination	<20 (Alpha)	<20 (Alpha)
	<1K (Beta-Gamma)	<1K (Beta-Gamma)
RCT*	R Gordon (Signature)	RCT* (Signature)

(8) Shipment Description

A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10535
C. Date and Time Sample Removed from Tank	9-3-96 / 1157 hr
D. Expected Liquid Content	100%
E. Expected Solid Content	0%
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	900 mR/hr
G. Expected Sample Length (Auger)/ Volume (GRAB)	125 ml

INFORMATION (Include statement of laboratory tests to be performed.)

90

(9) Field Comments

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
AP-105 @ 90°	222-S	RJ PRAZNIK	9-4-96/1030	
(16) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
RJ PRAZNIK			9-4-96/1035	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
		Jim Knight Jr	9496 12:40	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(10) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

HNF-SD-WM-DP-202, REV. 1

WHC 222S LAB ROOM 2F BACKSIDE Sep. 4 1996 1:44PM P. 4/8 No. 4720

B-10

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

Shipment Number 2005-04TF (2) Sample Number SAR-96-IB1(T) (3) Supervisor R.J. PRAZNIK

Tank AP-105 (5) Riser 1@90° (6) Cask/PIG Shipping Container Serial Number 6003A

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	<0.5 mr/hr	<0.5
Side Dose Rate	<0.5 mr/hr	<0.5
Bottom Dose Rate	<0.5 mr/hr	<0.5
Smearable Contamination (Alpha)	<20	<180/<AJ
(Beta-Gamma)	<1K	<1K/<AJ
RCT (Signature)	[signature]	RCT (Signature) [signature]

(8) Shipment Description

A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10537
C. Date and Time Sample Removed from Tank	9-3-96/1045hr
D. Expected Liquid Content	100%
E. Expected Solid Content	0%
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	<1.5 mR/hr
G. Expected Sample Length (Auger)/ Volume (GRAB)	125ml.

INFORMATION (Include statement of laboratory tests to be performed.)

26

(9) Field Comments

FIELD BLANK

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
AP-105 r-1@90°	222-S	R.J. PRAZNIK	9-4-96/1355	
(17) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
R.J. PRAZNIK		Eustolio Salinas	9-4-96/1355	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
Eustolio Salinas		Jim Knight	9496 1515	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
[X] Yes [ ] No	[X] Yes [ ] No	[X] Yes [ ] No	[X] Yes [ ] No	[X] Yes [ ] No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

WHC-SD-WM-DP-202, REV. 1

Sep. 4. 1996 3:23PM WHC 222S LAB ROOM 2F BACKSIDE P. 2/2 No. 4726

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

(1) Shipment Number 200E-08-TF (2) Sample Number 5AP-96-IB2 F.B. (T) (3) Supervisor R.J. PRATZNIK

(4) Tank AP-105 (5) Riser 1 @ 90° (6) Cask/PIG Shipping Container Serial Number 6003E

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	<0.5 mrad/hr	LO.5mrad/HR
Side Dose Rate	<0.5 mrad/hr	LO.5mrad/HR
Bottom Dose Rate	<0.5 mrad/hr	LO.5mrad/HR
Smearable Contamination (Alpha)	<20	L180 / LAS
(Beta-Gamma)	<1K	L1K / LAS
RCT* (Signature)	DGordon	RCT* CBell

(8) Shipment Description

A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10538
C. Date and Time Sample Removed from Tank	9-3-96 / 1047hr
D. Expected Liquid Content	100g
E. Expected Solid Content	0g
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	L.5mRh
G. Expected Sample Length (Auger)/ Volume (GRAB)	125ml.

(9) INFORMATION (Include statement of laboratory tests to be performed.)

93

WHC-SD-WM-DP-202, REV. 1 HNF

(10) Field Comments

FIELD BLANK

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
AP-105 r-1@90°	222-S	James Sickels James Sickels	1500 9-5-96	
(17) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
James Sickels James Sickels		[illegible]	9-5-96 1301	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
[illegible]		Sim Knight Jr	9-5-96 1340	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
X Yes ☐ No	X Yes ☐ No	X Yes ☐ No	X Yes ☐ No	X Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

TF-4A

(1) Shipment Number 200E-08-TF (2) Sample Number SAR-96-OB1(5) F.B. (3) Supervisor R.J. PRAZNIK

(4) Tank AP-105 (5) Riser 1 @ 90° (6) Cask/PIG Shipping Container Serial Number 6003A

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	<0.5 mr/hr	<0.5 mr/hr
Side Dose Rate	<0.5 mr/hr	<0.5 mr/hr
Bottom Dose Rate	<0.5 mr/hr	<0.5 mr/hr
Smearable Contamination	<20 (Alpha)	<180 (Alpha)
	<1K (Beta-Gamma)	<1K (Beta-Gamma)
	RCT* (Signature)	RCT* (Signature)

(8) Shipment Description

A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10539
C. Date and Time Sample Removed from Tank	9-3-96 / 1049
D. Expected Liquid Content	100%
E. Expected Solid Content	0%
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	<0.5 mR/h
G. Expected Sample Length (Auger)/ Volume (GRAB)	125 ml.

(9) INFORMATION (Include statement of laboratory tests to be performed.)

54

(29) Field Comments	(32) Laboratory Comments
FIELD BLANK	

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
R105 Riser 1 @ 90°	222-S	JAMES Sickels	9-5-96 1320	
(17) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
James Sickels JAMES Sickels		James Sickels	9-5-96 1342	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
James Sickels		RL Chambers RL CHAMBERS	9-5-96 1425	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

WHC-SD-WM-DP-202, REV. 1

HNF

WHC 222S LAB ROOM 2F BACKSIDE Sep. 5, 1996 2:50PM No. 4753 P. 2/3

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

B-25

Shipment Number 200E-08-TF (2) Sample Number 5AR96-0B2 (T) (3) Supervisor R.J. Prenzlik

Tank AP-105 (5) Riser 1@90° (6) Cask/PIG Shipping Container Serial Number 6003B

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	<0.5 mr/hr	<0.5 mR/HR
Side Dose Rate	<0.5 mr/hr	<0.5
Bottom Dose Rate	<0.5 mr/hr	<0.5
Smearable Contamination (Alpha)	<20	<180/LAS
(Beta-Gamma)	<1K	<1K/LAS
RCT* (Signature)	R Crockett	CBW

(8) Shipment Description

A. Work Package Number	ES96-00219/0
B. Cask/PIG Seal Number	10540
C. Date and Time Sample Removed from Tank	9.3.96/1051 1008
D. Expected Liquid Content	0%
E. Expected Solid Content	
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	<0.5 mR/hr
G. Expected Sample Length (Auger)/ Volume (GRAB)	125ml

INFORMATION (Include statement of laboratory tests to be performed.)

SG

(9) Field Comments

FIELD BLANK

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
AP 105 riser 1@90°	222-S	RJ Prenzlik	9-4-96/1355	
(17) Relinquished By (Sign and PRINT)	**(18) Received By (Sign and PRINT)**		**(19) Date/Time**	**(20) Receiver Comments**
RJ Prenzlik	Gustavo Salcedo Jr / Ernesto Salcedo		9-4-96/1355	
(21) Relinquished By (Sign and PRINT)	**(22) Received By (Sign and PRINT)**		**(23) Date/Time**	**(24) Receiver Comments**
Gustavo Salcedo / Ernesto Salcedo	Jim Knight Jr		9-4-96 15:15	
Relinquished By (Sign and PRINT)	**(26) Received By (Sign and PRINT)**		**(27) Date/Time**	**(28) Receiver Comments**

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
X Yes ☐ No	X Yes ☐ No	X Yes ☐ No	X Yes ☐ No	X Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

WHC-SD-WM-DP-202, REV. 1

HNF

P. 1/2 No. 4726 Sep. 4 1996 3:22PM WHC 222S LAB ROOM CF BACKSIDE

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

(1) Shipment Number 200E-96-TF (2) Sample Number 5AP-96-TB1 (3) Supervisor R.J. PRAZNIK

(4) Tank AP-105 (5) Riser + @ 90 82876 (6) Cask/PIG Shipping Container Serial Number 6003D

adiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	<0.5 mr/hr	<0.5
Side Dose Rate	0.5 mr/hr	0.5
Bottom Dose Rate	2 mr/hr	0.5
Smearable Contamination	<20 (Alpha)	<180/cpm (Alpha)
	<1K (Beta-Gamma)	<1K/cpm (Beta-Gamma)
	RCT* (Signature)	RCT* (Signature)

(8) Shipment Description	
A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10541
C. Date and Time Sample Removed from Tank	9-3-96/1055hr
D. Expected Liquid Content	100%
E. Expected Solid Content	0%
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	0mRhr
G. Expected Sample Length (Auger)/ Volume (GRAB)	125ml

(9) INFORMATION (Include statement of laboratory tests to be performed.)

96

(10) Field Comments	(32) Laboratory Comments
TRIP BLANK	

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
R-105 riser + @ 90°	222-S	RJ PRAZNIK	9-4-96/0900	
(17) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
RJ PRAZNIK		MLDunnington	9-4-96/0905	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
MLDunnington		LinKnight	9.4.96 1010	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

WHC-SD-WM-DP-202, REV. 1 #NF

Sep. 4, 1996 10:09AM WHC 222S LAB ROOM 2F BACKSIDE No. 4709 P. 3/3

B-18

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

(1) Shipment Number 2000-08-TF (2) Sample Number 5AP-96-TB2(T) +B (3) Supervisor R.J. PRATNIK

(4) Tank AP-105 (5) Riser #6 9-26-96 (6) Cask/PIG Shipping Container Serial Number 6003 B

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	<0.5 mr/hr	<0.5 mR/HR
Side Dose Rate	<0.5 mr/hr	<0.5 mR/HR
Bottom Dose Rate	<0.5 mr/hr	<0.5 mR/HR
Smearable Contamination	<20 (Alpha)	<180/LAS (Alpha)
	<1K (Beta-Gamma)	<1K/LAS (Beta-Gamma)
	RCT (Signature)	RCT (Signature)

(8) Shipment Description

A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10542
C. Date and Time Sample Removed from Tank	9-3-96/1050hr
D. Expected Liquid Content	100
E. Expected Solid Content	0
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	0mR/hr
G. Expected Sample Length (Auger)/ Volume (GRAB)	125 ml.

(9) INFORMATION (Include statement of laboratory tests to be performed.)

97

(10) Field Comments

TRIP BLANK

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
AP105	222-S		1320 9-5-96	
(17) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
James Sickels JAMES SICKELS		James R Richardson	1340 9-5-96	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
James R Richardson		R L Chambers R L Chambers	1425 9-5-96	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
[X] Yes [ ] No	[X] Yes [ ] No	[X] Yes [ ] No	[X] Yes [ ] No	[X] Yes [ ] No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

WHC-SD-WM-DP-202, REV 1
HNF

Sep. 5, 1996 2:50PM WHC 222S LAB ROOM 2F BACKSIDE No. 4753 P. 1/3

Sample Breakdown

worklistrpt Version 2.1 05/15/95
09/03/96 11:22

LABCORE Data Entry Template for Worklist# 12595

Analyst: DPB **Instrument:** NONE _____ **Book #** _____

Method: LA-519-151 Rev/Mod E-2

Worklist Comment: @APPEAR2 FOR AP-105(CONTACT GEORGE MILLER) RTS!

GROUP	PROJECT	S TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
96000853	AP-105	1 SAMPLE	S96V000055	0		@APPEAR2 ORGVOL02	LIQUID	N/A	0		mL
96000853	AP-105	1 SAMPLE	S96V000055	0		@APPEAR2 APPEAR02	LIQUID	N/A	Completed		
96000853	AP-105	1 SAMPLE	S96V000055	0		@APPEAR2 DOSE-02	LIQUID	N/A	2500		mrad/hour

Final page for worklist # 12595

David P. Bromley 9/3/96 1445
Analyst Signature **Date**

Linda Mack 9-5-96
Analyst Signature **Date**

APPEARANCE
color: colorless
clarity: clear
<1% solids
125 mL total volume

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

worklistrpt Version 2.1 05/15/95
09/03/96 11:27

LABCORE Data Entry Template for Worklist# 12596

Analyst: DCD **Instrument:** NONE **Book #**

Method: LA-519-151 Rev/Mod E-2

Worklist Comment: @BRKDWN1 FOR AP-105 (CONTACT GEORGE MILLER) RTS!

GROUP	PROJECT	S TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
96000853	AP-105	1 SAMPLE	S96V000047	0		@BRKDWN1 DOSERATE	LIQUID	N/A	2250		mrad/hour
96000853	AP-105	1 SAMPLE	S96V000047	0		@BRKDWN1 APPEAR02	LIQUID	N/A	Completed		

Final page for worklist # 12596

Analyst Signature Date 9-3-96

Analyst Signature Date 9-5-96

color: greenish yellow

clarity: clear

<1.0% solids

~125ml total volume → placed into 2 - 50mL bottles disposed ~25mL sample per PC instructions dcd

organics: None

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

worklistrpt Version 2.1 05/15/95
09/06/96 12:13

LABCORE Data Entry Template for Worklist# 12712

Analyst: _____ **Instrument:** NONE _____ **Book #** _____

Method: LA-519-151 Rev/Mod E2

Worklist Comment: AP-105. Phases/Solids,Color,Clarity,Mrad/hr. new

GROUP	PROJECT	S TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
96000855	AP-105	1 SAMPLE	S96V000056	0		@APPEAR2 ORGVOL02	LIQUID	N/A	0		mL
96000855	AP-105	1 SAMPLE	S96V000056	0		@APPEAR2 APPEAR02	LIQUID	N/A	Complete		
96000855	AP-105	1 SAMPLE	S96V000056	0		@APPEAR2 DOSE-02	LIQUID	N/A	3500		mrad/hour
96000855	AP-105	2 SAMPLE	S96V000057	0		@APPEAR2 ORGVOL02	LIQUID	N/A	0		mL
96000855	AP-105	2 SAMPLE	S96V000057	0		@APPEAR2 APPEAR02	LIQUID	N/A	Complete		
96000855	AP-105	2 SAMPLE	S96V000057	0		@APPEAR2 DOSE-02	LIQUID	N/A	3000		mrad/hour
96000855	AP-105	3 SAMPLE	S96V000053	0		@APPEAR2 ORGVOL02	LIQUID	N/A	0		mL
96000855	AP-105	3 SAMPLE	S96V000053	0		@APPEAR2 APPEAR02	LIQUID	N/A	Complete		
96000855	AP-105	3 SAMPLE	S96V000053	0		@APPEAR2 SAMPAMT2	LIQUID	N/A	120		mL
96000855	AP-105	3 SAMPLE	S96V000053	0		@APPEAR2 DOSE-02	LIQUID	N/A	3000		mrad/hour

Final page for worklist # 12712

Analyst Signature 9-10-96 Date

Analyst Signature 09/11/96 Date

Appearance : S96V000056 : Clear, No Solids
S96V000057 : Clear, No Solids
S96V000053 : Clear, No Solids

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

LABCORE Data Entry Template for Worklist# 12713

Analyst: _____ **Instrument:** NONE _____ **Book #** _____

Method: LA-519-151 Rev/Mod E2

Worklist Comment: AP-105. Doserate Worklist.(George Miller). new

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
96000853	AP-105	1	SAMPLE	S96V000043	0		DOSERATE	LIQ	N/A	3000		mrad/hour
96000855	AP-105	2	SAMPLE	S96V000044	0		DOSERATE	LIQ	N/A	4000		mrad/hour
96000855	AP-105	3	SAMPLE	S96V000045	0		DOSERATE	LIQ	N/A	4000 ~~1600~~		mrad/hour
96000855	AP-105	4	SAMPLE	S96V000046	0		DOSERATE	LIQ	N/A	<1		mrad/hour
96000855	AP-105	5	SAMPLE	S96V000062	0		DOSERATE	LIQ	N/A	<1		mrad/hour
96000853	AP-105	6	SAMPLE	S96V000039	0		DOSERATE	LIQ	N/A	3500		mrad/hour
96000855	AP-105	7	SAMPLE	S96V000040	0		DOSERATE	LIQ	N/A	4000		mrad/hour
96000855	AP-105	8	SAMPLE	S96V000041	0		DOSERATE	LIQ	N/A	4000		mrad/hour
96000855	AP-105	9	SAMPLE	S96V000042	0		DOSERATE	LIQ	N/A	<1		mrad/hour
96000855	AP-105	10	SAMPLE	S96V000061	0		DOSERATE	LIQ	N/A	<1		mrad/hour

Final page for worklist # 12713

J K Worrell 9-10-96
Analyst Signature **Date**

R Little 09/10/96
Analyst Signature **Date**

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

LABCORE Data Entry Template for Worklist# 12714

Analyst: _____ **Instrument:** NONE _____ **Book #** _____

Method: LA-519-151 Rev/Mod E-3

Worklist Comment: AP-105. DOSERATE WORKLIST. (George Miller). new

GROUP	PROJECT	S TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
96000855	AP-105	1 SAMPLE	S96V000058	0		DOSERATE	LIQUID	N/A	< 1		mrad/hour
96000855	AP-105	2 SAMPLE	S96V000059	0		DOSERATE	LIQUID	N/A	< 1		mrad/hour

Final page for worklist # 12714

John Worrell 9-10-96
Analyst Signature **Date**

[illegible] 9/10/96
Analyst Signature **Date**

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

worklistrpt Version 2.1 05/15/95
09/06/96 12:20

LABCORE Data Entry Template for Worklist# 12715

Analyst: _____ **Instrument:** NONE _____ **Book #** _____

Method: LA-519-151 Rev/Mod E-7

Worklist Comment: AP-105. BREAKDOWN WORKLIST. (George Miller). new

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
96000855	AP-105	1	SAMPLE	S96V000048	0		@BRKDWN1 DOSERATE	LIQUID	N/A	4000		mrad/hour
96000855	AP-105	1	SAMPLE	S96V000048	0		@BRKDWN1 APPEAR02	LIQUID	N/A	Complete		
96000855	AP-105	2	SAMPLE	S96V000049	0		@BRKDWN1 DOSERATE	LIQUID	N/A	4000		mrad/hour
96000855	AP-105	2	SAMPLE	S96V000049	0		@BRKDWN1 APPEAR02	LIQUID	N/A	Complete		

Final page for worklist # 12715

JK Worrell 9-10-96
Analyst Signature **Date**

RDBlack ~~9/10/96~~ 9/10/96
Analyst Signature **Date**

Appearance: S96V000049 : Clear, No Solids
S96V000048 : Clear, No Solids

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

Sample Preparations

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worklistrpt Version 2.1 05/15/95
09/10/96 14:47

LABCORE Data Entry Template for Worklist# 12716

Analyst: DCD/RK1 Under RK1 full direction **Instrument:** NONE **Book #** WHC-1A → 25 mL WHC-2 → 2.5 mL

Method: LA-505-158 Rev/Mod B-0

RUSH

Worklist Comment: AP-105.ACIDIG/DOSE WORKLIST. (George Miller). new

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
		1	BLNK-PREP				ACIDIG02	LIQUID	1	.050	N/A	DF
		2	STD-PREP				ACIDIG02	LIQUID	20	20	N/A	DF
96000853	AP-105	3	SAMPLE	S96V000050	0	B	ACIDIG02	LIQUID	N/A	50		DF
				1mL → 50 mL								
96000853	AP-105	4	SAMPLE	S96V000050	0	B	DOSE-02	LIQUID	N/A	50		mrad/hour
96000853	AP-105	5	DUP	S96V000050	0	B	ACIDIG02	LIQUID	50	50	N/A	DF
				1mL → 50mL								
96000853	AP-105	6	DUP	S96V000050	0	B	DOSE-02	LIQUID	50	40	N/A	mrad/hour
96000853	AP-105	7	SPK	S96V000050	0	B	ACIDIG02	LIQUID	N/A	50	N/A	DF
				1mL → 50 mL								
96000853	AP-105	8	SPK	S96V000050	0	B	DOSE-02	LIQUID	N/A	40	N/A	mrad/hour
96000855	AP-105	9	SAMPLE	S96V000051	0	B	ACIDIG02	LIQUID	N/A	50		DF
				1mL → 50 mL								
96000855	AP-105	10	SAMPLE	S96V000051	0	B	DOSE-02	LIQUID	N/A	40		mrad/hour
96000855	AP-105	11	DUP	S96V000051	0	B	ACIDIG02	LIQUID	50	50	N/A	DF
				1mL → 50 mL								
96000855	AP-105	12	DUP	S96V000051	0	B	DOSE-02	LIQUID	40	40	N/A	mrad/hour
96000855	AP-105	13	SAMPLE	S96V000052	0	B	ACIDIG02	LIQUID	N/A	50		DF
				1mL → 50 mL								
96000855	AP-105	14	SAMPLE	S96V000052	0	B	DOSE-02	LIQUID	N/A	40		mrad/hour
96000855	AP-105	15	DUP	S96V000052	0	B	ACIDIG02	LIQUID	50	50	N/A	DF
				1mL → 50 mL								
96000855	AP-105	16	DUP	S96V000052	0	B	DOSE-02	LIQUID	40	40	N/A	mrad/hour
96000855	AP-105	17	SAMPLE	S96V000054	0	B	ACIDIG02	LIQUID	N/A	50		DF
				1mL → 50 mL								
96000855	AP-105	18	SAMPLE	S96V000054	0	B	DOSE-02	LIQUID	N/A	50		mrad/hour

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

worklistrpt Version 2.1 05/15/95
09/10/96 14:47

LABCORE Data Entry Template for Worklist# 12716

GROUP	PROJECT	S TYPE	SAMPLE#	R	A	TEST	MATRIX	ACTUAL	FOUND	DL	UNIT
96000855	AP-105	19 DUP	S96V000054	0	B	ACIDIGO2	LIQUID	50	50	N/A	DF
			1 mL → 50 mL								
96000855	AP-105	20 DUP	S96V000054	0	B	DOSE-02	LIQUID	50	50	N/A	mrad/hour
96000855	AP-105	21 SAMPLE	S96V000060	0	B	ACIDIGO2	LIQUID	N/A	50		DF
			1 mL → 50 mL						< 10		
96000855	AP-105	22 SAMPLE	S96V000060	0	B	DOSE-02	LIQUID	N/A	~~0~~ lem 10-28-96		mrad/hour
96000855	AP-105	23 DUP	S96V000060	0	B	ACIDIGO2	LIQUID	50	50	N/A	DF
			1 mL → 50 mL								
96000855	AP-105	24 DUP	S96V000060	0	B	DOSE-02	LIQUID	0	0	N/A	mrad/hour

Final page for worklist # 12716

Daniel C Dunham 10-24-96
Analyst Signature **Date**

Keith Fuller 10-28-96

Linda Meade 10-28-96
Analyst Signature **Date**

S96V000047 → S96V000050
48 → 51
49 → 52
53 → 54
59 → 60

Reviewed: KJ Gunuskey 10/28/96

Data Entry Comments: HPT: Gerry Gunuskey

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

Inorganic Analyses

LABCORE Completed Worklist Report for Worklist# 12917

Analyst: pjm **Instrument:** BA001 **Book#** 133 N16A

Method: LA-510-112 Rev/Mod C-3

Worklist Comment: AP-105 SPG. RCJ

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	STD			0	SPG-01	LIQUID	1.39755	1.3784	98.630	% Recovery
2	SAMPLE	S96V000048		0	SPG-01	LIQUID	N/A	1.2349	1.00e-003	Sp.G.
3	DUP	S96V000048		0	SPG-01	LIQUID	1.2349	1.2280	0.560	RPD
4	SAMPLE	S96V000049		0	SPG-01	LIQUID	N/A	1.2347	1.00e-003	Sp.G.
5	DUP	S96V000049		0	SPG-01	LIQUID	1.2347	1.2272	0.609	RPD
6	SAMPLE	S96V000047		0	SPG-01	LIQUID	N/A	1.2294	1.00e-003	Sp.G.
7	DUP	S96V000047		0	SPG-01	LIQUID	1.2294	1.2228	0.538	RPD
8	SAMPLE	S96V000053		0	SPG-01	LIQUID	N/A	1.2473	1.00e-003	Sp.G.
9	DUP	S96V000053		0	SPG-01	LIQUID	1.2473	1.2356	0.942	RPD

Final page for worklist# 12917

See attached
Analyst Signature **Date**

See attached
Analyst Signature **Date**

Verified into Labcore, John McCluskey 11/04/96
Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

Analyst Signature **Date**

SPECIFIC GRAVITY: LA-510-112 (C-3)

WORKLIST #	ANALYST INITIALS	ANALYSIS DATE	ANALYSIS TIME	INSTRUMENT CODE
12917	[signature]	11/3/96	0930	

Block 1

☐ SAMPLE ☒ STANDARD ☐ DUPLICATE

SAMPLE # = STD # = 133N16A

	REPLICATE
TARE WEIGHT (g) 1.38219	1.41811
GROSS WEIGHT (g) 1.52012	1.55619
VOL. of SOLUTION (mL) .10012	.10012

Block 2

☒ SAMPLE ☒ STANDARD ☒ DUPLICATE

SAMPLE # = 596V000048 STD # =

	~~REPLICATE~~ DUPLICATE
TARE WEIGHT (g) 1.38593	1.40030
GROSS WEIGHT (g) 1.50957	1.52325
VOL. of SOLUTION (mL) .10012	.10012

Block 3

☒ SAMPLE ☒ STANDARD ☒ DUPLICATE

SAMPLE # = 596V000049 STD # =

	~~REPLICATE~~ DUPLICATE
TARE WEIGHT (g) 1.40195	1.39515
GROSS WEIGHT (g) 1.52557	1.51802
VOL. of SOLUTION (mL) .10012	.10012

Block 4

☒ SAMPLE ☒ STANDARD ☒ DUPLICATE

SAMPLE # = 596V000047 STD # =

	REPLICATE DUPLICATE
TARE WEIGHT (g) 1.36375	1.33670
GROSS WEIGHT (g) 1.48684	1.45913
VOL. of SOLUTION (mL) .10012	.10012

Block 5

☒ SAMPLE ☒ STANDARD ☒ DUPLICATE

SAMPLE # = 596V000053 STD # =

	~~REPLICATE~~ DUPLICATE
TARE WEIGHT (g) 1.42892	1.39781
GROSS WEIGHT (g) 1.55380	1.51552
VOL. of SOLUTION (mL) .10012	.10012

Block 6

☐ SAMPLE ☐ STANDARD ☐ DUPLICATE

SAMPLE # = STD # =

	REPLICATE
TARE WEIGHT (g)	
GROSS WEIGHT (g)	
VOL. of SOLUTION (mL)	

Block 7

☐ SAMPLE ☐ STANDARD ☐ DUPLICATE

SAMPLE # = STD # =

	REPLICATE
TARE WEIGHT (g)	
GROSS WEIGHT (g)	
VOL. of SOLUTION (mL)	

Block 8

☐ SAMPLE ☐ STANDARD ☐ DUPLICATE

SAMPLE # = STD # =

	REPLICATE
TARE WEIGHT (g)	
GROSS WEIGHT (g)	
VOL. of SOLUTION (mL)	

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

SPECIFIC GRAVITY : LA-510-112 (C-3)

		STD	REPLICATE
STD	Gross Weight (W2)	1.5201	1.5562
	Tare Weight (W1)	1.3822	1.4181
12917	Weight of Solution (W2-W1)	0.13793	0.13808
	Volume of Solution µL	100.1200	100.1200
SPG-01	Specific Gravity	1.3776	1.3791
	Specific Gravity (Average)	1.3784	
LIQUID			
STD			
	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
BA001	Tare Weight (W1) = Wt. of vial + cap + cotton		
PJM	Specific Gravity = [(W2-W1) * 1000 µL/mL] / [Vol. of Solution µL * 1.000 g/mL]		
11/03/96	v RESULT v		
	Specific Gravity Average =	1.378	
09:30 AM			

Data Entry by:	Date:	11/03/96
Approved by: John McCluskey	Date:	11/04/96

Specific Gravity Average = 1.2311

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

SPECIFIC GRAVITY : LA-510-112 (C-3)

		SAMPLE	REPLICATE
SAMPLE	Gross Weight (W2)	1.5256	1.5180
	Tare Weight (W1)	1.4020	1.3952
12917	Weight of Solution (W2-W1)	0.12362	0.12287
	Volume of Solution µL	100.1200	100.1200
SPG-01	Specific Gravity	1.2347	1.2272
	Specific Gravity (Average)	1.2310	
LIQUID			
S96V000049			
	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
BA001	Tare Weight (W1) = Wt. of vial + cap + cotton		
PJM	Specific Gravity = [(W2-W1) * 1000 µL/mL] / [Vol. of Solution µL * 1.000 g/mL]		
11/03/96	v RESULT v		
	Specific Gravity Average =	1.231	
09:30 AM			

Data Entry by:		Date:	11/03/96
Approved by:	John McCluskey	Date:	11/04/96

Form 510112L1 Rev. 1.1

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

SPECIFIC GRAVITY : LA-510-112 (C-3)

		SAMPLE	REPLICATE
SAMPLE	Gross Weight (W2)	1.4868	1.4591
	Tare Weight (W1)	1.3638	1.3367
12917	Weight of Solution (W2-W1)	0.12309	0.12243
	Volume of Solution µL	100.1200	100.1200
SPG-01	Specific Gravity	1.2294	1.2228
	Specific Gravity (Average)	1.2261	
LIQUID			
S96V000047			
	Gross Weight (W2) = Wt. of vial + cap + cotton + solution		
BA001	Tare Weight (W1) = Wt. of vial + cap + cotton		
PJM	Specific Gravity = [(W2-W1) * 1000 µL/mL] / [Vol. of Solution µL * 1.000 g/mL]		
11/03/96	v RESULT v		
	Specific Gravity Average =	1.226	
09:30 AM			

Data Entry by:		Date: 11/03/96
Approved by:	John McCluskey	Date: 11/04/96

LABCORE Data Entry Template for Worklist# 12905

Analyst: RAW **Instrument:** PH01 **Book #** 18N19-D

Method: LA-212-106 Rev/Mod A-0

Worklist Comment: AP-105 PH. RCJ

GROUP	PROJECT	S TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
		1 STDPH				PH-01	LIQUID	8.00	8.01	N/A	pH
96000855	AP-105	2 SAMPLE	S96V000048	0	6	PH-01	LIQUID	N/A	13.49	0.01	pH
96000855	AP-105	3 DUP	S96V000048	0		PH-01	LIQUID	13.49	13.48	N/A	pH
96000855	AP-105	4 SAMPLE	S96V000049	0		PH-01	LIQUID	N/A	13.45	0.01	pH
96000855	AP-105	5 DUP	S96V000049	0		PH-01	LIQUID	13.45	13.46	N/A	pH
96000853	AP-105	6 SAMPLE	S96V000047	0	6	PH-01	LIQUID	N/A	13.31	0.01	pH
96000853	AP-105	7 DUP	S96V000047	0		PH-01	LIQUID	13.31	13.35	N/A	pH

Final page for worklist # 12905

R. WENDLAND 11-15-96
Analyst Signature **Date**

Frieda Mack 11-16-96
Analyst Signature **Date**

Approved RW Schreckhise 11/18/96

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

worklistrpt Version 2.1 05/15/95
09/12/96 14:54

LABCORE Data Entry Template for Worklist# 12904

Analyst: SLH **Instrument:** PH01 **Book #** AN8

Method: LA-211-102 Rev/Mod C-0

Worklist Comment: AP-105 OH. RCJ

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
		1	BLNK				OH-01	LIQUID	1	< 42	N/A	ug/mL
		2	STD				OH-01	LIQUID	1.664E+4	1.64E+4	N/A	ug/mL
96000855	AP-105	3	SAMPLE	S96V000048	0		OH-01	LIQUID	N/A	3.27E+4	2.50E3	ug/mL
96000855	AP-105	4	DUP	S96V000048	0		OH-01	LIQUID	3.27E+4	3.32E+4	N/A	ug/mL
96000855	AP-105	5	SAMPLE	S96V000049	0		OH-01	LIQUID	N/A	3.61E+4	2.50E3	ug/mL
96000855	AP-105	6	DUP	S96V000049	0		OH-01	LIQUID	3.61E+4	3.60E+4	N/A	ug/mL
96000853	AP-105	7	SAMPLE	S96V000047	0		OH-01	LIQUID	N/A	3.18E+4	2.50E3	ug/mL
96000853	AP-105	8	DUP	S96V000047	0		OH-01	LIQUID	3.18E+4	3.13E+4	N/A	ug/mL
96000855	AP-105	9	SAMPLE	S96V000058	0		OH-01	LIQUID	N/A	< 63	6.25e1	ug/mL
96000855	AP-105	10	DUP	S96V000058	0		OH-01	LIQUID	< 63	< 63	N/A	ug/mL

Final page for worklist # 12904

Sandra L Hood Boatright
Analyst Signature Date
11-1-96

Susan Lee 11/01/96
Analyst Signature Date

Approved RW Schwenk
11/05/96

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

OH (AUTO): LA-211-102 (C-0)

WORKLIST #	ANALYST INITIALS	ANALYSIS DATE	ANALYSIS TIME	INSTRUMENT CODE
12904	SLH	11-1-96	0530	

HNF-SD-WM-DP-202, REV. ~~4~~

122

SAMPLE / STANDARD — DUPLICATE / PREP BLANK — SPIKE / REAGENT BLANK

SAMPLE/STD # = BLK — MATRIX =

SAMPLE SIZE (mL) —
VOL. H2O ADDED for DILUTION (if necessary) 3ml
VOL. DILUTED SAMPLE ANALYZED 1ml

* BaCl2 VOLUME ADDED .008
* ATTACH PRINT REPORT #2 & #5

SAMPLE / STANDARD — DUPLICATE / PREP BLANK — SPIKE / REAGENT BLANK

SAMPLE/STD # = STD — MATRIX =

SAMPLE SIZE (mL) .050
VOL. H2O ADDED for DILUTION (if necessary) 3ml
VOL. DILUTED SAMPLE ANALYZED 1ml

* BaCl2 VOLUME ADDED .241
* ATTACH PRINT REPORT #2 & #5

SAMPLE / STANDARD — DUPLICATE / PREP BLANK — SPIKE / REAGENT BLANK

SAMPLE/STD # = S96V048 — ~~MATRIX~~ = S96V048 Dup

SAMPLE SIZE (mL) .050
VOL. H2O ADDED for DILUTION (if necessary) 3ml
VOL. DILUTED SAMPLE ANALYZED 1ml

	sam	dup
* BaCl2 VOLUME ADDED	.480	.487
* ATTACH PRINT REPORT #2 & #5		

SAMPLE / STANDARD — DUPLICATE / PREP BLANK — SPIKE / REAGENT BLANK

SAMPLE/STD # = S96V0049 — ~~MATRIX~~ = S96V0049 Dup

SAMPLE SIZE (mL) .050
VOL. H2O ADDED for DILUTION (if necessary) 3ml
VOL. DILUTED SAMPLE ANALYZED 1ml

	sam	dup
* BaCl2 VOLUME ADDED	.529	.528
* ATTACH PRINT REPORT #2 & #5		

SAMPLE / STANDARD — DUPLICATE / PREP BLANK — SPIKE / REAGENT BLANK

SAMPLE/STD # = S96V047 — ~~MATRIX~~ = S96V0047 Dup

SAMPLE SIZE (mL) .050
VOL. H2O ADDED for DILUTION (if necessary) 3ml
VOL. DILUTED SAMPLE ANALYZED 1ml

	sam	dup
* BaCl2 VOLUME ADDED	.466	.459
* ATTACH PRINT REPORT #2 & #5		

SAMPLE / STANDARD — DUPLICATE / PREP BLANK — SPIKE / REAGENT BLANK

SAMPLE/STD # = S96V0058 — ~~MATRIX~~ = S96V0058 Dup

SAMPLE SIZE (mL) 2ml
VOL. H2O ADDED for DILUTION (if necessary) 3ml
VOL. DILUTED SAMPLE ANALYZED 1ml

	sam	dup
* BaCl2 VOLUME ADDED	.013	.010
* ATTACH PRINT REPORT #2 & #5		

SAMPLE / STANDARD — DUPLICATE / PREP BLANK — SPIKE / REAGENT BLANK

SAMPLE/STD # = — MATRIX =

SAMPLE SIZE (mL) —
VOL. H2O ADDED for DILUTION (if necessary) —
VOL. DILUTED SAMPLE ANALYZED —

* BaCl2 VOLUME ADDED
* ATTACH PRINT REPORT #2 & #5

SAMPLE / STANDARD — DUPLICATE / PREP BLANK — SPIKE / REAGENT BLANK

SAMPLE/STD # = — MATRIX =

SAMPLE SIZE (mL) —
VOL. H2O ADDED for DILUTION (if necessary) —
VOL. DILUTED SAMPLE ANALYZED —

* BaCl2 VOLUME ADDED
* ATTACH PRINT REPORT #2 & #5

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (C-0)

		BLANK
	Sample Size (mL) SS	3.000
BLANK	Concentration of HNO3 (Molarity)	0.2005
	HNO3 Titrant at OH end-point in mL	0.008
12904	Dilution Factor DF	1
	Concentration of OH in Sample (Molarity)	5.35E-04
OH-01	OH in Sample in µg/mL (PPM)	9.09E+00
LIQUID		
	Detection Limit = 125µg / SS * DF	
BLANK		
	Detection Limit (µg/mL)	4.17E+01
PH01		
	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
11/01/96		
		BLANK
01:03 AM	Concentration of OH in Sample (Molarity)	5.35E-04
	OH in Sample in µg/mL (PPM)	<42

The Result is < Detection Limit

Data Entry by:	Sue Bog	Date:	11/01/96
Approved by:	Ron Schwartz	Date:	11/5/96

Form 211102_1 Rev. 1.3

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (C-0)

		STD
	Sample Size (mL) SS	0.050
STD	Concentration of HNO3 (Molarity)	0.2005
	HNO3 Titrant at OH end-point in mL	0.241
12904	Dilution Factor DF	1
	Concentration of OH in Sample (Molarity)	9.66E-01
OH-01	OH in Sample in µg/mL (PPM)	1.64E+04
LIQUID		
	Detection Limit = 125µg / SS * DF	
STD		
	Detection Limit (µg/mL)	2.50E+03
PH01		
	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
11/01/96		
		STD
01:03 AM	Concentration of OH in Sample (Molarity)	9.66E-01
	OH in Sample in µg/mL (PPM)	1.64E+04

Data Entry by:	Eve Bee	Date:	11/01/96
Approved by:	Ken Schwaeth	Date:	11/5/96

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (C-0)

		SAMPLE
	Sample Size (mL) SS	0.050
SAMPLE	Concentration of HNO3 (Molarity)	0.2005
	HNO3 Titrant at OH end-point in mL	0.480
12904	Dilution Factor DF	1
	Concentration of OH in Sample (Molarity)	1.92E+00
OH-01	OH in Sample in µg/mL (PPM)	3.27E+04
LIQUID		
	Detection Limit = 125µg / SS * DF	
S96V000048		
	Detection Limit (µg/mL)	2.50E+03
PH01		
	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
11/01/96		
		SAMPLE
01:03 AM	Concentration of OH in Sample (Molarity)	1.92E+00
	OH in Sample in µg/mL (PPM)	3.27E+04

Data Entry by:	SUE BEE	Date:	11/01/96
Approved by:	R.W. Schroeder	Date:	11/5/96

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (C-0)

		SAMPLE
	Sample Size (mL) SS	0.050
SAMPLE	Concentration of HNO3 (Molarity)	0.2005
	HNO3 Titrant at OH end-point in mL	0.487
12904	Dilution Factor DF	1
	Concentration of OH in Sample (Molarity)	1.95E+00
OH-01	OH in Sample in µg/mL (PPM)	3.32E+04
LIQUID		
	Detection Limit = 125µg / SS * DF	
S96V000048 DUP		
	Detection Limit (µg/mL)	2.50E+03
PH01		
	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
11/01/96		
		SAMPLE
01:03 AM	Concentration of OH in Sample (Molarity)	1.95E+00
	OH in Sample in µg/mL (PPM)	3.32E+04

Data Entry by:	Sue Bee	Date:	11/01/96
Approved by:	Bill Schwab	Date:	11/05/96

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (C-0)

		SAMPLE
	Sample Size (mL) SS	0.050
SAMPLE	Concentration of HNO3 (Molarity)	0.2005
	HNO3 Titrant at OH end-point in mL	0.529
12904	Dilution Factor DF	1
	Concentration of OH in Sample (Molarity)	2.12E+00
OH-01	OH in Sample in µg/mL (PPM)	3.61E+04
LIQUID		
	Detection Limit = 125µg / SS * DF	
S96V000049		
	Detection Limit (µg/mL)	2.50E+03
PH01		
	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
11/01/96		
		SAMPLE
01:03 AM	Concentration of OH in Sample (Molarity)	2.12E+00
	OH in Sample in µg/mL (PPM)	3.61E+04

Data Entry by:	Sue Bee	Date:	11/01/96
Approved by:	CW Schmidt	Date:	11/5/96

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (C-0)

		SAMPLE
	Sample Size (mL) SS	0.050
SAMPLE	Concentration of HNO3 (Molarity)	0.2005
	HNO3 Titrant at OH end-point in mL	0.528
12904	Dilution Factor DF	1
	Concentration of OH in Sample (Molarity)	2.12E+00
OH-01	OH in Sample in µg/mL (PPM)	3.60E+04
LIQUID		
	Detection Limit = 125µg / SS * DF	
S96V000049 DUP		
	Detection Limit (µg/mL)	2.50E+03
PH01		
	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
11/01/96		
		SAMPLE
01:03 AM	Concentration of OH in Sample (Molarity)	2.12E+00
	OH in Sample in µg/mL (PPM)	3.60E+04

Data Entry by:	Sue Bee	Date:	11/01/96
Approved by:	RW Schneider	Date:	11/5/96

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (C-0)

		SAMPLE
	Sample Size (mL) SS	0.050
SAMPLE	Concentration of HNO3 (Molarity)	0.2005
	HNO3 Titrant at OH end-point in mL	0.466
12904	Dilution Factor DF	1
	Concentration of OH in Sample (Molarity)	1.87E+00
OH-01	OH in Sample in µg/mL (PPM)	3.18E+04
LIQUID		
	Detection Limit = 125µg / SS * DF	
S96V000047		
	Detection Limit (µg/mL)	2.50E+03
PH01		
	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
11/01/96		
		SAMPLE
01:03 AM	Concentration of OH in Sample (Molarity)	1.87E+00
	OH in Sample in µg/mL (PPM)	3.18E+04

Data Entry by:	Sue Bee	Date:	11/01/96
Approved by:	RW Schmoll	Date:	11/5/96

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (C-0)

		SAMPLE
	Sample Size (mL) SS	0.050
SAMPLE	Concentration of HNO3 (Molarity)	0.2005
	HNO3 Titrant at OH end-point in mL	0.459
12904	Dilution Factor DF	1
	Concentration of OH in Sample (Molarity)	1.84E+00
OH-01	OH in Sample in µg/mL (PPM)	3.13E+04
LIQUID		
	Detection Limit = 125µg / SS * DF	
S96V000047 DUP		
	Detection Limit (µg/mL)	2.50E+03
PH01		
	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
11/01/96		
		SAMPLE
01:03 AM	Concentration of OH in Sample (Molarity)	1.84E+00
	OH in Sample in µg/mL (PPM)	3.13E+04

Data Entry by:	SUE Bee	Date:	11/01/96
Approved by:	RW Schreckhise	Date:	11/5/96

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (C-0)

		SAMPLE
	Sample Size (mL) SS	2.000
SAMPLE	Concentration of HNO3 (Molarity)	0.2005
	HNO3 Titrant at OH end-point in mL	0.013
12904	Dilution Factor DF	1
	Concentration of OH in Sample (Molarity)	1.30E-03
OH-01	OH in Sample in µg/mL (PPM)	2.22E+01
LIQUID		
	Detection Limit = 125µg / SS * DF	
S96V000058		
	Detection Limit (µg/mL)	6.25E+01
PH01		
	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
11/01/96		
		SAMPLE
01:03 AM	Concentration of OH in Sample (Molarity)	1.30E-03
	OH in Sample in µg/mL (PPM)	<63

The Result is < Detection Limit

Data Entry by:	Sue Bee	Date:	11/01/96
Approved by:	RW Schwendiman	Date:	11/5/96

Form 211102_1 Rev. 1.3

PLACE ANALYTICAL CARD IN BOX BELOW OR ATTACH TRAVELER

OH (AUTO) : LA-211-102 (C-0)

		SAMPLE
	Sample Size (mL) SS	2.000
SAMPLE	Concentration of HNO3 (Molarity)	0.2005
	HNO3 Titrant at OH end-point in mL	0.010
12904	Dilution Factor DF	1
	Concentration of OH in Sample (Molarity)	1.00E-03
OH-01	OH in Sample in µg/mL (PPM)	1.70E+01
LIQUID		
	Detection Limit = 125µg / SS * DF	
S96V000058 DUP		
	Detection Limit (µg/mL)	6.25E+01
PH01		
	OH Molarity =((mL HNO3)*(M HNO3))/Sample Size in mL*Dilution Factor	
SLH		
	OH in µg/mL = (OH MOLARITY)*(17.0g/mole)*((1000000µg/g)/(1000mL/L))	
11/01/96		
		SAMPLE
01:03 AM	Concentration of OH in Sample (Molarity)	1.00E-03
	OH in Sample in µg/mL (PPM)	<63

The Result is < Detection Limit

Data Entry by:	Eve Rez	Date: 11/01/96
Approved by:	Ron Schwenk	Date: 11/5/96

Form 211102_1 Rev. 1.3

BIK

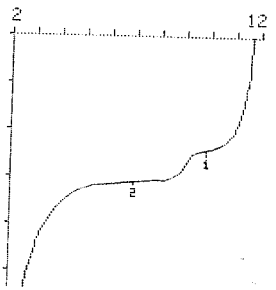
```
date 96-11-01 time 01:03
GET pH          12  #  142
Id.#1         0479
Id.#2        .2005
pH(init)     5.00
             V/ml          pH
EP1          .008        4.19
stop volt.reached
=========
```

STD 7908
.050ml

```
date 96-11-01 time 01:54
GET pH          12  #  145
Id.#1         0479
Id.#2        .2005
pH(init)    11.61
             V/ml          pH
EP1          .241        9.83
EP2          .310        6.93
stop volt.reached
=========
```

```
date 96-11-01 time 01:09
GET pH          12  #  142
.10ml/div       ΔpH=1/div
start V    .000 ml
```

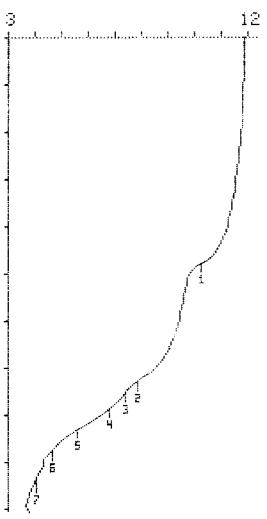

```
date 96-11-01 time 02:05
GET pH          12  #  145
.10ml/div       ΔpH=1/div
start V    .000 ml
```



S96V0048
.050ml

```
date 96-11-01 time 02:19
GET pH          12  #  146
Id.#1         0479
Id.#2        .2005
pH(init)    11.84
            V/ml          pH
EP1          .480       10.24
EP2          .728        7.89
EP3          .751        7.42
EP4          .786        6.81
EP5          .833        5.57
EP6          .876        4.65
EP7          .937        4.03
stop V reached
         ========
```

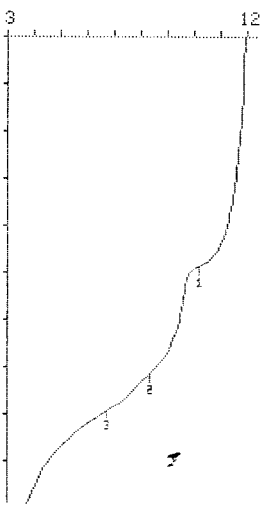
```
date 96-11-01 time 02:24
GET pH          12  #  146
.10ml/div        ΔpH=1/div
start V    .000 ml
```



S96V0048 Dup
.050 ml

```
date 96-11-01 time 02:36
GET pH          12  #  147
Id.#1         0479
Id.#2        .2005
pH(init)    11.90
            V/ml          pH
EP1          .487       10.20
EP2          .714        8.34
EP3          .794        6.71
stop V reached
         ========
```

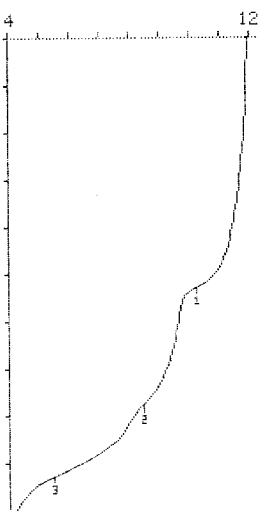
```
date 96-11-01 time 02:44
GET pH          12  #  147
.10ml/div        ΔpH=1/div
start V    .000 ml
```



S96V0049
.050 ml

```
date 96-11-01 time 02:58
GET pH          12  #  148
Id.#1         0479
Id.#2        .2085
pH(init)    11.90
            V/ml          pH
EP1          .529       10.22
EP2          .775        8.47
EP3          .929        5.47
stop V reached
        ========
```

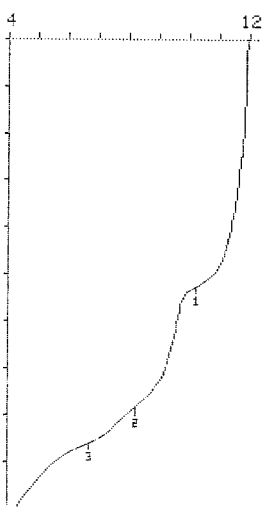
```
date 96-11-01 time 02:58
GET pH          12  #  148
.10ml/div       ΔpH=1/div
start V    .000 ml
```



S96V0049 Dup
.050 ml

```
date 96-11-01 time 03:09
GET pH          12  #  149
Id.#1         0479
Id.#2        .2085
pH(init)    11.88
            V/ml          pH
EP1          .528       10.22
EP2          .783        8.24
EP3          .860        6.69
stop V reached
        ========
```

```
date 96-11-01 time 03:12
GET pH          12  #  149
.10ml/div       ΔpH=1/div
start V    .000 ml
```



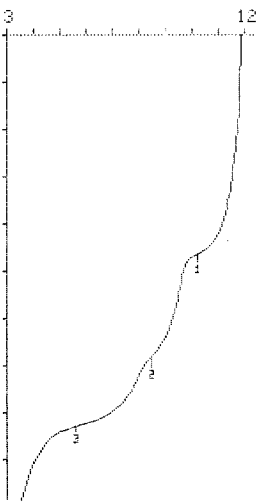
S96 V0047
.050 ml

date 96-11-01 time 03:25
GET pH 12 # 150
Id.#1 0479
Id.#2 .2005
pH(init) 11.82

	V/ml	pH
EP1	.466	10.17
EP2	.683	8.46
EP3	.829	5.60

stop V reached

date 96-11-01 time 03:35
GET pH 12 # 150
.10ml/div dpH=1/div
start V .000 ml



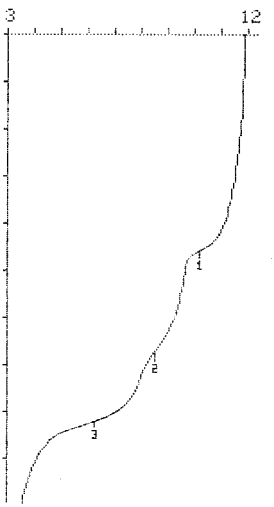
S96 V0047 Dup
.050 ml

date 96-11-01 time 03:46
GET pH 12 # 151
Id.#1 0479
Id.#2 .2005
pH(init) 11.84

	V/ml	pH
EP1	.459	10.18
EP2	.671	8.54
EP3	.822	6.25

stop V reached

date 96-11-01 time 03:58
GET pH 12 # 151
.10ml/div dpH=1/div
start V .000 ml



596V0058
2ml

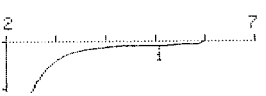
```
date 96-11-01 time 04:29
GET pH          12  #  154
Id.#1         0479
Id.#2        .2005
pH(init)      5.95
            V/ml          pH
EP1          .013        4.75
stop volt.reached
          ========
```

```
date 96-11-01 time 04:30
GET pH          12  #  154
.10ml/div       ΔpH=1/div
start V    .000 ml
```

596V0058
2ml Dup

```
date 96-11-01 time 04:36
GET pH          12  #  155
Id.#1         0479
Id.#2        .2005
pH(init)      5.97
            V/ml          pH
EP1          .010        5.08
stop volt.reached
          ========
```

```
date 96-11-01 time 05:14
GET pH          12  #  155
.10ml/div       ΔpH=1/div
start V    .000 ml
```



LABCORE Data Entry Template for Worklist# 12907

Analyst: RAW **Instrument:** NH301 **Book #** 19N19-D (386 ug/mL) 16N19-C (1000 mg/mL)

Method: LA-631-001 Rev/Mod B-2

Worklist Comment: AP-105 AMMONIA. RCJ

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
		1	BLNK				NH3-01	LIQUID	1	1.36	N/A	ug/mL
		2	STD				NH3-01	LIQUID	100	101	N/A	ug/mL
96000855	AP-105	3	SAMPLE	S96V000048	0		NH3-01	LIQUID	N/A	63.2	5.00	ug/mL
96000855	AP-105	4	SPK	S96V000048	0		NH3-01	LIQUID	100	116	N/A	ug/mL
96000855	AP-105	5	SPK-DUP	S96V000048	0		NH3-01	LIQUID	~~100~~ 116 RWS 11/19/96	122	N/A	ug/mL
96000855	AP-105	6	SAMPLE	S96V000049	0		NH3-01	LIQUID	N/A	~~65~~ 64.8 RWS 11/19/96	5.00	ug/mL
96000855	AP-105	7	SPK	S96V000049	0		NH3-01	LIQUID	100	121	N/A	ug/mL
96000853	AP-105	8	SAMPLE	S96V000047	0		NH3-01	LIQUID	N/A	20	5.00	ug/mL
96000853	AP-105	9	SPK	S96V000047	0		NH3-01	LIQUID	100	123	N/A	ug/mL
96000855	AP-105	10	SAMPLE	S96V000058	0		NH3-01	LIQUID	N/A	<5.00	5.00	ug/mL
96000855	AP-105	11	SPK	S96V000058	0		NH3-01	LIQUID	100	105	N/A	ug/mL
		12	STD				NH3-01	LIQUID	100	~~92~~ 91.6 RWS 11/19/96	N/A	ug/mL

Final page for worklist # 12907

R. Wendland 11-13-96
Analyst Signature Date

data entry by John McCluskey 11/19/96
Analyst Signature Date

Edited and approved RW Schroeder 11/19/96

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

BLK

STD 19419D 386 mg/mL

1 mL std + 24 mL H_2O

DF = 25

$$\frac{(17.0\ mg/mL - 1.36\ mg/mL)(25)}{386\ mg/mL}(100) = 101\ \%\ Rec$$

$(1.34-1.36)(25) < 5.00\ ng/mL$

19A/19D 386 ug/mL

1mL sample + 0.100mL 19A/19D + 23.9mL H_2O

DF = 25

sample < 5

$$\frac{(25)(17.6\ ug/mL - 1.36\ ug/mL) - (0)(25)}{386\ ug/mL}(100) = 105\ \%Rec$$

596V0004

1mL + 24 mL H_2O

DF = 25

$(2.16\ \mu g/mL - 1.36\ \mu g/mL)(25) = 20.0\ \mu g/mL$

596V00047 Spike

19N19D = 386 ug/mL

1mL sample + 0.100mL 19N19D + 23.9mL H_2O

DF = 25

$$\frac{(25)(21.1\ \text{ug/mL} - 1.36\ \text{ug/mL}) - (2.16\ \text{ug/mL} - 1.36\ \text{ug/mL})(25)}{386\ \text{ug/mL}}(100) = 123\%\ \text{R}$$

~~S96V00049~~ ~~Spk~~ JMM ~~JMM~~

S96V00049 Spk

19N19D = 386 ug/mL

1mL sample + 0.100mL 19N19D + 23.9mL H_2O

DF = 25

$$\frac{(25)(22.6\ ug/mL - 1.36\ ug/mL) - (3.95\ ug/mL - 1.36\ ug/mL)(25)}{386\ ug/mL}(100) =$$

= 121 % Spike recovery

596V000A6

1mL sample + ~~23~~ 24 mL H_2O
JMM

DF = 25

(3.89 mg/mL - 1.36 mg/mL)(25) = 63.2 mg/mL

596V00048 SPK

19N19D = 386 ug/mL

1mL sample + 0.100mL 19N19D + 23.9 mL H_2O

DF = 25

$$\frac{(25)(21.8\ ug/mL - 1.36\ ug/mL) - (3.89\ ug/mL - 1.36\ ug/mL)(25)}{386\ ug/mL}(100) = 116\%\ R$$

= 116 % spike recovery

48

DUP SPIK 19N19D = 386 ug/m

1mL sample + 0.100 mL 19N19D + 23.9 mL H

DF = 25

$$RPD = \left| \frac{122 - 116}{\frac{122 + 116}{2}} \right| (100) = 5\% \text{ RPD}$$

$$\frac{(25)(22.8 \text{ ug/mL} - 1.36 \text{ ug/mL}) - (3.89 \text{ ug/mL} - 1.36 \text{ ug/mL})(25)}{386 \text{ ug/mL}} (100) = 122\% \text{ spike recovery}$$

END STD

MPLE VOL= 25.000 AT 19:58, 11-13-96
TERED

F= 48.2 mV AT 19:59, 11-13-96

F= 47.5 mV AT 19:59, 11-13-96

F= 48.3 mV AT 19:59, 11-13-96
TERED

D CONCN= 1000 AT 19:59, 11-13-96
TERED

D VOL= .2360? AT 19:59, 11-13-96
TERED

F= 36.0 mV AT 20:00, 11-13-96

F= 25.9 mV AT 20:00, 11-13-96

F= 25.8 mV AT 20:00, 11-13-96
TERED

D VOL= 2.5000 AT 20:01, 11-13-96
TERED

F=-1.9 mV AT 20:01, 11-13-96

F=-2.6 mV AT 20:02, 11-13-96

F=-2.5 mV AT 20:02, 11-13-96

F=-2.6 mV AT 20:02, 11-13-96
TERED

NH3 SLOPE=-59.0 mV/DEC
T 20:02, 11-13-96

NH3 CONCN= 15.5

UBLE KNOWN ADDITION SELECTED
T 20:03, 11-13-96

19NH9D = 386 mg/mL

1mL + 24 mL H_2O = 25 mL

DF = 25

$$\frac{(15.5\ mg/mL - 1.36\ mg/mL)(25)}{386\ mg/mL}(100) = 92\%\ end\ std\ Rec.$$

LABCORE Completed Worklist Report for Worklist# 12912

Analyst: vlm **Instrument:** IC01 **Book#** 32N20A

Method: LA-533-105 Rev/Mod D-1

Worklist Comment: AP-105 IC. RCJ

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	CCB			0	@IC-QC F	QC	1	<1.20e-2		ug/mL
1	CCB			0	@IC-QC CL	QC	1	<1.70e-2		ug/mL
1	CCB			0	@IC-QC NO2	QC	1	<1.08e-1		ug/mL
1	CCB			0	@IC-QC BR	QC	1	<1.25e-1		ug/mL
1	CCB			0	@IC-QC NO3	QC	1	<1.39e-1		ug/mL
1	CCB			0	@IC-QC PO4	QC	1	<1.20e-1		ug/mL
1	CCB			0	@IC-QC SO4	QC	1	<1.38e-1		ug/mL
1	CCB			0	@IC-QC OXALATE2	QC	1	<1.05e-1		ug/mL
2	CCV			0	@IC-QC F	QC	5.90e01	5.48e+01	92.881	% Recovery
2	CCV			0	@IC-QC CL	QC	7.90e01	7.28e+01	92.152	% Recovery
2	CCV			0	@IC-QC NO2	QC	5.40e02	5.02e+02	92.963	% Recovery
2	CCV			0	@IC-QC BR	QC	5.89e02	5.86e+02	99.491	% Recovery
2	CCV			0	@IC-QC NO3	QC	5.94e02	6.00e+02	101.010	% Recovery
2	CCV			0	@IC-QC PO4	QC	5.45e02	5.42e+02	99.450	% Recovery
2	CCV			0	@IC-QC SO4	QC	6.31e02	6.50e+02	103.011	% Recovery
2	CCV			0	@IC-QC OXALATE2	QC	5.27e02	5.42e+02	102.846	% Recovery
3	SAMPLE	S96V000048		0	@IC-01 F-02	LIQUID	N/A	2.539e+02	49.690	ug/mL
3	SAMPLE	S96V000048		0	@IC-01 NO2-02	LIQUID	N/A	4.676e+04	447.200	ug/mL
3	SAMPLE	S96V000048		0	@IC-01 NO3-02	LIQUID	N/A	1.008e+05	575.600	ug/mL
3	SAMPLE	S96V000048		0	@IC-01 PO4-02	LIQUID	N/A	1.387e+03	496.900	ug/mL
3	SAMPLE	S96V000048		0	@IC-01 SO4-02	LIQUID	N/A	2.538e+03	571.500	ug/mL
4	SPK	S96V000048		0	@IC-01 F-02	LIQUID	5.90e01	6.62e+01	112.203	% Recovery
4	SPK	S96V000048		0	@IC-01 NO2-02	LIQUID	5.40e02	5.39e+02	99.815	% Recovery
4	SPK	S96V000048		0	@IC-01 NO3-02	LIQUID	5.94e02	5.97e+02	100.505	% Recovery
4	SPK	S96V000048		0	@IC-01 PO4-02	LIQUID	5.45e02	5.12e+02	93.945	% Recovery
4	SPK	S96V000048		0	@IC-01 SO4-02	LIQUID	6.31e02	6.30e+02	99.842	% Recovery
5	SPK-DUP	S96V000048		0	@IC-01 F-02	LIQUID	5.90e01	6.68e+01	12.401	RPD
5	SPK-DUP	S96V000048		0	@IC-01 NO2-02	LIQUID	5.40e02	4.90e+02	9.709	RPD
5	SPK-DUP	S96V000048		0	@IC-01 NO3-02	LIQUID	5.94e02	6.06e+02	2.000	RPD
5	SPK-DUP	S96V000048		0	@IC-01 PO4-02	LIQUID	5.45e02	5.13e+02	6.049	RPD
5	SPK-DUP	S96V000048		0	@IC-01 SO4-02	LIQUID	6.31e02	6.39e+02	1.260	RPD
6	SAMPLE	S96V000049		0	@IC-01 F-02	LIQUID	N/A	3.485e+02	25.450	ug/mL
6	SAMPLE	S96V000049		0	@IC-01 NO2-02	LIQUID	N/A	4.810e+04	229.100	ug/mL
6	SAMPLE	S96V000049		0	@IC-01 NO3-02	LIQUID	N/A	1.019e+05	294.800	ug/mL
6	SAMPLE	S96V000049		0	@IC-01 PO4-02	LIQUID	N/A	1.538e+03	254.500	ug/mL
6	SAMPLE	S96V000049		0	@IC-01 SO4-02	LIQUID	N/A	2.055e+03	292.700	ug/mL
7	SAMPLE	S96V000047		0	@IC-01 F-02	LIQUID	N/A	3.234e+02	25.450	ug/mL
7	SAMPLE	S96V000047		0	@IC-01 NO2-02	LIQUID	N/A	4.569e+04	229.100	ug/mL
7	SAMPLE	S96V000047		0	@IC-01 NO3-02	LIQUID	N/A	9.503e+04	294.800	ug/mL
7	SAMPLE	S96V000047		0	@IC-01 PO4-02	LIQUID	N/A	1.151e+03	254.500	ug/mL
7	SAMPLE	S96V000047		0	@IC-01 SO4-02	LIQUID	N/A	1.933e+03	292.700	ug/mL

Units shown for QC (BLK/BKG) may not reflect the actual units.

worklistdata Version 1.0 05/15/96
11/08/96 13:09

LABCORE Completed Worklist Report for Worklist# 12912

Seq	Type	Sample#	R	A	Test		Matrix	Actual		Found	DL or Yield	Unit
8	SAMPLE	S96V000058	0		@IC-01	F-02	LIQUID	N/A	<	7.200e-02	7.20e-002	ug/mL
8	SAMPLE	S96V000058	0		@IC-01	NO2-02	LIQUID	N/A	<	6.480e-01	0.648	ug/mL
8	SAMPLE	S96V000058	0		@IC-01	NO3-02	LIQUID	N/A		8.630e-01	0.834	ug/mL
8	SAMPLE	S96V000058	0		@IC-01	PO4-02	LIQUID	N/A	<	7.200e-01	0.720	ug/mL
8	SAMPLE	S96V000058	0		@IC-01	SO4-02	LIQUID	N/A		1.469e+01	0.828	ug/mL

Final page for worklist# 12912

Analyst Signature **Date**

Analyst Signature **Date**

James M. Luyc 11/8/96
Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

11/01/96 09:14
A-0004-1

LABCORE Data Entry Template for Worklist# 12912

Analyst: VLM **Instrument:** IC00 IC01 **Book#** 32N30-A

Method: LA-533-105 Rev/Mod D-1

Worklist Comment: AP-105 IC. RCJ

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	CCB				@IC-QC	QC		
2	CCV				@IC-QC	QC		
3	SAMPLE	S96V000048	0		@IC-01	LIQUID	96000855	AP-105
	Analytes Requested:	F-02 , NO2-02 , NO3-02 , PO4-02 , SO4-02						
4	SPK	S96V000048	0		@IC-01	LIQUID		
5	SPK-DUP	S96V000048	0		@IC-01	LIQUID		
6	SAMPLE	S96V000049	0		@IC-01	LIQUID	96000855	AP-105
	Analytes Requested:	F-02 , NO2-02 , NO3-02 , PO4-02 , SO4-02						
7	SAMPLE	S96V000047	0		@IC-01	LIQUID	96000853	AP-105
	Analytes Requested:	F-02 , NO2-02 , NO3-02 , PO4-02 , SO4-02						
8	SAMPLE	S96V000058	0		@IC-01	LIQUID	96000855	AP-105
	Analytes Requested:	F-02 , NO2-02 , NO3-02 , PO4-02 , SO4-02						

Final page for worklist # 12912

Valerie L Massie 11-1-96
Analyst Signature **Date**

Analyst Signature **Date**

12912 NV. CSV
In shell
Uploaded 11/4/96 JMFuge
Validated 11/8/96 JMFuge

Data Entry Comments: Spike dup calculation in labcore doesn't work, fix it in validation JMFuge
I can't fix it in validation, it will be calculated in a separate query. JMF

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

A-0010-IC DATA FILE/WORKLIST RESOLUTION 04-Nov-96

Worklist#: 12912

	Seq	Type	Sample #
=>	1	CCB	
=>	2	CCV	
=>	3	SAMPLE	S96V000048
=>	4	SPK	S96V000048
=>	5	SPK-DUP	S96V000048
=>	6	SAMPLE	S96V000049
=>	7	SAMPLE	S96V000047
=>	8	SAMPLE	S96V000058

Data File: 12912NV.CSV

Seq#	Data File	Sample Name	Dilution
8	96110101.d05	S96V00058 FIELD	6.00
6	96110101.d14	S96V000049	2121.00
7	96110101.d13	S96V000047	2121.00
5	96110101.d11	S96V000048 SPIKE	4141.00
4	96110101.d10	S96V000048 SPIKE	4141.00
3	96110101.d09	S96V000048	4141.00
2	96110101.d02	STD 32N20-A	101.00
1	96110101.d01	INSTR BLANK	1.00

Save(F4) Abort(Shift-F3) ListFiles(Shift-F1) UploadFile(F8)

Data Reprocessed On 11/04/1996 09:59:28

```
Sample Name: INSTR BLANK                    Date: 11/01/1996 09:34:48
Data File  : C:\DX\DATA\96110101.d01
Method     : C:\DX\METHOD\KIT.MET
ACI Address: 1  System: 1  Inject#: 1                Detector:CDM-1
Analyst    :               Column: AG4A/AS4A anion column
```

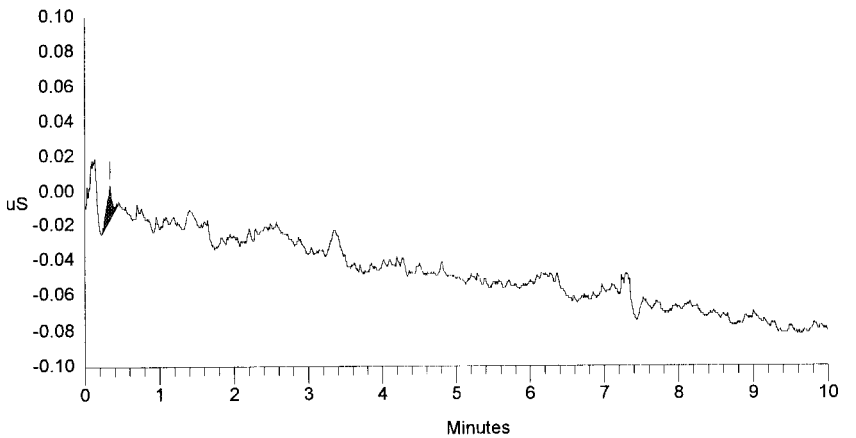
A Anastos for VL Massie 1-10-97

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	3000	5Hz	0.00	10.00	50

********** Peak Report: All Peaks **********

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.34		0.000	19	95	1	
		Totals	0.000	19	95		

File: 96110101.d01 Sample: INSTR BLANK



SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 155 TO 162.

Data Reprocessed On 11/04/1996 09:59:26

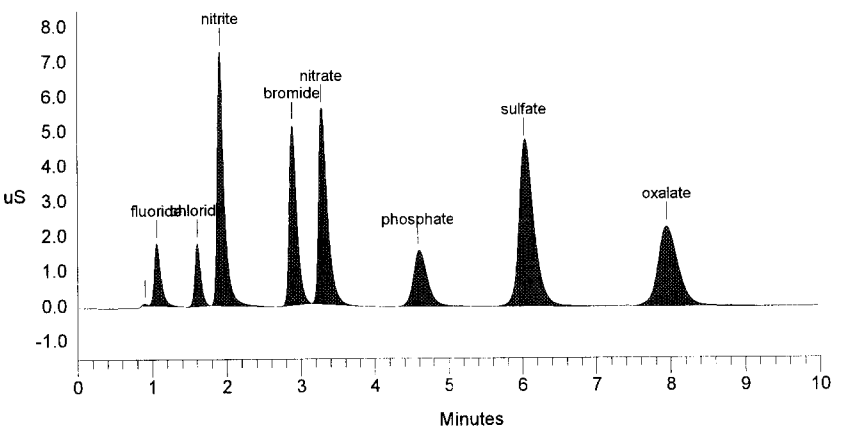
Sample Name: STD 32N20-A Date: 11/01/1996 09:55:27
Data File : C:\DX\DATA\96110101.d02
Method : C:\DX\METHOD\KIT.MET
ACI Address: 1 System: 1 Inject#: 2 Detector:CDM-1
Analyst : Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	101	3000	5Hz	0.00	10.00	50

********** Peak Report: All Peaks **********

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.90		0.000	43	157	2	
2	1.06	fluoride	54.793	1756	10790	2	3.92
3	1.61	chloride	72.772	1783	9637	1	-0.41
4	1.91	nitrite	501.926	7285	46282	1	-3.37
5	2.89	bromide	586.398	5148	36024	1	-3.13
6	3.28	nitrate	600.186	5602	46029	1	-3.81
7	4.59	phosphate	542.146	1560	21697	1	-6.96
8	6.03	sulfate	650.421	4714	66531	1	-8.13
9	7.95	oxalate	542.370	2283	42946	1	-3.21
		Totals	3551.012	30173	280093		

File: 96110101.d02 Sample: STD 32N20-A



Data Reprocessed On 11/04/1996 09:59:24

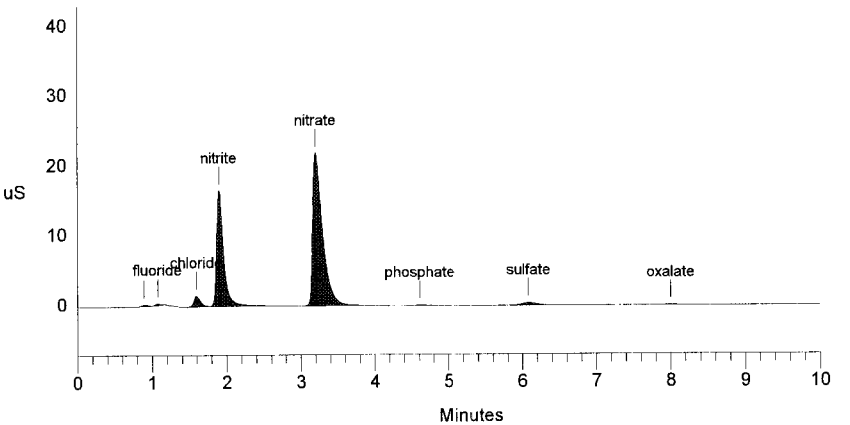
Sample Name: S96V000048		Date: 11/01/1996 14:01:14	
Data File : C:\DX\DATA\96110101.d09			
Method : C:\DX\METHOD\KIT.MET			
ACI Address: 1 System: 1 Inject#: 9			Detector:CDM-1
Analyst :	Column: AG4A/AS4A anion column		

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	4141	3000	5Hz	0.00	10.00	50

********** Peak Report: All Peaks **********

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.89		0.000	180	921	1	
2	1.07	fluoride	253.948	251	1024	1	5.23
3	1.59	chloride	2777.059	1533	8964	1	-1.24
4	1.90	nitrite	46760.209	16500	107657	1	-4.04
5	3.20	nitrate	100788.942	21879	202551	1	-6.16
6	4.61	phosphate	1386.514	92	1342	1	-6.42
7	6.08	sulfate	2537.591	374	5807	1	-7.32
8	8.00	oxalate	477.048	41	702	1	-2.56
		Totals	154981.311	40851	328968		

File: 96110101.d09 Sample: S96V000048



Data Reprocessed On 11/04/1996 09:59:22

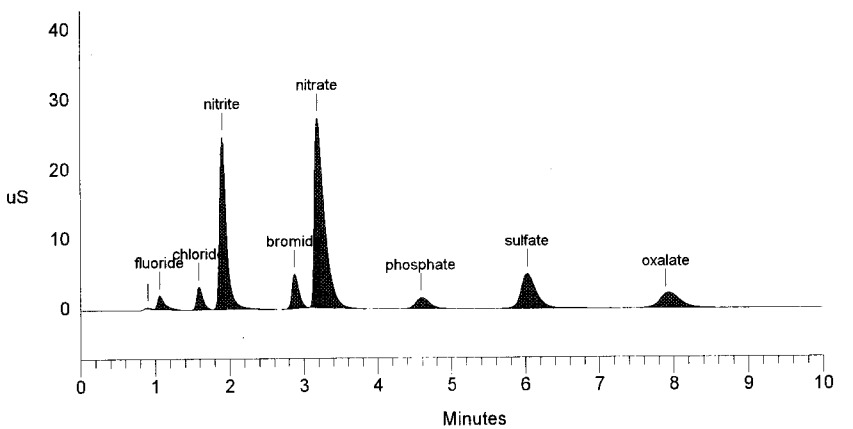
```
Sample Name: S96V000048 SPIKE                Date: 11/01/1996 14:12:31
Data File  : C:\DX\DATA\96110101.d10
Method     : C:\DX\METHOD\KIT.MET
ACI Address: 1  System: 1  Inject#: 10                  Detector:CDM-1
Analyst    :                Column: AG4A/AS4A anion column
```

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	4141	3000	5Hz	0.00	10.00	50

********** Peak Report: All Peaks **********

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.90		0.000	211	1015	2	
2	1.06	fluoride	2924.239	1975	14159	2	3.92
3	1.59	chloride	5807.055	3288	18967	1	-1.65
4	1.91	nitrite	68474.010	24748	159775	1	-3.70
5	2.87	bromide	21249.806	4894	31697	1	0.12
6	3.19	nitrate	124841.645	27274	256184	1	-6.55
7	4.59	phosphate	22048.825	1596	21519	1	-6.96
8	6.03	sulfate	27957.121	4970	69836	1	-8.13
9	7.89	oxalate	21382.506	2031	41274	1	-3.86
		Totals	294685.206	70989	614425		

File: 96110101.d10 Sample: S96V000048 SPIKE



Data Reprocessed On 11/04/1996 09:59:20

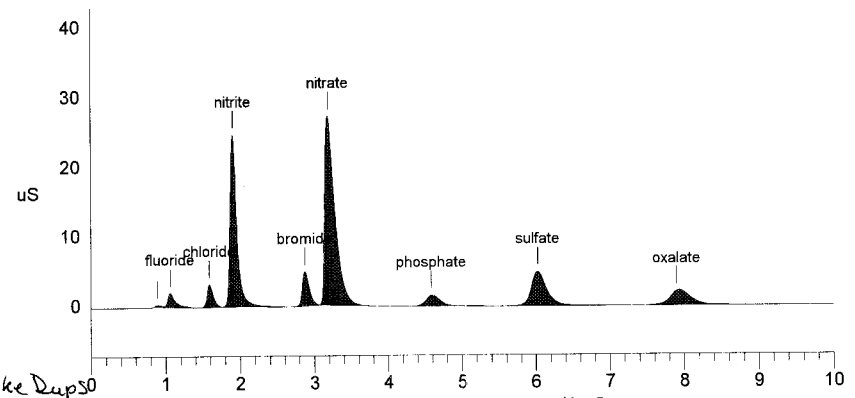
```
Sample Name: S96V000048 SPIKE DUP          Date: 11/01/1996 14:23:48
Data File  : C:\DX\DATA\96110101.d11
Method     : C:\DX\METHOD\KIT.MET
ACI Address: 1  System: 1  Inject#: 11                 Detector:CDM-1
Analyst    :               Column: AG4A/AS4A anion column
```

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	4141	3000	5Hz	0.00	10.00	50

********** Peak Report: All Peaks **********

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.89		0.000	222	1184	2	
2	1.06	fluoride	2947.604	1998	14276	2	3.92
3	1.59	chloride	5686.671	3309	18564	1	-1.65
4	1.91	nitrite	66536.394	24692	155077	1	-3.70
5	2.87	bromide	21309.040	4931	31789	1	0.12
6	3.19	nitrate	125224.843	27187	257058	1	-6.55
7	4.59	phosphate	22062.747	1605	21533	1	-6.96
8	6.03	sulfate	28312.386	4973	70747	1	-8.13
9	7.89	oxalate	21170.129	2052	40858	1	-3.86
		Totals	293249.814	70971	611085		

File: 96110101.d11 Sample: S96V000048 SPIKE DUP



Spike Dups

F $\frac{(2947.604 - 253.948)\ 10.25}{(.1)(59)(4141)} \times 100\% = 113.01\%$

Cl $\frac{(5686.671 - 277.059)\ 10.25}{(.1)(79)(4141)} \times 100 = 91.16\%$

NO_2 $\frac{(66536.394 - 4676.209)\ 10.25}{(.1)(540)(4141)} \times 100 = 90.65\%$

Br $\frac{(21309.04 - 0)\ 10.25}{(.1)(589)(4141)} \times 100 = 89.65\%$

NO_3 $\frac{(125224.843 - 100788.942)\ 10.25}{(.1)(694)(4141)} \times 100 = 101.82\%$ (~~113.48%~~)

PO_4 $\frac{(22062.747 - 1386.574)\ 10.25}{(.1)(545)(4141)} \times 100 = 93.91\%$

SO_4 $\frac{(28312.386 - 2537.591)\ 10.25}{(.1)(681)(4141)} \times 100 = 101.10\%$

159 ox $\frac{(21170.129 - 477.048)(10.25)}{(.1)(527)(4141)} \times 100 = 97.49\%$

Data Reprocessed On 11/04/1996 09:59:18

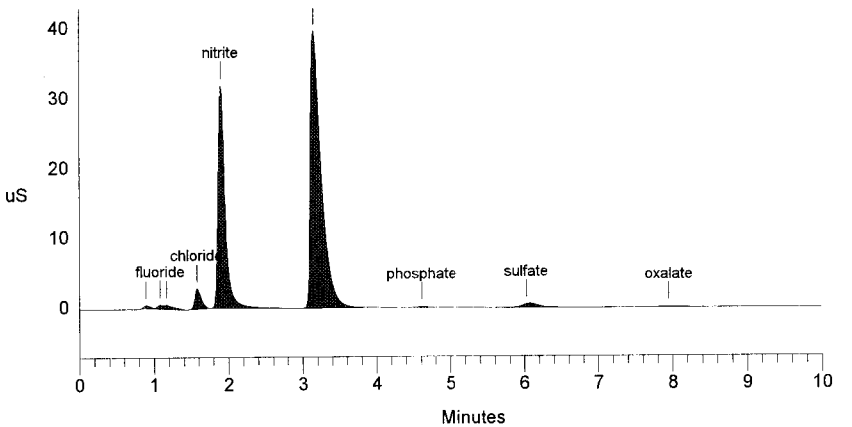
Sample Name: S96V000047		Date: 11/01/1996 14:49:31	
Data File : C:\DX\DATA\96110101.d13			
Method : C:\DX\METHOD\KIT.MET			
ACI Address: 1 System: 1	Inject#: 13		Detector:CDM-1
Analyst :	Column: AG4A/AS4A anion column		

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	2121	3000	5Hz	0.00	10.00	50

********** Peak Report: All Peaks **********

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.89		0.000	381	2330	2	
2	1.08	fluoride	323.407	554	2859	2	5.88
3	1.17		0.000	567	4972	2	
4	1.57	chloride	2731.313	2925	17382	1	-2.48
5	1.90	nitrite	45690.129	31871	210633	1	-4.04
6	3.15	nitrate	95029.302	39606	403537	1	-0.11
7	4.61	phosphate	1151.069	174	2171	1	-6.42
8	6.03	sulfate	1933.164	507	8870	1	-8.13
9	7.95	oxalate	417.090	65	1352	1	-3.21
		Totals	147275.475	76651	654106		

File: 96110101.d13 Sample: S96V000047



Data Reprocessed On 11/04/1996 09:59:16

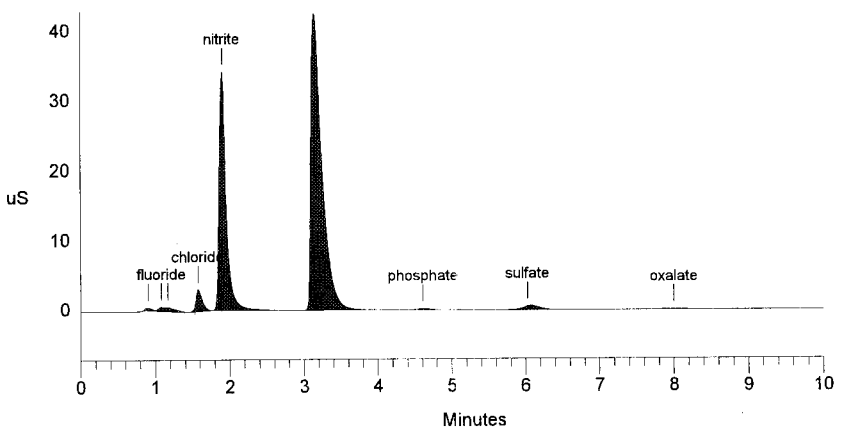
Sample Name: S96V000049 Date: 11/01/1996 15:02:43
Data File : C:\DX\DATA\96110101.d14
Method : C:\DX\METHOD\KIT.MET
ACI Address: 1 System: 1 Inject#: 14 Detector:CDM-1
Analyst : Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	2121	3000	5Hz	0.00	10.00	50

********** Peak Report: All Peaks **********

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
1	0.90		0.000	424	2572	2	
2	1.08	fluoride	348.537	592	3098	2	5.88
3	1.17		0.000	616	5365	2	
4	1.57	chloride	2885.323	3172	18386	1	-2.48
5	1.90	nitrite	48097.247	34169	222320	1	-4.04
6	3.14	nitrate	101870.123	42509	438811	1	0.00
7	4.61	phosphate	1538.337	196	2900	1	-6.42
8	6.03	sulfate	2054.880	545	9459	1	-8.13
9	8.00	oxalate	428.472	78	1395	1	-2.56
		Totals	157222.919	82300	704305		

File: 96110101.d14 Sample: S96V000049



Data Reprocessed On 11/04/1996 09:59:13

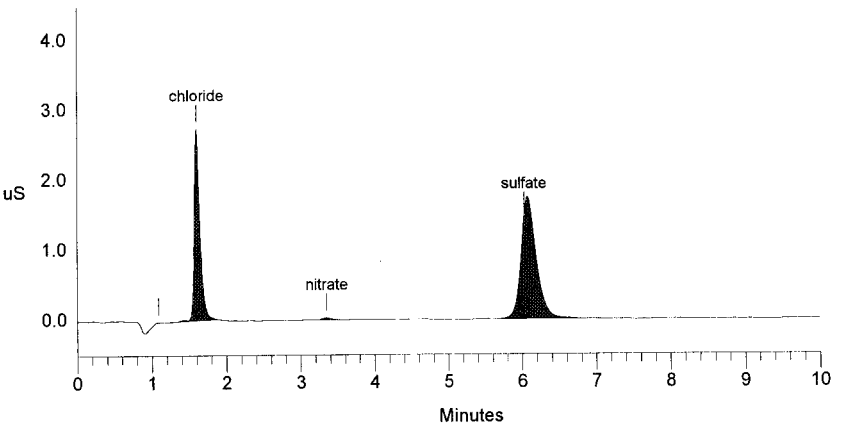
Sample Name: S96V00058 FIELD BLANK Date: 11/01/1996 11:43:02
Data File : C:\DX\DATA\96110101.d05
Method : C:\DX\METHOD\KIT.MET
ACI Address: 1 System: 1 Inject#: 5 Detector:CDM-1
Analyst : Column: AG4A/AS4A anion column

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	6	3000	5Hz	0.00	10.00	50

********** Peak Report: All Peaks **********

Pk. Num	Ret Time	Component Name	Concentration ug/ml	Height	Area	Bl. Code	%Delta
2	1.60	chloride	6.443	2738	14442	1	-0.83
3	3.35	nitrate	0.863	26	166	1	-1.86
4	6.03	sulfate	14.689	1462	24714	1	-8.13
		Totals	21.995	4227	39322		

File: 96110101.d05 Sample: S96V00058 FIELD BLANK



LABCORE Data Entry Template for Worklist# 14566

Analyst: JK S.T.C **Instrument:** ICP01 JK 11-04-96 **Book#** LB848

Method: LA-505-~~151~~/161 Rev/Mod B-1 JK

Worklist Comment: ICP AP-105 (LIQUID ACID DIGEST)

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	ICV				@ICP-QC	QC		
2	ICB				@ICP-QC	QC		
3	LLS				@ICP-QC	QC		
4	ICSA				@ICP-QC	QC		
5	ICSAB				@ICP-QC	QC		
6	PREPSTDTJA				@ICP-B01	LIQUID		
7	PREPBLKTJA SERDIL				@ICP-B01	LIQUID		
8	SAMPLE	S96V000050	0	B	@ICP-B01	LIQUID	96000853	AP-105
	Analytes Requested: AL-B-01 , CR-B-01 , FE-B-01 , MN-B-01 , NA-B-01 , NI-B-01 , SI-B-01 , U-B-01							
9	DUP	S96V000050	0	B	@ICP-B01	LIQUID		
10	SPK-PREDIG Sample X	S96V000050	0	B	@ICP-B01	LIQUID		
11	SPK-DUP	S96V000050	0	B	@ICP-B01	LIQUID		
12	CCV				@ICP-QC	QC		
13	CCB				@ICP-QC	QC		
14	SAMPLE	S96V000051	0	B	@ICP-B01	LIQUID	96000855	AP-105
	Analytes Requested: AL-B-01 , CR-B-01 , FE-B-01 , MN-B-01 , NA-B-01 , NI-B-01 , SI-B-01 , U-B-01							
15	DUP	S96V000051	0	B	@ICP-B01	LIQUID		
16	SAMPLE	S96V000052	0	B	@ICP-B01	LIQUID	96000855	AP-105
	Analytes Requested: AL-B-01 , CR-B-01 , FE-B-01 , MN-B-01 , NA-B-01 , NI-B-01 , SI-B-01 , U-B-01							

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

LABCORE Data Entry Template for Worklist# 14566

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
17	DUP	S96V000052	0	B	@ICP-B01	LIQUID		
18	SAMPLE	S96V000054	0	B	@ICP-B01	LIQUID	96000855	AP-105
	Analytes Requested:	AL-B-01 , CR-B-01 , FE-B-01 , MN-B-01 , NA-B-01 , NI-B-01 , SI-B-01 , U-B-01						
19	DUP	S96V000054	0	B	@ICP-B01	LIQUID		
20	SAMPLE	S96V000060	0	B	@ICP-B01	LIQUID	96000855	AP-105
	Analytes Requested:	AL-B-01 , CR-B-01 , FE-B-01 , MN-B-01 , NA-B-01 , NI-B-01 , SI-B-01 , U-B-01						
21	DUP	S96V000060	0	B	@ICP-B01	LIQUID		
22	ICSA				@ICP-QC	QC		
23	ICSAB				@ICP-QC	QC		
24	CCV				@ICP-QC	QC		
25	CCB				@ICP-QC	QC		

Final page for worklist # 14566

DK Lee 11-04-96
Analyst Signature **Date**

Reviewed by: Karl M. Pang 11/06/96
Analyst Signature **Date**

Prep blk, direct
Prep std, direct
S96V000050_L , 2-8-2-8 , DF 25
S96V000050 , 2-8 , 5
S96V000050_D , 2-8 , 5
S96V000050_S , 2-8 , 5
S96V000050_X , 1-10 , DF 101
S96V000050_SD , 1-10 , 101 , 1 ml sample + 1.01 ml each 6MCl + 7.98 ml HNO_3
S96V000051 , 2-8 , DF 5
S96V000051_D , 2-8 , 5
S96V000052 , 2-8 , 5
S96V000052_D , 2-8 , 5
S96V000054 , 2-8 , 5
S96V000054_D , 2-8 , 5

S96V000060 , direct , DF 1
S96V000060_D , direct , 1

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

Analysis Report Summary HNF Mon 11-04-96 12:03:45 PM page 1

#	Sample Name	File	Method	Date	Time	OpID	Type	Mode
1	ICV	961104A	ICP2	11/04/96	09:50	DKS	Q	CONC
2	ICB	961104A	ICP2	11/04/96	09:53	DKS	Q	CONC
3	LLS	961104A	ICP2	11/04/96	09:56	DKS	Q	CONC
4	ICSA	961104A	ICP2	11/04/96	09:59	DKS	Q	CONC
5	ICSAB	961104A	ICP2	11/04/96	10:02	DKS	Q	CONC
6	PREPSTDTJA	961104A	ICP2	11/04/96	10:07	DKS	S	CONC
7	PREPBLKTJA	961104A	ICP2	11/04/96	10:12	DKS	S	CONC
8	S96V000050_L	961104A	ICP2	11/04/96	10:16	DKS	S	CONC
9	S96V000050	961104A	ICP2	11/04/96	10:21	DKS	S	CONC
10	S96V000050_D	961104A	ICP2	11/04/96	10:24	DKS	S	CONC
11	S96V000050_S	961104A	ICP2	11/04/96	10:28	DKS	S	CONC
12	S96V000050_X	961104A	ICP2	11/04/96	10:32	DKS	S	CONC
13	S96V000050_SD	961104A	ICP2	11/04/96	10:36	DKS	S	CONC
14	CCV	961104A	ICP2	11/04/96	10:41	DKS	Q	CONC
15	CCB	961104A	ICP2	11/04/96	10:44	DKS	Q	CONC
16	S96V000051	961104A	ICP2	11/04/96	10:48	DKS	S	CONC
17	S96V000051_D	961104A	ICP2	11/04/96	10:51	DKS	S	CONC
18	S96V000052	961104A	ICP2	11/04/96	10:54	DKS	S	CONC
19	S96V000052_D	961104A	ICP2	11/04/96	11:00	DKS	S	CONC
20	S96V000054	961104A	ICP2	11/04/96	11:03	DKS	S	CONC
21	S96V000054_D 11-4-96	961104A	ICP2	11/04/96	11:06	DKS	S	CONC
22	S96V000060	961104A	ICP2	11/04/96	11:12	DKS	S	CONC
23	S96V000060_D	961104A	ICP2	11/04/96	11:15	DKS	S	CONC
24	ICSA	961104A	ICP2	11/04/96	11:18	DKS	Q	CONC
25	ICSAB	961104A	ICP2	11/04/96	11:21	DKS	Q	CONC
26	CCV_1	961104A	ICP2	11/04/96	11:25	DKS	Q	CONC
27	CCB_1	961104A	ICP2	11/04/96	11:29	DKS	Q	CONC
28	S96V000050_SD	961104A	ICP2	11/04/96	11:46	DKS	S	CONC
29	ICSA	961104A	ICP2	11/04/96	11:50	DKS	Q	CONC
30	ICSAB	961104A	ICP2	11/04/96	11:53	DKS	Q	CONC
31	CCV_2	961104A	ICP2	11/04/96	11:57	DKS	Q	CONC
32	CCB_2	961104A	ICP2	11/04/96	12:00	DKS	Q	CONC

JK 11-04-96
Qp-105

S96V000050
S96V000051
S96V000052
S96V000054
S96V000060

Work list # 14566

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 165 TO 170.

Analysis Report Averages Mon 11-04-96 12:03:45 PM

#	Sample Name	Ag	Al	As	B	Ba	Be
1	ICV	4.995	4.907	5.197	5.028	4.947	5.139
2	ICB	-.0004	.0030	-.0191	.0034	.0000	.0002
3	LLS	.0202	.0988	.1921	.1061	.0983	.0104
4	ICSA	.0019	245.0	-.0029	-.0060	.0001	.0003
5	ICSAB	.9579	242.5	-.0361	-.0007	.4649	.4756
6	PREPSTDTJA	.5293	4.492	4.649	4.921	4.401	4.527
7	PREPBLKTJA	.0007	.1310	-.0220	.7079	.0007	.0002
8	S96V000050_L	.1710	356.7	-.6403	.7749	.0040	.0099
9	S96V000050	.1605	348.4	-.4740	.8063	.0029	.0051
10	S96V000050_D	.1589	349.9	-.3516	.6659	.0025	.0044
11	S96V000050_S	.4531	351.7	4.498	5.137	4.488	4.658
12	S96V000050_X	.1474	356.3	-1.898	.8312	-.0018	.0222
13	S96V000050_SD	953.1	1323.	1038.	990.2	1004.	1036.
14	CCV	5.031	4.937	5.227	5.089	5.012	5.168
15	CCB	.0052	.0034	-.0140	.0010	-.0000	.0001
16	S96V000051	.1692	353.3	-.4236	.7119	.0024	.0061
17	S96V000051_D	.1549	334.0	-.3138	.8087	.0020	.0055
18	S96V000052	.1556	343.3	-.3471	.6538	.0025	.0055
19	S96V000052_D	.1588	351.0	-.3197	.7700	.0027	.0044
20	S96V000054	.1637	354.1	-.4012	.7457	.0020	.0051
21	S96V000054_D 11-4-96	.1578	346.1	-.3301	.7167	.0020	.0048
22	S96V000060	-.0008	.1484	-.0088	.6890	.0011	.0002
23	S96V000060_D	-.0008	.1395	-.0217	.7670	.0011	-.0001
24	ICSA	.0016	246.5	-.0539	-.0028	.0001	.0000
25	ICSAB	.9657	245.2	-.0030	.0009	.4705	.4801
26	CCV_1	4.993	4.903	5.248	5.127	4.972	5.190
27	CCB_1	-.0005	-.0065	-.0166	.0019	.0001	.0000
28	S96V000050_SD	967.3	1318.	1047.	1004.	1010.	1042.
29	ICSA	.0109	243.1	-.0256	-.0035	.0002	.0002
30	ICSAB	.9645	242.8	-.0030	-.0040	.4684	.4733
31	CCV_2	4.977	4.862	5.205	5.038	4.932	5.119
32	CCB_2	-.0004	-.0089	-.0167	.0039	.0001	.0000

#	Sample Name	Bi	Ca	Cd	Ce	Co	Cr
1	ICV	5.037	5.025	5.073	4.973	5.098	5.088
2	ICB	-.0415	.0008	-.0005	.0044	-.0024	-.0003
3	LLS	.1755	.2108	.0092	.1958	.0398	.0199
4	ICSA	-.0329	247.8	-.0000	.0076	-.0010	.0068
5	ICSAB	-.0450	249.3	.9354	.0081	.4653	.4765
6	PREPSTDTJA	4.462	4.460	4.410	4.547	4.542	4.429
7	PREPBLKTJA	-.0223	.2104	-.0010	.0047	-.0026	.0016
8	S96V000050_L	-.1136	.5210	-.0201	-.0097	-.0774	4.363
9	S96V000050	.0513	.4058	-.0007	-.0185	.0161	4.266
10	S96V000050_D	-.0024	.3480	-.0073	-.0111	-.0013	4.267
11	S96V000050_S	4.625	4.841	4.561	4.702	4.643	8.742
12	S96V000050_X	-1.114	.5683	.0406	-.5651	-.2262	4.261
13	S96V000050_SD	1011.	987.5	994.1	992.4	1.191	1000.
14	CCV	5.193	4.999	5.059	4.999	5.097	5.077
15	CCB	.0095	.0023	-.0008	-.0019	-.0029	-.0005
16	S96V000051	-.1607	.3253	-.0015	.0034	.0011	4.311
17	S96V000051_D	-.0803	.3857	-.0013	-.0073	.0117	4.095

Analysis Report Averages Mon 11-04-96 12:03:45 PM page 3

#	Sample Name	Bi	Ca	Cd	Ce	Co	Cr
18	S96V000052	-.0936	.3809	-.0014	-.0054	-.0055	4.222
19	S96V000052_D	-.1103	.3281	.0015	-.0165	.0037	4.304
20	S96V000054	-.1213	.3738	-.0054	-.0001	.0099	4.312
21	S96V000054_D	-.1540	.3764	.0001	-.0149	.0037	4.214
22	S96V000060	-.0198	.5002	-.0014	-.0035	-.0026	.0006
23	S96V000060_D	.0051	.4866	-.0013	-.0012	-.0044	.0022
24	ICSA	.0037	252.3	-.0004	.0145	-.0022	.0073
25	ICSAB	-.0203	249.6	.9399	.0110	.4651	.4781
26	CCV_1	5.088	4.992	5.073	4.977	5.096	5.078
27	CCB_1	-.0013	-.0003	-.0019	-.0011	-.0035	-.0007
28	S96V000050_SD	1020.	997.1	1003.	999.1	1.503	1008.
29	ICSA	-.0408	251.8	.0008	.0116	-.0002	.0092
30	ICSAB	.0216	252.0	.9394	.0119	.4685	.4783
31	CCV_2	5.109	5.022	5.052	4.939	5.094	5.067
32	CCB_2	-.0409	.0030	-.0010	-.0078	-.0025	-.0014

#	Sample Name	Cu	Eu	Fe	K	La	Li
1	ICV	5.182	-.0011	5.042	5.000	5.028	5.059
2	ICB	-.0004	-.0001	.0006	-.0794	-.0001	.0000
3	LLS	.0209	.0003	.1032	.6171	.1003	.0217
4	ICSA	-.0105	-.0344	93.52	.0509	-.0050	.0022
5	ICSAB	.4743	-.0362	92.96	.3327	-.0039	1.040
6	PREPSTDTJA	4.449	-.0014	4.551	4.469	4.556	4.595
7	PREPBLKTJA	.0029	-.0012	.0443	.0616	.0005	-.0011
8	S96V000050_L	.0313	-.0007	.1103	64.42	-.0110	.0059
9	S96V000050	.0302	.0007	.1329	66.68	-.0006	.0012
10	S96V000050_D	.0105	.0003	.1273	68.73	-.0019	.0018
11	S96V000050_S	4.583	-.0036	4.594	71.87	4.726	4.870
12	S96V000050_X	-.0000	-.0580	.1103	47.82	-.0766	-.0712
13	S96V000050_SD	-.3386	.3231	986.5	1059.	1004.	1027.
14	CCV	5.240	-.0015	5.034	5.044	5.067	5.169
15	CCB	-.0002	-.0005	-.0001	.1613	-.0007	.0000
16	S96V000051	.0181	-.0029	.1358	80.72	-.0028	-.0029
17	S96V000051_D	.0205	.0002	.1218	77.33	-.0032	.0000
18	S96V000052	.0258	.0019	.1320	67.08	-.0001	.0023
19	S96V000052_D	.0115	.0008	.1129	68.14	-.0021	-.0006
20	S96V000054	.0160	-.0001	.1485	67.95	-.0007	.0006
21	S96V000054_D	.0193	-.0006	.1872	67.19	-.0045	.0006
22	S96V000060	.0069	-.0014	.0429	.0371	-.0014	-.0014
23	S96V000060_D	.0081	-.0007	.0359	.1692	-.0003	-.0004
24	ICSA	-.0109	-.0402	94.22	.0573	-.0049	.0031
25	ICSAB	.4820	-.0343	93.45	.1268	-.0045	1.059
26	CCV_1	5.237	-.0010	5.011	5.059	5.044	5.156
27	CCB_1	-.0007	.0003	-.0004	.1528	.0001	.0004
28	S96V000050_SD	-.3203	.3383	991.5	1053.	1009.	1028.
29	ICSA	-.0101	-.0407	93.49	.1606	-.0045	.0035
30	ICSAB	.4726	-.0397	93.31	.2659	-.0049	1.039
31	CCV_2	5.149	-.0003	4.979	4.940	4.986	5.042
32	CCB_2	-.0004	.0002	-.0003	.0525	.0000	.0001

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#	Sample Name	Mg	Mn	Mo	Na	Nd	Ni
1	ICV	4.845	4.922	5.074	4.885	5.025	5.028
2	ICB	-.0065	-.0001	-.0009	4.0033	-.0036	-.0037
3	LLS	.1850	.0192	.0963	.2042	.1959	.0397
4	ICSA	254.3	-.0069	-.0075	197.7	-.0006	-.0030
5	ICSAB	251.4	.4407	-.0139	192.8	.0031	.9221
6	PREPSTDTJA	4.141	4.320	4.459	5.235	4.455	4.560
7	PREPBLKTJA	.0245	-.0001	-.0004	.9850	-.0006	.0000
8	S96V000050_L	-.0958	-.0060	.6041	2314.	-.0126	-.0407
9	S96V000050	.0284	-.0008	.6078	2252.	-.0060	-.0058
10	S96V000050_D	.0471	-.0016	.6103	2258.	-.0123	.0174
11	S96V000050_S	4.235	4.349	5.164	2251.	4.590	4.622
12	S96V000050_X	-.2260	-.0465	.5915	2306.	-.2601	-.9198
13	S96V000050_SD	1004.	986.2	967.9	3281.	1004.	982.1
14	CCV	4.837	4.949	5.084	4.876	5.073	5.043
15	CCB	-.0049	-.0002	.0007	-.0098	-.0022	-.0017
16	S96V000051	.0275	-.0018	.6250	2318.	-.0176	.0427
17	S96V000051_D	.0282	-.0012	.5853	2183.	.0046	.0415
18	S96V000052	.0350	.0005	.6061	2202.	.0011	.0087
19	S96V000052_D	.0126	-.0008	.6190	2257.	-.0097	.0046
20	S96V000054	.0370	-.0010	.6181	2288.	-.0165	-.0163
21	S96V000054_D	.0134	-.0012	.6034	2233.	-.0103	-.0110
22	S96V000060	.0789	-.0002	.0008	.9792	-.0037	-.0018
23	S96V000060_D	.0848	-.0001	-.0014	1.099	-.0021	-.0075
24	ICSA	255.9	-.0068	-.0121	195.7	-.0006	-.0036
25	ICSAB	254.0	.4423	-.0135	194.1	-.0024	.9009
26	CCV_1	4.798	4.926	5.073	4.848	5.033	4.996
27	CCB_1	-.0127	-.0001	-.0002	-.0012	-.0020	-.0049
28	S96V000050_SD	1008.	993.6	983.9	3235.	1007.	992.4
29	ICSA	251.8	-.0059	-.0083	192.1	.0036	-.0115
30	ICSAB	251.2	.4457	-.0120	191.2	-.0002	.9283
31	CCV_2	4.748	4.921	5.074	4.778	4.970	5.004
32	CCB_2	-.0073	-.0003	.0002	-.0049	-.0027	-.0037

#	Sample Name	P	Pb	S	Sb	Se	Si
1	ICV	5.163	5.055	5.063	4.842	4.794	4.974
2	ICB	-.0037	-.0046	.0032	.0017	.0153	.0030
3	LLS	.4211	.2149	.2024	.1023	.2046	Q.2096
4	ICSA	.0202	.0322	-.0491	.0025	-.0341	-.0072
5	ICSAB	.0428	.9999	-.0460	-.0034	-.0142	-.0012
6	PREPSTDTJA	4.682	4.314	4.581	4.441	4.164	4.879
7	PREPBLKTJA	.0061	.0017	.1295	.0064	.0103	1.173
8	S96V000050_L	11.81	.6105	14.30	.0664	.0745	1.940
9	S96V000050	11.45	.7407	14.06	.0548	.0894	1.889
10	S96V000050_D	11.61	.7024	14.17	.0533	.0343	1.474
11	S96V000050_S	13.94	5.180	18.65	4.642	4.492	5.162
12	S96V000050_X	12.55	.8121	13.56	-.1105	.3433	1.515
13	S96V000050_SD	1039.	1013.	1020.	985.7	972.8	1011.
14	CCV	5.141	5.038	5.056	4.862	4.927	4.975
15	CCB	.0109	-.0007	-.0053	.0046	.0066	-.0035
16	S96V000051	11.38	.7221	16.68	-.0103	.0493	1.688
17	S96V000051_D	10.94	.6910	15.85	.0082	.0214	1.672

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#	Sample Name	P	Pb	S	Sb	Se	Si
18	S96V000052	11.40	.7241	14.09	-.0107	.0991	1.673
19	S96V000052_D	11.83	.7624	14.35	.0251	.1087	1.737
20	S96V000054	11.99	.7116	14.41	-.0104	.0730	1.818
21	S96V000054_D 11-4-96	11.47	.7486	14.04	.0082	.0668	1.702
22	S96V000060	.0002	.0163	.1629	.0043	.0194	1.363
23	S96V000060_D	.0313	.0091	.2074	.0046	.0051	1.485
24	ICSA	.0090	.0266	-.0487	-.0118	-.0307	-.0054
25	ICSAB	.0149	.9927	-.0522	.0050	-.0298	-.0063
26	CCV_1	5.303	5.032	5.119	4.845	4.937	4.960
27	CCB_1	.0102	.0058	-.0090	-.0047	.0065	-.0011
28	S96V000050_SD	1052.	1025.	1035.	1002.	975.2	1027.
29	ICSA	.0195	.0369	-.0489	.0116	-.0022	-.0042
30	ICSAB	.0219	1.007	-.0343	.0116	-.0206	-.0022
31	CCV_2	5.275	5.025	5.087	4.835	4.867	4.951
32	CCB_2	-.0020	-.0041	-.0060	.0061	.0039	-.0052

#	Sample Name	Sm	Sr	Th	Ti	Tl	U
1	ICV	4.856	4.888	.0534	4.872	4.878	9.499
2	ICB	-.0013	-.0001	-.0000	-.0002	.0028	-.0055
3	LLS	.1997	.0199	.0004	.0196	.3875	.4880
4	ICSA	-.0101	.0019	.0007	.0015	-.0004	-.0622
5	ICSAB	.0007	.0019	.0032	.0012	.0209	-.0410
6	PREPSTDTJA	4.383	4.386	.0466	4.092	4.196	8.556
7	PREPBLKTJA	-.0203	.0001	.0052	.0015	.0044	-.0762
8	S96V000050_L	-.1000	.0000	.0477	.0001	-.0697	-.2046
9	S96V000050	-.0390	.0010	-.0045	-.0001	-.1370	.1037
10	S96V000050_D	-.0369	.0012	-.0141	.0011	.0678	.0891
11	S96V000050_S	4.484	4.514	.0464	4.138	4.339	8.823
12	S96V000050_X	-1.191	-.0150	.0031	-.0243	2.398	-3.496
13	S96V000050_SD	974.6	977.6	5.593	887.1	950.4	69.49
14	CCV	4.892	4.917	.0597	4.880	4.841	9.610
15	CCB	-.0105	-.0001	.0024	-.0002	-.0020	-.0369
16	S96V000051	-.0793	.0007	.0046	.0011	-.1267	.0083
17	S96V000051_D	-.0368	.0010	-.0242	.0034	-.1128	.0748
18	S96V000052	-.0054	.0017	.0037	.0011	-.0104	.1990
19	S96V000052_D	-.0243	.0010	-.0205	.0022	-.0385	.1475
20	S96V000054	-.0497	.0010	-.0140	-.0026	-.0647	.0620
21	S96V000054_D 11-4-96	-.0430	.0012	-.0092	-.0001	-.1168	.0308
22	S96V000060	-.0270	.0018	.0054	.0008	-.0281	-.0989
23	S96V000060_D	-.0178	.0017	.0008	.0010	.0008	-.0592
24	ICSA	.0015	.0019	-.0062	.0007	.0242	-.0443
25	ICSAB	-.0041	.0019	.0041	.0012	.0076	-.0446
26	CCV_1	4.887	4.903	.0558	4.882	4.886	9.559
27	CCB_1	.0017	.0000	-.0042	-.0000	-.0032	.0070
28	S96V000050_SD	979.8	981.7	5.112	903.8	958.8	71.17
29	ICSA	.0098	.0018	.0010	.0010	.0245	-.0419
30	ICSAB	.0053	.0018	.0034	.0012	-.0156	-.0350
31	CCV_2	4.837	4.836	.0596	4.833	4.859	9.424
32	CCB_2	-.0020	-.0001	-.0001	-.0002	-.0063	-.0048

#	Sample Name	V	Y	Zn	Zr		
1	ICV	5.040	.0067	5.106	4.922		
2	ICB	-.0004	.0000	.0002	-.0003		
3	LLS	.1025	.0003	.0221	.0203		
4	ICSA	-.0020	.0064	.0035	-.0047		
5	ICSAB	.4647	.0072	.9572	-.0026		
6	PREPSTDTJA	4.416	.0048	4.374	4.530		
7	PREPBLKTJA	-.0034	-.0010	.0431	.0004		
8	S96V000050_L	-.0098	-.0078	.0563	-.0036		
9	S96V000050	-.0019	-.0016	.0624	.0121		
10	S96V000050_D	-.0028	-.0028	.0438	.0146		
11	S96V000050_S	4.526	.0021	4.643	.9840		
12	S96V000050_X	-.1806	-.0618	.0399	-.1010		
13	S96V000050_SD	.6275	1.419	-3.037	989.4		
14	CCV	5.058	.0064	5.107	4.948		
15	CCB	-.0018	-.0005	-.0003	-.0015		
16	S96V000051	-.0101	-.0039	.0476	.0028		
17	S96V000051_D	-.0027	-.0032	.0553	.0101		
18	S96V000052	.0016	-.0013	.0570	.0166		
19	S96V000052_D	-.0011	-.0020	.0488	.0132		
20	S96V000054	-.0046	-.0032	.0499	.0129		
21	S96V000054_D JK 11-4-96	-.0055	-.0035	.0508	.0073		
22	S96V000060	-.0045	-.0014	.0561	-.0003		
23	S96V000060_D	-.0027	-.0007	.0527	.0011		
24	ICSA	.0000	.0070	.0036	-.0029		
25	ICSAB	.4665	.0069	.9638	-.0041		
26	CCV_1	5.049	.0062	5.108	4.933		
27	CCB_1	.0004	.0000	-.0013	-.0000		
28	S96V000050_SD	.7007	1.426	-3.215	1004.		
29	ICSA	.0015	.0074	.0046	-.0020		
30	ICSAB	.4677	.0075	.9655	-.0023		
31	CCV_2	5.025	.0067	5.110	4.895		
32	CCB_2	-.0004	-.0002	-.0012	-.0010		

JK 11-04-96

LABCORE Data Entry Template for Worklist# 12910

Analyst: RAW **Instrument:** TOC01 WB39937 **Book #** 24NIZ-D STD
23NIZ-B SPK

Method: LA-344-105 Rev/Mod D-1

Worklist Comment: AP-105 TOC. RCJ

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
		1	BLNK				TOC-01	LIQUID	1	0.70	N/A	ug/mL
		2	STD				TOC-01	LIQUID	3.00e3	2.82e3	N/A	ug/mL
96000855	AP-105	3	SAMPLE	S96V000048	0		TOC-01	LIQUID	N/A	1.48e3	5.50e1	ug/mL
96000855	AP-105	4	SPK	S96V000048	0		TOC-01	LIQUID	~~1.48e3~~ 100	90.2	N/A	ug/mL
96000855	AP-105	5	SPK-DUP	S96V000048	0		TOC-01	LIQUID	90.2	89.5	N/A	ug/mL
96000855	AP-105	6	SAMPLE	S96V000049	0		TOC-01	LIQUID	N/A	1.53e3	5.50e1	ug/mL
96000853	AP-105	7	SAMPLE	S96V000047	0		TOC-01	LIQUID	N/A	1.50e3	5.50e1	ug/mL
96000855	AP-105	8	SAMPLE	S96V000053	0		TOC-01	LIQUID	N/A	1.44e3	5.50e1	ug/mL
96000855	AP-105	9	SAMPLE	S96V000058	0		TOC-01	LIQUID	N/A	7.70e0	5.50e0	ug/mL

RWS 10/29/96

Final page for worklist # 12910

R. Wendland 10-15-96
Analyst Signature **Date**

10-25-96
Analyst Signature **Date**

Approved RWSchreckhise 10/29/96

47, 48, 49, 53 = .200 SAM – 2mL H_2SO_4 – .200 INJ

58 = 2mL – .200 – .200

Data Entry Comments: SPK = 1mL DILUTE – 1mL SPK – .200 INJ

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: STD Date: 10/15/96 Time: 09:36:47

Sample Size = 200 uL
Dil Factor = 11
Blank ID # = BLK
Blank Value = .2397834 ug/minute C

Analyst : RA WENDLAND
Min Readings = 10
Max Readings = 10
% Difference = 10

== Reading ====	Analysis Time ====	Coulometer ====	% Difference ==
1	0.51	1.60	0.00
2	1.01	34.80	95.40
3	1.51	47.30	26.43
4	2.01	51.10	7.44
5	2.51	52.30	2.29
6	3.01	52.70	0.76
7	3.51	52.90	0.38
8	4.00	53.00	0.19
9	4.51	53.10	0.19
10	5.01	53.20	0.19

BLANK VALUE = 1.2 micrograms carbon
BLANK FACTOR = 1.2 / 5.004517 = +2.4E-01 ug/min Carbon

SAMPLE RESULTS:
(53.2 - 1.200234)(11)/(200) = +2.86E+00 g/L Carbon
(53.2 - 1.200234)(11)/(200)(12) = +2.38E-01 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPILED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 172 TO 190.

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: BASE Date: 10/15/96 Time: 09:02:26

Sample Size = 200 uL
Dil Factor = 1
Blank ID # =
Blank Value = 0 ug/minute C

Analyst : RA WENDLAND
Min Readings = 10
Max Readings = 10
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.00	0.00
2	1.01	0.70	100.00
3	1.51	1.30	46.15
4	2.00	1.50	13.33
5	2.50	1.60	6.25
6	3.00	1.70	5.88
7	3.50	1.70	0.00
8	4.01	1.80	5.56
9	4.50	1.80	0.00
10	5.00	1.90	5.26

USER INPUT BLANK VALUE
BLANK VALUE = 0 micrograms carbon
BLANK FACTOR = 0 / 0 = +0.0E+00 ug/min Carbon

SAMPLE RESULTS:
(1.9 - 0)(1)/(200) = +9.5E-03 g/L Carbon
(1.9 - 0)(1)/(200)(12) = +7.9E-04 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0
<<< BLANK ANALYSIS >>>

Sample: BLK Date: 10/15/96 Time: 09:10:36

Sample Size = 200 uL	Analyst : RA WENDLAND
Dil Factor = 1	Min Readings = 10
Blank ID # = BLK	Max Readings = 10
Blank Value = N/A	% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.00	0.00
2	1.01	0.50	100.00
3	1.50	0.80	37.50
4	2.00	0.90	11.11
5	2.50	1.00	10.00
6	3.00	1.10	9.09
7	3.50	1.10	0.00
8	4.00	1.20	8.33
9	4.50	1.20	0.00
10	5.00	1.20	0.00

BLANK VALUE = 1.2 micrograms carbon
BLANK FACTOR = 1.2 / 5.004517 = +2.4E-01 ug/min Carbon

Sample Run By: _____
RA WENDLAND 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 48 Date: 10/15/96 Time: 10:50:19

Sample Size = 200 uL
Dil Factor = 11
Blank ID # = BLK
Blank Value = .2397834 ug/minute C

Analyst : RA WENDLAND
Min Readings = 10
Max Readings = 10
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	4.20	0.00
2	1.01	21.10	80.09
3	1.51	24.60	14.23
4	2.01	26.30	6.46
5	2.51	27.20	3.31
6	3.01	27.90	2.51
7	3.51	28.30	1.41
8	4.01	28.50	0.70
9	4.50	28.70	0.70
10	5.00	28.90	0.69

BLANK VALUE = 1.2 micrograms carbon
BLANK FACTOR = 1.2 / 5.004517 = +2.4E-01 ug/min Carbon

SAMPLE RESULTS:
(28.9 - 1.200044)(11)/(200) = +1.52E+00 g/L Carbon
(28.9 - 1.200044)(11)/(200)(12) = +1.27E-01 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 48SPK Date: 10/15/96 Time: 10:59:48

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .2397834 ug/minute C

Analyst : RA WENDLAND
Min Readings = 10
Max Readings = 10
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	9.20	0.00
2	1.01	60.10	84.69
3	1.51	71.60	16.06
4	2.01	77.20	7.25
5	2.51	79.90	3.38
6	3.00	81.50	1.96
7	3.50	82.20	0.85
8	4.00	82.70	0.60
9	4.50	83.10	0.48
10	5.00	83.30	0.24

BLANK VALUE = 1.2 micrograms carbon
BLANK FACTOR = 1.2 / 5.004517 = +2.4E-01 ug/min Carbon

SAMPLE RESULTS:
(83.3 - 1.19981)(1)/(200) = +4.11E-01 g/L Carbon
(83.3 - 1.19981)(1)/(200)(12) = +3.42E-02 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 48DUPSPK Date: 10/15/96 Time: 11:06:58

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .2397834 ug/minute C

Analyst : RA WENDLAND
Min Readings = 10
Max Readings = 10
% Difference = 10

== Reading ====	Analysis Time ====	Coulometer ====	% Difference ==
1	0.51	9.80	0.00
2	1.01	61.90	84.17
3	1.51	70.80	12.57
4	2.00	75.40	6.10
5	2.50	78.10	3.46
6	3.00	79.90	2.25
7	3.50	81.00	1.36
8	4.00	81.80	0.98
9	4.50	82.30	0.61
10	5.00	82.80	0.60

BLANK VALUE = 1.2 micrograms carbon
BLANK FACTOR = 1.2 / 5.004517 = +2.4E-01 ug/min Carbon

SAMPLE RESULTS:
(82.8 - 1.199576)(1)/(200) = +4.08E-01 g/L Carbon
(82.8 - 1.199576)(1)/(200)(12) = +3.40E-02 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 49 Date: 10/15/96 Time: 13:01:59

Sample Size = 200 uL
Dil Factor = 11
Blank ID # = BLK
Blank Value = .2397834 ug/minute C

Analyst : RA WENDLAND
Min Readings = 10
Max Readings = 10
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	5.80	0.00
2	1.01	22.40	74.11
3	1.51	25.10	10.76
4	2.00	26.80	6.34
5	2.50	27.60	2.90
6	3.00	28.30	2.47
7	3.50	28.90	2.08
8	4.00	29.20	1.03
9	4.50	29.60	1.35
10	5.00	29.70	0.34

BLANK VALUE = 1.2 micrograms carbon
BLANK FACTOR = 1.2 / 5.004517 = +2.4E-01 ug/min Carbon

SAMPLE RESULTS:
(29.7 - 1.199839)(11)/(200) = +1.57E+00 g/L Carbon
(29.7 - 1.199839)(11)/(200)(12) = +1.31E-01 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 47 *Date: 10/15/96* *Time: 10:11:59*

Sample Size = 200 uL *Analyst : RA WENDLAND*
Dil Factor = 11 *Min Readings = 10*
Blank ID # = BLK *Max Readings = 10*
Blank Value = .2397834 ug/minute C *% Difference = 10*

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	3.40	0.00
2	1.01	21.60	84.26
3	1.51	26.00	16.92
4	2.00	27.60	5.80
5	2.50	28.30	2.47
6	3.00	28.50	0.70
7	3.50	28.70	0.70
8	4.00	28.90	0.69
9	4.50	28.90	0.00
10	5.00	29.10	0.69

BLANK VALUE = 1.2 micrograms carbon
BLANK FACTOR = 1.2 / 5.004517 = +2.4E-01 ug/min Carbon

SAMPLE RESULTS:
(29.1 - 1.200044)(11)/(200) = +1.53E+00 g/L Carbon
(29.1 - 1.200044)(11)/(200)(12) = +1.28E-01 Molar Carbon

Sample Run By: _____
RA WENDLAND *00000*

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 53 *Date: 10/15/96* *Time: 10:28:06*

Sample Size = 200 uL *Analyst : RA WENDLAND*
Dil Factor = 11 *Min Readings = 10*
Blank ID # = BLK *Max Readings = 10*
Blank Value = .2397834 ug/minute C *% Difference = 10*

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	1.50	0.00
2	1.01	19.60	92.35
3	1.51	24.30	19.34
4	2.01	26.00	6.54
5	2.51	26.80	2.99
6	3.01	27.30	1.83
7	3.51	27.60	1.09
8	4.01	27.80	0.72
9	4.50	27.90	0.36
10	5.00	28.00	0.36

BLANK VALUE = 1.2 micrograms carbon
BLANK FACTOR = 1.2 / 5.004517 = +2.4E-01 ug/min Carbon

SAMPLE RESULTS:
(28 - 1.200044)(11)/(200) = +1.47E+00 g/L Carbon
(28 - 1.200044)(11)/(200)(12) = +1.23E-01 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 58 Date: 10/15/96 Time: 10:05:17

Sample Size = 200 uL
Dil Factor = 1.1
Blank ID # = BLK
Blank Value = .2397834 ug/minute C

Analyst : RA WENDLAND
Min Readings = 10
Max Readings = 10
% Difference = 10

== Reading ====	Analysis Time ====	Coulometer ====	% Difference ==
1	0.51	0.40	0.00
2	1.01	1.40	71.43
3	1.51	2.50	44.00
4	2.01	2.90	13.79
5	2.50	2.90	0.00
6	3.00	3.10	6.45
7	3.50	3.10	0.00
8	4.01	3.20	3.13
9	4.50	3.30	3.03
10	5.00	3.30	0.00

BLANK VALUE = 1.2 micrograms carbon
BLANK FACTOR = 1.2 / 5.004517 = +2.4E-01 ug/min Carbon

SAMPLE RESULTS:
(3.3 - 1.200044)(1.1)/(200) = +1.2E-02 g/L Carbon
(3.3 - 1.200044)(1.1)/(200)(12) = +9.6E-04 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

WORKBOOK PAGE: BLANK1

TOC : LA-344-105 (D-1) LIQUIDS

			BLNK
	Sample Volume in mL	(SS)	0.200
BLNK	H2SO4 Volume in mL	(VR)	0.000
	Volume Injected in mL	(VI)	0.200
12910	Dilution Factor (calculated)	(DF)	1.000
	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Blank	(C1)	1.2
	µg of Carbon from Baseline	(C2)	1.9

LIQUID

µg of Carbon = |C1-C2|

0

Method Detection Limit (µg/mL) = 1 µg C * DF * DDF / VI

N/A

BLNK

TOC01

rws

RWS

RAW

10/28/96

10/15/96

06:38 AM	Method Detection Limit in µg/mL	5.00E+00
AP-105	µg of Carbon	7.00E-01

Data Entered By:	rws	Date:	10/28/96
Signature of Chemist:	RW Schwartz	Date:	10/28/96

BLANK.WB1 REV 2.0 344105ML

WORKBOOK PAGE: STD2

TOC : LA-344-105 (D-1) LIQUIDS

			STD
STD	Sample Volume in mL	(SS)	0.200
	H2SO4 Volume in mL	(VR)	2.000
	Volume Injected in mL	(VI)	0.200
12910	Dilution Factor (calculated)	(DF)	11.000
	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon Found	(C1)	53.2
	µg of Carbon from Baseline	(C2)	1.9
LIQUID	Standard Book Number		24N12D
	Standard Value (µg/ml)		3000

0

µg of Carbon/mL = (C1-C2) * DF * DDF / VI

N/A

Method Detection Limit (µg/mL) = 1 µg C * DF * DDF / VI

STD

TOC01

RWS

RWS

RAW

10/28/96

10/15/96

	Method Detection Limit in µg/mL	5.50E+01
08:38 AM	QC Actual in µg/mL	3.00E+03
	QC Found in µg/mL	2.82E+03
AP-015	Percent Standard Recovery	94.1

Data Entered By:	RWS	Date:	10/28/96
Signature of Chemist:	RW Schaeffer	Date:	10/28/96

STANDARD.WB1 REV 2.0 344105ML

[redacted]

WORKBOOK PAGE: SAM3

TOC : LA-344-105 (D-1) LIQUIDS

			SAMPLE
	Sample Volume in mL	(SS)	0.200
SAMPLE	H2SO4 Volume in mL	(VR)	2.000
	Volume Injected in mL	(VI)	0.200
12910	Dilution Factor (calculated)	(DF)	11.000
	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Sample	(C1)	28.9
	µg of Carbon from Baseline	(C2)	1.9
LIQUID			

µg of Carbon/g = (C1-C2) * DF * 1000 / (VI * D g/L)

0

Method Detection Limit = 1 µg C * DF * DDF / VI

N/A

S96V000048

TOC01

RWS

RWS

RAW

10/28/96

10/15/96

	Method Detection Limit in µg/mL	5.50E+01
06:38 AM		
	µg of Carbon/mL	1.48E+03
AP-105		

Data Entered By:	RWS	Date:	10/28/96
Signature of Chemist:	R W Schwerdtfeger	Date:	10/28/96

SAMPLE.WB1 REV 2.0 344105ML

[redacted]

WORKBOOK PAGE: SPIKE5

TOC : LA-344-105 (D-1) LIQUIDS

SPIKE

	Sample Vial Data			Spiked Vial Data		
SPK	Sample Volume in mL	(SS)	0.200	Was the sample dilution used? (yes/no)		YES
	H2SO4 Volume in mL	(VR)	2.000	Sample Volume in mL	(SPK SS)	1.000
12910	Volume Injected in mL	(VI)	0.200	H2SO4 Volume in mL	(SPK VR)	0.000
	µg of Carbon in Sample	(C1)	28.9	Amount of Spike Std. in mL	(SPK VOL)	1.000
TOC-01	µg of Carbon from Baseline	(C2)	1.9	Volume Injected in mL	(SPK VI)	0.200
				µg C in Sample + Spike	(C3)	83.3
LIQUID				Pre-Spike Dilution Factor	(PDF)	11.00
				Spike Book Number		23N12B
				Spike Value in µg/ml		753

0	Spike Correction Factor (SPK CF) = (SPK SS + SPK VOL + SPK VR) / SPK VI
	Sample Correction Factor (SAM CF) = (SS + VR) / (VI)
N/A	Sample Size Correction Factor (SS CF) = (SPK SS) / (SS)
S96V000048	QC Actual in µg/mL = Spike Value (µg/mL)
	QC Found in µg/mL = [(C3 - C2)(SPK CF) - (C1-C2)(SAM CF)(SS CF)/(PDF)] / (SPK VOL)
TOC01	Percent Spike Recovery = (QC Found) / (QC Actual) * 100
RWS	
RWS	
RAW	
10/28/96	
10/15/96	
08:38 AM	
AP-105	

QC Actual in µg/mL	7.53E+02
QC Found in µg/mL	6.79E+02
Percent Spike Recovery	90.2

Data Entered By:	RWS	Date:	10/28/96
Signature of Chemist:	RWS Johnson	Date:	10/28/96

SPIKE.WB1 REV 2.0 344105ML

WORKBOOK PAGE: SPIKE5

TOC : LA-344-105 (D-1) **LIQUIDS** **SPIKE**

	Sample Vial Data			Spiked Vial Data	
SPK-DUP	Sample Volume in mL (SS)	0.200	Was the sample dilution used? (yes/no)		YES
	H2SO4 Volume in mL (VR)	2.000	Sample Volume in mL (SPK SS)		1.000
12910	Volume Injected in mL (VI)	0.200	H2SO4 Volume in mL (SPK VR)		0.000
	µg of Carbon in Sample (C1)	28.9	Amount of Spike Std. in mL (SPK VOL)		1.000
TOC-01	µg of Carbon from Baseline (C2)	1.9	Volume Injected in mL (SPK VI)		0.200
			µg C in Sample + Spike (C3)		82.8
LIQUID			Pre-Spike Dilution Factor (PDF)		11.00
			Spike Book Number		23N12B
			Spike Value in µg/ml		753

0	Spike Correction Factor (SPK CF) = (SPK SS + SPK VOL + SPK VR) / SPK VI
	Sample Correction Factor (SAM CF) = (SS + VR) / (VI)
N/A	Sample Size Correction Factor (SS CF) = (SPK SS) / (SS)
S96V000048	QC Actual in µg/mL = Spike Value (µg/mL)
	QC Found in µg/mL = [(C3 - C2)(SPK CF) - (C1-C2)(SAM CF)(SS CF)/(PDF)] / (SPK VOL)
TOC01	Percent Spike Recovery = (QC Found) / (QC Actual) * 100
RWS	
RWS	
RAW	
10/28/96	
10/15/96	

06:38 AM	QC Actual in µg/mL	7.53E+02
	QC Found in µg/mL	6.74E+02
AP-105	Percent Spike Recovery	89.5

Data Entered By:	RWS	Date:	10/28/96
Signature of Chemist:	[signature]	Date:	10/28/96

SPIKE.WB1 REV 2.0 344105ML

WORKBOOK PAGE: SAM3

TOC : LA-344-105 (D-1) **LIQUIDS**

			SAMPLE
	Sample Volume in mL	(SS)	0.200
SAMPLE	H2SO4 Volume in mL	(VR)	2.000
	Volume Injected in mL	(VI)	0.200
12910	Dilution Factor (calculated)	(DF)	11.000
	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Sample	(C1)	29.7
	µg of Carbon from Baseline	(C2)	1.9
LIQUID			

µg of Carbon/g = (C1-C2) * DF * 1000 / (VI * D g/L)

0

Method Detection Limit = 1 µg C * DF * DDF / VI

N/A

S96V000049

TOC01

RWS

RWS

RAW

10/28/96

10/15/96

	Method Detection Limit in µg/mL	5.50E+01
08:38 AM		
	µg of Carbon/mL	1.53E+03
AP-105		

Data Entered By:	RWS	Date:	10/28/96
Signature of Chemist:	RW Schneider	Date:	10/28/96

SAMPLE.WB1 REV 2.0 344105ML

[redacted]

WORKBOOK PAGE: SAM3

TOC : LA-344-105 (D-1) **LIQUIDS**

			SAMPLE
	Sample Volume in mL	(SS)	0.200
SAMPLE	H2SO4 Volume in mL	(VR)	2.000
	Volume Injected in mL	(VI)	0.200
12910	Dilution Factor (calculated)	(DF)	11.000
	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Sample	(C1)	29.1
	µg of Carbon from Baseline	(C2)	1.9
LIQUID			

µg of Carbon/g = (C1-C2) * DF * 1000 / (VI * D g/L)

0

Method Detection Limit = 1 µg C * DF * DDF / VI

N/A

S96V000047

TOC01

RWS

RWS

RAW

10/28/96

10/15/96

	Method Detection Limit in µg/mL	5.50E+01
06:38 AM		
	µg of Carbon/mL	1.50E+03
AP-105		

Data Entered By:	RWS	Date:	10/28/96
Signature of Chemist:	Rus Schneider	Date:	10/28/96

SAMPLE.WB1 REV 2.0 344105ML

[redacted]

WORKBOOK PAGE: SAM3

TOC : LA-344-105 (D-1) LIQUIDS

			SAMPLE
SAMPLE	Sample Volume in mL	(SS)	0.200
	H2SO4 Volume in mL	(VR)	2.000
	Volume Injected in mL	(VI)	0.200
12910	Dilution Factor (calculated)	(DF)	11.000
	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Sample	(C1)	28
	µg of Carbon from Baseline	(C2)	1.9
LIQUID			

µg of Carbon/g = (C1-C2) * DF * 1000 / (VI * D g/L)

0

Method Detection Limit = 1 µg C * DF * DDF / VI

N/A

S96V000053

TOC01

RWS

RWS

RAW

10/28/96

10/15/96

Method Detection Limit in µg/mL	5.50E+01
µg of Carbon/mL	1.44E+03

06:38 AM

AP-105

Data Entered By:	RWS	Date:	10/28/96
Signature of Chemist:	RW Johnson	Date:	10/28/96

SAMPLE.WB1 REV 2.0 344105ML

[redacted]

WORKBOOK PAGE: SAM3

TOC : LA-344-105 (D-1) LIQUIDS

			SAMPLE
SAMPLE	Sample Volume in mL	(SS)	2.000
	H2SO4 Volume in mL	(VR)	0.200
	Volume Injected in mL	(VI)	0.200
12910	Dilution Factor (calculated)	(DF)	1.100
	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Sample	(C1)	3.3
	µg of Carbon from Baseline	(C2)	1.9
LIQUID			

µg of Carbon/g = (C1-C2) * DF * 1000 / (VI * D g/L)

0

Method Detection Limit = 1 µg C * DF * DDF / VI

N/A

S96V000058

TOC01

RWS

RWS

RAW

10/28/96

10/15/96

	Method Detection Limit in µg/mL	5.50E+00
06:38 AM		
	µg of Carbon/mL	7.70E+00

AP-105

Data Entered By:	RWS	Date:	10/28/96
Signature of Chemist:	R W Dworzanski	Date:	10/28/96

SAMPLE.WB1 REV 2.0 344105ML

[redacted]

LABCORE Data Entry Template for Worklist# 12909

Analyst: JLS2 **Instrument:** TIC01 #2 **Book #** 22N12F

Method: LA-342-100 Rev/Mod E.D

Worklist Comment: AP-105 TIC. RCJ

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
		1	BLNK				TIC-02	LIQUID	1	1.90	N/A	ug/mL
		2	STD				TIC-02	LIQUID	6.02 e2	5.94 e2	N/A	ug/mL
96000855	AP-105	3	SAMPLE	S96V000048	0		TIC-02	LIQUID	N/A	278 e3	5	ug/mL
96000855	AP-105	4	SPK	S96V000048	0		TIC-02	LIQUID	~~278 e3~~ 100.0	105.3	N/A	ug/mL
96000855	AP-105	5	SPK-DUP	S96V000048	0		TIC-02	LIQUID	100.0	108	N/A	ug/mL
96000855	AP-105	6	SAMPLE	S96V000049	0		TIC-02	LIQUID	N/A	251 e3	5	ug/mL
96000855	AP-105	7	SPK	S96V000049	0		TIC-02	LIQUID	100	102.6	N/A	ug/mL
96000853	AP-105	8	SAMPLE	S96V000047	0		TIC-02	LIQUID	N/A	274 e3	5	ug/mL
96000853	AP-105	9	SPK	S96V000047	0		TIC-02	LIQUID	100	100.6	N/A	ug/mL
96000855	AP-105	10	SAMPLE	S96V000058	0		TIC-02	LIQUID	N/A	7.00	5	ug/mL
96000855	AP-105	11	SPK	S96V000058	0		TIC-02	LIQUID	100	101.7	N/A	ug/mL

Final page for worklist # 12909

Jacqueline Steele 11/6/96
~~Analyst~~ Signature **Date**

[signature] 11/8/96
Analyst Signature **Date**

Robert Schreck 11/8/96

Data Entry Comments:

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

TIC/TOC : LA-342-100 (E-0) **LIQUIDS**

			TIC	TOC
	Sample Size in mL	(SS)	0.0000	
BLANK	Dilution Factor	(DF)	1	1
	µg of Carbon in Sample	(C1)	3	
12909	µg of Carbon from Baseline	(C2)	4.9	

TIC-02

LIQUID

µg of Carbon = |C1-C2|

BLNK

TIC01

RTS

RWS

JLS2

11/07/96

11/06/96

	TIC	TOC
Method Detection Limit in µg/mL	5	40
µg of Carbon	1.90E+00	

AP-105

Data Entered By:	RTS	Date:	11/07/96
Signature of Chemist:		Date:	11/8/96

BLANK.WB1 REV 1.0 342100ML

TIC/TOC : LA-342-100 (E-0)	LIQUIDS		TIC	TOC
	Sample Size in mL	(SS)	1.0000	
STANDARD	Dilution Factor	(DF)	1	1
	Final Coulometer Reading in µg	(C1)	599.2	
12909	µg of Carbon from Baseline	(C2)	4.9	
	Standard Book Number		22N12F	
TIC-02	Standard Value (µg/ml)		602	

LIQUID

QC Actual in µg/mL = Standard Value (µg/mL)
QC Found in µg/mL = (C1 - C2) * DF / SS
QC Found in µg/mL for TIC = 5 if C1 < C2
QC Found in µg/mL for TOC = 40 if C1 < C2

STD

% Recovery = QC Found / QC Actual * 100

TIC01

RTS

RWS

JLS2

11/07/96

NOTE: FOR TOC: The Reported Result is < 40.

11/06/96

			TIC	TOC
	Method Detection Limit in µg/mL		5	40
	QC Actual in µg/mL		6.02E+02	
	QC Found in µg/mL See Note:	<	5.94E+02	
AP-105	Percent Standard Recovery		98.7	

Data Entered By:	RTS	Date:	11/07/96
Signature of Chemist:	Rui Schwellen	Date:	11/8/96

STANDARD.WB1 REV 1.0 342100ML

TIC/TOC : LA-342-100 (E-0) LIQUIDS

			TIC	TOC
	Sample Size in mL	(SS)	0.1000	
SAMPLE	Dilution Factor	(DF)	1	1
	µg of Carbon in Sample	(C1)	282.8	
12909	µg of Carbon from Baseline	(C2)	4.9	
TIC-02				

LIQUID

µg of Carbon/mL = (C1-C2) * DF / SS
µg of Carbon/mL for TIC = 5 if C1 < C2
µg of Carbon/mL for TOC = 40 if C1 < C2

S96V000048

TIC01

RTS

RWS

JLS2

11/07/96

NOTE: FOR TOC: The Reported Result is < 40.

11/06/96

			TIC	TOC
Method Detection Limit in µg/mL			5	40
µg of Carbon/mL	Note:	<	2.78E+03	

AP-105

Data Entered By:	RTS	Date:	11/07/96
Signature of Chemist:	RW Schneider	Date:	11/8/96

SAMPLE.WB1 REV 1.0 342100ML

TIC/TOC : LA-342-100 (E-0) LIQUIDS

	Sample Vial Data		TIC	TOC
SPIKE	Sample Volume in mL	(SS)	0.1000	
	Final Coulometer Reading in µg	(C1)	282.8	
12909	Spiked Vial Data			
	Sample Volume in mL	(SPK SS)	0.1000	
TIC-02	Amount of Spike Std. in mL	(SPK VOL)	0.500	
	Final Coulometer Reading in µg	(C2)	599.7	
LIQUID	Spike Book Number		22N12F	
	Spike Standard Value in µg/ml	(SPK CONC)	602	

Percent Spike Recovery = (C2 - C1 * (SPK SS) / SS) / ((SPK CONC) * (SPK VOL)) * 100

S96V000048

QC Actual in µg/mL = Spike Value (µg/mL)

TIC01

QC Found in µg/mL = (Percent Spike Recovery)*(QC Actual) / 100

RTS

RWS

JLS2

11/07/96

11/06/96

		TIC	TOC
	QC Actual in µg/mL	6.02E+02	
	QC Found in µg/mL	6.34E+02	
AP-105	Percent Spike Recovery	105.3	

Data Entered By:	RTS	Date:	11/07/96
Signature of Chemist:	Rui Schwede	Date:	11/8/96

SPIKE.WB1 REV 1.1 342100ML

TIC/TOC : LA-342-100 (E-0) LIQUIDS

	Sample Vial Data		TIC	TOC
SPIKE	Sample Volume in mL	(SS)	0.1000	
	Final Coulometer Reading in µg	(C1)	282.8	
12909	Spiked Vial Data			
	Sample Volume in mL	(SPK SS)	0.1000	
TIC-02	Amount of Spike Std. in mL	(SPK VOL)	0.500	
	Final Coulometer Reading in µg	(C2)	607.8	
LIQUID	Spike Book Number		22N12F	
	Spike Standard Value in µg/ml	(SPK CONC)	602	

Percent Spike Recovery = (C2 - C1 * (SPK SS) / SS) / ((SPK CONC) * (SPK VOL)) * 100

S96V000048

QC Actual in µg/mL = Spike Value (µg/mL)

TIC01

QC Found in µg/mL = (Percent Spike Recovery)*(QC Actual) / 100

RTS

RWS

JLS2

11/07/96

11/06/96

		TIC	TOC
	QC Actual in µg/mL	6.02E+02	
	QC Found in µg/mL	6.50E+02	
AP-105	Percent Spike Recovery	108.0	

Data Entered By:	RTS	Date:	11/07/96
Signature of Chemist:	RW Schneider	Date:	11/8/96

SPIKE.WB1 REV 1.1 342100ML

TIC/TOC : LA-342-100 (E-0) LIQUIDS

			TIC	TOC
	Sample Size in mL	(SS)	0.1000	
SAMPLE	Dilution Factor	(DF)	1	1
	µg of Carbon in Sample	(C1)	255.5	
12909	µg of Carbon from Baseline	(C2)	4.9	
TIC-02				

LIQUID
S96V000049
TIC01
RTS
RWS
JLS2
11/07/96
11/06/96
AP-105

µg of Carbon/mL = (C1-C2) * DF / SS
µg of Carbon/mL for TIC = 5 if C1 < C2
µg of Carbon/mL for TOC = 40 if C1 < C2

NOTE: FOR TOC: The Reported Result is < 40.

		TIC	TOC
Method Detection Limit in µg/mL		5	40
µg of Carbon/mL	Note: <	2.51E+03	

Data Entered By:	RTS	Date:	11/07/96
Signature of Chemist:	RW Schroeder	Date:	11/8/96

SAMPLE.WB1 REV 1.0 342100ML

TIC/TOC : LA-342-100 (E-0) **LIQUIDS**

	Sample Vial Data		TIC	TOC
SPIKE	Sample Volume in mL	(SS)	0.1000	
	Final Coulometer Reading in µg	(C1)	255.5	
12909	Spiked Vial Data			
	Sample Volume in mL	(SPK SS)	0.1000	
TIC-02	Amount of Spike Std. in mL	(SPK VOL)	0.500	
	Final Coulometer Reading in µg	(C2)	564.2	
LIQUID	Spike Book Number		22N12F	
	Spike Standard Value in µg/ml	(SPK CONC)	602	

Percent Spike Recovery = (C2 - C1 * (SPK SS) / SS) / ((SPK CONC) * (SPK VOL)) * 100

S96V000049

QC Actual in µg/mL = Spike Value (µg/mL)

TIC01

QC Found in µg/mL = (Percent Spike Recovery)*(QC Actual) / 100

RTS

RWS

JLS2

11/07/96

11/06/96

		TIC	TOC
	QC Actual in µg/mL	6.02E+02	
	QC Found in µg/mL	6.17E+02	
AP-105	Percent Spike Recovery	102.6	

Data Entered By:	RTS	Date:	11/07/96
Signature of Chemist:	Ravi Schwada	Date:	11/8/96

SPIKE.WB1 REV 1.1 342100ML

TIC/TOC : LA-342-100 (E-0) LIQUIDS

			TIC	TOC
	Sample Size in mL	(SS)	0.1000	
SAMPLE	Dilution Factor	(DF)	1	1
	µg of Carbon in Sample	(C1)	278.9	
12909	µg of Carbon from Baseline	(C2)	4.9	
TIC-02				

LIQUID

µg of Carbon/mL = (C1-C2) * DF / SS
µg of Carbon/mL for TIC = 5 if C1 < C2
µg of Carbon/mL for TOC = 40 if C1 < C2

S96V000047

TIC01

RTS

RWS

JLS2

11/07/96

NOTE: FOR TOC: The Reported Result is < 40.

11/06/96

		TIC	TOC
Method Detection Limit in µg/mL		5	40
µg of Carbon/mL	Note: <	2.74E+03	

AP-105

Data Entered By:	RTS	Date:	11/07/96
Signature of Chemist:	TJW Schroeder	Date:	11/8/96

SAMPLE.WB1 REV 1.0 342100ML

TIC/TOC : LA-342-100 (E-0) LIQUIDS

	Sample Vial Data		TIC	TOC
SPIKE	Sample Volume in mL	(SS)	0.1000	
	Final Coulometer Reading in µg	(C1)	278.9	
12909	Spiked Vial Data			
	Sample Volume in mL	(SPK SS)	0.1000	
TIC-02	Amount of Spike Std. in mL	(SPK VOL)	0.500	
	Final Coulometer Reading in µg	(C2)	581.8	
LIQUID	Spike Book Number		22N12F	
	Spike Standard Value in µg/ml	(SPK CONC)	602	

Percent Spike Recovery = (C2 - C1 * (SPK SS) / SS) / ((SPK CONC) * (SPK VOL)) * 100

S96V000047

QC Actual in µg/mL = Spike Value (µg/mL)

TIC01

QC Found in µg/mL = (Percent Spike Recovery)*(QC Actual) / 100

RTS

RWS

JLS2

11/07/96

11/06/96

		TIC	TOC
	QC Actual in µg/mL	6.02E+02	
	QC Found in µg/mL	6.06E+02	
AP-105	Percent Spike Recovery	100.6	

Data Entered By:	RTS	Date:	11/07/96
Signature of Chemist:	Ray Schneider	Date:	11/8/96

SPIKE.WB1 REV 1.1 342100ML

TIC/TOC : LA-342-100 (E-0) LIQUIDS

			TIC	TOC
SAMPLE	Sample Size in mL	(SS)	0.1000	
	Dilution Factor	(DF)	1	1
12909	µg of Carbon in Sample	(C1)	5.6	
	µg of Carbon from Baseline	(C2)	4.9	
TIC-02				
LIQUID				

µg of Carbon/mL = (C1-C2) * DF / SS
µg of Carbon/mL for TIC = 5 if C1 < C2
µg of Carbon/mL for TOC = 40 if C1 < C2

S96V000058
TIC01
RTS
RWS
JLS2
11/07/96
11/06/96
AP-105

NOTE: FOR TOC: The Reported Result is < 40.

		TIC	TOC
Method Detection Limit in µg/mL		5	40
µg of Carbon/mL	Note: <	7.00E+00	

Data Entered By:	RTS	Date:	11/07/96
Signature of Chemist:	R.W. Schroeder	Date:	11/8/96

SAMPLE.WB1 REV 1.0 342100ML

TIC/TOC : LA-342-100 (E-0) LIQUIDS

	Sample Vial Data		TIC	TOC
SPIKE	Sample Volume in mL	(SS)	0.1000	
	Final Coulometer Reading in µg	(C1)	5.6	
12909	Spiked Vial Data			
	Sample Volume in mL	(SPK SS)	0.1000	
TIC-02	Amount of Spike Std. in mL	(SPK VOL)	0.500	
	Final Coulometer Reading in µg	(C2)	311.8	
LIQUID	Spike Book Number		22N12F	
	Spike Standard Value in µg/ml	(SPK CONC)	602	

Percent Spike Recovery = (C2 - C1 * (SPK SS) / SS) / ((SPK CONC) * (SPK VOL)) * 100

S96V000047

QC Actual in µg/mL = Spike Value (µg/mL)

TIC01

QC Found in µg/mL = (Percent Spike Recovery)*(QC Actual) / 100

RTS

RWS

JLS2

11/07/96

11/06/96

		TIC	TOC
	QC Actual in µg/mL	6.02E+02	
	QC Found in µg/mL	6.12E+02	
AP-105	Percent Spike Recovery	101.7	

Data Entered By:	RTS	Date:	11/07/96
Signature of Chemist:	Ray Schwede	Date:	11/8/96

SPIKE.WB1 REV 1.1 342100ML

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0
<<< BLANK ANALYSIS >>>

Sample: 2-BASELINE Date: 11/06/96 Time: 09:34:28

Sample Size = 1 uL	Analyst : JL STEELE
Dil Factor = 1	Min Readings = 22
Blank ID # = 2-BASELINE	Max Readings = 22
Blank Value = N/A	% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.70	0.00
2	1.01	1.30	46.15
3	1.51	1.70	23.53
4	2.01	1.90	10.53
5	2.51	2.30	17.39
6	3.00	2.40	4.17
7	3.50	2.70	11.11
8	4.00	2.90	6.90
9	4.50	3.10	6.45
10	5.00	3.30	6.06
11	5.50	3.40	2.94
12	6.00	3.60	5.56
13	6.50	3.70	2.70
14	7.00	3.90	5.13
15	7.50	4.00	2.50
16	8.00	4.20	4.76
17	8.50	4.30	2.33
18	9.00	4.80	10.42
19	9.50	4.80	0.00
20	10.00	4.90	2.04
21	10.50	4.90	0.00
22	11.00	4.90	0.00

BLANK VALUE = 4.9 micrograms carbon
BLANK FACTOR = 4.9 / 10.99878 = +4.5E-01 ug/min Carbon

Sample Run By: Jacque Steele
JL STEELE 00000

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 2-STD 22N12F Date: 11/06/96 Time: 09:49:18

Sample Size = 1 uL 100SE-6 96 11h1
Dil Factor = 1
Blank ID # =
Blank Value = .45 ug/minute C

Analyst : JL STEELE
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.10	0.00
2	1.01	94.70	99.89
3	1.51	254.70	62.82
4	2.00	386.90	34.17
5	2.50	481.80	19.70
6	3.01	543.10	11.29
7	3.51	575.80	5.68
8	4.01	589.60	2.34
9	4.50	594.60	0.84
10	5.00	596.50	0.32
11	5.50	597.40	0.15
12	6.00	597.70	0.05
13	6.50	597.90	0.03
14	7.00	598.40	0.08
15	7.50	598.40	0.00
16	8.00	598.50	0.02
17	8.50	598.60	0.02
18	9.00	598.70	0.02
19	9.50	598.90	0.03
20	10.00	599.00	0.02
21	10.50	599.10	0.02
22	11.00	599.20	0.02

USER INPUT BLANK VALUE
BLANK VALUE = 4.94945 micrograms carbon
BLANK FACTOR = 4.94945 / 10.99878 = +4.5E-01 ug/min Carbon

SAMPLE RESULTS:
(599.2 - 4.949478)(1)/(1) = +5.943E+02 g/L Carbon
(599.2 - 4.949478)(1)/(1)(12) = +4.952E+01 Molar Carbon

Sample Run By: JL Steele
JL STEELE 00000

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 2-BLANK Date: 11/06/96 Time: 10:17:19

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = .45 ug/minute C

Analyst : JL STEELE
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading ====	Analysis Time ====	Coulometer ====	% Difference ==
1	0.51	0.80	0.00
2	1.01	1.20	33.33
3	1.50	1.50	20.00
4	2.00	1.60	6.25
5	2.50	1.70	5.88
6	3.00	1.80	5.56
7	3.50	1.90	5.26
8	4.00	2.00	5.00
9	4.50	2.10	4.76
10	5.00	2.10	0.00
11	5.50	2.20	4.55
12	6.00	2.30	4.35
13	6.50	2.40	4.17
14	7.00	2.50	4.00
15	7.50	2.50	0.00
16	8.00	2.60	3.85
17	8.50	2.60	0.00
18	9.00	2.70	3.70
19	9.50	2.80	3.57
20	10.00	2.90	3.45
21	10.50	3.00	3.33
22	11.00	3.00	0.00

USER INPUT BLANK VALUE
BLANK VALUE = 4.94945 micrograms carbon
BLANK FACTOR = 4.94945 / 10.99878 = +4.5E-01 ug/min Carbon

SAMPLE RESULTS:
(3 - 4.949093)(1)/(1) = < 5.00 E-3 g/L Carbon
(3 - 4.949093)(1)/(1)(12) = < 4.17 E-4 Molar Carbon

Sample Run By: Jackie Steele
JL STEELE 00000

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 2-S96V000048 Date: 11/06/96 Time: 14:54:55

Sample Size = 1 uL 100ml
Dil Factor = 1
Blank ID # =
Blank Value = .45 ug/minute C

Analyst : JL STEELE
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading ====	Analysis Time ====	Coulometer ====	% Difference ==
1	0.51	0.90	0.00
2	1.01	16.50	94.55
3	1.51	83.00	80.12
4	2.01	151.50	45.21
5	2.51	200.90	24.59
6	3.01	229.80	12.58
7	3.51	244.30	5.94
8	4.00	252.40	3.21
9	4.50	257.30	1.90
10	5.00	261.40	1.57
11	5.50	264.80	1.28
12	6.00	267.30	0.94
13	6.50	269.80	0.93
14	7.00	271.70	0.70
15	7.50	273.70	0.73
16	8.00	275.30	0.58
17	8.50	276.60	0.47
18	9.00	278.20	0.58
19	9.50	279.70	0.54
20	10.00	280.70	0.36
21	10.50	281.80	0.39
22	11.00	282.80	0.35

USER INPUT BLANK VALUE
BLANK VALUE = 4.94945 micrograms carbon
BLANK FACTOR = 4.94945 / 10.99878 = +4.5E-01 ug/min Carbon

SAMPLE RESULTS:
(282.8 - 4.949093)(1)/(1) = +2.779E+02 g/L Carbon
(282.8 - 4.949093)(1)/(1)(12) = +2.315E+01 Molar Carbon

Sample Run By: Jessie Steele
JL STEELE 00000

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 2-48 SPIKE Date: 11/06/96 Time: 15:08:28

Sample Size = 1 uL ,100ml + 500ml 22Ni2F Analyst : JL STEELE
Dil Factor = 1 Min Readings = 22
Blank ID # = Max Readings = 22
Blank Value = .45 ug/minute C % Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.90	0.00
2	1.01	35.00	97.43
3	1.51	182.10	80.78
4	2.00	337.40	46.03
5	2.50	443.50	23.92
6	3.00	506.60	12.46
7	3.50	541.10	6.38
8	4.00	558.00	3.03
9	4.50	566.30	1.47
10	5.00	571.90	0.98
11	5.50	575.80	0.68
12	6.00	579.60	0.66
13	6.50	582.50	0.50
14	7.00	585.10	0.44
15	7.50	587.60	0.43
16	8.00	589.60	0.34
17	8.50	592.00	0.41
18	9.00	593.80	0.30
19	9.50	595.30	0.25
20	10.00	596.80	0.25
21	10.50	598.30	0.25
22	11.00	599.70	0.23

USER INPUT BLANK VALUE
BLANK VALUE = 4.94945 micrograms carbon
BLANK FACTOR = 4.94945 / 10.99878 = +4.5E-01 ug/min Carbon

SAMPLE RESULTS:
(599.7 - 4.949478)(1)/(1) = +5.948E+02 g/L Carbon
(599.7 - 4.949478)(1)/(1)(12) = +4.956E+01 Molar Carbon

Sample Run By: Michael Steele
JL STEELE 00000

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 2-48 SPK DUP Date: 11/06/96 Time: 15:23:34

Sample Size = 1 uL .100ml + .500ml 22N12F Analyst : JL STEELE
Dil Factor = 1 Min Readings = 22
Blank ID # = Max Readings = 22
Blank Value = .45 ug/minute C % Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	1.30	0.00
2	1.01	35.70	96.36
3	1.51	187.40	80.95
4	2.00	349.80	46.43
5	2.50	455.50	23.21
6	3.00	515.40	11.62
7	3.50	547.10	5.79
8	4.00	562.10	2.67
9	4.50	570.50	1.47
10	5.00	575.70	0.90
11	5.50	580.50	0.83
12	6.00	584.20	0.63
13	6.50	587.70	0.60
14	7.00	590.60	0.49
15	7.50	593.50	0.49
16	8.00	596.00	0.42
17	8.50	598.40	0.40
18	9.00	600.50	0.35
19	9.50	602.60	0.35
20	10.00	604.30	0.28
21	10.50	606.10	0.30
22	11.00	607.80	0.28

USER INPUT BLANK VALUE
BLANK VALUE = 4.94945 micrograms carbon
BLANK FACTOR = 4.94945 / 10.99878 = +4.5E-01 ug/min Carbon

SAMPLE RESULTS:
(607.8 - 4.949478)(1)/(1) = +6.029E+02 g/L Carbon
(607.8 - 4.949478)(1)/(1)(12) = +5.024E+01 Molar Carbon

Sample Run By: Jackie Steele
JL STEELE 00000

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 2-S96V000049 Date: 11/06/96 Time: 14:15:25

Sample Size = 1 uL
Dil Factor = 1
Blank ID # =
Blank Value = .45 ug/minute C

Analyst : JL STEELE
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading ====	Analysis Time ====	Coulometer ====	% Difference ==
1	0.51	0.70	0.00
2	1.01	14.50	95.17
3	1.51	76.90	81.14
4	2.00	142.40	46.00
5	2.50	188.30	24.38
6	3.00	215.20	12.50
7	3.50	228.40	5.78
8	4.00	235.60	3.06
9	4.50	239.60	1.67
10	5.00	242.50	1.20
11	5.50	244.70	0.90
12	6.00	246.40	0.69
13	6.50	247.90	0.61
14	7.00	249.10	0.48
15	7.50	250.20	0.44
16	8.00	251.20	0.40
17	8.50	252.00	0.32
18	9.00	252.80	0.32
19	9.50	253.60	0.32
20	10.00	254.30	0.28
21	10.50	254.90	0.24
22	11.00	255.50	0.23

USER INPUT BLANK VALUE
BLANK VALUE = 4.94945 micrograms carbon
BLANK FACTOR = 4.94945 / 10.99878 = +4.5E-01 ug/min Carbon

SAMPLE RESULTS:
(255.5 - 4.949093)(1)/(1) = +2.506E+02 g/L Carbon
(255.5 - 4.949093)(1)/(1)(12) = +2.088E+01 Molar Carbon

Sample Run By: Jackie Steele
JL STEELE 00000

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 2-49 SPIKE Date: 11/06/96 Time: 14:41:04

Sample Size = 1 uL, 10ml + 500ml 22N12F
Dil Factor = 1
Blank ID # =
Blank Value = .45 ug/minute C

Analyst : JL STEELE
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.80	0.00
2	1.01	37.70	97.88
3	1.51	189.50	80.11
4	2.00	346.80	45.36
5	2.50	443.00	21.72
6	3.00	497.40	10.94
7	3.50	524.40	5.15
8	4.00	536.30	2.22
9	4.50	542.20	1.09
10	5.00	545.90	0.68
11	5.50	548.80	0.53
12	6.00	550.80	0.36
13	6.50	552.90	0.38
14	7.00	554.60	0.31
15	7.50	556.30	0.31
16	8.00	557.80	0.27
17	8.50	559.10	0.23
18	9.00	560.30	0.21
19	9.50	561.30	0.18
20	10.00	562.50	0.21
21	10.50	563.20	0.12
22	11.00	564.20	0.18

USER INPUT BLANK VALUE
BLANK VALUE = 4.94945 micrograms carbon
BLANK FACTOR = 4.94945 / 10.99878 = +4.5E-01 ug/min Carbon

SAMPLE RESULTS:
(564.2 - 4.949039)(1)/(1) = +5.593E+02 g/L Carbon
(564.2 - 4.949039)(1)/(1)(12) = +4.660E+01 Molar Carbon

Sample Run By: Janice Steele
JL STEELE 00000

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 2-S96V000047 Date: 11/06/96 Time: 13:48:57

Sample Size = 1 uL ,10ml
Dil Factor = 1
Blank ID # =
Blank Value = .45 ug/minute C

Analyst : JL STEELE
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.20	0.00
2	1.01	10.50	98.10
3	1.50	72.70	85.56
4	2.00	146.10	50.24
5	2.50	201.30	27.42
6	3.00	235.60	14.56
7	3.50	253.80	7.17
8	4.00	262.60	3.35
9	4.50	267.20	1.72
10	5.00	269.60	0.89
11	5.50	271.30	0.63
12	6.00	272.60	0.48
13	6.50	273.70	0.40
14	7.00	274.50	0.29
15	7.50	275.20	0.25
16	8.00	275.80	0.22
17	8.50	276.50	0.25
18	9.00	277.00	0.18
19	9.50	277.50	0.18
20	10.00	278.00	0.18
21	10.50	278.40	0.14
22	11.00	278.90	0.18

USER INPUT BLANK VALUE
BLANK VALUE = 4.94945 micrograms carbon
BLANK FACTOR = 4.94945 / 10.99878 = +4.5E-01 ug/min Carbon

SAMPLE RESULTS:
(278.9 - 4.949039)(1)/(1) = +2.740E+02 g/L Carbon
(278.9 - 4.949039)(1)/(1)(12) = +2.283E+01 Molar Carbon

Sample Run By: Jaime Steele
JL STEELE 00000

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 2-47 SPIKE Date: 11/06/96 Time: 14:03:09

Sample Size = 1 uL ,100ml + .500ml 22N12F Analyst : JL STEELE
Dil Factor = 1 Min Readings = 22
Blank ID # = Max Readings = 22
Blank Value = .45 ug/minute C % Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	0.10	0.00
2	1.01	33.10	99.70
3	1.50	189.80	82.56
4	2.00	351.00	45.93
5	2.50	452.60	22.45
6	3.00	512.40	11.67
7	3.50	544.20	5.84
8	4.00	558.90	2.63
9	4.50	565.50	1.17
10	5.00	569.30	0.67
11	5.50	571.60	0.40
12	6.00	573.30	0.30
13	6.50	574.70	0.24
14	7.00	575.90	0.21
15	7.50	577.00	0.19
16	8.00	577.70	0.12
17	8.50	578.60	0.16
18	9.00	579.50	0.16
19	9.50	580.20	0.12
20	10.00	580.70	0.09
21	10.50	581.30	0.10
22	11.00	581.80	0.09

USER INPUT BLANK VALUE
BLANK VALUE = 4.94945 micrograms carbon
BLANK FACTOR = 4.94945 / 10.99878 = +4.5E-01 ug/min Carbon

SAMPLE RESULTS:
(581.8 - 4.949093)(1)/(1) = +5.769E+02 g/L Carbon
(581.8 - 4.949093)(1)/(1)(12) = +4.807E+01 Molar Carbon

Sample Run By: Jackie Steele
JL STEELE 00000

TIC- TOTAL INORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 2-S96V000058 Date: 11/06/96 Time: 10:40:22

Sample Size = 1 uL ,100ml
Dil Factor = 1
Blank ID # =
Blank Value = .45 ug/minute C

Analyst : JL STEELE
Min Readings = 22
Max Readings = 22
% Difference = 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.00	0.00
2	1.01	1.70	100.00
3	1.50	2.80	39.29
4	2.00	3.60	22.22
5	2.50	4.00	10.00
6	3.00	4.30	6.98
7	3.50	4.50	4.44
8	4.00	4.60	2.17
9	4.50	4.70	2.13
10	5.00	4.80	2.08
11	5.50	4.80	0.00
12	6.00	4.90	2.04
13	6.50	5.00	2.00
14	7.00	5.00	0.00
15	7.50	5.10	1.96
16	8.00	5.10	0.00
17	8.50	5.20	1.92
18	9.00	5.30	1.89
19	9.50	5.30	0.00
20	10.00	5.40	1.85
21	10.50	5.50	1.82
22	11.00	5.60	1.79

USER INPUT BLANK VALUE
BLANK VALUE = 4.94945 micrograms carbon
BLANK FACTOR = 4.94945 / 10.99878 = +4.5E-01 ug/min Carbon

SAMPLE RESULTS:
(5.6 - 4.948627)(1)/(1) = +6.5E-01 g/L Carbon
(5.6 - 4.948627)(1)/(1)(12) = +5.4E-02 Molar Carbon

Sample Run By: Jane Steele
JL STEELE 00000

Sample: 2-458 SPIKE *Date: 11/06/96* *Time: 13:19:09*

,100ml + .500ml 22N12F

Sample Size = 1 uL *Analyst : JL STEELE*
Dil Factor = 1 *Min Readings = 22*
Blank ID # = *Max Readings = 22*
Blank Value = .45 ug/minute C *% Difference = 10*

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.10	0.00
2	1.01	13.00	99.23
3	1.51	76.90	83.09
4	2.01	153.00	49.74
5	2.50	216.40	29.30
6	3.00	259.90	16.74
7	3.50	285.70	9.03
8	4.00	298.90	4.42
9	4.50	305.90	2.29
10	5.00	308.70	0.91
11	5.50	310.00	0.42
12	6.00	310.60	0.19
13	6.50	310.90	0.10
14	7.00	311.10	0.06
15	7.50	311.20	0.03
16	8.00	311.30	0.03
17	8.50	311.50	0.06
18	9.00	311.60	0.03
19	9.50	311.70	0.03
20	10.00	311.70	0.00
21	10.50	311.80	0.03
22	11.00	311.80	0.00

USER INPUT BLANK VALUE
BLANK VALUE = 4.94945 micrograms carbon
BLANK FACTOR = 4.94945 / 10.99878 = +4.5E-01 ug/min Carbon

SAMPLE RESULTS:
(311.8 - 4.949093)(1)/(1) = +3.069E+02 g/L Carbon
(311.8 - 4.949093)(1)/(1)(12) = +2.557E+01 Molar Carbon

Sample Run By: Jessie Steele
JL STEELE 00000

LABCORE Data Entry Template for Worklist# 12911

Analyst: _____ **Instrument:** TOC01 _____ **Book #** 23N12-B SPK
ZAN12-B STD

Method: LA-344-105 Rev/Mod D-1

Worklist Comment: AP-105 TOTC. RCJ

GROUP	PROJECT	S	TYPE	SAMPLE#	R	A	-------TEST------	MATRIX	ACTUAL	FOUND	DL	UNIT
		1	BLNK				TOTC-01	LIQUID	/	.100	N/A	ug/mL
		2	STD				TOTC-01	LIQUID	5.00^{E3}	2.84^{E3}	N/A	ug/mL
96000855	AP-105	3	SAMPLE	S96V000048	0		TOTC-01	LIQUID	N/A	465^{E3}	5.50^{E1}	ug/mL
96000855	AP-105	4	SPK	S96V000048	0		TOTC-01	LIQUID	~~4.65^{E3}~~ 100 10/24/96	107.7	N/A	ug/mL
96000855	AP-105	5	SPK-DUP	S96V000048	0		TOTC-01	LIQUID	107.7	107.0	N/A	ug/mL
96000855	AP-105	6	SAMPLE	S96V000049	0		TOTC-01	LIQUID	N/A	4.81^{E3}	5.50^{E1}	ug/mL
96000853	AP-105	7	SAMPLE	S96V000047	0		TOTC-01	LIQUID	N/A	4.67^{E3}	5.50^{E1}	ug/mL
96000855	AP-105	8	SAMPLE	S96V000058	0		TOTC-01	LIQUID	N/A	~~5.06~~ 5.06^{E1} 10/24/96 RWS	~~5.50~~ 5.50^{E0}	ug/mL RWS 10/24/96

Final page for worklist # 12911

Analyst Signature Date

Analyst Signature 10-23-96 Date

Data Entry Comments:

Sample S96V000058 2ml + .2ml H_2O - .200 inj
BLK 0.200ml H_2O std .200 + 2ml H_2O - .200 inj
Samples S96V000047, 48 & 49 .200ml + 2mL H_2O - .200 inj.
SPK & spk dup .400 ml dilute + .400ml Spike - .200 inj. RWS

Units shown for QC (SPK & STD) may not reflect the actual units. DL = Detection Limit, S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: STD Date: 10/16/96 Time: 09:56:00

Sample Size	= 200 uL	Analyst :	RA WENDLAND
Dil Factor	= 11	Min Readings	= 10
Blank ID #	= BLK	Max Readings	= 10
Blank Value	= .3796617 ug/minute C	% Difference	= 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	1.30	0.00
2	1.01	35.70	96.36
3	1.51	48.10	25.78
4	2.01	51.70	6.96
5	2.51	52.90	2.27
6	3.00	53.50	1.12
7	3.50	53.60	0.19
8	4.00	53.80	0.37
9	4.50	54.00	0.37
10	5.00	54.20	0.37

BLANK VALUE = 1.9 micrograms carbon
BLANK FACTOR = 1.9 / 5.004456 = +3.8E-01 ug/min Carbon

SAMPLE RESULTS:
(54.2 - 1.899745)(11)/(200) = +2.88E+00 g/L Carbon
(54.2 - 1.899745)(11)/(200)(12) = +2.40E-01 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

SIGNATURE ABOVE REPRESENTS CHEMICAL TECHNOLOGIST/CHEMIST THAT COMPLETED/VERIFIED THE CALIBRATION/ANALYSIS ON PAGES 216 TO 232

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: BASE Date: 10/16/96 Time: 09:42:36

Sample Size	= 200 uL	Analyst :	RA WENDLAND
Dil Factor	= 1	Min Readings	= 10
Blank ID #	=	Max Readings	= 10
Blank Value	= 0 ug/minute C	% Difference	= 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.00	0.00
2	1.01	1.00	100.00
3	1.51	1.70	41.18
4	2.01	2.00	15.00
5	2.51	2.10	4.76
6	3.01	2.20	4.55
7	3.51	2.30	4.35
8	4.01	2.40	4.17
9	4.51	2.50	4.00
10	5.01	2.60	3.85

USER INPUT BLANK VALUE
BLANK VALUE = 0 micrograms carbon
BLANK FACTOR = 0 / 0 = +0.0E+00 ug/min Carbon

SAMPLE RESULTS:
(2.6 - 0)(1)/(200) = +1.3E-02 g/L Carbon
(2.6 - 0)(1)/(200)(12) = +1.1E-03 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0
<<< BLANK ANALYSIS >>>

Sample: BLK Date: 10/16/96 Time: 09:48:40

Sample Size	= 200 uL	Analyst :	RA WENDLAND
Dil Factor	= 1	Min Readings	= 10
Blank ID #	= BLK	Max Readings	= 10
Blank Value	= N/A	% Difference	= 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	0.10	0.00
2	1.01	0.60	83.33
3	1.51	1.00	40.00
4	2.01	1.10	9.09
5	2.51	1.30	15.38
6	3.01	1.40	7.14
7	3.51	1.50	6.67
8	4.01	1.60	6.25
9	4.50	1.80	11.11
10	5.00	1.90	5.26

BLANK VALUE = 1.9 micrograms carbon
BLANK FACTOR = 1.9 / 5.004456 = +3.8E-01 ug/min Carbon

Sample Run By: _____
RA WENDLAND 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 48 Date: 10/16/96 Time: 10:21:06

Sample Size = 200 uL
Dil Factor = 11
Blank ID # = BLK
Blank Value = .3796617 ug/minute C

Analyst : RA WENDLAND
Min Readings = 10
Max Readings = 10
% Difference = 10

Reading	Analysis Time	Coulometer	% Difference
1	0.51	1.70	0.00
2	1.01	42.70	96.02
3	1.51	65.40	34.71
4	2.01	73.10	10.53
5	2.51	77.40	5.56
6	3.01	80.30	3.61
7	3.51	82.40	2.55
8	4.01	84.20	2.14
9	4.51	85.90	1.98
10	5.01	87.20	1.49

BLANK VALUE = 1.9 micrograms carbon
BLANK FACTOR = 1.9 / 5.004456 = +3.8E-01 ug/min Carbon

SAMPLE RESULTS:
(87.2 - 1.900371)(11)/(200) = +4.69E+00 g/L Carbon
(87.2 - 1.900371)(11)/(200)(12) = +3.91E-01 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 48SPK Date: 10/16/96 Time: 10:27:02

Sample Size	= 200 uL	Analyst :	RA WENDLAND
Dil Factor	= 1	Min Readings	= 10
Blank ID #	= BLK	Max Readings	= 10
Blank Value	= .3796617 ug/minute C	% Difference	= 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	2.90	0.00
2	1.01	28.70	89.90
3	1.51	88.30	67.50
4	2.00	104.10	15.18
5	2.51	112.50	7.47
6	3.01	117.10	3.93
7	3.51	120.20	2.58
8	4.01	122.50	1.88
9	4.50	124.50	1.61
10	5.00	126.00	1.19

BLANK VALUE = 1.9 micrograms carbon
BLANK FACTOR = 1.9 / 5.004456 = +3.8E-01 ug/min Carbon

SAMPLE RESULTS:
(126 - 1.900069)(1)/(200) = +6.205E-01 g/L Carbon
(126 - 1.900069)(1)/(200)(12) = +5.171E-02 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 48DUPSPK Date: 10/16/96 Time: 10:39:52

Sample Size = 200 uL
Dil Factor = 1
Blank ID # = BLK
Blank Value = .3796617 ug/minute C

Analyst : RA WENDLAND
Min Readings = 10
Max Readings = 10
% Difference = 10

== Reading	Analysis Time	Coulometer	% Difference ==
1	0.51	3.00	0.00
2	1.01	72.40	95.86
3	1.51	97.60	25.82
4	2.01	107.70	9.38
5	2.51	113.60	5.19
6	3.01	117.30	3.15
7	3.51	120.00	2.25
8	4.01	122.20	1.80
9	4.51	123.90	1.37
10	5.01	125.50	1.27

BLANK VALUE = 1.9 micrograms carbon
BLANK FACTOR = 1.9 / 5.004456 = +3.8E-01 ug/min Carbon

SAMPLE RESULTS:
(125.5 - 1.900417)(1)/(200) = +6.180E-01 g/L Carbon
(125.5 - 1.900417)(1)/(200)(12) = +5.150E-02 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 47 Date: 10/16/96 Time: 10:03:03

Sample Size	= 200 uL	Analyst :	RA WENDLAND
Dil Factor	= 11	Min Readings	= 10
Blank ID #	= BLK	Max Readings	= 10
Blank Value	= .3796617 ug/minute C	% Difference	= 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	1.00	0.00
2	1.01	26.70	96.25
3	1.51	61.50	56.59
4	2.01	73.00	15.75
5	2.51	78.00	6.41
6	3.01	80.80	3.47
7	3.51	82.80	2.42
8	4.01	84.50	2.01
9	4.51	86.10	1.86
10	5.01	87.50	1.60

BLANK VALUE = 1.9 micrograms carbon
BLANK FACTOR = 1.9 / 5.004456 = +3.8E-01 ug/min Carbon

SAMPLE RESULTS:
(87.5 - 1.900417)(11)/(200) = +4.71E+00 g/L Carbon
(87.5 - 1.900417)(11)/(200)(12) = +3.92E-01 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 49 Date: 10/16/96 Time: 10:08:29

Sample Size = 200 uL
Dil Factor = 11
Blank ID # = BLK
Blank Value = .3796617 ug/minute C

Analyst : RA WENDLAND
Min Readings = 10
Max Readings = 10
% Difference = 10

== Reading ====	Analysis Time ====	Coulometer ====	% Difference ==
1	0.51	2.20	0.00
2	1.01	32.60	93.25
3	1.51	64.70	49.61
4	2.01	75.20	13.96
5	2.51	80.20	6.23
6	3.01	83.10	3.49
7	3.51	85.20	2.46
8	4.01	87.00	2.07
9	4.50	88.60	1.81
10	5.00	90.10	1.66

BLANK VALUE = 1.9 micrograms carbon
BLANK FACTOR = 1.9 / 5.004456 = +3.8E-01 ug/min Carbon

SAMPLE RESULTS:
(90.1 - 1.899676)(11)/(200) = +4.85E+00 g/L Carbon
(90.1 - 1.899676)(11)/(200)(12) = +4.04E-01 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

TOC- TOTAL ORGANIC CARBON ANALYSIS REPORT
TICTOC REV 2.0

Sample: 58 Date: 10/16/96 • Time: 10:14:58

Sample Size	= 200 uL	Analyst :	RA WENDLAND
Dil Factor	= 1.1	Min Readings	= 10
Blank ID #	= BLK	Max Readings	= 10
Blank Value	= .3796617 ug/minute C	% Difference	= 10

== Reading	==== Analysis Time	==== Coulometer	==== % Difference ==
1	0.51	1.70	0.00
2	1.01	4.10	58.54
3	1.50	5.50	25.45
4	2.01	6.80	19.12
5	2.51	7.70	11.69
6	3.01	8.70	11.49
7	3.51	9.40	7.45
8	4.00	10.40	9.62
9	4.50	11.00	5.45
10	5.00	11.80	6.78

BLANK VALUE = 1.9 micrograms carbon
BLANK FACTOR = 1.9 / 5.004456 = +3.8E-01 ug/min Carbon

SAMPLE RESULTS:
(11.8 - 1.900046)(1.1)/(200) = +5.44E-02 g/L Carbon
(11.8 - 1.900046)(1.1)/(200)(12) = +4.54E-03 Molar Carbon

Sample Run By: _____
RA WENDLAND 00000

TOC : LA-344-105 (D-1) LIQUIDS

			BLANK
	Sample Volume in mL	(SS)	0.200
BLANK	H2SO4 Volume in mL	(VR)	0.000
	Volume Injected in mL	(VI)	0.200
13065	Dilution Factor (calculated)	(DF)	1.000
	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Blank	(C1)	1.9
	µg of Carbon from Baseline	(C2)	2.6

LIQUID

Batch Number

µg of Carbon = |C1-C2|

Run

Method Detection Limit (µg/mL) = 1 µg C * DF * DDF / VI

Sample Type

Sample

BLANK

Instrument Code

TOTC01

Prepared By

RCJ

Chemist

RWS

Run

RAW

Prepared Date

10/23/96

Analyzed Date

10/16/96

Analyzed Time	Method Detection Limit in µg/mL	5.00E+00
09:42 AM		
Sample	µg of Carbon	7.00E-01
AP-105		

Data Entered By:	RCJ	Date:	10/23/96
Signature of Chemist:	R W Schroeder	Date:	10/24/96

BLANK.WB1 REV 2.0 344105ML

TOC : LA-344-105 (D-1) LIQUIDS

			STANDARD
	Sample Volume in mL	(SS)	0.200
STANDARD	H2SO4 Volume in mL	(VR)	2.000
	Volume Injected in mL	(VI)	0.200
12911	Dilution Factor (calculated)	(DF)	11.000
	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon Found	(C1)	54.2
	µg of Carbon from Baseline	(C2)	2.6
LIQUID	Standard Book Number		24N12D
	Standard Value (µg/ml)		3000

µg of Carbon/mL = (C1-C2) * DF * DDF / VI

Method Detection Limit (µg/mL) = 1 µg C * DF * DDF / VI

STANDARD

TOTC-01

RCJ

RWS

RAW

10/23/96

10/16/96

09:42 AM

AP-105

Method Detection Limit in µg/mL	5.50E+01
QC Actual in µg/mL	3.00E+03
QC Found in µg/mL	2.84E+03
Percent Standard Recovery	94.6

Data Entered By:	RCJ	Date:	10/23/96
Signature of Chemist:	RW Schwalk	Date:	10/24/96

STANDARD.WB1 REV 2.0 344105ML

TOC : LA-344-105 (D-1) LIQUIDS

			SAMPLE
	Sample Volume in mL	(SS)	0.200
SAMPLE	H2SO4 Volume in mL	(VR)	2.000
	Volume Injected in mL	(VI)	0.200
13065	Dilution Factor (calculated)	(DF)	11.000
	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Sample	(C1)	87.2
	µg of Carbon from Baseline	(C2)	2.6
LIQUID			

µg of Carbon/mL = (C1-C2) * DF * DDF / VI

Method Detection Limit = 1 µg C * DF * DDF / VI

S96V000048

TOTC01

RCJ

RWS

RAW

10/23/96

10/16/96

	Method Detection Limit in µg/mL	5.50E+01
09:42 AM		
	µg of Carbon/mL	4.65E+03
AW-105		

Data Entered By:	RCJ	Date:	10/23/96
Signature of Chemist:	P.W. Schweden	Date:	10/24/96

SAMPLE.WB1 REV 2.0 344105ML

TOC : LA-344-105 (D-1) **LIQUIDS** **SPIKE**

Sample Vial Data			Spiked Vial Data	
Sample Volume in mL (SS)	0.200	Was the sample dilution used? (yes/no)	YES
H2SO4 Volume in mL (VR)	2.000	Sample Volume in mL (SPK SS)	0.400
Volume Injected in mL (VI)	0.200	H2SO4 Volume in mL (SPK VR)	0.000
µg of Carbon in Sample (C1)	87.2	Amount of Spike Std. In mL (SPK VOL)	0.400
µg of Carbon from Baseline (C2)	2.6	Volume Injected in mL (SPK VI)	0.200
		µg C in Sample + Spike (C3)	126
		Pre-Spike Dilution Factor (PDF)	11.00
		Spike Book Number	23N12B
		Spike Value in µg/ml	753

Spike Correction Factor (SPK CF) = (SPK SS + SPK VOL + SPK VR) / SPK VI
Sample Correction Factor (SAM CF) = (SS + VR) / (VI)
Sample Size Correction Factor (SS CF) = (SPK SS) / (SS)

QC Actual in µg/mL = Spike Value (µg/mL)
QC Found in µg/mL = [(C3 - C2)(SPK CF) - (C1-C2)(SAM CF)(SS CF)/(PDF)] / (SPK VOL)
Percent Spike Recovery = (QC Found) / (QC Actual) * 100

SPIKE
12911
TOC-01
LIQUID
S96V000048
TOTC01
RCJ
RWS
RAW
10/23/96
10/16/96
09:42 AM
AP-106

QC Actual in µg/mL	7.53E+02
QC Found in µg/mL	8.11E+02
Percent Spike Recovery	107.7

Data Entered By:	RCJ	Date: 10/23/96
Signature of Chemist:	Ron Schneider	Date: 10/24/96

SPIKE.WB1 REV 2.0 344105ML

TOC : LA-344-105 (D-1) **LIQUIDS** **SPIKE**

	Sample Vial Data		Spiked Vial Data	
SPIKE	Sample Volume in mL (SS)	0.200	Was the sample dilution used? (yes/no)	YES
	H2SO4 Volume in mL (VR)	2.000	Sample Volume in mL (SPK SS)	0.400
12911	Volume Injected in mL (VI)	0.200	H2SO4 Volume in mL (SPK VR)	0.000
	µg of Carbon in Sample (C1)	87.2	Amount of Spike Std. In mL (SPK VOL)	0.400
TOC-01	µg of Carbon from Baseline (C2)	2.6	Volume Injected in mL (SPK VI)	0.200
			µg C in Sample + Spike (C3)	125.5
LIQUID			Pre-Spike Dilution Factor (PDF)	11.00
			Spike Book Number	23N12B
			Spike Value in µg/ml	753

Spike Correction Factor (SPK CF) = (SPK SS + SPK VOL + SPK VR) / SPK VI
Sample Correction Factor (SAM CF) = (SS + VR) / (VI)
Sample Size Correction Factor (SS CF) = (SPK SS) / (SS)

S96V000048DU P

QC Actual in µg/mL = Spike Value (µg/mL)
QC Found in µg/mL = [(C3 - C2)(SPK CF) - (C1-C2)(SAM CF)(SS CF)/(PDF)] / (SPK VOL)

TOTC01

Percent Spike Recovery = (QC Found) / (QC Actual) * 100

RCJ

RWS

RAW

10/23/96

10/16/96

09:42 AM

QC Actual in µg/mL	7.53E+02
QC Found in µg/mL	8.06E+02
Percent Spike Recovery	107.0

AP-106

Data Entered By:	RCJ	Date: 10/23/96
Signature of Chemist:	Ron Schroeder	Date: 10/24/96

SPIKE.WB1 REV 2.0 344105ML

TOC : LA-344-105 (D-1) LIQUIDS

			SAMPLE
	Sample Volume in mL	(SS)	0.200
SAMPLE	H2SO4 Volume in mL	(VR)	2.000
	Volume Injected in mL	(VI)	0.200
13065	Dilution Factor (calculated)	(DF)	11.000
	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Sample	(C1)	87.5
	µg of Carbon from Baseline	(C2)	2.6
LIQUID			

µg of Carbon/mL = (C1-C2) * DF * DDF / VI

Method Detection Limit = 1 µg C * DF * DDF / VI

S96V000047

TOTC01

RCJ

RWS

RAW

10/23/96

10/16/96

Method Detection Limit in µg/mL	5.50E+01
µg of Carbon/mL	4.67E+03

09:42 AM

AW-105

Data Entered By:	RCJ	Date:	10/23/96
Signature of Chemist:	R.C. Johnson	Date:	10/24/96

SAMPLE.WB1 REV 2.0 344105ML

TOC : LA-344-105 (D-1) LIQUIDS

			SAMPLE
	Sample Volume in mL	(SS)	0.200
SAMPLE	H2SO4 Volume in mL	(VR)	2.000
	Volume Injected in mL	(VI)	0.200
13065	Dilution Factor (calculated)	(DF)	11.000
	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Sample	(C1)	90.1
	µg of Carbon from Baseline	(C2)	2.6
LIQUID			

µg of Carbon/mL = (C1-C2) * DF * DDF / VI

Method Detection Limit = 1 µg C * DF * DDF / VI

S96V000049

TOTC01

RCJ

RWS

RAW

10/23/96

10/16/96

Method Detection Limit in µg/mL	5.50E+01
µg of Carbon/mL	4.81E+03

09:42 AM

AW-105

Data Entered By:	RCJ	Date:	10/23/96
Signature of Chemist:	RW Schmidt	Date:	10/24/96

SAMPLE.WB1 REV 2.0 344105ML

TOC : LA-344-105 (D-1) LIQUIDS

			SAMPLE
Sample Type	Sample Volume in mL	(SS)	2.000
SAMPLE	H2SO4 Volume in mL	(VR)	0.200
Work List	Volume Injected in mL	(VI)	0.200
13065	Dilution Factor (calculated)	(DF)	1.100
Instrument	Digest Dilution Factor	(DDF)	1
TOC-01	µg of Carbon in Sample	(C1)	11.8
Matrix	µg of Carbon from Baseline	(C2)	2.6
LIQUID			
Extract Number			

Report: µg of Carbon/mL = (C1-C2) * DF * DDF / VI

Sample Prep: Method Detection Limit = 1 µg C * DF * DDF / VI

Sample No.
S96V000058
Instrument Code
TOTC01
Prepared By
RCJ
Chemist
RWS
Analyst
RAW
Date Prepared
10/23/96
Analysis Date
10/16/96
Analysis Time
09:42 AM
Sample Size
AW-105

Method Detection Limit in µg/mL	5.50E+00
µg of Carbon/mL	5.06E+01

Data Entered By:	RCJ	Date:	10/23/96
Signature of Chemist:	RW Schroeder	Date:	10/24/96

SAMPLE.WB1 REV 2.0 344105ML

LABCORE Completed RadChem Report for Worklist#: 12889

Analyst: slh **Instrument:** U01 **Book#** 104856

Method: IA-925-009 Rev/Mod A-1

Worklist Comment: AP-105.0.1-10ml sample prep.For spike: 0.1ml. new

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	STD		0	@U-01	U-02	LIQUID	6.39E-02	6.40E-02	100.156	% Recovery
1	STD		0	@U-01	U-02E	LIQUID	1	3.28E+00	3.280	Ratio
2	BLNK		0	@U-01	U-02	LIQUID	1	5.59E-2	55.900e-003	ug/mL
2	BLNK		0	@U-01	U-02E	LIQUID	1	2.04E+00	2.040	Ratio
3	SAMPLE	S96V000047	0	@U-01	U-02	LIQUID	N/A	1.42E+01	370.0e-005	ug/mL
3	SAMPLE	S96V000047	0	@U-01	U-02E	LIQUID	N/A	3.35E+00	0.0e+000	% Inst Error
4	DUP	S96V000047	0	@U-01	U-02	LIQUID	1.42E+1	1.39E+1	2.135 RPD	
4	DUP	S96V000047	0	@U-01	U-02E	LIQUID	1	3.47E+00	3.470	Ratio
5	SPK	S96V000047	0	@U-01	U-02	LIQUID	5.49E+01	4.80E+01	87.432	% Recovery
6	SPK-DUP	S96V000047	0	@U-01	U-02	LIQUID	4.80E+01	4.97E+01	3.480 RPD	

Final page for worklist# 12889

Analyst Signature **Date**

Analyst Signature **Date**

R J Smith 10/28/96
Reviewer Signature **Date**
Validated

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Data Entry Template for Worklist# 12889

Analyst: SLH ~~CLJ~~ 10-26-96 **Instrument:** U01 _____ **Book#** ~~15316~~ 64356 SLH 10-26-96

Method: LA-925-009 Rev/Mod 17-1

Worklist Comment: AP-105.0.1-10ml sample prep.For spike: 0.1ml. new

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	STD				@U-01	LIQUID		
2	BLNK				@U-01	LIQUID		
3	SAMPLE	S96V000047	0		@U-01	LIQUID	96000853	AP-105
		Analytes Requested:			U-02	, U-02E		
4	DUP	S96V000047	0		@U-01	LIQUID		
5	SPK	S96V000047	0		@U-01	LIQUID		
6	SPK-DUP	S96V000047	0		@U-01	LIQUID		

Final page for worklist # 12889

SLH 10/27/96
Analyst Signature **Date**
Sandra K Wood Boeing WT 10-27-96

C.J. Quinn 10/28/96
Analyst Signature **Date**
M B 10/28/96

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

Uranium Data Collection Sheet

Date/Time: 10/27/96 1730 hrs

rklist Number: 12889

Spike Volume: 100 ml

ke Book Number: 27B55

Sample Type	Sample Number	Digest Factor	Preparation Factor	Sample Size	Dilution Factor	Comments
	64B56		10-10	1ml		
STD	~~CSTD~~ STD 10-24-96					
			.1-10			
BLNK			.1-10			
Sample	S96V000042		.1-10			spk .100 ml
Dup	47		.1-10			spk .100 ml
Spk	47		.1-10			
Spk-Dup	47					

WORKBOOK PAGE: STD1

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

STD			STANDARD
	STANDARD BOOK #		64B56
12889	VOLUME OF SAMPLE (mL)	(SS)	1.00
	DILUTION FACTOR OF SAMPLE	(DF)	1.00
@U-01	PREPARATION FACTOR OF SAMPLE	(PF)	1.00
	LIFETIME IN MICROSECONDS		257.00
LIQUID	R2 VALUE		0.9986
	RANGE (HIGH OR LOW)		HIGH
96009337	INSTRUMENT UNCERTAINTY	(IU)	2.10E-06
	INSTRUMENT RESULT	(IR)	6.40E-05
0	DETECTION LEVEL (µg/mL)		3.70E-05
N/A	RESULT (µg/mL)		6.40E-02
	VALUE OF STANDARD		6.39E-02
WL12889	%RECOVERY		100.19
	RELATIVE % UNCERTAINTY		3.3
U01			
CJO	Result = DF * PF * IR * 1000		
NDS	Detection Level = 3.70 E-08 * DF * PF * 1000		
SLH	% Recovery = Result / Value of Standard * 100		
10/28/96	Relative % Uncertainty = IU / IR * 100		
10/27/96			
05:30 PM			
AP-105			

Analyst:		SLH	Date:	28-Oct-96
Signature of Chemist:	Joel Smith	NDS	Date:	10/28/96

STANDARD.WB1 REV 2.0 925009ML

WORKBOOK PAGE: BLANK2

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

Type			
BLNK			BLANK
Sample ID	VOLUME OF SAMPLE (mL)	(SS)	1.00
12889	DILUTION FACTOR OF SAMPLE	(DF)	1.00
Batch Number	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		225.00
LIQUID	R2 VALUE		0.9963
Batch Number	RANGE (HIGH OR LOW)		LOW
96009337	INSTRUMENT UNCERTAINTY	(IU)	1.14E-08
Replicate	INSTRUMENT RESULT	(IR)	5.59E-07
0	DETECTION LEVEL (µg/mL)		3.70E-03
Sample Prep			
N/A			
Sample #	RESULT (µg/mL)		5.59E-02
WL12889	RELATIVE % UNCERTAINTY		2.0
Technician Code			
U01			
Calculation	Result = DF * PF * DDF * IR * 1000		
CJO			
	Detection Level = 3.70 E-08 * DF * PF * DDF * 1000		
NDS			
	Relative % Uncertainty = IU / IR * 100		
SLH			
Date Counted			
10/28/96			
Date Prepared			
10/27/96			
Time			
05:30 PM			
Instrument			
AP-108			

Analyst:		SLH	Date: 28-Oct-96
Signature of Chemist:	Joe L Smith	NDS	Date: 10/31/96

BLANK.WB1 REV 2.0 925009ML

WORKBOOK PAGE: SAM3

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

SAMPLE			SAMPLE
	VOLUME OF SAMPLE (mL)	(SS)	1.00
12889	DILUTION FACTOR OF SAMPLE	(DF)	1.00
	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
	LIFETIME IN MICROSECONDS		153.00
LIQUID	R2 VALUE		0.9991
	RANGE (HIGH OR LOW)		HIGH
96009337	INSTRUMENT UNCERTAINTY	(IU)	4.75E-06
	INSTRUMENT RESULT	(IR)	1.42E-04
0	DETECTION LEVEL (µg/mL)		3.70E-03
N/A	CONCENTRATION IN SOLUTION (g/L)		1.42E-02
	RESULT (µg/mL)		1.42E+01
S96V000047	RELATIVE % UNCERTAINTY		3.3

U01

CJO

NDS

SLH

10/28/96

10/27/96

05:30 PM

AP-105

Result = DF * PF * DDF * IR * 1000

Detection Level = 3.70 E-08 * DF * PF * DDF * 1000

Relative % Uncertainty = IU / IR * 100

Analyst:		SLH	Date:	28-Oct-96
Signature of Chemist:	Neil Smith	NDS	Date:	10/28/96

SAMPLE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: DUP4

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

DUP			DUP
	VOLUME OF SAMPLE (mL)	(SS)	1.00
12889	DILUTION FACTOR OF SAMPLE	(DF)	1.00
	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
	LIFETIME IN MICROSECONDS		155.00
LIQUID	R2 VALUE		0.9986
	RANGE (HIGH OR LOW)		HIGH
96009337	INSTRUMENT UNCERTAINTY	(IU)	4.82E-06
	INSTRUMENT RESULT	(IR)	1.39E-04
0	DETECTION LEVEL (µg/mL)		3.70E-03
N/A	CONCENTRATION IN SOLUTION (g/L)		1.39E-02
	RESULT (µg/mL)		1.39E+01
S96V000047	RELATIVE % UNCERTAINTY		3.5
U01			

Result = DF * PF * DDF * IR * 1000

CJO

Detection Level = 3.70 E-08 * DF * PF * DDF * 1000

NDS

Relative % Uncertainty = IU / IR * 100

SLH

10/28/96

10/27/96

05:30 PM

AP-105

Analyst:		SLH	Date:	28-Oct-96
Signature of Chemist:		NDS	Date:	10/28/96

SAMPLE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: SPIKE5

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

Type			SPIKE
SPK	SPIKE BOOK #		27B55
Work Order	VOLUME OF SAMPLE + SPIKE (mL)	(SS)	1.00
12889	DILUTION FACTOR OF SAMPLE + SPIKE	(DF)	1.00
Cell Code	PREPARATION FACTOR OF SAMPLE + SPIKE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR OF SAMPLE	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		164.00
LIQUID	R2 VALUE		0.9991
Batch Number	RANGE (HIGH OR LOW)		HIGH
96009337	INSTRUMENT RESULT	(IR)	6.22E-04
Result	CONCENTRATION IN SOLUTION (g/L)	(CONC)	6.22E-02
0	SPIKE VALUE (g/L)	(SV)	5.49E-02
Sample Prep	INITIAL VOLUME OF SPIKE (mL)	(IV)	0.10
N/A	ORIGINAL SAMPLE VOLUME BEFORE PREP (mL)	(OSV)	0.10
Sample Number	CONCENTRATION IN SOLN (g/L) FROM SAMPLE FORM	(SR)	1.42E-02
S96V000047			
Method Code			
U01	Concentration = IR * DF * PF		
Analyzed By			
CJO	QC Actual (µg/mL) = SV (g/L) * 1000		
Calculated By			
NDS	QC Found (µg/mL) = (CONC - SR) * OSV / IV * 1000		
Reviewed By			
SLH	% Recovery = QC FOUND / QC ACTUAL		
Date Analyzed			
10/28/96			
Time Analyzed			
10/27/96	QC ACTUAL	=	5.49E+01 µg/mL
Date Reviewed	QC FOUND	=	4.80E+01 µg/mL
05:30 PM	% SPIKE RECOVERY	=	87.4%
Time Reviewed			
AP-105			

Analyst:		SLH	Date: 28-Oct-96
Signature of Chemist:		NDS	Date: 10/28/96

SPIKE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: SP_DUP6

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

Type			SPK-DUP
SPK-DUP	SPIKE BOOK #		27B55
Volume	VOLUME OF SAMPLE + SPIKE (mL)	(SS)	1.00
12889	DILUTION FACTOR OF SAMPLE + SPIKE	(DF)	1.00
Prep Factor	PREPARATION FACTOR OF SAMPLE + SPIKE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR OF SAMPLE	(DDF)	1.0000
Method	LIFETIME IN MICROSECONDS		162.00
LIQUID	R2 VALUE		0.9991
Calc. Method	RANGE (HIGH OR LOW)		HIGH
96009337	INSTRUMENT RESULT	(IR)	6.39E-04
Result	CONCENTRATION IN SOLUTION (g/L)	(CONC)	6.39E-02
0	SPIKE VALUE (g/L)	(SV)	5.49E-02
Initial Prep	INITIAL VOLUME OF SPIKE (mL)	(IV)	0.10
N/A	ORIGINAL SAMPLE VOLUME BEFORE PREP (mL)	(OSV)	0.10
Sample Number	CONCENTRATION IN SOLN (g/L) FROM SAMPLE FORM	(SR)	1.42E-02
S96V000047			
Analysis Code			
U01	Concentration = IR * DF * PF		
Analyst (S)			
CJO	QC Actual (µg/mL) = SV (g/L) * 1000		
Chemist			
NDS	QC Found (µg/mL) = (CONC - SR) * OSV / IV * 1000		
Analyst			
SLH	% Recovery = QC FOUND / QC ACTUAL		
Date Completed			
10/28/96			
Analysis Date			
10/27/96	QC ACTUAL	=	5.49E+01 µg/mL
Analysis Time	QC FOUND	=	4.97E+01 µg/mL
05:30 PM	% SPIKE RECOVERY	=	90.5%
Sample Prep			
AP-105			

Analyst:		SLH	Date: 28-Oct-96
Signature of Chemist:	Joel Smith	NDS	Date: 10/28/96

SPIKE.WB1 REV 2.0 925009ML

URANIUM ANALYSIS

Sample ID BLANK
Description BLK
Ref. Ratio 1.045
Laser Pulses 500
Lifetime 225 ± 2.069 us
R2 .7963
Integrated 36995
Range: LOW

Date/Time 10/27/96/16:02:37
Cal Y=3.03E+09X0
Intensity 2460 (t= 39 us)
Conc 5.59E-07 ± 1.14E-08 g/L
Dilution Factor 1 mL/mL

FINAL RESULT 5.59E-07 ± 1.14E-08 g/L

Sample ID 64256
Description STD
Ref. Ratio 1.046
Laser Pulses 500
Lifetime 257 ± 1.27 us
R2 .7906
Integrated 29469
Range: HIGH

Date/Time 10/27/96/16:00:37
Cal Y=6.52E+07X-1.09E+03
Intensity 2182 (t= 32 us)
Conc 3.30E-05 ± 2.10E-06 g/L
Dilution Factor 1 mL/mL

FINAL RESULT 3.30E-05 ± 2.10E-06 g/L

Sample ID 0262 42
Description SAM
Ref. Ratio 2.131
Laser Pulses 500
Lifetime 152 ± 1.27 us
R2 .7951
Integrated 29469
Range: LOW

Date/Time 10/27/96/16:04:37
Cal Y=3.03E+09X-1.09E+03
Intensity 1282 (t= 37 us)
Conc 3.42E-07 ± 1.01E-08 g/L
Dilution Factor 1 mL/mL

FINAL RESULT 3.42E-07 ± 1.01E-08 g/L

Sample ID 64256 DUP
Description STD
Ref. Ratio 1.045
Laser Pulses 500
Lifetime 257 ± 1.27 us
R2 .7906
Integrated 29469
Range: HIGH

Date/Time 10/27/96/16:06:37
Cal Y=6.52E+07X-1.09E+03
Intensity 2182 (t= 32 us)
Conc 3.30E-05 ± 2.10E-06 g/L
Dilution Factor 1 mL/mL

FINAL RESULT 3.30E-05 ± 2.10E-06 g/L

URANIUM ANALYSIS

Sample ID S96V00047
Description SPK DUP
Ref. Ratio 1.067
Laser Pulses 500
Lifetime 162 + .756 us
R2 .9991
Integrated 373004
Range: HIGH

Date/Time 10/27/96/16:12:48
Cal Y=6.33E+07X-4.89E+01
Intensity 31606 (t= 39 us)
Conc 6.39E-04 + 2.14E-05 g/L
Dilution Factor 1 mL/mL

FINAL RESULT 6.39E-04 + 2.14E-05 g/L

LABCORE Completed RadChem Report for Worklist#: 12891

Analyst: dgg **Instrument:** U01 **Book#** 64B56

Method: LA-925-MM9 Rev/Mod A-1

Worklist Comment: AP-105. 0.1-10ml sample prep.Spike: 0.1ml. new

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	STD		0	@U-01	U-02	LIQUID	6.39E-02	6.42E-02	100.469	% Recovery
1	STD		0	@U-01	U-02E	LIQUID	1	3.24E+00	3.240	Ratio
2	BLNK		0	@U-01	U-02	LIQUID	1	<4.07E-2		ug/mL
2	BLNK		0	@U-01	U-02E	LIQUID	1	N/A		Ratio
3	SAMPLE	S96V000048	0	@U-01	U-02	LIQUID	N/A	1.97E+01	407.0e-004	ug/mL
3	SAMPLE	S96V000048	0	@U-01	U-02E	LIQUID	N/A	1.45E+00	0.0e+000	% Inst Error
4	DUP	S96V000048	0	@U-01	U-02	LIQUID	1.97E+1	1.73E+1	12.973	RPD
4	DUP	S96V000048	0	@U-01	U-02E	LIQUID	1	1.45E+00	1.450	Ratio
5	SPK	S96V000048	0	@U-01	U-02	LIQUID	5.49E+01	5.17E+01	94.171	% Recovery
6	SPK-DUP	S96V000048	0	@U-01	U-02	LIQUID	5.17E+01	5.08E+01	1.756	RPD
7	SAMPLE	S96V000049	0	@U-01	U-02	LIQUID	N/A	1.67E+01	407.0e-004	ug/mL
7	SAMPLE	S96V000049	0	@U-01	U-02E	LIQUID	N/A	1.53E+00	0.0e+000	% Inst Error

Final page for worklist# 12891

Signature attached
Analyst Signature **Date**

Analyst Signature **Date**

Vicki Smith 10/31/96
Reviewer Signature **Date**

Validated.

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Data Entry Template for Worklist# 12891

Analyst: SLH 10-27-96 **Instrument:** U01 **Book#** 64852 ~~55857~~ 10.38

Method: LA-925-009 Rev/Mod 1 1

Worklist Comment: AP-105. 0.1-10ml sample prep.Spike: 0.1ml. new

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	STD				@U-01	LIQUID		
2	BLNK				@U-01	LIQUID		
3	SAMPLE	S96V000048	0		@U-01	LIQUID	96000855	AP-105
		Analytes Requested:			U-02	, U-02E		
4	DUP	S96V000048	0		@U-01	LIQUID		
5	SPK	S96V000048	0		@U-01	LIQUID		
6	SPK-DUP	S96V000048	0		@U-01	LIQUID		
7	SAMPLE	S96V000049	0		@U-01	LIQUID	96000855	AP-105
		Analytes Requested:			U-02	, U-02E		

Final page for worklist # 12891

Analyst Signature **Date** 10-28-96

Analyst Signature **Date** 10-29-96

Data Entry Comments:
SLHB boiled down

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

Uranium Data Collection Sheet

Date/Time: 10/28/96 0200 hrs

Worklist Number: 12891

Spike Volume: .100ml

Spike Book Number: 27BSS

Sample Type	Sample Number	Digest Factor	Preparation Factor	Sample Size	Dilution Factor	Comments
	64B56		10-16	1ml		
STD	~~55B30~~ 434		.1-10	1	1-10	
BLNK			.1-10		1-10	
Sample A	S9V000048		.1-10		1-10	
Dup	48		.1-10		1-10	
Spk	48		.1-10		1-10	
Spk-Dup	48		.1-10			
Sample B	S9V000049					

URANIUM ANALYSIS

Sample ID BLANK
Description WL# 12891
Ref. Ratio 1.034
Laser Pulses 500
Lifetime + us
R2
Integrated 0
Range: LOW
Sample <= Blank

Date/Time 10/27/96/22:04:50
Cal Y=5.032E-09X0
Intensity =350 (t= 39 us)
Conc + g/L
Dilution Factor X mL/mL

FINAL RESULT

Sample ID 64B56
Description LMCE STD.
Ref. Ratio 1.02
Laser Pulses 300
Lifetime 2e2 + 1.1 us
R2 .9959
Integrated 48638
Ranges MEDH

Date/Time 10/27/96/22:47:52
Cal Y=6.875E-07X+122.906
Intensity 3648 (t= 35 us)
Conc 6.42E-01 + 9.09E-04 g/L
Dilution Factor 1 mL/mL

FINAL RESULT 6.42E-01 + 9.09E-04 g/L

Sample ID 596VC00046
Description SP-105
Ref. Ratio 1.048
Laser Pulses 300
Lifetime 704 + 1.22E us
R2 .7995
Integrated 40747

Date/Time 10/28/96/00:07:15
Cal Y=5.032E-09X0
Intensity 48740 (t= 102 us)
Conc 1.79E-03 + 2.02E-07 g/L
Dilution Factor 1 mL/mL

FINAL RESULT 1.79E-03 + 2.02E-07 g/L

Dilution 1-10

Dilution 1-10

Dilution 1-10

URANIUM ANALYSIS

Sample ID S96V048SPK-DUP
Description AP-105
Ref. Ratio 1.041
Laser Pulses 500
Lifetime 303 ± 1.66E us
R2 .9987
Integrated 74447
Range: HIGH

Date/Time 10/28/96/00:59:58
Cal Y=6.07E+07X+122.906
Intensity 3833 (t= 39 us)
Conc 6.41E-05 ± 2.08E-06 g/L
Dilution Factor 1 mL/mL

FINAL RESULT 6.41E-05 ± 2.08E-06 g/L
Dilution 1-10

Sample ID S96V000049
Description AP-105
Ref. Ratio 1.056
Laser Pulses 500
Lifetime 311 ± 1.70E us
R2 .9987
Integrated 960474
Range: LOW

Date/Time 10/28/96/01:05:40
Cal Y=6.08E+07X
Intensity 47918 (t= 163 us)
Conc 1.58E-05 ± 2.72E-07 g/L
Dilution Factor 1 mL/mL

FINAL RESULT 1.58E-05 ± 2.72E-07 g/L
Dilution 1-10

WORKBOOK PAGE: STD1

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

Type			
STD			STANDARD
Work List	STANDARD BOOK #		64B56
12891	VOLUME OF SAMPLE (mL)	(SS)	1.00
Test Code	DILUTION FACTOR OF SAMPLE	(DF)	1.00
@U-01	PREPARATION FACTOR OF SAMPLE	(PF)	1.00
Matrix	LIFETIME IN MICROSECONDS		262.00
LIQUID	R2 VALUE		0.9989
Batch Number	RANGE (HIGH OR LOW)		HIGH
96009339	INSTRUMENT UNCERTAINTY	(IU)	2.08E-06
Rerun	INSTRUMENT RESULT	(IR)	6.42E-05
0	DETECTION LEVEL (µg/mL)		3.70E-05
Sample Prep			
N/A	RESULT (µg/mL)		6.42E-02
Sample #	VALUE OF STANDARD		6.39E-02
WL12891	%RECOVERY		100.50
Instrument Code	RELATIVE % UNCERTAINTY		3.2
U01			
Prepared By			
SH2 NDS	Result = DF * PF * IR * 1000		
Chemist			
NDS	Detection Level = 3.70 E-08 * DF * PF * 1000		
Analyst			
DGG	% Recovery = Result / Value of Standard * 100		
Date Complete			
10/28/96	Relative % Uncertainty = IU / IR * 100		
Analysis Date			
10/28/96			
Analysis Time			
10:47 PM			
Sample Point			
AP-105			

Analyst:		DGG	Date: 28-Oct-96
Signature of Chemist:	Noel Smith	NDS	Date: 10/31/96

STANDARD.WB1 REV 2.0 925009ML

WORKBOOK PAGE: BLANK2

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

Type			
BLNK			BLANK
Work List	VOLUME OF SAMPLE (mL)	(SS)	1.00
12891	DILUTION FACTOR OF SAMPLE	(DF)	11.00
Test Code	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		0.00
LIQUID	R2 VALUE		0.0000
Batch Number	RANGE (HIGH OR LOW)		LOW
96009339	INSTRUMENT UNCERTAINTY	(IU)	0.00E+00
Rerun	INSTRUMENT RESULT	(IR)	0.00E+00
0	DETECTION LEVEL (µg/mL)		4.07E-02
Sample Exp			
N/A			
Sample #	RESULT (µg/mL)	<	4.07E-02
WL12891	RELATIVE % UNCERTAINTY		N/A
Instrument Code			
U01			
Prepared By	Result = DF * PF * DDF * IR * 1000		
NDS			
Chemist	Detection Level = 3.70 E-08 * DF * PF * DDF * 1000		
NDS			
Analyst	Relative % Uncertainty = IU / IR * 100		
DGG			
Date Prepared			
10/28/96			
Analysis Date			
10/28/96			
Analysis Time			
10:47 PM			
Sample Point			
AP-105			

Analyst:		DGG	Date:	28-Oct-96
Signature of Chemist:	Noel Smith	NDS	Date:	10/31/96

BLANK.WB1 REV 2.0 925009ML

WORKBOOK PAGE: SAM3

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

Type			
SAMPLE			SAMPLE
Work List	VOLUME OF SAMPLE (mL)	(SS)	1.00
12891	DILUTION FACTOR OF SAMPLE	(DF)	11.00
Test Code	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		308.00
LIQUID	R2 VALUE		0.9993
Batch Number	RANGE (HIGH OR LOW)		LOW
96009339	INSTRUMENT UNCERTAINTY	(IU)	2.59E-07
Rerun	INSTRUMENT RESULT	(IR)	1.79E-05
0	DETECTION LEVEL (µg/mL)		4.07E-02
Sample Prep			
N/A	CONCENTRATION IN SOLUTION (g/L)		1.97E-02
Sample #	RESULT (µg/mL)		1.97E+01
S96V000048	RELATIVE % UNCERTAINTY		1.4
Instrument Code			
U01			
Prepared By			
NDS			
Chemist			
NDS			
Analyst			
DGG			
Date Complete			
10/28/96			
Analysis Date			
10/28/96			
Analysis Time			
10:47 PM			
Sample Point			
AP-105			

Result = DF * PF * DDF * IR * 1000

Detection Level = 3.70 E-08 * DF * PF * DDF * 1000

Relative % Uncertainty = IU / IR * 100

Analyst:		DGG	Date: 28-Oct-96
Signature of Chemist:	Neil Smith	NDS	Date: 10/31/96

SAMPLE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: DUP4

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

Type			
DUP			DUP
Work List	VOLUME OF SAMPLE (mL)	(SS)	1.00
12891	DILUTION FACTOR OF SAMPLE	(DF)	11.00
Test Code	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		317.00
LIQUID	R2 VALUE		0.9992
Batch Number	RANGE (HIGH OR LOW)		LOW
96009339	INSTRUMENT UNCERTAINTY	(IU)	2.28E-07
Rerun	INSTRUMENT RESULT	(IR)	1.57E-05
0	DETECTION LEVEL (µg/mL)		4.07E-02
Sample Prep			
N/A	CONCENTRATION IN SOLUTION (g/L)		1.73E-02
Sample #	RESULT (µg/mL)		1.73E+01
S96V000048	RELATIVE % UNCERTAINTY		1.5
Instrument Code			
U01			
Prepared By			
NDS			
Chemist			
NDS			
Analyst			
DGG			
Date Complete			
10/28/96			
Analysis Date			
10/28/96			
Analysis Time			
10:47 PM			
Sample Point			
AP-105			

Result = DF * PF * DDF * IR * 1000

Detection Level = 3.70 E-08 * DF * PF * DDF * 1000

Relative % Uncertainty = IU / IR * 100

Analyst:		DGG	Date: 28-Oct-96
Signature of Chemist:	Noel Smith	NDS	Date: 11/3/96

SAMPLE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: SPIKE5

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

Type			SPIKE
SPK	SPIKE BOOK #		27B55
Work List	VOLUME OF SAMPLE + SPIKE (mL)	(SS)	1.00
12891	DILUTION FACTOR OF SAMPLE + SPIKE	(DF)	11.00
Test Code	PREPARATION FACTOR OF SAMPLE + SPIKE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR OF SAMPLE	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		294.00
LIQUID	R2 VALUE		0.9982
Batch Number	RANGE (HIGH OR LOW)		HIGH
96009339	INSTRUMENT RESULT	(IR)	6.49E-05
Rerun	CONCENTRATION IN SOLUTION (g/L)	(CONC)	7.14E-02
0	SPIKE VALUE (g/L)	(SV)	5.49E-02
Sample Prep	INITIAL VOLUME OF SPIKE (mL)	(IV)	0.10
N/A	ORIGINAL SAMPLE VOLUME BEFORE PREP (mL)	(OSV)	0.10
Sample Number	CONCENTRATION IN SOLN (g/L) FROM SAMPLE FORM	(SR)	1.97E-02
S96V000048			
Instrument Code			
U01	Concentration = IR * DF * PF		
Prepared By			
NDS	QC Actual (µg/mL) = SV (g/L) * 1000		
Chemist			
NDS	QC Found (µg/mL) = (CONC - SR) * OSV / IV * 1000		
Analyst			
DGG	% Recovery = QC FOUND / QC ACTUAL		
Date Complete			
10/28/96			
Analysis Date			
10/28/96	QC ACTUAL	=	5.49E+01 µg/mL
Analysis Time	QC FOUND	=	5.17E+01 µg/mL
10:47 PM	% SPIKE RECOVERY	=	94.2%
Sample Point			
AP-105			

Analyst: DGG Date: 28-Oct-96

Signature of Chemist: Mark Smith NDS Date: 10/31/96

SPIKE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: SP_DUP6

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

Type			SPK-DUP
SPK-DUP	SPIKE BOOK #		27B55
Work List	VOLUME OF SAMPLE + SPIKE (mL)	(SS)	1.00
12891	DILUTION FACTOR OF SAMPLE + SPIKE	(DF)	11.00
Test Code	PREPARATION FACTOR OF SAMPLE + SPIKE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR OF SAMPLE	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		303.00
LIQUID	R2 VALUE		0.9987
Batch Number	RANGE (HIGH OR LOW)		HIGH
96009339	INSTRUMENT RESULT	(IR)	6.41E-05
Reps	CONCENTRATION IN SOLUTION (g/L)	(CONC)	7.05E-02
0	SPIKE VALUE (g/L)	(SV)	5.49E-02
Sample Prep	INITIAL VOLUME OF SPIKE (mL)	(IV)	0.10
N/A	ORIGINAL SAMPLE VOLUME BEFORE PREP (mL)	(OSV)	0.10
Sample Number	CONCENTRATION IN SOLN (g/L) FROM SAMPLE FORM	(SR)	1.97E-02
S96V000048			
Instrument Code			
U01	Concentration = IR * DF * PF		
Prepared By			
NDS	QC Actual (µg/mL) = SV (g/L) * 1000		
Chemist			
NDS	QC Found (µg/mL) = (CONC - SR) * OSV / IV * 1000		
Analyst			
DGG	% Recovery = QC FOUND / QC ACTUAL		
Date Complete			
10/28/96			
Analysis Date			
10/28/96	QC ACTUAL	=	5.49E+01 µg/mL
Analysis Time	QC FOUND	=	5.08E+01 µg/mL
10:47 PM	% SPIKE RECOVERY	=	92.6%
Sample Point			
AP-105			

Analyst:		DGG	Date: 28-Oct-96
Signature of Chemist:	Noel Smith	NDS	Date: 10/31/96

SPIKE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: SAM7

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

Type			
SAMPLE			SAMPLE
Work List	VOLUME OF SAMPLE (mL)	(SS)	1.00
12891	DILUTION FACTOR OF SAMPLE	(DF)	11.00
Test Code	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		311.00
LIQUID	R2 VALUE		0.9987
Batch Number	RANGE (HIGH OR LOW)		LOW
96009339	INSTRUMENT UNCERTAINTY	(IU)	2.32E-07
Rerun	INSTRUMENT RESULT	(IR)	1.52E-05
0	DETECTION LEVEL (µg/mL)		4.07E-02
Sample Prep			
N/A	CONCENTRATION IN SOLUTION (g/L)		1.67E-02
Sample #	RESULT (µg/mL)		1.67E+01
S96V000049	RELATIVE % UNCERTAINTY		1.5
Instrument Code			
U01			
Prepared By			
NDS			
Chemist			
NDS			
Analyst			
DGG			
Date Complete			
10/28/96			
Analysis Date			
10/28/96			
Analysis Time			
10:47 PM			
Sample Point			
AP-105			

Result = DF * PF * DDF * IR * 1000

Detection Level = 3.70 E-08 * DF * PF * DDF * 1000

Relative % Uncertainty = IU / IR * 100

Analyst:		DGG	Date: 28-Oct-96
Signature of Chemist:	Noel Smith	NDS	Date: 10/31/96

SAMPLE.WB1 REV 2.0 925009ML

LABCORE Completed RadChem Report for Worklist#: 12892

Analyst: crj **Instrument:** U01 **Book#** _____

Method: _____Rev/Mod _____

Worklist Comment: AP-105. 0.1-10ml sample prep.For spike: 0.1ml. new

Seq	Type	Sample#	R	A	Test	Matrix	Actual		Found	DL or Yield	Unit
1	STD		0	@U-01	U-02	LIQUID	5.10E-02		5.33E-02	104.510	% Recovery
1	STD		0	@U-01	U-02E	LIQUID	1		3.26E+00	3.260	Ratio
2	BLNK		0	@U-01	U-02	LIQUID	1		6.10E-3	61.000e-004	uCi/mL
2	BLNK		0	@U-01	U-02E	LIQUID	1		8.97E+00	8.970	Ratio
3	SAMPLE	S96V000058	0	@U-01	U-02	LIQUID	N/A	<	3.70E-03	370.0e-005	ug/mL
3	SAMPLE	S96V000058	0	@U-01	U-02E	LIQUID	N/A		N/A	0.0e+000	% Inst Error
4	DUP	S96V000058	0	@U-01	U-02	LIQUID	<3.70E-3		<3.70E-3		RPD
4	DUP	S96V000058	0	@U-01	U-02E	LIQUID	1		N/A		Ratio
5	SPK	S96V000058	0	@U-01	U-02	LIQUID	5.69E+01		6.19E+01	108.787	% Recovery
6	SPK-DUP	S96V000058	0	@U-01	U-02	LIQUID	6.19E+01		5.86E+01	5.477	RPD

Final page for worklist# 12892

Analyst Signature **Date** **Analyst Signature** **Date**

Reviewer Signature 9/24/96 **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

09/12/96 14:49
A-0004-1

LABCORE Data Entry Template for Worklist# 12892

Analyst: CRJ **Instrument:** U01 _____ **Book#** 55852

Method: LA-925-009 Rev/Mod A-1

Worklist Comment: AP-105. 0.1-10ml sample prep. For spike: 0.1ml. new

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	STD				@U-01	LIQUID		
2	BLNK				@U-01	LIQUID		
3	SAMPLE	S96V000058	0		@U-01	LIQUID	96000855	AP-105
		Analytes Requested: U-02				, U-02E		
4	DUP	S96V000058	0		@U-01	LIQUID		
5	SPK	S96V000058	0		@U-01	LIQUID		
6	SPK-DUP	S96V000058	0		@U-01	LIQUID		

Final page for worklist # 12892

CRJ 9/17/96
Analyst Signature **Date**

M Raymond 9.18.96
Analyst Signature **Date**

Sylvia E Cochrane 9-18-96

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

Uranium Data Collection Sheet

9/11/96

rklist Number: 62892

Date/Time: 1100 hrs

ike Book Number: 22855

Spike Volume: 100 ml

mple Type	Sample Number	Digest Factor	Preparation Factor	Sample Size	Dilution Factor	Comments
			10-10	1ml		
STD	55856		1-10	↓		
BLNK			1-10			
Sample	59600058		1-10			
Dup	58		1-10			
SPK	58		1-10			
SPK-Dup	58					

URANIUM ANALYSIS

Sample ID 55B56
Description STD WL#12892
Ref. Ratio 1.126
Laser Pulses 500
Lifetime 227 + 1.351 us
R2 .9985
Integrated 45387
Range: HIGH

Date/Time 09/17/96/11:35:42
Cal Y=7.36E+07X-5.01E+02
Intensity 2920 (t= 39 us)
Conc 5.33E-05 + 1.74E-06 g/L
Dilution Factor 1 mL/mL

FINAL RESULT 5.33E-05 + 1.74E-06 g/L

Sample ID BLANK-PREP
Description BLK WL#12892
Ref. Ratio 1.109
Laser Pulses 500
Lifetime 180 + 11.193 us
R2 .9058
Integrated 2989
Range: LOW

Date/Time 09/17/96/11:38:20
Cal Y=5.19E+09X-4.88E-04
Intensity 184 (t= 39 us)
Conc 6.10E-08 + 5.47E-09 g/L
Dilution Factor 1 mL/mL

FINAL RESULT 6.10E-08 + 5.47E-09 g/L

Sample ID S96V000058
Description SAM WL#12892
Ref. Ratio 1.114
Laser Pulses 500
Lifetime + us
R2
Integrated 285
Range: LOW
Sample <= Blank

Date/Time 09/17/96/11:41:39
Cal Y=5.19E+09X-4.88E-04
Intensity 29 (t= 39 us)
Conc + g/L
Dilution Factor 1 mL/mL

FINAL RESULT

Sample ID S96V000059
Description SAM WL#12892
Ref. Ratio 1.106
Laser Pulses 500
Lifetime 548 + 58.784 us
R2 .8887
Integrated 2982
Range: LOW

Date/Time 09/17/96/11:43:34
Cal Y=5.19E+09X-4.88E-04
Intensity 139 (t= 39 us)
Conc 2.19E-08 + 1.63E-09 g/L
Dilution Factor 1 mL/mL

FINAL RESULT 2.19E-08 + 1.63E-09 g/L

OK RG 9.18.96

Sample < Detection Level Zero will be used for ACE

Sample ID S96V000060
Description SAM WL#12892
Ref. Ratio 1.122
Laser Pulses 500
Lifetime 298 + 1.22 us
R2 .9993
Integrated 61582
Range: HIGH

Date/Time 09/17/96/11:45:30
Cal Y=7.36E+07X-5.01E+02
Intensity 8128 (t= 39 us)
Conc 5.63E-05 + 1.78E-06 g/L
Dilution Factor 1 mL/mL

FINAL RESULT 5.63E-05 + 1.78E-06 g/L

SK

1-10

URANIUM ANALYSIS

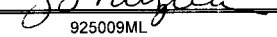
Sample ID S96V000058 Date/Time 08/17/96/11:56:39
Description SPK DUP WL1S38S Cal Ya7.93E+07X-6.01E+02
Ref. Ratio 1.1E6 Intensity 9029 (t= 39 us)
Laser Pulses 500 Conc 5.33E-05 + 1.72E-06 g/L
Lifetime 264 + 1.537 us Dilution Factor 1 mL/mL
R2 .9865
Integrated 52132 FINAL RESULT 5.33E-05 + 1.72E-06 g/L
Range: HIGH

1-0

WORKBOOK PAGE: STD1

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

STD			STANDARD
	STANDARD BOOK #		55B56
12892	VOLUME OF SAMPLE (mL)	(SS)	1.00
	DILUTION FACTOR OF SAMPLE	(DF)	1.00
@U-01	PREPARATION FACTOR OF SAMPLE	(PF)	1.00
	LIFETIME IN MICROSECONDS		227.00
LIQUID	R2 VALUE		0.9985
	RANGE (HIGH OR LOW)		HIGH
96009342	INSTRUMENT UNCERTAINTY	(IU)	1.74E-06
	INSTRUMENT RESULT	(IR)	5.33E-05
0	DETECTION LEVEL (µg/mL)		3.70E-05
N/A	RESULT (µg/mL)		5.33E-02
	VALUE OF STANDARD		5.10E-02
WL12892	%RECOVERY		104.51
	RELATIVE % UNCERTAINTY		3.3
UO1			
VAR	Result = DF * PF * IR * 1000		
JLN	Detection Level = 3.70 E-08 * DF * PF * 1000		
CRJ	% Recovery = Result / Value of Standard * 100		
09/18/96	Relative % Uncertainty = IU / IR * 100		
09/17/96			
11:00 AM			
AP-105			

Analyst:		CRJ	Date: 18-Sep-96
Signature of Chemist:		JLN	Date: 9/24/96

STANDARD.WB1 REV 2.0 925009ML

WORKBOOK PAGE: BLANK2

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

BLNK			BLANK
	VOLUME OF SAMPLE (mL)	(SS)	1.00
12892	DILUTION FACTOR OF SAMPLE	(DF)	1.00
	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
	LIFETIME IN MICROSECONDS		180.00
LIQUID	R2 VALUE		0.9058
	RANGE (HIGH OR LOW)		LOW
96009342	INSTRUMENT UNCERTAINTY	(IU)	5.47E-09
	INSTRUMENT RESULT	(IR)	6.10E-08
0	DETECTION LEVEL (µg/mL)		3.70E-03
N/A			
	RESULT (µg/mL)		6.10E-03
WL12892	RELATIVE % UNCERTAINTY		9.0
UO1			
	Result = DF * PF * DDF * IR * 1000		
VAR			
	Detection Level = 3.70 E-08 * DF * PF * DDF * 1000		
JLN			
	Relative % Uncertainty = IU / IR * 100		
CRJ			
09/18/96			
09/17/96			
11:00 AM			
AP-105			

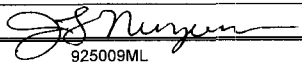
Analyst:		CRJ	Date: 18-Sep-96
Signature of Chemist:	J Nguyen	JLN	Date: 9/21/96

BLANK.WB1 REV 2.0 925009ML

WORKBOOK PAGE: SAM3

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

SAMPLE			SAMPLE
	VOLUME OF SAMPLE (mL)	(SS)	1.00
12892	DILUTION FACTOR OF SAMPLE	(DF)	1.00
	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
	LIFETIME IN MICROSECONDS		0.00
LIQUID	R2 VALUE		0.0000
	RANGE (HIGH OR LOW)		LOW
96009342	INSTRUMENT UNCERTAINTY	(IU)	0.00E+00
	INSTRUMENT RESULT	(IR)	0.00E+00
0	DETECTION LEVEL (µg/mL)		3.70E-03
N/A	CONCENTRATION IN SOLUTION (g/L)		0.00E+00
	RESULT (µg/mL)	<	3.70E-03
S96V000058	RELATIVE % UNCERTAINTY		N/A
UO1			
	Result = DF * PF * DDF * IR * 1000		
VAR			
	Detection Level = 3.70 E-08 * DF * PF * DDF * 1000		
JLN			
	Relative % Uncertainty = IU / IR * 100		
CRJ			
09/18/96			
09/17/96			
11:00 AM			
AP-105			

Analyst:		CRJ	Date: 18-Sep-96
Signature of Chemist:		JLN	Date: 9/24/96

SAMPLE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: DUP4

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

Type			
DUP			DUP
Work List	VOLUME OF SAMPLE (mL)	(SS)	1.00
12892	DILUTION FACTOR OF SAMPLE	(DF)	1.00
Test Code	PREPARATION FACTOR OF SAMPLE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR	(DDF)	1.0000
Matrix	LIFETIME IN MICROSECONDS		0.00
LIQUID	R2 VALUE		0.0000
Batch Number	RANGE (HIGH OR LOW)		LOW
96009342	INSTRUMENT UNCERTAINTY	(IU)	0.00E+00
Rerun	INSTRUMENT RESULT	(IR)	0.00E+00
0	DETECTION LEVEL (µg/mL)		3.70E-03
Sample Prep			
N/A	CONCENTRATION IN SOLUTION (g/L)		0.00E+00
Sample #	RESULT (µg/mL)	<	3.70E-03
S96V000058	RELATIVE % UNCERTAINTY		N/A
Instrument Code			
UO1			
Prepared By			
VAR			
Chemist			
JLN			
Analyst			
CRJ			
Date Complete			
09/18/96			
Analysis Date			
09/17/96			
Analysis Time			
11:00 AM			
Sample Point			
AP-105			

Result = DF * PF * DDF * IR * 1000

Detection Level = 3.70 E-08 * DF * PF * DDF * 1000

Relative % Uncertainty = IU / IR * 100

Analyst:		CRJ	Date: 18-Sep-96
Signature of Chemist:		JLN	Date 9/24/96

SAMPLE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: SPIKE5

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

			SPIKE
SPK	SPIKE BOOK #		22B55
	VOLUME OF SAMPLE + SPIKE (mL)	(SS)	1.00
12892	DILUTION FACTOR OF SAMPLE + SPIKE	(DF)	11.00
	PREPARATION FACTOR OF SAMPLE + SPIKE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR OF SAMPLE	(DDF)	1.0000
	LIFETIME IN MICROSECONDS		298.00
LIQUID	R2 VALUE		0.9993
	RANGE (HIGH OR LOW)		HIGH
96009342	INSTRUMENT RESULT	(IR)	5.63E-05
	CONCENTRATION IN SOLUTION (g/L)	(CONC)	6.19E-02
0	SPIKE VALUE (g/L)	(SV)	5.69E-02
	INITIAL VOLUME OF SPIKE (mL)	(IV)	0.10
N/A	ORIGINAL SAMPLE VOLUME BEFORE PREP (mL)	(OSV)	0.10
	CONCENTRATION IN SOLN (g/L) FROM SAMPLE FORM	(SR)	0.00E+00

S96V000058

UO1

Concentration = IR * DF * PF

VAR

QC Actual (µg/mL) = SV (g/L) * 1000

JLN

QC Found (µg/mL) = (CONC - SR) * OSV / IV * 1000

CRJ

% Recovery = QC FOUND / QC ACTUAL

09/18/96

QC ACTUAL	=	5.69E+01	µg/mL
QC FOUND	=	6.19E+01	µg/mL
% SPIKE RECOVERY	=	108.8%	

09/17/96

11:00 AM

AP-105

Analyst:	CRJ	Date:	18-Sep-96
Signature of Chemist:	JLN	Date:	9/24/96

SPIKE.WB1 REV 2.0 925009ML

WORKBOOK PAGE: SP_DUP6

Uranium by Phosphorescence: LA-925-009 (A-1) LIQUID/SOLID

			SPK-DUP
SPK-DUP	SPIKE BOOK #		22B55
	VOLUME OF SAMPLE + SPIKE (mL)	(SS)	1.00
12892	DILUTION FACTOR OF SAMPLE + SPIKE	(DF)	11.00
	PREPARATION FACTOR OF SAMPLE + SPIKE	(PF)	100.00
@U-01	DIGEST DILUTION FACTOR OF SAMPLE	(DDF)	1.0000
	LIFETIME IN MICROSECONDS		264.00
LIQUID	R2 VALUE		0.9985
	RANGE (HIGH OR LOW)		HIGH
96009342	INSTRUMENT RESULT	(IR)	5.33E-05
	CONCENTRATION IN SOLUTION (g/L)	(CONC)	5.86E-02
0	SPIKE VALUE (g/L)	(SV)	5.69E-02
	INITIAL VOLUME OF SPIKE (mL)	(IV)	0.10
N/A	ORIGINAL SAMPLE VOLUME BEFORE PREP (mL)	(OSV)	0.10
	CONCENTRATION IN SOLN (g/L) FROM SAMPLE FORM	(SR)	0.00E+00
S96V000058			
UO1	Concentration = IR * DF * PF		
VAR	QC Actual (µg/mL) = SV (g/L) * 1000		
JLN	QC Found (µg/mL) = (CONC - SR) * OSV / IV * 1000		
CRJ	% Recovery = QC FOUND / QC ACTUAL		
09/18/96			
09/17/96	QC ACTUAL	=	5.69E+01 µg/mL
	QC FOUND	=	5.86E+01 µg/mL
11:00 AM	% SPIKE RECOVERY	=	103.0%
AP-105			

Analyst:		CRJ	Date:	18-Sep-96
Signature of Chemist:		JLN	Date:	9/24/96

SPIKE.WB1 REV 2.0 925009ML

Radiochemical Analyses

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LABCORE Completed RadChem Report for Worklist#: 15286

Analyst: rag **Instrument:** LSC03 **Book#** _____

Method: _____ Rev/Mod _____

Worklist Comment: See attached sheet for sample sizes. Rerun #2. SLF

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	STD		0	@H3-01	H3-01	LIQUID	7.51E-04	8.60E-4	114.514	% Recovery
1	STD		0	@H3-01	H3-01E	LIQUID	1	9.40E-01	0.940	% Ct. Erro
2	BLNK		0	@H3-01	H3-01	LIQUID	1	3.92E-5	39.200e-006	uCi/mL
2	BLNK		0	@H3-01	H3-01E	LIQUID	1	5.66E+00	5.660	uCi/mL
3	SAMPLE	S96V000047	0	@H3-01	H3-01	LIQUID	N/A	4.65E-03	310.0e-007	uCi/mL
3	SAMPLE	S96V000047	0	@H3-01	H3-01E	LIQUID	N/A	1.29E+00	100.0e-006	% Ct. Error
4	SPK	S96V000047	0	@H3-01	H3-01	LIQUID	7.51E-04	7.65E-04	101.864	% Recovery
5	SPK-DUP	S96V000047	0	@H3-01	H3-01	LIQUID	7.65E-04	7.86E-04	2.708 RPD	
6	SAMPLE	S96V000048	0	@H3-01	H3-01	LIQUID	N/A	1.04E-03	282.0e-008	uCi/mL
6	SAMPLE	S96V000048	0	@H3-01	H3-01E	LIQUID	N/A	8.30E-01	100.0e-006	% Ct. Error
7	SAMPLE	S96V000049	0	@H3-01	H3-01	LIQUID	N/A	2.76E-02	312.0e-007	uCi/mL
7	SAMPLE	S96V000049	0	@H3-01	H3-01E	LIQUID	N/A	5.40E-01	100.0e-006	% Ct. Error
8	SAMPLE	S96V000058	0	@H3-01	H3-01	LIQUID	N/A	8.98E-05	309.0e-007	uCi/mL
8	SAMPLE	S96V000058	0	@H3-01	H3-01E	LIQUID	N/A	5.34E+00	100.0e-006	% Ct. Error

Final page for worklist# 15286

Analyst Signature **Date**

Analyst Signature **Date**

12/3/96

Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Data Entry Template for Worklist# 15286

Analyst: RG **Instrument:** LSC00 6500 **Book#** 64B56

Method: LA-218-114 Rev/Mod 13-0

Worklist Comment: See attached sheet for sample sizes. Rerun #2. SLF

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	STD				@H3-01	LIQUID		
2	BLNK				@H3-01	LIQUID		
3	SAMPLE	S96V000047	0		@H3-01	LIQUID	96000853	AP-105
	Analytes Requested:				H3-01	, H3-01E		
4	SPK	S96V000047	0		@H3-01	LIQUID		
5	SPK-DUP	S96V000047	0		@H3-01	LIQUID		
6	SAMPLE	S96V000048	0		@H3-01	LIQUID	96000855	AP-105
	Analytes Requested:				H3-01	, H3-01E		
7	SAMPLE	S96V000049	0		@H3-01	LIQUID	96000855	AP-105
	Analytes Requested:				H3-01	, H3-01E		
8	SAMPLE	S96V000058	0		@H3-01	LIQUID	96000855	AP-105
	Analytes Requested:				H3-01	, H3-01E		

Final page for worklist # 15286

Raj Jura Sheen 12-1-96
Analyst Signature **Date**

12/2/96
Analyst Signature **Date**
Sue Hogan 12/2/96

Data Entry Comments: 15 ml sam + 1.5 ml std for spk samples

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code

WORKBOOK PAGE: STD1

H3 : LA-218-114 (A-4), LA-218-115(A-0) TRITIUM LIQUIDS

			STANDARD
	Disintegrations per minute from Counter	(dpm)	1909.67
STD	Sample Volume in mL	(SS)	1
	Dilution Factor	(DF)	1
15286	Digest Dilution Factor	(DDF)	1
	Background Count Rate in Counts per Minute	(BKG cpm)	21.44
@H3-01	Background Count Time in Minutes	(BKG Time)	50
	Instrument Fractional Efficiency	(EFF)	0.48
LIQUID	% Counting Error		0.94
	Detection Limit	(Ld)	6.47
96011896	Critical Level	(Lc)	1.53
	Tritium Concentration in µCi/L		8.60E-01
0	Standard Book No.		64B56
	Standard Value in µCi/mL		7.5051E-04
N/A			

Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG Time)

WL15286

Detection Limit (Ld) = ((2.72 / BKG Time) + (2 * Lc)) / EFF

H3 µCi/L = (dpm * (1000mL/L) * DF * DDF) / (SS * (2220000dpm/µCi))

WC51586

H3 µCi/mL = µCi/L/1000mL/L

Detection Limit (µCi/mL) = (Ld)(DF)(DDF) / [(SS) (2220000 dpm/µCi)]

MCB

SLF

Tritium Concentration in µCi/L	8.60E-01

RAG

Tritium Concentration in µCi/mL	8.60E-04
Detection Limit in µCi/mL	2.91E-06
% Counting Error	0.94

12/02/96

12/01/96

09:30 AM

AP-105

Analyst:		RAG	Date:	12/02/96
Signature of Chemist:		SLF	Date:	12/3/96

STANDARD.WB1 REV 2.0 21811NML

WORKBOOK PAGE: BLANK2

H3 : LA-218-114 (A-4), LA-218-115(A-0) TRITIUM LIQUIDS/ SOLIDS

			BLANK
	Disintegrations per minute from Counter	(dpm)	7.92
BLNK	Sample Volume in mL	(SS)	1
	Dilution Factor	(DF)	11
15286	Digest Dilution Factor	(DDF)	1
	Background Count Rate in Counts per Minute	(BKG cpm)	21.44
@H3-01	Background Count Time in Minutes	(BKG Time)	50
	Instrument Fractional Efficiency	(EFF)	0.5434
LIQUID	% Counting Error		5.66
	Detection Limit	(Ld)	5.72
96011896	Critical Level	(Lc)	1.53
	Tritium Concentration in µCi/L		3.92E-02
0			

Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG Time)
N/A
Detection Limit (Ld) = ((2.72 / BKG Time) + (2 * Lc)) / EFF
H3 µCi/L = (dpm * (1000mL/L) * DF * DDF) / (SS * (2220000dpm/µCi))
WL15286
H3 µCi/mL = µCi/L/1000mL/L
Detection Limit (µCi/mL) = (Ld)(DF)(DDF) / [(SS)(2220000 dpm/µCi)]

WC-15286
MCB
SLF
12/2/96
12/3/96
09:40 AM
NT-105

Tritium Concentration in µCi/L	3.92E-02

Tritium Concentration in µCi/mL	3.92E-05
Detection Limit in µCi/mL	2.83E-05
% Counting Error	5.66

Analyst:		RAG	Date:	12/02/96
Signature of Chemist:		SLF	Date:	12/3/96

WORKBOOK PAGE: SAM3

H3 : LA-218-114 (A-4), LA-218-115(A-0) TRITIUM LIQUIDS/ SOLIDS

			SAMPLE
	Disintegrations per minute from Counter	(dpm)	937.56
SAMPLE	Sample Volume in mL	(SS)	1
	Dilution Factor	(DF)	11
15286	Digest Dilution Factor	(DDF)	1
	Background Count Rate in Counts per Minute	(BKG cpm)	21.44
@H3-01	Background Count Time in Minutes	(BKG Time)	50
	Instrument Fractional Efficiency	(EFF)	0.4957
LIQUID	% Counting Error		1.29
	Detection Limit	(Ld)	6.27
96011896	Critical Level	(Lc)	1.53
	Tritium Concentration in µCi/L		4.65E+00

0

Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG Time)

N/A

Detection Limit (Ld) = ((2.72 / BKG Time) + (2 * Lc)) / EFF

H3 µCi/L = (dpm * (1000mL/L) * DF * DDF) / (SS * (2220000dpm/µCi))

S96V000047

H3 µCi/mL = µCi/L/1000mL/L

Detection Limit (µCi/mL) = (Ld)(DF)(DDF) / [(SS)(2220000 dpm/µCi)]

WG51586

MGB

SLF

Tritium Concentration in µCi/L	4.65E+00

RAG

Tritium Concentration in µCi/mL	4.65E-03
Detection Limit in µCi/mL	3.10E-05
% Counting Error	1.29

12/02/96

09:30 AM

APEX05

Analyst:		RAG	Date:	12/02/96
Signature of Chemist:		SLF	Date:	12/3/96

SAMPLE.WB1 REV 2.0 21811NML

WORKBOOK PAGE: SPIKE4

H3 : LA-218-114 (A-4), LA-218-115(A-0) TRITIUM LIQUIDS/ SOLIDS			SPIKE
	dpm of Sample from Counter	(dpm1)	937.56
SPK	dpm of Sample + Spike from Counter	(dpm2)	1317.42
	Volume of Sample in Distillation Vial in mL	(Svol)	1.5
15286	Volume of Spike in Distillation Vial in mL	(SPK vol)	1.5
	Volume Transferred to Scintillation Vial in mL	(TR vol)	1
@H3-01	Spike Book Number	(Spk BN)	64B56
	Spike Value in µCi/mL	(SPK val)	7.5051E-04
LIQUID	Background Count Rate in cpm	(BKG cpm)	21.44
	Background Count Time in Minutes	(BKG Time)	50
96011896	Instrument Fractional Efficiency of Sample	(EFF)	0.4935
	Detection Limit	(Ld)	6.29
0	Critical Level	(Lc)	1.53
	H3 µCi/mL in Sample Vial	(Rsam)	4.22E-04
N/A	H3 µCi/mL in Sample + Spike Vial	(Rs+s)	5.93E-04
	Vol. Ratio Sample Vol. to Total Vol.	(VRsam)	5.00E-01
S96V000047	Vol. Ratio Spike Vol. to Total Vol.	(VRspike)	5.00E-01

VGS1686	Spk val = value taken from RCTABLE and then decayed using a ½ life of 29.1 years
	Detection Limit (Ld) = ((2.72 / BKG time) + (2 * Lc)) / EFF
MCB	Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG time)
	H3 µCi/mL in Sample Vial (Rsam) = dpm1 / (TR vol * (2220000dpm/µCi))
SLF	H3 µCi/mL in Sample + Spike Vial (Rs+s) = dpm2 / (TR vol * (2220000dpm/µCi))
	Volume Ratio of Sample Volume to Total Volume (VRsam)= Svol / (Svol + SPK vol)
RAS	Volume Ratio of Spike Volume to Total Volume (VRspike) = SPK vol / (Svol + SPK vol)
	QC Actual in µCi/mL = SPK val
242296	QC Found in µCi/mL = (((Rs+s) - (Rsam * VRsam)) / (VRspike))
	Percent Spike Recovery = QC Found / QC Actual *100
281196	
09:30AM	**QC Actual in µCi/mL = 7.51E-04**
	QC Found in µCi/mL = 7.65E-04
AP-105	**Percent Spike Recovery = 101.9%**

12/3/96

H3 : LA-218-114 (A-4), LA-218-115(A-0) TRITIUM LIQUIDS/ SOLIDS			SPK-DUP
	dpm of Sample from Counter	(dpm1)	937.56
SPK-DUP	dpm of Sample + Spike from Counter	(dpm2)	1340.85
	Volume of Sample in Distillation Vial in mL	(Svol)	1.5
15286	Volume of Spike in Distillation Vial in mL	(SPK vol)	1.5
	Volume Transferred to Scintillation Vial in mL	(TR vol)	1
@H3-01	Spike Book Number	(Spk BN)	64B56
	Spike Value in µCi/mL	(SPK val)	7.5051E-04
LIQUID	Background Count Rate in cpm	(BKG cpm)	21.44
	Background Count Time in Minutes	(BKG Time)	50
96011896	Instrument Fractional Efficiency of Sample	(EFF)	0.4907
	Detection Limit	(Ld)	6.33
0	Critical Level	(Lc)	1.53
	H3 µCi/mL in Sample Vial	(Rsam)	4.22E-04
N/A	H3 µCi/mL in Sample + Spike Vial	(Rs+s)	6.04E-04
	Vol. Ratio Sample Vol. to Total Vol.	(VRsam)	5.00E-01
S96V000047	Vol. Ratio Spike Vol. to Total Vol.	(VRspike)	5.00E-01

WCS1586	Spk val = value taken from RCTABLE and then decayed using a ½ life of 29.1 years
	Detection Limit (Ld) = ((2.72 / BKG time) + (2 * Lc)) / EFF
MCB1	Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG time)
	H3 µCi/mL in Sample Vial (Rsam) = dpm1 / (TR vol * (2220000dpm/µCi))
SL1	H3 µCi/mL in Sample + Spike Vial (Rs+s) = dpm2 / (TR vol * (2220000dpm/µCi))
	Volume Ratio of Sample Volume to Total Volume (VRsam)= Svol / (Svol + SPK vol)
RMG	Volume Ratio of Spike Volume to Total Volume (VRspike) = SPK vol / (Svol + SPK vol)
	QC Actual in µCi/mL = SPK val
12/02/96	QC Found in µCi/mL = (((Rs+s) - (Rsam * VRsam)) / (VRspike))
	Percent Spike Recovery = QC Found / QC Actual *100
12/01/96	
09:50 AM	**QC Actual in µCi/mL** = **7.51E-04**
	QC Found in µCi/mL = **7.86E-04**
AP_05	**Percent Spike Recovery** = **104.7%**

12/3/96

WORKBOOK PAGE: SAM6

H3 : LA-218-114 (A-4), LA-218-115(A-0) TRITIUM LIQUIDS/ SOLIDS			SAMPLE
	Disintegrations per minute from Counter	(dpm)	2304.84
SAMPLE	Sample Volume in mL	(SS)	1
	Dilution Factor	(DF)	1
15286	Digest Dilution Factor	(DDF)	1
	Background Count Rate in Counts per Minute	(BKG cpm)	21.44
@H3-01	Background Count Time in Minutes	(BKG Time)	50
	Instrument Fractional Efficiency	(EFF)	0.4954
LIQUID	% Counting Error		0.83
	Detection Limit	(Ld)	6.27
96011896	Critical Level	(Lc)	1.53
	Tritium Concentration in µCi/L		1.04E+00

0

Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG Time)

N/A

Detection Limit (Ld) = ((2.72 / BKG Time) + (2 * Lc)) / EFF

H3 µCi/L = (dpm * (1000mL/L) * DF * DDF) / (SS * (2220000dpm/µCi))

S96V000048

H3 µCi/mL = µCi/L/1000mL/L

Detection Limit (µCi/mL) = (Ld)(DF)(DDF) / [(SS)(2220000 dpm/µCi)]

WC-51586

CMS-5

SLF

Tritium Concentration in µCi/L	1.04E+00

RAG

Tritium Concentration in µCi/mL	1.04E-03
Detection Limit in µCi/mL	2.82E-06
% Counting Error	0.83

12/02/96

12/01/96

[illegible]

SFF105

Analyst:	RAG	Date:	12/02/96
Signature of Chemist:	SLF	Date:	12/3/96

SAMPLE.WB1 REV 2.0 21811NML

I:\21811N\OUT\15286.WB1 12/02/96 10:48:57

WORKBOOK PAGE: SAM7

H3 : LA-218-114 (A-4), LA-218-115(A-0) TRITIUM LIQUIDS/ SOLIDS			SAMPLE
	Disintegrations per minute from Counter	(dpm)	5566.39
SAMPLE	Sample Volume in mL	(SS)	1
	Dilution Factor	(DF)	11
15286	Digest Dilution Factor	(DDF)	1
	Background Count Rate in Counts per Minute	(BKG cpm)	21.44
@H3-01	Background Count Time in Minutes	(BKG Time)	50
	Instrument Fractional Efficiency	(EFF)	0.4938
LIQUID	% Counting Error		0.54
	Detection Limit	(Ld)	6.29
96011896	Critical Level	(Lc)	1.53
	Tritium Concentration in µCi/L		2.76E+01
0			

Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG Time)

N/A

Detection Limit (Ld) = ((2.72 / BKG Time) + (2 * Lc)) / EFF

H3 µCi/L = (dpm * (1000mL/L) * DF * DDF) / (SS * (2220000dpm/µCi))

S96V000049

H3 µCi/mL = µCi/L/1000mL/L

Detection Limit (µCi/mL) = (Ld)(DF)(DDF) / [(SS)(2220000 dpm/µCi)]

WC51586

MCB

SLF

Tritium Concentration in µCi/L	2.76E+01

RAG

Tritium Concentration in µCi/mL	2.76E-02
Detection Limit in µCi/mL	3.12E-05
% Counting Error	0.54

12/01/96

09:30 AM

AP-105

Analyst:		RAG	Date:	12/02/96
Signature of Chemist:		SLF	Date:	12/3/96

SAMPLE.WB1 REV 2.0 21811NML

I:\21811N\OUT\15286.WB1 12/02/96 10:48:58

WORKBOOK PAGE: SAM8

H3 : LA-218-114 (A-4), LA-218-115(A-0) TRITIUM LIQUIDS/ SOLIDS			SAMPLE
	Disintegrations per minute from Counter	(dpm)	18.13
SAMPLE	Sample Volume in mL	(SS)	1
	Dilution Factor	(DF)	11
15286	Digest Dilution Factor	(DDF)	1
	Background Count Rate in Counts per Minute	(BKG cpm)	21.44
@H3-01	Background Count Time in Minutes	(BKG Time)	50
	Instrument Fractional Efficiency	(EFF)	0.4973
LIQUID	% Counting Error		5.34
	Detection Limit	(Ld)	6.25
96011896	Critical Level	(Lc)	1.53
	Tritium Concentration in µCi/L		8.98E-02
0			

Critical Level (Lc) = 2.33 * the Square Root of (BKG cpm / BKG Time)
N/A
Detection Limit (Ld) = ((2.72 / BKG Time) + (2 * Lc)) / EFF
H3 µCi/L = (dpm * (1000mL/L) * DF * DDF) / (SS * (2220000dpm/µCi))
S96V000058
H3 µCi/mL = µCi/L/1000mL/L
Detection Limit (µCi/mL) = (Ld)(DF)(DDF) / [(SS)(2220000 dpm/µCi)]

WC51586

MGB1

SL

Tritium Concentration in µCi/L	8.98E-02

RAG

Tritium Concentration in µCi/mL	8.98E-05
Detection Limit in µCi/mL	3.09E-05
% Counting Error	5.34

12/02/96

12/01196

08:10 AM

AF-105

Analyst:		RAG	Date:	12/02/96
Signature of Chemist:		SLF	Date:	12/3/96

SAMPLE.WB1 REV 2.0 21811NML

LABCORE Completed RadChem Report for Worklist#: 14423

Analyst: smf **Instrument:** AB16 **Book#** _____

Method: LA-508-101 Rev/Mod E-1

Worklist Comment: AP-105 ABS

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	STD		0	@AB-01	ALPHA01	LIQUID	2.31E-04	2.38E-4	103.030	% Recovery
1	STD		0	@AB-01	ALPHA01E	LIQUID	1	3.48E+00	3.480	% Ct. Erro
1	STD		0	@AB-01	BETA-01	LIQUID	2.97E-03	2.98E-3	100.337	% Recovery
1	STD		0	@AB-01	BETA-01E	LIQUID	1	6.92E-01	0.692	% Ct. Erro
2	BLNK-PREP		0	@AB-01	ALPHA01	LIQUID	1	<1.02E-2		uCi/mL
2	BLNK-PREP		0	@AB-01	ALPHA01E	LIQUID	1.00	5.00E+02	500.000	uCi/mL
2	BLNK-PREP		0	@AB-01	BETA-01	LIQUID	1	1.59E-1	0.159	uCi/mL
2	BLNK-PREP		0	@AB-01	BETA-01E	LIQUID	1.00	2.02E+01	20.200	uCi/mL
3	BLNK/BKG		0	@AB-01	ALPHA01	LIQUID	1.00E+00	1.11E+00	1.110	BLNK/BKG
3	BLNK/BKG		0	@AB-01	BETA-01	LIQUID	1.00E+00	1.96E+00	1.960	BLNK/BKG
4	SAMPLE	S96V000050	0	B @AB-01	ALPHA01	LIQUID	N/A <	1.02E-02	121.0e-004	uCi/mL
4	SAMPLE	S96V000050	0	B @AB-01	ALPHA01E	LIQUID	N/A	5.00E+02	0.0e+000	% Ct. Error
4	SAMPLE	S96V000050	0	B @AB-01	BETA-01	LIQUID	N/A	1.08E+02	371.0e-004	uCi/mL
4	SAMPLE	S96V000050	0	B @AB-01	BETA-01E	LIQUID	N/A	1.17E+00	0.0e+000	% Ct. Error
5	DUP	S96V000050	0	B @AB-01	ALPHA01	LIQUID	<1.02E-2	<6.76E-3		RPD
5	DUP	S96V000050	0	B @AB-01	ALPHA01E	LIQUID	1.00	5.00E+02	500.000	% Ct. Erro
5	DUP	S96V000050	0	B @AB-01	BETA-01	LIQUID	1.08E+2	1.08E+2	0.000	RPD
5	DUP	S96V000050	0	B @AB-01	BETA-01E	LIQUID	1.00	3.62E-01	0.362	% Ct. Erro
6	SAMPLE	S96V000051	0	B @AB-01	ALPHA01	LIQUID	N/A <	1.02E-02	121.0e-004	uCi/mL
6	SAMPLE	S96V000051	0	B @AB-01	ALPHA01E	LIQUID	N/A	5.00E+02	0.0e+000	% Ct. Error
6	SAMPLE	S96V000051	0	B @AB-01	BETA-01	LIQUID	N/A	1.12E+02	371.0e-004	uCi/mL
6	SAMPLE	S96V000051	0	B @AB-01	BETA-01E	LIQUID	N/A	3.55E-01	0.0e+000	% Ct. Error
7	DUP	S96V000051	0	B @AB-01	ALPHA01	LIQUID	<1.02E-2	<5.05E-3		RPD
7	DUP	S96V000051	0	B @AB-01	ALPHA01E	LIQUID	1.00	5.00E+02	500.000	% Ct. Erro
7	DUP	S96V000051	0	B @AB-01	BETA-01	LIQUID	1.12E+2	1.06E+2	5.505	RPD
7	DUP	S96V000051	0	B @AB-01	BETA-01E	LIQUID	1.00	3.63E-01	0.363	% Ct. Erro
8	SAMPLE	S96V000052	0	B @AB-01	ALPHA01	LIQUID	N/A <	5.05E-03	121.0e-004	uCi/mL
8	SAMPLE	S96V000052	0	B @AB-01	ALPHA01E	LIQUID	N/A	5.00E+02	0.0e+000	% Ct. Error
8	SAMPLE	S96V000052	0	B @AB-01	BETA-01	LIQUID	N/A	1.07E+02	371.0e-004	uCi/mL
8	SAMPLE	S96V000052	0	B @AB-01	BETA-01E	LIQUID	N/A	3.62E-01	0.0e+000	% Ct. Error
9	DUP	S96V000052	0	B @AB-01	ALPHA01	LIQUID	<5.05E-3	<5.05E-3		RPD
9	DUP	S96V000052	0	B @AB-01	ALPHA01E	LIQUID	1.00	5.00E+02	500.000	% Ct. Erro
9	DUP	S96V000052	0	B @AB-01	BETA-01	LIQUID	1.07E+2	1.08E+2	0.930	RPD
9	DUP	S96V000052	0	B @AB-01	BETA-01E	LIQUID	1.00	3.59E-01	0.359	% Ct. Erro
10	SAMPLE	S96V000054	0	B @AB-01	ALPHA01	LIQUID	N/A <	5.05E-03	121.0e-004	uCi/mL
10	SAMPLE	S96V000054	0	B @AB-01	ALPHA01E	LIQUID	N/A	5.00E+02	0.0e+000	% Ct. Error
10	SAMPLE	S96V000054	0	B @AB-01	BETA-01	LIQUID	N/A	1.11E+02	371.0e-004	uCi/mL
10	SAMPLE	S96V000054	0	B @AB-01	BETA-01E	LIQUID	N/A	3.55E-01	0.0e+000	% Ct. Error
11	DUP	S96V000054	0	B @AB-01	ALPHA01	LIQUID	<5.05E-3	<5.05E-3		RPD
11	DUP	S96V000054	0	B @AB-01	ALPHA01E	LIQUID	1.00	5.00E+02	500.000	% Ct. Erro
11	DUP	S96V000054	0	B @AB-01	BETA-01	LIQUID	1.11E+2	1.10E+2	0.905	RPD

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Completed RadChem Report for Worklist#: 14423

Seq	Type	Sample#	R	A	Test	Matrix	Actual		Found	DL or Yield	Unit
11	DUP	S96V000054	0	B	@AB-01	BETA-01E	LIQUID	1.00	3.56E-01	0.356	% Ct. Erro
12	SAMPLE	S96V000060	0	B	@AB-01	ALPHA01	LIQUID	N/A <	2.50E-05	597.0e-007	uCi/mL
12	SAMPLE	S96V000060	0	B	@AB-01	ALPHA01E	LIQUID	N/A	5.00E+02	0.0e+000	% Ct. Error
12	SAMPLE	S96V000060	0	B	@AB-01	BETA-01	LIQUID	N/A	3.02E-04	184.0e-006	uCi/mL
12	SAMPLE	S96V000060	0	B	@AB-01	BETA-01E	LIQUID	N/A	4.71E+01	0.0e+000	% Ct. Error
13	DUP	S96V000060	0	B	@AB-01	ALPHA01	LIQUID	<2.50E-5	<4.19E-5		RPD
13	DUP	S96V000060	0	B	@AB-01	ALPHA01E	LIQUID	1.00	5.00E+02	500.000	% Ct. Erro
13	DUP	S96V000060	0	B	@AB-01	BETA-01	LIQUID	3.02E-4	2.19E-4	31.862	RPD
13	DUP	S96V000060	0	B	@AB-01	BETA-01E	LIQUID	1.00	5.92E+01	59.200	% Ct. Erro
14	SPK	S96V000060	0	B	@AB-01	ALPHA01	LIQUID	3.59E-02	3.15E-02	87.744	% Recovery
14	SPK	S96V000060	0	B	@AB-01	BETA-01	LIQUID	1.52E-01	1.54E-01	101.316	% Recovery
15	SPK-DUP	S96V000060	0	B	@AB-01	ALPHA01	LIQUID	3.15E-02	3.28E-02	4.044	RPD
15	SPK-DUP	S96V000060	0	B	@AB-01	BETA-01	LIQUID	1.54E-01	1.48E-01	3.974	RPD

Final page for worklist# 14423

Analyst Signature **Date**

Analyst Signature **Date**

11/4/96

Reviewer Signature **Date**

The RPD for #60 7B is acceptable due to low sample beta activity.

11/4/96

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Data Entry Template for Worklist# 14423

Analyst: SMF **Instrument:** AB00 #16 **Book#** 66B56

Method: LA-508-101 Rev/Mod E-1

Worklist Comment: AP-105 AB'S DETERMINE SS USING LUDLUM. RCJ

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	STD				@AB-01	LIQUID		
2	BLNK-PREP				@AB-01	LIQUID		
3	BLNK/BKG				@AB-01	LIQUID		
4	SAMPLE	S96V000050	0	B	@AB-01	LIQUID	96000853	AP-105
	Analytes Requested:	ALPHA01 , ALPHA01E, BETA-01 , BETA-01E						
5	DUP	S96V000050	0	B	@AB-01	LIQUID		
6	SAMPLE	S96V000051	0	B	@AB-01	LIQUID	96000855	AP-105
	Analytes Requested:	ALPHA01 , ALPHA01E, BETA-01 , BETA-01E						
7	DUP	S96V000051	0	B	@AB-01	LIQUID		
8	SAMPLE	S96V000052	0	B	@AB-01	LIQUID	96000855	AP-105
	Analytes Requested:	ALPHA01 , ALPHA01E, BETA-01 , BETA-01E						
9	DUP	S96V000052	0	B	@AB-01	LIQUID		
10	SAMPLE	S96V000054	0	B	@AB-01	LIQUID	96000855	AP-105
	Analytes Requested:	ALPHA01 , ALPHA01E, BETA-01 , BETA-01E						
11	DUP	S96V000054	0	B	@AB-01	LIQUID		
12	SAMPLE	S96V000060	0	B	@AB-01	LIQUID	96000855	AP-105
	Analytes Requested:	ALPHA01 , ALPHA01E, BETA-01 , BETA-01E						
13	DUP	S96V000060	0	B	@AB-01	LIQUID		
14	SPK	S96V000060	0	B	@AB-01	LIQUID		
15	SPK-DUP	S96V000060	0	B	@AB-01	LIQUID		

Data Entry Comments: S96V000060 SPK + SPK DUP - run on S96V000060 SAM

SMF

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

LABCORE Data Entry Template for Worklist# 14423

S Type	Sample#	R	A	Test	Matrix	Group#	Project

Final page for worklist # 14423

Susie M. Sulton 10-30-96
Analyst Signature Date

David C Dunbar 10-31-96

C Raymond 11-2-96
Analyst Signature Date

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

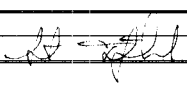
WORKBOOK PAGE: STD1

TB : LA-508-101 (E-1) LA-508-113 (A-2) STANDARD

			STANDARD	REPLICATE
	DETECTOR NUMBER		16	16
STD	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	85928	81493
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	15.3	15.3
TB	SAMPLE SIZE in mL	(SS)	1.000	1.000
	DILUTION FACTOR	(DF)	1	1
@AB-01	STANDARD BOOK NUMBER	(Std BN)	66B56	66B56
	EFFICIENCY FACTOR	(EFF)	0.4195	0.4195
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		2848.967	2701.133
	Standard Value in µCi/mL		2.97E-03	
96010977	Concentration in µCi/L	=	3.06E+00	
	Replicate Concentration in µCi/L	=	2.90E+00	
0	AVERAGE CONCENTRATION in µCi/L	=	2.9798E+00	

N/A	Rs (Sample Count Rate) = (TC / CT) - BKG
	TOTAL BETA µCi/L = Rs * 1000mL/L * DF / (EFF * SS * 2220000dpm/µCi)
WL14423	TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L
	Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100
WB27806	Detection Levels and Less Than Values are determined from Procedure LA-508-002.
VAR	

SLF	TOTAL BETA CONCENTRATION in µCi/mL	=	2.98E-03	DETECTION LEVEL
SMF				3.68E-06 µCi/mL
11/02/96	RELATIVE COUNTING ERROR	=	0.7%	
10/30/96				
01:00 PM				
AP-105				

Analyst:		VAR	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

STANDARD.WB1 Rev. 1.0 508101ML

WORKBOOK PAGE: STD2

AT : LA-508-101 (E-1) **LA-508-113 (A-2) STANDARD**

			STANDARD	REPLICATE
	DETECTOR NUMBER		16	16
STD	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	3489	3190
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	0.3	0.3
AT	SAMPLE SIZE in mL	(SS)	1.000	1.000
	DILUTION FACTOR	(DF)	1	1
@AB-01	STANDARD BOOK NUMBER	(Std BN)	66B56	66B56
	EFFICIENCY FACTOR	(EFF)	0.2104	0.2104
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		116.000	106.033
	Standard Value in µCi/mL		2.31E-04	
96010977	Concentration in µCi/L	=	2.48E-01	
	Replicate Concentration in µCi/L	=	2.27E-01	
0	AVERAGE CONCENTRATION in µCi/L	=	2.3768E-01	

N/A	Rs (Sample Count Rate) = (TC / CT) - BKG
	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF / (EFF * SS * 2220000dpm/µCi)
WL14423	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
	Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100
WB27806	Detection Levels and Less Than Values are determined from Procedure LA-508-002.
VAR	
SLF	ALPHA TOTAL CONCENTRATION in µCi/mL = 2.38E-04
SMF	
	RELATIVE COUNTING ERROR = 3.5%
11/02/96	
10/30/96	
01:00 PM	
AP-105	

DETECTION LEVEL
1.19E-06 µCi/mL

Analyst:		VAR	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

STANDARD.WB1 Rev. 1.0 508101ML

WORKBOOK PAGE: BLANK3

TB : LA-508-101 (E-1) LIQUIDS

			BLNK-PREP	REPLICATE
	DETECTOR NUMBER		16	16
BLNK-PREP	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	803	994
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	15.3	15.3
TB	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.4195	0.4195
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		11.467	17.833

96010977	Blank Concentration in µCi/L	1.24E+02
	Replicate Concentration in µCi/L	1.93E+02
0	Average Concentration in µCi/L	1.5888E+02

N/A

Rs (Sample Count Rate) = (TC / CT) - BKG

TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

WL14423 TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L

Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100

WB27806 Detection Levels and Less Than Values are determined from Procedure LA-508-002.

VAR

SLF	TOTAL BETA in µCi/mL (Average)	=	1.59E-01	DETECTION LEVEL
SMF				3.71E-02 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		20.2%	
10/30/96				
01:00 PM				
AP-105				

Analyst:		SMF	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

BLANK.WB1 Rev. 1.0 508101ML

WORKBOOK PAGE: BLANK4

AT : LA-508-101 (E-1) LIQUIDS

			BLNK-PREP	REPLICATE
	DETECTOR NUMBER		16	16
BLNK-PREP	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	15	5
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	0.3	0.3
AT	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.2104	0.2104
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		0.469	0.233

96010977	Blank Concentration in µCi/L	<	1.02E+01
	Replicate Concentration in µCi/L	<	5.05E+00
0	Maximum Concentration in µCi/L	<	1.0151E+01

N/A	Rs (Sample Count Rate) = (TC / CT) - BKG
	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
WL14423	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
	Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100
WB27806	Detection Levels and Less Than Values are determined from Procedure LA-508-002.
VAR	

SLF	ALPHA TOTAL in µCi/mL (Maximum)	=	< 1.02E-02	DETECTION LEVEL
SMF	LESS THAN Value was Determined from Rmax.			1.21E-02 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		500.0%	
10/30/96				
01:00 PM				
AP-105				

Analyst:		SMF	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

BLANK.WB1 Rev. 1.0 508101ML

WORKBOOK PAGE: SAM7

TB : LA-508-101 (E-1) LIQUIDS

			SAMPLE	REPLICATE
	DETECTOR NUMBER		16	16
SAMPLE	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	307698	293093
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	15.3	15.3
TB	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.4195	0.4195
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		10241.300	9754.467

96010977	Blank Concentration in µCi/L	1.11E+05
	Replicate Concentration in µCi/L	1.06E+05
0	Average Concentration in µCi/L	1.0843E+05

ACIDIG02

Rs (Sample Count Rate) = (TC / CT) - BKG

TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

S96V000050

TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L

Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100

WB27806

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

VAR

SLF	TOTAL BETA in µCi/mL (Average)	=	1.08E+02	DETECTION LEVEL
SMF				3.71E-02 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		0.4%	
10/30/96				
01:00 PM				
AP-105				

Analyst:		SMF	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: SAM8

AT : LA-508-101 (E-1) LIQUIDS

			SAMPLE	REPLICATE
	DETECTOR NUMBER		16	16
SAMPLE	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	15	4
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	0.3	0.3
AT	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.2104	0.2104
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		0.469	0.233

96010977	Blank Concentration in µCi/L	<	1.02E+01
	Replicate Concentration in µCi/L	<	5.05E+00
0	Maximum Concentration in µCi/L	<	1.0151E+01

ACIDIG02	Rs (Sample Count Rate) = (TC / CT) - BKG
	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
S96V000050	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
	Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100
WB27806	Detection Levels and Less Than Values are determined from Procedure LA-508-002.
VAR	

SLF	ALPHA TOTAL in µCi/mL (Maximum)	=	< 1.02E-02	DETECTION LEVEL
SMF	LESS THAN Value was Determined from Rmax.			1.21E-02 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		500.0%	

10/30/96
01:00 PM
AP-105

Analyst:		SMF	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: DUP9

TB : LA-508-101 (E-1) LIQUIDS

			DUP	REPLICATE
	DETECTOR NUMBER		16	16
DUP	DISH SIZE (1, 2, or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	294803	304981
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	15.3	15.3
TB	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.4195	0.4195
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		9811.467	10150.733

96010977	Blank Concentration in µCi/L	1.06E+05
	Replicate Concentration in µCi/L	1.10E+05
0	Average Concentration in µCi/L	1.0825E+05

ACIDIG02

Rs (Sample Count Rate) = (TC / CT) - BKG

TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

S96V000050

TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L

Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100

WB27806

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

VAR

SLF	TOTAL BETA in µCi/mL (Average)	=	1.08E+02	DETECTION LEVEL
SMF				3.71E-02 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		0.4%	
10/30/96				
01:00 PM				
AP-105				

Analyst:	SMF	Date: 02-Nov-96	
Signature of Chemist:	SLF	Date: 11/4/96	

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: DUP10

AT : LA-508-101 (E-1) LIQUIDS

			DUP	REPLICATE
	DETECTOR NUMBER		16	16
DUP	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	11	8
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	0.3	0.3
AT	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.2104	0.2104
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		0.313	0.233

96010977	Blank Concentration in µCi/L	<	6.76E+00
	Replicate Concentration in µCi/L	<	5.05E+00
0	Maximum Concentration in µCi/L	<	6.7602E+00

ACIDIG02	Rs (Sample Count Rate) = (TC / CT) - BKG
	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
S96V000050	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
	Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100
WB27806	Detection Levels and Less Than Values are determined from Procedure LA-508-002.
VAR	

SLF	ALPHA TOTAL in µCi/mL (Maximum)	=	< 6.76E-03	DETECTION LEVEL
SMF	LESS THAN Value was Determined from Rmax.			1.21E-02 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		500.0%	
10/30/96				
01:00 PM				
AP-105				

Analyst:	SMF	Date:	02-Nov-96
Signature of Chemist:	SLF	Date:	11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: SAM11

TB : LA-508-101 (E-1) LIQUIDS

			SAMPLE	REPLICATE
	DETECTOR NUMBER		16	16
SAMPLE	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	315357	305833
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	15.3	15.3
TB	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.4195	0.4195
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		10496.600	10179.133

96010977	Blank Concentration in µCi/L	1.14E+05
	Replicate Concentration in µCi/L	1.10E+05
0	Average Concentration in µCi/L	1.1212E+05

ACIDIG02

Rs (Sample Count Rate) = (TC / CT) - BKG

TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

S96V000051

TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L

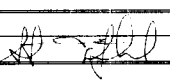
Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100

WB27806

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

VAR

SLF	TOTAL BETA in µCi/mL (Average)	=	1.12E+02	DETECTION LEVEL
SMF				3.71E-02 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		0.4%	
10/30/96				
01:00 PM				
AP-105				

Analyst:		SMF	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: SAM12

AT : LA-508-101 (E-1) LIQUIDS

			SAMPLE	REPLICATE
	DETECTOR NUMBER		16	16
SAMPLE	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	7	15
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	0.3	0.3
AT	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.2104	0.2104
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		0.233	0.469

96010977	Blank Concentration in µCi/L	<	5.05E+00
	Replicate Concentration in µCi/L	<	1.02E+01
0	Maximum Concentration in µCi/L	<	1.0151E+01

ACIDIG02

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

S96V000051

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100

WB27806

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

VAR

SLF	ALPHA TOTAL in µCi/mL (Maximum)	=	< 1.02E-02	DETECTION LEVEL
SMF	LESS Than Value was Determined from Lc.			1.21E-02 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		500.0%	

10/30/96

01:00 PM

AP-105

Analyst:		SMF	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: DUP13

TB : LA-508-101 (E-1) LIQUIDS

			DUP	REPLICATE
	DETECTOR NUMBER		16	16
DUP	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	293155	296080
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	15.3	15.3
TB	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.4195	0.4195
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		9756.533	9854.033

96010977	Blank Concentration in µCi/L	1.06E+05
	Replicate Concentration in µCi/L	1.07E+05
0	Average Concentration in µCi/L	1.0634E+05

ACIDIG02

Rs (Sample Count Rate) = (TC / CT) - BKG

S96V000051

TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L

WB27806

Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

VAR

SLF	TOTAL BETA in µCi/mL (Average)	=	1.06E+02	DETECTION LEVEL
SMF				
11/02/96	RELATIVE COUNTING ERROR		0.4%	3.71E-02 µCi/mL
10/30/96				
01:00 PM				
AP-105				

Analyst:		SMF	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: DUP14

AT : LA-508-101 (E-1) LIQUIDS

			DUP	REPLICATE
	DETECTOR NUMBER		16	16
DUP	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	7	5
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	0.3	0.3
AT	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.2104	0.2104
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		0.233	0.233

96010977	Blank Concentration in µCi/L	<	5.05E+00
	Replicate Concentration in µCi/L	<	5.05E+00
0	Maximum Concentration in µCi/L	<	5.0457E+00

ACIDIG02	Rs (Sample Count Rate) = (TC / CT) - BKG
	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
S96V000051	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
	Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100
WB27806	Detection Levels and Less Than Values are determined from Procedure LA-508-002.
VAR	

SLF	ALPHA TOTAL in µCi/mL (Maximum)	=	< 5.05E-03	DETECTION LEVEL
SMF	LESS Than Value was Determined from Lc.			
11/02/96	RELATIVE COUNTING ERROR		500.0%	1.21E-02 µCi/mL
10/30/96				
01:00 PM				
AP-105				

Analyst:	SMF	Date: 02-Nov-96	
Signature of Chemist:	SLF	Date: 11/4/96	

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: SAM15

TB : LA-508-101 (E-1) LIQUIDS

			SAMPLE	REPLICATE
	DETECTOR NUMBER		16	16
SAMPLE	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	295279	295571
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	15.3	15.3
TB	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.4195	0.4195
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		9827.333	9837.067

96010977	Blank Concentration in µCi/L	1.07E+05
	Replicate Concentration in µCi/L	1.07E+05
0	Average Concentration in µCi/L	1.0663E+05

ACIDIG02

Rs (Sample Count Rate) = (TC / CT) - BKG

TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

S96V000052

TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L

Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100

WB27806

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

VAR

SLF	TOTAL BETA in µCi/mL (Average)	=	1.07E+02	DETECTION LEVEL
SMF				3.71E-02 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		0.4%	
10/30/96				
01:00 PM				
AP-105				

Analyst:	SMF		Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: SAM16

AT : LA-508-101 (E-1) LIQUIDS

			SAMPLE	REPLICATE
	DETECTOR NUMBER		16	16
SAMPLE	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	6	7
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	0.3	0.3
AT	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.2104	0.2104
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		0.233	0.233

96010977	Blank Concentration in µCi/L	<	5.05E+00
	Replicate Concentration in µCi/L	<	5.05E+00
0	Maximum Concentration in µCi/L	<	5.0457E+00

ACIDIG02

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

S96V000052

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100

WB27806

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

VAR

SLF	ALPHA TOTAL in µCi/mL (Maximum)	=	< 5.05E-03	DETECTION LEVEL
SMF	LESS Than Value was Determined from Lc.			1.21E-02 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		500.0%	

10/30/96

01:00 PM

AP-105

Analyst:		SMF	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: DUP17

TB : LA-508-101 (E-1) LIQUIDS

			DUP	REPLICATE
	DETECTOR NUMBER		16	16
DUP	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	299075	299391
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	15.3	15.3
TB	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.4195	0.4195
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		9953.867	9964.400

96010977	Blank Concentration in µCi/L	1.08E+05
	Replicate Concentration in µCi/L	1.08E+05
0	Average Concentration in µCi/L	1.0801E+05

ACIDIG02

Rs (Sample Count Rate) = (TC / CT) - BKG

TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

S96V000052

TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L

Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100

WB27806

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

VAR

SLF	TOTAL BETA in µCi/mL (Average)	=	1.08E+02	DETECTION LEVEL
SMF				
11/02/96	RELATIVE COUNTING ERROR		0.4%	3.71E-02 µCi/mL
10/30/96				
01:00 PM				
AP-105				

Analyst:	SMF	Date: 02-Nov-96	
Signature of Chemist:	SLF	Date: 11/4/96	

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: DUP18

AT : LA-508-101 (E-1) LIQUIDS

			DUP	REPLICATE
	DETECTOR NUMBER		16	16
DUP	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	6	8
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	0.3	0.3
AT	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.2104	0.2104
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		0.233	0.233

96010977	Blank Concentration in µCi/L	<	5.05E+00
	Replicate Concentration in µCi/L	<	5.05E+00
0	Maximum Concentration in µCi/L	<	5.0457E+00

ACIDIG02	Rs (Sample Count Rate) = (TC / CT) - BKG
	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
S96V000052	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
	Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100
WB27806	Detection Levels and Less Than Values are determined from Procedure LA-508-002.
VAR	

SLF	ALPHA TOTAL in µCi/mL (Maximum)	=	< 5.05E-03	DETECTION LEVEL
SMF	LESS Than Value was Determined from Lc.			1.21E-02 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		500.0%	
10/30/96				
01:00 PM				
AP-105				

Analyst:		SMF	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: SAM19

TB : LA-508-101 (E-1) LIQUIDS

			SAMPLE	REPLICATE
	DETECTOR NUMBER		16	16
SAMPLE	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	305892	310599
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	15.3	15.3
TB	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.4195	0.4195
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		10181.100	10338.000

96010977	Blank Concentration in µCi/L	1.10E+05
	Replicate Concentration in µCi/L	1.12E+05
0	Average Concentration in µCi/L	1.1127E+05

ACIDIG02

Rs (Sample Count Rate) = (TC / CT) - BKG

S96V000054

TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L

WB27806

Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

VAR

SLF	TOTAL BETA in µCi/mL (Average)	=	1.11E+02	DETECTION LEVEL
SMF				3.71E-02 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		0.4%	
10/30/96				
01:00 PM				
AP-105				

Analyst:		SMF	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: SAM20

AT : LA-508-101 (E-1) LIQUIDS

			SAMPLE	REPLICATE
	DETECTOR NUMBER		16	16
SAMPLE	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	4	3
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	0.3	0.3
AT	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.2104	0.2104
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		0.233	0.233

96010977	Blank Concentration in µCi/L	<	5.05E+00
	Replicate Concentration in µCi/L	<	5.05E+00
0	Maximum Concentration in µCi/L	<	5.0457E+00

ACIDIG02	Rs (Sample Count Rate) = (TC / CT) - BKG
	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
S96V000054	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
	Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100
WB27806	Detection Levels and Less Than Values are determined from Procedure LA-508-002.
VAR	
SLF	ALPHA TOTAL in µCi/mL (Maximum) = < 5.05E-03
SMF	LESS Than Value was Determined from Lc.
11/02/96	RELATIVE COUNTING ERROR 500.0%
10/30/96	
01:00 PM	
AP-105	

DETECTION LEVEL
1.21E-02 µCi/mL

Analyst:	SMF		Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: DUP21

TB : LA-508-101 (E-1) LIQUIDS

			DUP	REPLICATE
	DETECTOR NUMBER		16	16
DUP	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	304158	303952
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	15.3	15.3
TB	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.4195	0.4195
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		10123.300	10116.433

96010977	Blank Concentration in µCi/L	1.10E+05
	Replicate Concentration in µCi/L	1.10E+05
0	Average Concentration in µCi/L	1.0975E+05

ACIDIG02

Rs (Sample Count Rate) = (TC / CT) - BKG

S96V000054

TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L

Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100

WB27806

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

VAR

SLF	TOTAL BETA in µCi/mL (Average)	=	1.10E+02	DETECTION LEVEL
SMF				3.71E-02 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		0.4%	
10/30/96				
01:00 PM				
AP-105				

Analyst:		SMF	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: DUP22

AT : LA-508-101 (E-1) LIQUIDS

			DUP	REPLICATE
	DETECTOR NUMBER		16	16
DUP	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	3	9
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	0.3	0.3
AT	SAMPLE SIZE in mL	(SS)	0.500	0.500
	DILUTION FACTOR	(DF)	101	101
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.2104	0.2104
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		0.233	0.233

96010977	Blank Concentration in µCi/L	<	5.05E+00
	Replicate Concentration in µCi/L	<	5.05E+00
0	Maximum Concentration in µCi/L	<	5.0457E+00

ACIDIG02

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

S96V000054

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100

WB27806

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

VAR

SLF	ALPHA TOTAL in µCi/mL (Maximum)	=	< 5.05E-03	DETECTION LEVEL
SMF	LESS Than Value was Determined from Lc.			1.21E-02 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		500.0%	

10/30/96

01:00 PM

AP-105

Analyst:		SMF	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: SAM23

TB : LA-508-101 (E-1) LIQUIDS

			SAMPLE	REPLICATE
	DETECTOR NUMBER		16	16
SAMPLE	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	661	594
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	15.3	15.3
TB	SAMPLE SIZE in mL	(SS)	1.000	1.000
	DILUTION FACTOR	(DF)	1	1
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.4195	0.4195
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		6.733	4.500

96010977	Blank Concentration in µCi/L	3.62E-01
	Replicate Concentration in µCi/L	2.42E-01
0	Average Concentration in µCi/L	3.0155E-01

ACIDIG02	Rs (Sample Count Rate) = (TC / CT) - BKG
	TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
S96V000060	TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L
	Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100
WB27806	Detection Levels and Less Than Values are determined from Procedure LA-508-002.
VAR	

SLF	TOTAL BETA in µCi/mL (Average)	=	3.02E-04	DETECTION LEVEL
SMF				1.84E-04 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		47.1%	
10/30/96				
01:00 PM				
AP-105				

Analyst:		SMF	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: SAM24

AT : LA-508-101 (E-1) LIQUIDS

			SAMPLE	REPLICATE
	DETECTOR NUMBER		16	16
SAMPLE	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	8	8
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	0.3	0.3
AT	SAMPLE SIZE in mL	(SS)	1.000	1.000
	DILUTION FACTOR	(DF)	1	1
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.2104	0.2104
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		0.233	0.233

96010977	Blank Concentration in µCi/L	<	2.50E-02
	Replicate Concentration in µCi/L	<	2.50E-02
0	Maximum Concentration in µCi/L	<	2.4979E-02

ACIDIG02

Rs (Sample Count Rate) = (TC / CT) - BKG

ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)

S96V000060

ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L

Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100

WB27806

Detection Levels and Less Than Values are determined from Procedure LA-508-002.

VAR

SLF	ALPHA TOTAL in µCi/mL (Maximum)	=	< 2.50E-05	DETECTION LEVEL
SMF	LESS Than Value was Determined from Lc.			5.97E-05 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		500.0%	

10/30/96

01:00 PM

AP-105

Analyst:		SMF	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: DUP25

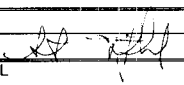
TB : LA-508-101 (E-1) LIQUIDS

			DUP	REPLICATE
	DETECTOR NUMBER		16	16
DUP	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	598	565
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	15.3	15.3
TB	SAMPLE SIZE in mL	(SS)	1.000	1.000
	DILUTION FACTOR	(DF)	1	1
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.4195	0.4195
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		4.633	3.533

96010977	Blank Concentration in µCi/L	2.49E-01
	Replicate Concentration in µCi/L	1.90E-01
0	Average Concentration in µCi/L	2.1923E-01

ACIDIG02	Rs (Sample Count Rate) = (TC / CT) - BKG
	TOTAL BETA µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
S96V000060	TOTAL BETA µCi/mL = TOTAL BETA µCi/L / 1000mL/L
	Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100
WB27806	Detection Levels and Less Than Values are determined from Procedure LA-508-002.
VAR	

SLF	TOTAL BETA in µCi/mL (Average)	=	2.19E-04	DETECTION LEVEL
SMF				1.84E-04 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		59.2%	
10/30/96				
01:00 PM				
AP-105				

Analyst:		SMF	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: DUP26

AT : LA-508-101 (E-1) LIQUIDS

			DUP	REPLICATE
	DETECTOR NUMBER		16	16
DUP	DISH SIZE (1 , 2 , or 5)	(MS)	2	2
	GROSS COUNTS	(GC)	13	9
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	0.3	0.3
AT	SAMPLE SIZE in mL	(SS)	1.000	1.000
	DILUTION FACTOR	(DF)	1	1
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	EFFICIENCY FACTOR	(EFF)	0.2104	0.2104
LIQUID	Lc, Rmax, or Rs,(SAMPLE RATE) as APPROPRIATE		0.391	0.233

96010977	Blank Concentration in µCi/L	<	4.19E-02
	Replicate Concentration in µCi/L	<	2.50E-02
0	Maximum Concentration in µCi/L	<	4.1888E-02

ACIDIG02	Rs (Sample Count Rate) = (TC / CT) - BKG
	ALPHA TOTAL µCi/L = Rs * 1000mL/L * DF * DDF / (EFF * SS * 2220000dpm/µCi)
S96V000060	ALPHA TOTAL µCi/mL = ALPHA TOTAL µCi/L / 1000mL/L
	Relative Counting Error = [|(The Square Root of TC + BKG * CT) / (TC - BKG * CT)|] * 1.96 * 100
WB27806	Detection Levels and Less Than Values are determined from Procedure LA-508-002.
VAR	

SLF	ALPHA TOTAL in µCi/mL (Maximum)	=	< 4.19E-05	DETECTION LEVEL
SMF	LESS THAN Value was Determined from Rmax.			5.97E-05 µCi/mL
11/02/96	RELATIVE COUNTING ERROR		500.0%	
10/30/96				
01:00 PM				
AP-105				

Analyst:	SMF		Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SAMPLE.WB1 Rev. 1. 508101ML

WORKBOOK PAGE: SPK27

TB : LA-508-101 (E-1) LA-508-113 (A-2) SPIKED SAMPLE

			SPIKE	REPLICATE
	DETECTOR NUMBER		16	16
SPK	DISH SIZE 1 , 2 , or 5	(MS)	2	2
Worklist	TOTAL COUNTS	(TC)	406721	453203
14423	COUNT TIME in MINUTES	(CT)	30	30
Vial	BACKGROUND in cpm	(BKG)	15.3	15.3
TB	SAMPLE VOLUME in mL (Spiked Vial)	(SS)	1.000	1.000
	SAMPLE DILUTION FACTOR (Spiked Vial)	(DF)	1	1
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	SPIKE VOLUME in mL	(SVol)	0.100	0.100
LIQUID	SPIKE DILUTION FACTOR	(SDF)	1	1
Spk Book	SPIKE BOOK NUMBER	(Spk BN)	58B56	58B56
96010977	SPIKE VALUE in µCi/mL	(SVal)	1.5160E-01	1.5160E-01
Eff	INSTRUMENT EFFICIENCY FACTOR	(EFF)	0.4195	0.4195
0	SAMPLE + SPIKE µCi/mL	(S+S)	7.27E-01	8.10E-01
Sample Prep	AVERAGE or MAXIMUM µCi/mL in SAMPLE		3.0155E-04	
ACIDIG02				
Sample				
S96V000060	Rs (Sample Count Rate) = (TC / CT) - BKG			
Calculation Code	SAMPLE + SPIKE µCi/mL = Rs * DF * DDF / (EFF * SS * 2220000dpm/µCi)			
WB27806	QC ACTUAL = SVal			
Calculation	QC FOUND = (((S+S µCi/mL - SAMPLE µCi/mL) * ((SDF/SVol)/(DF*DDF/SS))))			
VAR	PERCENT SPIKE RECOVERY = (QC FOUND / QC ACTUAL) *100			
Analyst				
SLF				
Chemist				
SMF				
Date Counted				
11/02/96				
Date Spiked				
10/30/96	QC ACTUAL	=	1.52E-01	
Time Counted	QC FOUND	=	1.54E-01	
01:00 PM	AVG. PERCENT SPIKE RECOVERY	=	101.4%	
Time Spiked				
AP-105				

Analyst:		VAR	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SPIKE.WB1 Rev. 1.0 508101ML

WORKBOOK PAGE: SPK28

	AT : LA-508-101 (E-1) LA-508-113 (A-2) SPIKED SAMPLE			SPIKE	REPLICATE
	DETECTOR NUMBER			16	16
SPK	DISH SIZE 1 , 2 , or 5		(MS)	2	2
	TOTAL COUNTS		(TC)	45394	42775
14423	COUNT TIME in MINUTES		(CT)	30	30
	BACKGROUND in cpm		(BKG)	0.3	0.3
AT	SAMPLE VOLUME in mL	(Spiked Vial)	(SS)	1.000	1.000
	SAMPLE DILUTION FACTOR	(Spiked Vial)	(DF)	1	1
@AB-01	DIGEST DILUTION FACTOR		(DDF)	50	50
	SPIKE VOLUME in mL		(SVol)	0.100	0.100
LIQUID	SPIKE DILUTION FACTOR		(SDF)	1	1
	SPIKE BOOK NUMBER		(Spk BN)	123B43	123B43
96010977	SPIKE VALUE in µCi/mL		(SVal)	3.5865E-02	3.5865E-02
	INSTRUMENT EFFICIENCY FACTOR		(EFF)	0.2104	0.2104
0	SAMPLE + SPIKE µCi/mL		(S+S)	1.62E-01	1.53E-01
	AVERAGE or MAXIMUM µCi/mL in SAMPLE		<	2.4979E-05	

ACIDIG02

S96V000060

WB27806

VAR

SLF

SMF

11/02/96

10/30/96

01:00 PM

AP-105

Rs (Sample Count Rate) = (TC / CT) - BKG

SAMPLE + SPIKE µCi/mL = Rs * DF * DDF / (EFF * SS * 2220000dpm/µCi)

QC ACTUAL = SVal

QC FOUND = (((S+S µCi/mL - SAMPLE µCi/mL) * ((SDF/SVol)/(DF*DDF/SS))))

PERCENT SPIKE RECOVERY = (QC FOUND / QC ACTUAL) *100

NOTE: Original Sample result was a LESS THAN value. Zero (0) was subtracted from the spiked value for QC found calculation.

QC ACTUAL	=	3.59E-02
QC FOUND	=	3.15E-02
AVG. PERCENT SPIKE RECOVERY	=	87.7%

Analyst:	VAR		Date: 02-Nov-96
Signature of Chemist:	SLF		Date:

SPIKE.WB1 Rev. 1.0 508101ML

TB : LA-508-101 (E-1) LA-508-113 (A-2) SPIKED SAMPLE

			SPIKE	REPLICATE
	DETECTOR NUMBER		16	16
SPIKE-DUPLICATE	DISH SIZE 1 , 2 , or 5	(MS)	2	2
	TOTAL COUNTS	(TC)	408219	417817
WL14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	15.3	15.3
TB	SAMPLE VOLUME in mL (Spiked Vial)	(SS)	1.000	1.000
	SAMPLE DILUTION FACTOR (Spiked Vial)	(DF)	1	1
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	SPIKE VOLUME in mL	(SVol)	0.100	0.100
LIQUID	SPIKE DILUTION FACTOR	(SDF)	1	1
	SPIKE BOOK NUMBER	(Spk BN)	58B56	58B56
96010977	SPIKE VALUE in µCi/mL	(SVal)	1.5160E-01	1.5160E-01
	INSTRUMENT EFFICIENCY FACTOR	(EFF)	0.4195	0.4195
0	SAMPLE + SPIKE µCi/mL	(S+S)	7.30E-01	7.47E-01
Sample	AVERAGE or MAXIMUM µCi/mL in SAMPLE		3.0155E-04	

ACIDIG02

S96V000060

Rs (Sample Count Rate) = (TC / CT) - BKG

SAMPLE + SPIKE µCi/mL = Rs * DF * DDF / (EFF * SS * 2220000dpm/µCi)

WB27806

QC ACTUAL = SVal

QC FOUND = (((S+S µCi/mL - SAMPLE µCi/mL) * ((SDF/SVol)/(DF*DDF/SS))))

VAR

PERCENT SPIKE RECOVERY = (QC FOUND / QC ACTUAL) *100

SLF

SMF

11/02/96

10/30/96	QC ACTUAL	=	1.52E-01
	QC FOUND	=	1.48E-01
01:00 PM	AVG. PERCENT SPIKE RECOVERY	=	97.4%

AP-105

Analyst:		VAR	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SPIKE.WB1 Rev. 1.0 508101ML

AT : LA-508-101 (E-1) LA-508-113 (A-2) SPIKED SAMPLE

			SPIKE	REPLICATE
	DETECTOR NUMBER		16	16
SPIKE DUPLICATE	DISH SIZE 1 , 2 , or 5	(MS)	2	2
	TOTAL COUNTS	(TC)	45000	47071
14423	COUNT TIME in MINUTES	(CT)	30	30
	BACKGROUND in cpm	(BKG)	0.3	0.3
AT	SAMPLE VOLUME in mL (Spiked Vial)	(SS)	1.000	1.000
	SAMPLE DILUTION FACTOR (Spiked Vial)	(DF)	1	1
@AB-01	DIGEST DILUTION FACTOR	(DDF)	50	50
	SPIKE VOLUME in mL	(SVol)	0.100	0.100
LIQUID	SPIKE DILUTION FACTOR	(SDF)	1	1
	SPIKE BOOK NUMBER	(Spk BN)	123B43	123B43
96010977	SPIKE VALUE in µCi/mL	(SVal)	3.5865E-02	3.5865E-02
	INSTRUMENT EFFICIENCY FACTOR	(EFF)	0.2104	0.2104
0	SAMPLE + SPIKE µCi/mL	(S+S)	1.61E-01	1.68E-01
	AVERAGE or MAXIMUM µCi/mL in SAMPLE	<	2.4979E-05	

ACIDIG02

S96V000060

Rs (Sample Count Rate) = (TC / CT) - BKG

SAMPLE + SPIKE µCi/mL = Rs * DF * DDF / (EFF * SS * 2220000dpm/µCi)

WB27806

QC ACTUAL = SVal

QC FOUND = (((S+S µCi/mL - SAMPLE µCi/mL) * ((SDF/SVol)/(DF*DDF/SS))))

VAR

PERCENT SPIKE RECOVERY = (QC FOUND / QC ACTUAL) *100

SLF

SMF

NOTE: **Original Sample result was a LESS THAN value. Zero (0) was subtracted from the spiked value for QC found calculation.**

11/02/96

10/30/96	QC ACTUAL	=	3.59E-02
	QC FOUND	=	3.28E-02
01:00 PM	AVG. PERCENT SPIKE RECOVERY	=	91.6%

AP-105

Analyst:		VAR	Date: 02-Nov-96
Signature of Chemist:		SLF	Date: 11/4/96

SPIKE.WB1 Rev. 1.0 508101ML

LABCORE Completed RadChem Report for Worklist#: 14453

Analyst: scl **Instrument:** GEA02 **Book#** _____

Method: _____ Rev/Mod _____

Worklist Comment: AP-105 GEA RCJ

Seq	Type	Sample#	R	A	Test	Matrix	Actual		Found	DL or Yield	Unit
1	STD			0	@GEA-03 CO60-02	LIQUID	7.882e-03		7.82e-03	99.213	% Recovery
1	STD			0	@GEA-03 CO60-02E	LIQUID	1		2.56	2.560	% Ct Error
1	STD			0	@GEA-03 CS13702	LIQUID	7.705e-03		7.42e-03	96.301	% Recovery
1	STD			0	@GEA-03 CS13702E	LIQUID	1		3.48	3.480	% Ct Error
2	BLNK-PREP			0	@GEA-03 CO60-02	LIQUID	1		<1.14e-4		uCi/mL
2	BLNK-PREP			0	@GEA-03 NB94-02	LIQUID	1		<1.03e-4		uCi/mL
2	BLNK-PREP			0	@GEA-03 RU10602	LIQUID	1		<2.17e-3		uCi/mL
2	BLNK-PREP			0	@GEA-03 CS13402	LIQUID	1		<1.01e-4		uCi/mL
2	BLNK-PREP			0	@GEA-03 CS13702	LIQUID	1		<2.91e-4		uCi/mL
2	BLNK-PREP			0	@GEA-03 CE14402	LIQUID	1		<1.22e-3		uCi/mL
2	BLNK-PREP			0	@GEA-03 EU15402	LIQUID	1		<3.45e-4		uCi/mL
2	BLNK-PREP			0	@GEA-03 EU15502	LIQUID	1		<3.02e-4		uCi/mL
2	BLNK-PREP			0	@GEA-03 RA22602	LIQUID	1		<2.08e-3		uCi/mL
3	SAMPLE	S96V000050	0	B	@GEA-03 CO60-02	LIQUID	N/A	<	6.071e-03	607.1e-005	uCi/mL
3	SAMPLE	S96V000050	0	B	@GEA-03 CO60-02E	LIQUID	N/A		n/a	0.0e+000	% Ct. Error
3	SAMPLE	S96V000050	0	B	@GEA-03 NB94-02	LIQUID	N/A	<	1.338e-02	133.8e-004	uCi/mL
3	SAMPLE	S96V000050	0	B	@GEA-03 NB94-02E	LIQUID	N/A		n/a	0.0e+000	% Ct. Error
3	SAMPLE	S96V000050	0	B	@GEA-03 RU10602	LIQUID	N/A	<	1.100e+00	110.0e-002	uCi/mL
3	SAMPLE	S96V000050	0	B	@GEA-03 RU10602E	LIQUID	N/A		n/a	0.0e+000	% Ct. Error
3	SAMPLE	S96V000050	0	B	@GEA-03 CS13402	LIQUID	N/A	<	5.501e-02	550.1e-004	uCi/mL
3	SAMPLE	S96V000050	0	B	@GEA-03 CS13402E	LIQUID	N/A		n/a	0.0e+000	% Ct. Error
3	SAMPLE	S96V000050	0	B	@GEA-03 CS13702	LIQUID	N/A		1.105e+02	0.0e+000	uCi/mL
3	SAMPLE	S96V000050	0	B	@GEA-03 CS13702E	LIQUID	N/A		0.330	0.0e+000	% Ct. Error
3	SAMPLE	S96V000050	0	B	@GEA-03 CE14402	LIQUID	N/A	<	7.198e-01	719.8e-003	uCi/mL
3	SAMPLE	S96V000050	0	B	@GEA-03 CE14402E	LIQUID	N/A		n/a	0.0e+000	% Ct. Error
3	SAMPLE	S96V000050	0	B	@GEA-03 EU15402	LIQUID	N/A	<	2.356e-02	235.6e-004	uCi/mL
3	SAMPLE	S96V000050	0	B	@GEA-03 EU15402E	LIQUID	N/A		n/a	0.0e+000	% Ct. Error
3	SAMPLE	S96V000050	0	B	@GEA-03 EU15502	LIQUID	N/A	<	2.024e-01	202.4e-003	uCi/mL
3	SAMPLE	S96V000050	0	B	@GEA-03 EU15502E	LIQUID	N/A		n/a	0.0e+000	% Ct. Error
3	SAMPLE	S96V000050	0	B	@GEA-03 RA22602	LIQUID	N/A	<	1.427e+00	142.7e-002	uCi/mL
3	SAMPLE	S96V000050	0	B	@GEA-03 RA22602E	LIQUID	N/A		n/a	0.0e+000	% Ct. Error
4	DUP	S96V000050	0	B	@GEA-03 CO60-02	LIQUID	<6.07e-3		<7.31e-3		RPD
4	DUP	S96V000050	0	B	@GEA-03 CO60-02E	LIQUID	1		n/a		% Ct Error
4	DUP	S96V000050	0	B	@GEA-03 NB94-02	LIQUID	<1.34e-2		<1.34e-2		RPD
4	DUP	S96V000050	0	B	@GEA-03 NB94-02E	LIQUID	1		n/a		% Ct Error
4	DUP	S96V000050	0	B	@GEA-03 RU10602	LIQUID	<1.10e0		<1.11e0		RPD
4	DUP	S96V000050	0	B	@GEA-03 RU10602E	LIQUID	1		n/a		% Ct Error
4	DUP	S96V000050	0	B	@GEA-03 CS13402	LIQUID	<5.50e-2		<5.46e-2		RPD
4	DUP	S96V000050	0	B	@GEA-03 CS13402E	LIQUID	1		n/a		% Ct Error
4	DUP	S96V000050	0	B	@GEA-03 CS13702	LIQUID	1.10e+02		1.12e+02	1.802	RPD
4	DUP	S96V000050	0	B	@GEA-03 CS13702E	LIQUID	1		0.320	0.320	% Ct Error

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Completed RadChem Report for Worklist#: 14453

Seq Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
4 DUP	S96V000050	0	B	@GEA-03	CE14402	LIQUID	<7.20e-1	<7.27e-1	RPD
4 DUP	S96V000050	0	B	@GEA-03	CE14402E	LIQUID	1	n/a	% Ct Error
4 DUP	S96V000050	0	B	@GEA-03	EU15402	LIQUID	<2.36e-2	<2.82e-2	RPD
4 DUP	S96V000050	0	B	@GEA-03	EU15402E	LIQUID	1	n/a	% Ct Error
4 DUP	S96V000050	0	B	@GEA-03	EU15502	LIQUID	<2.02e-1	<2.04e-1	RPD
4 DUP	S96V000050	0	B	@GEA-03	EU15502E	LIQUID	1	n/a	% Ct Error
4 DUP	S96V000050	0	B	@GEA-03	RA22602	LIQUID	<1.43e0	<1.43e0	RPD
4 DUP	S96V000050	0	B	@GEA-03	RA22602E	LIQUID	1	n/a	% Ct Error
5 SAMPLE	S96V000051	0	B	@GEA-03	CO60-02	LIQUID	N/A <	7.572e-03	757.2e-005	uCi/mL
5 SAMPLE	S96V000051	0	B	@GEA-03	CO60-02E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
5 SAMPLE	S96V000051	0	B	@GEA-03	NB94-02	LIQUID	N/A <	1.410e-02	141.0e-004	uCi/mL
5 SAMPLE	S96V000051	0	B	@GEA-03	NB94-02E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
5 SAMPLE	S96V000051	0	B	@GEA-03	RU10602	LIQUID	N/A <	1.126e+00	112.6e-002	uCi/mL
5 SAMPLE	S96V000051	0	B	@GEA-03	RU10602E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
5 SAMPLE	S96V000051	0	B	@GEA-03	CS13402	LIQUID	N/A <	5.593e-02	559.3e-004	uCi/mL
5 SAMPLE	S96V000051	0	B	@GEA-03	CS13402E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
5 SAMPLE	S96V000051	0	B	@GEA-03	CS13702	LIQUID	N/A	1.145e+02	0.0e+000	uCi/mL
5 SAMPLE	S96V000051	0	B	@GEA-03	CS13702E	LIQUID	N/A	0.320	0.0e+000	% Ct. Error
5 SAMPLE	S96V000051	0	B	@GEA-03	CE14402	LIQUID	N/A <	7.305e-01	730.5e-003	uCi/mL
5 SAMPLE	S96V000051	0	B	@GEA-03	CE14402E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
5 SAMPLE	S96V000051	0	B	@GEA-03	EU15402	LIQUID	N/A <	2.411e-02	241.1e-004	uCi/mL
5 SAMPLE	S96V000051	0	B	@GEA-03	EU15402E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
5 SAMPLE	S96V000051	0	B	@GEA-03	EU15502	LIQUID	N/A <	2.050e-01	205.0e-003	uCi/mL
5 SAMPLE	S96V000051	0	B	@GEA-03	EU15502E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
5 SAMPLE	S96V000051	0	B	@GEA-03	RA22602	LIQUID	N/A <	1.449e+00	144.9e-002	uCi/mL
5 SAMPLE	S96V000051	0	B	@GEA-03	RA22602E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
6 SAMPLE	S96V000052	0	B	@GEA-03	CO60-02	LIQUID	N/A <	6.711e-03	671.1e-005	uCi/mL
6 SAMPLE	S96V000052	0	B	@GEA-03	CO60-02E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
6 SAMPLE	S96V000052	0	B	@GEA-03	NB94-02	LIQUID	N/A <	1.371e-02	137.1e-004	uCi/mL
6 SAMPLE	S96V000052	0	B	@GEA-03	NB94-02E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
6 SAMPLE	S96V000052	0	B	@GEA-03	RU10602	LIQUID	N/A <	1.112e+00	111.2e-002	uCi/mL
6 SAMPLE	S96V000052	0	B	@GEA-03	RU10602E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
6 SAMPLE	S96V000052	0	B	@GEA-03	CS13402	LIQUID	N/A <	5.546e-02	554.6e-004	uCi/mL
6 SAMPLE	S96V000052	0	B	@GEA-03	CS13402E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
6 SAMPLE	S96V000052	0	B	@GEA-03	CS13702	LIQUID	N/A	1.120e+02	0.0e+000	uCi/mL
6 SAMPLE	S96V000052	0	B	@GEA-03	CS13702E	LIQUID	N/A	0.320	0.0e+000	% Ct. Error
6 SAMPLE	S96V000052	0	B	@GEA-03	CE14402	LIQUID	N/A <	7.225e-01	722.5e-003	uCi/mL
6 SAMPLE	S96V000052	0	B	@GEA-03	CE14402E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
6 SAMPLE	S96V000052	0	B	@GEA-03	EU15402	LIQUID	N/A <	2.631e-02	263.1e-004	uCi/mL
6 SAMPLE	S96V000052	0	B	@GEA-03	EU15402E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
6 SAMPLE	S96V000052	0	B	@GEA-03	EU15502	LIQUID	N/A <	2.044e-01	204.4e-003	uCi/mL
6 SAMPLE	S96V000052	0	B	@GEA-03	EU15502E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
6 SAMPLE	S96V000052	0	B	@GEA-03	RA22602	LIQUID	N/A <	1.432e+00	143.2e-002	uCi/mL
6 SAMPLE	S96V000052	0	B	@GEA-03	RA22602E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
7 SAMPLE	S96V000060	0	B	@GEA-03	CO60-02	LIQUID	N/A <	6.711e-03	671.1e-005	uCi/mL
7 SAMPLE	S96V000060	0	B	@GEA-03	CO60-02E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
7 SAMPLE	S96V000060	0	B	@GEA-03	NB94-02	LIQUID	N/A <	5.693e-03	569.3e-005	uCi/mL
7 SAMPLE	S96V000060	0	B	@GEA-03	NB94-02E	LIQUID	N/A	n/a	0.0e+000	% Ct. Error
7 SAMPLE	S96V000060	0	B	@GEA-03	RU10602	LIQUID	N/A <	1.058e-01	105.8e-003	uCi/mL

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Completed RadChem Report for Worklist#: 14453

Seq Type	Sample#	R	A	Test	Matrix	Actual		Found	DL or Yield	Unit
7 SAMPLE	S96V000060	0	B	@GEA-03	RU10602E	LIQUID	N/A		n/a	0.0e+000	% Ct. Error
7 SAMPLE	S96V000060	0	B	@GEA-03	CS13402	LIQUID	N/A	<	4.177e-03	417.7e-005	uCi/mL
7 SAMPLE	S96V000060	0	B	@GEA-03	CS13402E	LIQUID	N/A		n/a	0.0e+000	% Ct. Error
7 SAMPLE	S96V000060	0	B	@GEA-03	CS13702	LIQUID	N/A	<	1.489e-02	148.9e-004	uCi/mL
7 SAMPLE	S96V000060	0	B	@GEA-03	CS13702E	LIQUID	N/A		n/a	0.0e+000	% Ct. Error
7 SAMPLE	S96V000060	0	B	@GEA-03	CE14402	LIQUID	N/A	<	5.239e-02	523.9e-004	uCi/mL
7 SAMPLE	S96V000060	0	B	@GEA-03	CE14402E	LIQUID	N/A		n/a	0.0e+000	% Ct. Error
7 SAMPLE	S96V000060	0	B	@GEA-03	EU15402	LIQUID	N/A	<	1.528e-02	152.8e-004	uCi/mL
7 SAMPLE	S96V000060	0	B	@GEA-03	EU15402E	LIQUID	N/A		n/a	0.0e+000	% Ct. Error
7 SAMPLE	S96V000060	0	B	@GEA-03	EU15502	LIQUID	N/A	<	1.802e-02	180.2e-004	uCi/mL
7 SAMPLE	S96V000060	0	B	@GEA-03	EU15502E	LIQUID	N/A		n/a	0.0e+000	% Ct. Error
7 SAMPLE	S96V000060	0	B	@GEA-03	RA22602	LIQUID	N/A	<	1.119e-01	111.9e-003	uCi/mL
7 SAMPLE	S96V000060	0	B	@GEA-03	RA22602E	LIQUID	N/A		n/a	0.0e+000	% Ct. Error

Comments Section:

Comments for sample# S96V000050 **and test** @GEA-03 .
DL=0 => n/a.

Comments for sample# S96V000051 **and test** @GEA-03 .
DL=0 => n/a.

Comments for sample# S96V000052 **and test** @GEA-03 .
DL=0 => n/a.

Final page for worklist# 14453

Analyst Signature **Date**

Analyst Signature **Date**

Rachelo 11/20/96
Reviewer Signature **Date**

Units shown for QC (BLK/BKG) may not reflect the actual units.

LABCORE Data Entry Template for Worklist# 14453

Analyst: S.L **Instrument:** GEA00 2 **Book#** 62856

Method: LA-548-121 Rev/Mod E-0

Worklist Comment: AP-105 GEA RCJ

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	STD				@GEA-03	LIQUID		
2	BLNK-PREP				@GEA-03	LIQUID		
3	SAMPLE	S96V000050	0	B	@GEA-03	LIQUID	96000853	AP-105
	Analytes Requested:	CE14402 , CE14402E, CO60-02 , CO60-02E, CS13402 , CS13402E, CS13702 , CS13702E, EU15402 , EU15402E, EU15502 , EU15502E, NB94-02 , NB94-02E, RA22602 , RA22602E, RU10602 , RU10602E						
4	DUP	S96V000050	0	B	@GEA-03	LIQUID		
5	SAMPLE	S96V000051	0	B	@GEA-03	LIQUID	96000855	AP-105
	Analytes Requested:	CE14402 , CE14402E, CO60-02 , CO60-02E, CS13402 , CS13402E, CS13702 , CS13702E, EU15402 , EU15402E, EU15502 , EU15502E, NB94-02 , NB94-02E, RA22602 , RA22602E, RU10602 , RU10602E						
6	SAMPLE	S96V000052	0	B	@GEA-03	LIQUID	96000855	AP-105
	Analytes Requested:	CE14402 , CE14402E, CO60-02 , CO60-02E, CS13402 , CS13402E, CS13702 , CS13702E, EU15402 , EU15402E, EU15502 , EU15502E, NB94-02 , NB94-02E, RA22602 , RA22602E, RU10602 , RU10602E						
7	SAMPLE	S96V000060	0	B	@GEA-03	LIQUID	96000855	AP-105
	Analytes Requested:	CE14402 , CE14402E, CO60-02 , CO60-02E, CS13402 , CS13402E, CS13702 , CS13702E, EU15402 , EU15402E, EU15502 , EU15502E, NB94-02 , NB94-02E, RA22602 , RA22602E, RU10602 , RU10602E						

Final page for worklist # 14453

Sue Lee 11-19-96
Analyst Signature **Date**

Analyst Signature **Date** 11-20-96

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

****
* 222-S Laboratory Counting Room 19-NOV-1996 14:31:58.14 *
****

>>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Worklist #: 14453
Sample ID: WL14453
Sample Size: 1.00000E-03 L
Dilution Factor: 1.00000E+00

Removed by:

>>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID: GEA2
File Number: dka300:[spec.GEA2]2g2942.cnf
Geometry: 42
Count Time: 0 00:50:00.00 sec
Real Time: 0 00:50:05.32 sec
Dead Time: 0.2%

Verified by: 11/20/96

>>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time: 19-NOV-1996 13:41:12.62
Decayed to: 19-NOV-1996 13:41:12.62
Standard Deviations: 2
Analysis Library: ENVGEA
Analyst: LMHS
Background Subtract: DKA300:[SPEC.GEA2]2GBACK

>>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
Date of last energy calibration: 21-MAR-1994 09:31:55.15
Date of last efficiency calibration: 21-MAR-1994 09:43:42.61
****

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/L
0	122.89	12185	1.19	246.21	240	12	2.3		EU-152	17.7
									CO-57	5.86
									EU-154	12.4
3	244.85	275	1.39	490.00	486	16	40.0	2.21E+00	EU-152	2.00
3	247.91	1404	1.16	496.11	486	16	8.6		EU-154	11.3
0	344.06	735	1.37	688.32	681	13	17.8		EU-152	1.91
0	444.20	137	1.55	888.54	882	11	75.8			
0	591.89	563	1.67	1183.83	1178	12	18.0			
0	661.70*	5348	1.48	1323.42	1315	16	3.5		CS-137	7.42
0	692.63	146	1.46	1385.27	1382	9	47.0		CO-57	111.
0	723.39	1802	1.58	1446.77	1441	13	6.7		EU-154	11.5
0	756.88	413	1.68	1513.74	1510	10	18.4			
0	779.36	197	1.72	1558.70	1553	12	41.8		EU-152	2.07
0	845.78	128	1.45	1691.54	1687	10	53.9			
0	873.15	955	1.64	1746.29	1738	15	12.4		EU-154	11.8
0	964.47	225	1.56	1928.93	1924	12	36.1		EU-152	2.54
0	996.34	708	1.77	1992.67	1986	13	13.7		EU-154	11.6
0	1004.78	1338	1.79	2009.56	2002	16	9.3		EU-154	12.7
0	1085.53	133	1.15	2171.08	2166	12	51.4		EU-152	2.45
0	1111.93	149	1.94	2223.90	2217	14	54.1		EU-152	2.05
0	1173.35	4004	1.84	2346.76	2338	17	3.6		CO-60	7.87
0	1274.56	1963	2.04	2549.24	2541	17	5.3		EU-154	12.0

Post-NID Peak Search Report (continued)
Sample ID : WL14453 Acquisition date : 19-NOV-1996 13:41:12

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/L
0	1332.68	3569	1.95	2665.52	2656	21	3.6		CO-60	7.77
0	1397.37	27	2.16	2794.95	2787	14	75.2			
0	1408.14*	184	2.39	2816.49	2807	21	17.4		EU-152	2.01
0	1596.61	101	2.07	3193.62	3185	15	21.7			

Summary of Nuclide Activity
Sample ID : WL14453 Acquisition date : 19-NOV-1996 13:41:12

Total number of lines in spectrum 24
Number of unidentified lines 4
Number of lines tentatively identified by NID 20 83.33%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/L	Wtd Mean Decay Corr uCi/L	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
~~CO-57~~	~~271.80D~~	~~1.000~~	~~1.108E+02~~	~~1.108E+02~~	~~0.520E+02~~	~~46.95~~	~~E~~
CO-60	5.27Y	1.000	7.816E+00	7.816E+00	0.200E+00	2.56	
CS-137	30.00Y	1.000	7.421E+00	7.421E+00	0.258E+00	3.48	
EU-152	13.54Y	1.000	2.015E+00	2.015E+00	0.211E+00	10.49	
EU-154	8.59Y	1.000	1.179E+01	1.179E+01	0.038E+01	3.25	
	Total Activity :		1.399E+02	1.399E+02			
	Grand Total Activity :		1.399E+02	1.399E+02			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BE-7	632.	477.59	1.0195E+00
NA-22	2060.	1274.53	4.4307E-01
NA-24	21.	1368.55	4.7705E-02
K-40	119.	1460.75	1.1133E+00
CR-51	664.	320.08	7.7998E-01
MN-54	286.	834.83	1.1332E-01
CO-56	422.	846.76	1.3935E-01
CO-58	319.	810.78	1.1742E-01
FE-59	264.	1099.25	2.4701E-01
SE-75	707.	264.66	1.2148E-01
SR-85	514.	514.01	1.0564E-01
Y-88	6.	1836.06	3.2268E-02
NB-94	1035.	871.09	2.2344E-01
ZRNB-95	2103.	724.18	6.2299E-01
RU-103	501.	497.08	1.0698E-01
RURH-106	350.	621.93	1.9714E+00
AG-108m	2113.	722.94	3.0005E-01
CD-109	1284.	88.03	2.7515E+00
AG-110M	449.	657.76	1.2258E-01
SN-113	564.	391.69	1.3067E-01
TE-123m	797.	159.00	6.3165E-02
SB-124	347.	602.73	9.7019E-02
SB-125	502.	427.89	2.8924E-01
TE-125m	1176.	109.27	2.5423E+01
I-131	570.	364.48	9.8456E-02
CS-134	359.	604.70	9.9191E-02
BA-140	420.	537.31	3.9001E-01
LA-140	103.	1596.21	1.2545E-01
CEPR-144	825.	133.51	9.5972E-01
EU-155	1285.	105.31	3.5689E-01
HG-203	717.	279.20	9.1034E-02
TL-208	713.	277.36	1.1665E+00
BI-212	370.	727.18	1.7234E+00
PB-212	833.	238.63	1.6466E-01
BI-214	411.	609.31	2.3242E-01
PB-214	590.	351.92	3.9470E-01
RA-224	872.	240.99	1.8698E+00
RA-226	835.	186.10	1.6853E+00
AC-228	397.	911.21	5.4053E-01
TH-228	1182.	84.37	8.1059E+00
TH-229	1259.	88.47	3.9495E-01
PA-233	645.	312.17	1.9710E-01
UTH-233	1248.	245.34	8.3789E+01
PA-234M	433.	1001.03	2.7793E-01
TH-234	737.	63.29	3.7293E+00
U-235	822.	185.71	1.0167E-01
NP-237	1283.	86.48	8.2536E-01
NP-239	1251.	106.12	3.3420E-01
PU-239	800.	129.30	8.2566E+02
AM-241	863.	59.54	6.4212E-01
AM-243	892.	74.67	1.9132E-01

```
**********************************************************************************
* 222-S Laboratory Counting Room   19-NOV-1996 15:46:41.33                       *
**********************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Worklist #:              14453
Sample ID:               WK14453-BLK
Sample Size:             2.50000E-04 L
Dilution Factor:         1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:             GEA2
File Number:             dka300:[spec.GEA2]2g2943.cnf
Geometry:                42
Count Time:              0 00:50:00.00 sec
Real Time:               0 00:50:00.49 sec
Dead Time:               0.0%

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:       19-NOV-1996 14:56:02.49
Decayed to:              19-NOV-1996 14:56:02.49
Standard Deviations:     2
Analysis Library:        ENVGEA
Analyst:                 LMHS
Background Subtract:     DKA300:[SPEC.GEA2]2GBACK

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       21-MAR-1994 09:31:55.15
 Date of last efficiency calibration:   21-MAR-1994 09:43:42.61
**********************************************************************************
```

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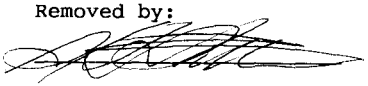
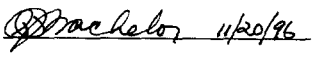


Verified by:



Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/L
0	526.53	21	1.37	1053.14	1049	9	69.5			

Total number of lines in spectrum	1	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BE-7	31.	477.59	9.0110E-01
NA-22	9.	1274.53	1.1912E-01
NA-24	6.	1368.55	1.0694E-01
K-40	113.	1460.75	4.3397E+00
CR-51	54.	320.08	8.8989E-01
MN-54	21.	834.83	1.2212E-01
CO-56	20.	846.76	1.2146E-01
CO-57	68.	122.06	7.3806E-02
CO-58	19.	810.78	1.1396E-01
FE-59	9.	1099.25	1.8079E-01
CO-60	8.	1332.50	1.1447E-01
SE-75	64.	264.66	1.4651E-01
SR-85	41.	514.01	1.1861E-01
Y-88	2.	1836.06	7.4519E-02
NB-94	14.	871.09	1.0318E-01
ZRNB-95	13.	724.18	1.9728E-01
RU-103	32.	497.08	1.0765E-01
RURH-106	26.	621.93	2.1661E+00
AG-108m	16.	722.94	1.0364E-01
CD-109	67.	88.03	2.5119E+00
AG-110M	19.	657.76	1.0028E-01
SN-113	50.	391.69	1.5526E-01
TE-123m	97.	159.00	8.8070E-02
SB-124	25.	602.73	1.0476E-01
SB-125	41.	427.89	3.3197E-01
TE-125m	58.	109.27	2.2513E+01
I-131	55.	364.48	1.2234E-01
CS-134	23.	604.70	1.0055E-01
CS-137	127.	661.66	2.9112E-01
BA-140	37.	537.31	4.6416E-01
LA-140	5.	1596.21	1.1546E-01
CEPR-144	83.	133.51	1.2190E+00
EU-152	9.	1408.01	5.9212E-01
EU-154	9.	1274.51	3.4533E-01
EU-155	57.	105.31	3.0191E-01
HG-203	56.	279.20	1.0135E-01
TL-208	51.	277.36	1.2511E+00
BI-212	18.	727.18	1.5286E+00
PB-212	74.	238.63	1.9682E-01
BI-214	55.	609.31	3.4027E-01
PB-214	65.	351.92	5.2440E-01
RA-224	62.	240.99	1.9939E+00
RA-226	79.	186.10	2.0802E+00
AC-228	38.	911.21	6.7085E-01
TH-228	63.	84.37	7.4861E+00
TH-229	72.	88.47	3.7743E-01
PA-233	59.	312.17	2.3916E-01
UTH-233	71.	245.34	8.0195E+01
PA-234M	9.	1001.03	1.6453E-01
TH-234	63.	63.29	4.3542E+00
U-235	83.	185.71	1.2921E-01

Minimum Detectable Activity Report (continued)
Sample ID : WK14453-BLK Acquisition date : 19-NOV-1996 14:56:02

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
NP-237	64.	86.48	7.3763E-01
NP-239	60.	106.12	2.9374E-01
PU-239	83.	129.30	1.0611E+03
AM-241	61.	59.54	6.8556E-01
AM-243	79.	74.67	2.2711E-01

```
**********************************************************************
* 222-S Laboratory Counting Room   19-NOV-1996 16:49:28.78           *
**********************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Worklist #:              14453
Sample ID:               S96V50-SAM
Sample Size:             2.50000E-04 L
Dilution Factor:         1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:             GEA2
File Number:             dka300:[spec.GEA2]2g2944.cnf
Geometry:                42
Count Time:              0 00:50:00.00 sec
Real Time:               0 00:50:53.75 sec
Dead Time:               1.8%

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:       19-NOV-1996 15:57:55.60
Decayed to:              19-NOV-1996 15:57:55.60
Standard Deviations:     2
Analysis Library:        ENVGEA
Analyst:                 LMHS
Background Subtract:     DKA300:[SPEC.GEA2]2GBACK

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:      21-MAR-1994 09:31:55.15
 Date of last efficiency calibration:  21-MAR-1994 09:43:42.61
**********************************************************************
```

Removed by:

Verified by:

11/20/96

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/L
0	661.66*	398314	1.53	1323.35	1315	17	0.3		CS-137	2.211E+03

Summary of Nuclide Activity
Sample ID : S96V50-SAM

Acquisition date : 19-NOV-1996 15:57:55

Total number of lines in spectrum	1	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	1	100.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/L	Wtd Mean Decay Corr uCi/L	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-137	30.00Y	1.000	2.211E+03	2.211E+03	0.007E+03	0.33	
	Total Activity :		2.211E+03	2.211E+03			
Grand Total Activity :			2.211E+03	2.211E+03			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BE-7	12731.	477.59	1.8307E+01
NA-22	17.	1274.53	1.6179E-01
NA-24	9.	1368.55	1.2293E-01
K-40	108.	1460.75	4.2334E+00
CR-51	10501.	320.08	1.2404E+01
MN-54	107.	834.83	2.7728E-01
CO-56	123.	846.76	3.0078E-01
CO-57	11387.	122.06	9.5441E-01
CO-58	120.	810.78	2.8745E-01
FE-59	48.	1099.25	4.2316E-01
CO-60	9.	1332.50	1.2142E-01
SE-75	11574.	264.66	1.9658E+00
SR-85	6373.	514.01	1.4877E+00
Y-88	5.	1836.06	1.2172E-01
NB-94	93.	871.09	2.6753E-01
ZRNB-95	173.	724.18	7.1546E-01
RU-103	7874.	497.08	1.6958E+00
RURH-106	2725.	621.93	2.1996E+01
AG-108m	171.	722.94	3.4149E-01
CD-109	9931.	88.03	3.0604E+01
AG-110M	9708.	657.76	2.2796E+00
SN-113	11213.	391.69	2.3309E+00
TE-123m	11810.	159.00	9.7260E-01
SB-124	2844.	602.73	1.1112E+00
SB-125	12912.	427.89	5.8698E+00
TE-125m	10593.	109.27	3.0514E+02
I-131	10506.	364.48	1.6901E+00
CS-134	2763.	604.70	1.1002E+00
BA-140	4723.	537.31	5.2343E+00
LA-140	9.	1596.21	1.4899E-01
CEPR-144	11597.	133.51	1.4395E+01
EU-152	14.	1408.01	7.4556E-01
EU-154	17.	1274.51	4.7114E-01
EU-155	10333.	105.31	4.0477E+00
HG-203	10971.	279.20	1.4240E+00
TL-208	11133.	277.36	1.8432E+01
BI-212	191.	727.18	4.9541E+00
PB-212	13042.	238.63	2.6066E+00
BI-214	2696.	609.31	2.3819E+00
PB-214	10445.	351.92	6.6993E+00
RA-224	12986.	240.99	2.8868E+01
RA-226	14953.	186.10	2.8533E+01
AC-228	102.	911.21	1.0963E+00
TH-228	9936.	84.37	9.3997E+01
TH-229	9958.	88.47	4.4425E+00
PA-233	10416.	312.17	3.1679E+00
UTH-233	12662.	245.34	1.0677E+03
PA-234M	52.	1001.03	3.8491E-01
TH-234	9297.	63.29	5.2966E+01
U-235	14766.	185.71	1.7234E+00
NP-237	9876.	86.48	9.1583E+00

Minimum Detectable Activity Report (continued)
Sample ID : S96V50-SAM Acquisition date : 19-NOV-1996 15:57:55

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
NP-239	10428.	106.12	3.8591E+00
PU-239	11654.	129.30	1.2608E+04
AM-241	9525.	59.54	8.5356E+00
AM-243	9719.	74.67	2.5267E+00

```
********************************************************************************
* 222-S Laboratory Counting Room   19-NOV-1996 18:10:42.95                     *
********************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Worklist #:              14453
Sample ID:               S96V50-DUP                    Removed by:
Sample Size:             2.50000E-04 L
Dilution Factor:         1.00000E+00                   SHWahl

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:             GEA2                          Verified by:
File Number:             dka300:[spec.GEA2]2g2945.cnf  BJMachelor 11/20/96
Geometry:                42
Count Time:              0 00:50:00.00 sec
Real Time:               0 00:50:54.35 sec
Dead Time:               1.8%

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:       19-NOV-1996 17:19:11.29
Decayed to:              19-NOV-1996 17:19:11.29
Standard Deviations:     2
Analysis Library:        ENVGEA
Analyst:                 LMHS
Background Subtract:     DKA300:[SPEC.GEA2]2GBACK

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       21-MAR-1994 09:31:55.15
 Date of last efficiency calibration:   21-MAR-1994 09:43:42.61
********************************************************************************

Post-NID Peak Search Report

It   Energy      Area  FWHM Channel   Left  Pw %Err    Fit   Nuclides  Activity
                                                                        uCi/L

 0   661.67*  403282  1.54 1323.36   1315  17  0.3           CS-137    2.239E+03
 0  1322.86      23  1.50 2645.86   2643   8 70.7
```

Summary of Nuclide Activity HNF Page : 2
Sample ID : S96V50-DUP Acquisition date : 19-NOV-1996 17:19:11

Total number of lines in spectrum 2
Number of unidentified lines 1
Number of lines tentatively identified by NID 1 50.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/L	Wtd Mean Decay Corr uCi/L	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-137	30.00Y	1.000	2.239E+03	2.239E+03	0.007E+03	0.32	
Total Activity :			2.239E+03	2.239E+03			
Grand Total Activity :			2.239E+03	2.239E+03			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Minimum Detectable Activity Report HNF
Sample ID : S96V50-DUP Acquisition date : 19-NOV-1996 17:19:11

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BE-7	12675.	477.59	1.8267E+01
NA-22	25.	1274.53	1.9473E-01
NA-24	5.	1368.55	9.3957E-02
K-40	94.	1460.75	3.9611E+00
CR-51	10475.	320.08	1.2389E+01
MN-54	122.	834.83	2.9556E-01
CO-56	112.	846.76	2.8714E-01
CO-57	11511.	122.06	9.5960E-01
CO-58	128.	810.78	2.9771E-01
FE-59	51.	1099.25	4.3336E-01
CO-60	13.	1332.50	1.4619E-01
SE-75	11913.	264.66	1.9944E+00
SR-85	6614.	514.01	1.5156E+00
Y-88	3.	1836.06	9.0457E-02
NB-94	94.	871.09	2.6873E-01
ZRNB-95	185.	724.18	7.3982E-01
RU-103	7994.	497.08	1.7086E+00
RURH-106	2792.	621.93	2.2266E+01
AG-108m	182.	722.94	3.5269E-01
CD-109	10041.	88.03	3.0774E+01
AG-110M	9641.	657.76	2.2717E+00
SN-113	11247.	391.69	2.3345E+00
TE-123m	11767.	159.00	9.7080E-01
SB-124	2803.	602.73	1.1032E+00
SB-125	12920.	427.89	5.8717E+00
TE-125m	10681.	109.27	3.0641E+02
I-131	10707.	364.48	1.7062E+00
CS-134	2725.	604.70	1.0926E+00
BA-140	4748.	537.31	5.2483E+00
LA-140	3.	1596.21	8.5479E-02
CEPR-144	11831.	133.51	1.4540E+01
EU-152	7.	1408.01	5.1817E-01
EU-154	25.	1274.51	5.6485E-01
EU-155	10450.	105.31	4.0705E+00
HG-203	11095.	279.20	1.4320E+00
TL-208	11244.	277.36	1.8524E+01
BI-212	211.	727.18	5.2087E+00
PB-212	13219.	238.63	2.6243E+00
BI-214	2846.	609.31	2.4473E+00
PB-214	10592.	351.92	6.7471E+00
RA-224	13141.	240.99	2.9041E+01
RA-226	15104.	186.10	2.8677E+01
AC-228	84.	911.21	9.9654E-01
TH-228	10099.	84.37	9.4765E+01
TH-229	10029.	88.47	4.4584E+00
PA-233	10690.	312.17	3.2093E+00
UTH-233	12624.	245.34	1.0661E+03
PA-234M	59.	1001.03	4.1073E-01
TH-234	9556.	63.29	5.3701E+01
U-235	14953.	185.71	1.7343E+00
NP-237	10115.	86.48	9.2684E+00

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
NP-239	10397.	106.12	3.8535E+00
PU-239	11960.	129.30	1.2772E+04
AM-241	9439.	59.54	8.4968E+00
AM-243	9634.	74.67	2.5157E+00

```
********************************************************************************
* 222-S Laboratory Counting Room   19-NOV-1996 19:43:23.67                     *
********************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Worklist #:             14453
Sample ID:              S96V51-SAM
Sample Size:            2.50000E-04 L
Dilution Factor:        1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:            GEA2
File Number:            dka300:[spec.GEA2]2g2946.cnf
Geometry:               42
Count Time:             0 00:50:00.00 sec
Real Time:              0 00:50:55.61 sec
Dead Time:              1.8%

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:      19-NOV-1996 18:51:48.98
Decayed to:             19-NOV-1996 18:51:48.98
Standard Deviations:    2
Analysis Library:       ENVGEA
Analyst:                SLH2
Background Subtract:    DKA300:[SPEC.GEA2]2GBACK

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       21-MAR-1994 09:31:55.15
 Date of last efficiency calibration:   21-MAR-1994 09:43:42.61
********************************************************************************
```

HNF-WHC-SD-WM-DP-202, REV. 1

Removed by:

SLHale

Verified by:

BSMachelor 11/20/96

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/L
0	661.68*	412033	1.53	1323.37	1315	17	0.3		CS-137	2.287E+03
0	1322.77	42	2.85	2645.69	2641	11	47.9			

Total number of lines in spectrum 2
Number of unidentified lines 1
Number of lines tentatively identified by NID 1 50.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/L	Wtd Mean Decay Corr uCi/L	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-137	30.00Y	1.000	2.287E+03	2.287E+03	0.007E+03	0.32	
Total Activity :			2.287E+03	2.287E+03			
Grand Total Activity :			2.287E+03	2.287E+03			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BE-7	12767.	477.59	1.8333E+01
NA-22	18.	1274.53	1.6668E-01
NA-24	5.	1368.55	9.3958E-02
K-40	116.	1460.75	4.3879E+00
CR-51	10762.	320.08	1.2558E+01
MN-54	113.	834.83	2.8442E-01
CO-56	129.	846.76	3.0815E-01
CO-57	11845.	122.06	9.7342E-01
CO-58	140.	810.78	3.1053E-01
FE-59	39.	1099.25	3.7849E-01
CO-60	14.	1332.50	1.5143E-01
SE-75	12078.	264.66	2.0082E+00
SR-85	6565.	514.01	1.5100E+00
Y-88	6.	1836.06	1.2912E-01
NB-94	103.	871.09	2.8199E-01
ZRNB-95	171.	724.18	7.0962E-01
RU-103	8220.	497.08	1.7327E+00
RURH-106	2856.	621.93	2.2519E+01
AG-108m	157.	722.94	3.2729E-01
CD-109	10360.	88.03	3.1259E+01
AG-110M	9744.	657.76	2.2838E+00
SN-113	11613.	391.69	2.3722E+00
TE-123m	11817.	159.00	9.7286E-01
SB-124	2879.	602.73	1.1178E+00
SB-125	13150.	427.89	5.9238E+00
TE-125m	10957.	109.27	3.1034E+02
I-131	10956.	364.48	1.7260E+00
CS-134	2856.	604.70	1.1185E+00
BA-140	4952.	537.31	5.3601E+00
LA-140	3.	1596.21	8.5479E-02
CEPR-144	11946.	133.51	1.4610E+01
EU-152	9.	1408.01	5.9430E-01
EU-154	18.	1274.51	4.8212E-01
EU-155	10601.	105.31	4.0997E+00
HG-203	11340.	279.20	1.4478E+00
TL-208	11416.	277.36	1.8665E+01
BI-212	198.	727.18	5.0450E+00
PB-212	13459.	238.63	2.6480E+00
BI-214	2855.	609.31	2.4513E+00
PB-214	10721.	351.92	6.7895E+00
RA-224	13333.	240.99	2.9252E+01
RA-226	15420.	186.10	2.8976E+01
AC-228	112.	911.21	1.1483E+00
TH-228	10250.	84.37	9.5474E+01
TH-229	10350.	88.47	4.5291E+00
PA-233	10783.	312.17	3.2232E+00
UTH-233	13019.	245.34	1.0827E+03
PA-234M	71.	1001.03	4.4923E-01
TH-234	9696.	63.29	5.4092E+01
U-235	15255.	185.71	1.7518E+00
NP-237	10190.	86.48	9.3027E+00

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
NP-239	10677.	106.12	3.9050E+00
PU-239	12062.	129.30	1.2826E+04
AM-241	9607.	59.54	8.5719E+00
AM-243	9896.	74.67	2.5496E+00

```
**********************************************************************************
* 222-S Laboratory Counting Room   19-NOV-1996 20:37:33.66                       *
**********************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Worklist #:              14453
Sample ID:               S96V52-SAM                    Removed by:
Sample Size:             2.50000E-04 L
Dilution Factor:         1.00000E+00                   ____________________

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:             GEA2                          Verified by:
File Number:             dka300:[spec.GEA2]2g2947.cnf
Geometry:                42                            ____________________ 11/20/96
Count Time:              0 00:50:00.00 sec
Real Time:               0 00:50:54.37 sec
Dead Time:               1.8%

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:       19-NOV-1996 19:46:02.35
Decayed to:              19-NOV-1996 19:46:02.35
Standard Deviations:     2
Analysis Library:        ENVGEA
Analyst:                 SLH2
Background Subtract:     DKA300:[SPEC.GEA2]2GBACK

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       21-MAR-1994 09:31:55.15
 Date of last efficiency calibration:   21-MAR-1994 09:43:42.61
**********************************************************************************

Post-NID Peak Search Report

It   Energy     Area   FWHM Channel   Left   Pw %Err    Fit   Nuclides  Activity
                                                                        uCi/L

 0   661.68*  403065   1.54 1323.38   1315   17  0.3           CS-137    2.237E+03
```

Summary of Nuclide Activity
Sample ID : S96V52-SAM Acquisition date : 19-NOV-1996 19:46:02

Total number of lines in spectrum	1	
Number of unidentified lines	0	
Number of lines tentatively identified by NID	1	100.00%

Nuclide Type :

Nuclide	Hlife	Decay	Wtd Mean Uncorrected uCi/L	Wtd Mean Decay Corr uCi/L	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CS-137	30.00Y	1.000	2.237E+03	2.237E+03	0.007E+03	0.32	
Total Activity :			2.237E+03	2.237E+03			
Grand Total Activity :			2.237E+03	2.237E+03			

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BE-7	12628.	477.59	1.8233E+01
NA-22	21.	1274.53	1.8094E-01
NA-24	4.	1368.55	7.9266E-02
K-40	105.	1460.75	4.1860E+00
CR-51	10621.	320.08	1.2475E+01
MN-54	115.	834.83	2.8711E-01
CO-56	122.	846.76	2.9965E-01
CO-57	11430.	122.06	9.5622E-01
CO-58	122.	810.78	2.9015E-01
FE-59	31.	1099.25	3.3908E-01
CO-60	11.	1332.50	1.3423E-01
SE-75	11728.	264.66	1.9788E+00
SR-85	6426.	514.01	1.4939E+00
Y-88	2.	1836.06	7.4519E-02
NB-94	97.	871.09	2.7417E-01
ZRNB-95	194.	724.18	7.5789E-01
RU-103	8036.	497.08	1.7131E+00
RURH-106	2786.	621.93	2.2239E+01
AG-108m	214.	722.94	3.8154E-01
CD-109	10157.	88.03	3.0951E+01
AG-110M	9391.	657.76	2.2421E+00
SN-113	11285.	391.69	2.3384E+00
TE-123m	11665.	159.00	9.6661E-01
SB-124	2842.	602.73	1.1106E+00
SB-125	13075.	427.89	5.9068E+00
TE-125m	10744.	109.27	3.0731E+02
I-131	10793.	364.48	1.7131E+00
CS-134	2809.	604.70	1.1092E+00
BA-140	4683.	537.31	5.2121E+00
LA-140	6.	1596.21	1.2089E-01
CEPR-144	11685.	133.51	1.4450E+01
EU-152	5.	1408.01	4.5305E-01
EU-154	22.	1274.51	5.2618E-01
EU-155	10540.	105.31	4.0879E+00
HG-203	11220.	279.20	1.4401E+00
TL-208	11281.	277.36	1.8554E+01
BI-212	188.	727.18	4.9143E+00
PB-212	13204.	238.63	2.6228E+00
BI-214	2795.	609.31	2.4254E+00
PB-214	10615.	351.92	6.7543E+00
RA-224	12972.	240.99	2.8853E+01
RA-226	15069.	186.10	2.8643E+01
AC-228	72.	911.21	9.2257E-01
TH-228	10031.	84.37	9.4449E+01
TH-229	10147.	88.47	4.4844E+00
PA-233	10734.	312.17	3.2160E+00
UTH-233	12687.	245.34	1.0688E+03
PA-234M	56.	1001.03	3.9854E-01
TH-234	9424.	63.29	5.3329E+01
U-235	14986.	185.71	1.7362E+00
NP-237	10090.	86.48	9.2571E+00

Minimum Detectable Activity Report (continued)
Sample ID : S96V52-SAM Acquisition date : 19-NOV-1996 19:46:02

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
NP-239	10493.	106.12	3.8712E+00
PU-239	11760.	129.30	1.2665E+04
AM-241	9351.	59.54	8.4569E+00
AM-243	9684.	74.67	2.5221E+00

```
**********************************************************************************
* 222-S Laboratory Counting Room   19-NOV-1996 21:50:22.41                       *
**********************************************************************************
      >>>>>>>>>> SAMPLE INFORMATION <<<<<<<<<<
Worklist #:              14453
Sample ID:               S97V60-SAM
Sample Size:             2.50000E-04 L
Dilution Factor:         1.00000E+00

      >>>>>>>>>> COUNT INFORMATION <<<<<<<<<<
Detector ID:             GEA2
File Number:             dka300:[spec.GEA2]2g2948.cnf
Geometry:                42
Count Time:              0 00:50:00.00 sec
Real Time:               0 00:50:00.48 sec
Dead Time:               0.0%

      >>>>>>>>>> ANALYSIS INFORMATION <<<<<<<<<<
Sample Count Time:       19-NOV-1996 20:59:39.72
Decayed to:              19-NOV-1996 20:59:39.72
Standard Deviations:     2
Analysis Library:        ENVGEA
Analyst:                 SLH2
Background Subtract:     DKA300:[SPEC.GEA2]2GBACK

      >>>>>>>>>> CALIBRATION INFORMATION <<<<<<<<<<
 Date of last energy calibration:       21-MAR-1994 09:31:55.15
 Date of last efficiency calibration:   21-MAR-1994 09:43:42.61
**********************************************************************************
```

Removed by:

S L Hall

Verified by:

B Mackey 11/20/96

Post-NID Peak Search Report

It	Energy	Area	FWHM	Channel	Left	Pw	%Err	Fit	Nuclides	Activity uCi/L
0	32.74*	78	2.18	66.03	61	13	86.5			

Total number of lines in spectrum	1	
Number of unidentified lines	1	
Number of lines tentatively identified by NID	0	0.00%

**** There are no nuclides meeting summary criteria ****

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
BE-7	27.	477.59	8.4955E-01
NA-22	7.	1274.53	1.0487E-01
NA-24	14.	1368.55	1.5504E-01
K-40	125.	1460.75	4.5555E+00
CR-51	49.	320.08	8.5132E-01
MN-54	15.	834.83	1.0353E-01
CO-56	12.	846.76	9.4030E-02
CO-57	69.	122.06	7.4301E-02
CO-58	13.	810.78	9.3766E-02
FE-59	16.	1099.25	2.4437E-01
CO-60	11.	1332.50	1.3423E-01
SE-75	51.	264.66	1.3107E-01
SR-85	42.	514.01	1.2120E-01
Y-88	0.	1836.06	0.0000E+00
NB-94	17.	871.09	1.1385E-01
ZRNB-95	24.	724.18	2.6494E-01
RU-103	32.	497.08	1.0773E-01
RURH-106	25.	621.93	2.1158E+00
AG-108m	24.	722.94	1.2726E-01
CD-109	76.	88.03	2.6811E+00
AG-110M	30.	657.76	1.2646E-01
SN-113	39.	391.69	1.3781E-01
TE-123m	65.	159.00	7.2203E-02
SB-124	20.	602.73	9.2170E-02
SB-125	39.	427.89	3.2107E-01
TE-125m	71.	109.27	2.4954E+01
I-131	46.	364.48	1.1221E-01
CS-134	16.	604.70	8.3545E-02
CS-137	133.	661.66	2.9774E-01
BA-140	34.	537.31	4.4204E-01
LA-140	9.	1596.21	1.4857E-01
CEPR-144	61.	133.51	1.0477E+00
EU-152	6.	1408.01	4.9890E-01
EU-154	7.	1274.51	3.0552E-01
EU-155	82.	105.31	3.6033E-01
HG-203	56.	279.20	1.0162E-01
TL-208	58.	277.36	1.3256E+00
BI-212	24.	727.18	1.7488E+00
PB-212	90.	238.63	2.1651E-01
BI-214	43.	609.31	2.9939E-01
PB-214	81.	351.92	5.8583E-01
RA-224	69.	240.99	2.0991E+00
RA-226	92.	186.10	2.2372E+00
AC-228	24.	911.21	5.3631E-01
TH-228	61.	84.37	7.3458E+00
TH-229	76.	88.47	3.8750E-01
PA-233	56.	312.17	2.3232E-01
UTH-233	55.	245.34	7.0145E+01
PA-234M	13.	1001.03	1.8963E-01
TH-234	58.	63.29	4.1671E+00
U-235	93.	185.71	1.3696E-01

Nuclide	Bckgnd Sum	Energy (keV)	MDA (uCi/L)
NP-237	72.	86.48	7.8172E-01
NP-239	73.	106.12	3.2342E-01
PU-239	60.	129.30	9.0607E+02
AM-241	61.	59.54	6.8495E-01
AM-243	68.	74.67	2.1151E-01

LABCORE Completed RadChem Report for Worklist#: 12887

Analyst: slh **Instrument:** GEA06 **Book#** _____

Method: _____ Rev/Mod _____

Worklist Comment: AP-105. Sample size = 1.0ml. new

Seq	Type	Sample#	R	A	Test	Matrix	Actual	Found	DL or Yield	Unit
1	STD		0		@I129-01 I129-01	LIQUID	7.86E-04	5.70E-4	72.519	% Recovery
1	STD		0		@I129-01 I129-01C	LIQUID	100	6.07E+01	60.700	% Recovery
1	STD		0		@I129-01 I129-01E	LIQUID	1.00	1.28E+00	1.280	% Ct. Erro
2	BLNK		0		@I129-01 I129-01	LIQUID	1	<1.46E-5		uCi/mL
2	BLNK		0		@I129-01 I129-01E	LIQUID	1.00	0.00E+00	0.000	uCi/mL
3	SAMPLE	S96V000048	0		@I129-01 I129-01	LIQUID	N/A	1.40E-04	522.0e-008	uCi/mL
3	SAMPLE	S96V000048	0		@I129-01 I129-01C	LIQUID	N/A	5.08E+01	0.0e+000	% Recovery
3	SAMPLE	S96V000048	0		@I129-01 I129-01E	LIQUID	N/A	3.25E+00	0.0e+000	% Ct. Error
4	DUP	S96V000048	0		@I129-01 I129-01	LIQUID	1.40E-4	1.44E-4	2.817	RPD
4	DUP	S96V000048	0		@I129-01 I129-01C	LIQUID	100	4.98E+01	49.800	% Recovery
4	DUP	S96V000048	0		@I129-01 I129-01E	LIQUID	1.00	3.15E+00	3.150	% Ct. Erro
5	SPK	S96V000048	0		@I129-01 I129-01	LIQUID	7.86E-04	6.23E-04	79.262	% Recovery
6	SPK-DUP	S96V000048	0		@I129-01 I129-01	LIQUID	6.23E-04	6.16E-04	1.130	RPD
7	SAMPLE	S96V000049	0		@I129-01 I129-01	LIQUID	N/A	1.19E-04	433.0e-008	uCi/mL
7	SAMPLE	S96V000049	0		@I129-01 I129-01C	LIQUID	N/A	6.13E+01	0.0e+000	% Recovery
7	SAMPLE	S96V000049	0		@I129-01 I129-01E	LIQUID	N/A	3.26E+00	0.0e+000	% Ct. Error

Final page for worklist# 12887

Analyst Signature **Date** **Analyst Signature** **Date**

~~Reviewer Signature~~ 12 Dec 96
Date

Spike is below customer levels but well within the average of the method, therefore the data was accepted. SAL

Units shown for QC (BLK/BKG) may not reflect the actual units.

HNF-SD-WM-DP-202, REV. 1

LABCORE Data Entry Template for Worklist# 12887

Analyst: SLH **Instrument:** GEA00 6 **Book#** 53B56

Method: LA-378-103 Rev/Mod C-0

Worklist Comment: AP-105. Sample size = 1.0ml. new

S	Type	Sample#	R	A	Test	Matrix	Group#	Project
1	STD				@I129-01	LIQUID		
2	BLNK				@I129-01	LIQUID		
3	SAMPLE	S96V000048	0		@I129-01	LIQUID	96000855	AP-105
	Analytes Requested: I129-01 , I129-01C, I129-01E							
4	DUP	S96V000048	0		@I129-01	LIQUID		
5	SPK	S96V000048	0		@I129-01	LIQUID		
6	SPK-DUP	S96V000048	0		@I129-01	LIQUID		
7	SAMPLE	S96V000049	0		@I129-01	LIQUID	96000855	AP-105
	Analytes Requested: I129-01 , I129-01C, I129-01E							

Final page for worklist # 12887

Sandra L Hood Boatright
Analyst Signature Date
12-5-96

Sue Morgan 12/11/96
Analyst Signature Date
12/11/96

Data Entry Comments:

S = Worklist Slot Number, R = Replicate Number, A = Aliquot Code.

WORKBOOK PAGE: STD1

I-129: LA-378-101 (C-0), 103 (C-0)	IODINE-129		STANDARD
Date	GROSS WEIGHT	(wt2)	2.8894
STD	TARE WEIGHT	(wt1)	2.8709
Work Lot	MASS PRECIPITATE	(net wt)	0.0185
12887	I-129 µCi / SAMPLE from GEA	(I-129 GEA)	3.469E-4
Test Code	SAMPLE VOLUME in mL	(SS)	1.0000
@I129-01	DILUTION FACTOR	(DF)	1.0000
Results	DIGEST DILUTION FACTOR	(DDF)	1.0000
LIQUID	CARRIER FRACTIONAL RECOVERY	(Rec)	0.6066
Batch Number	COUNT TIME IN MINUTES		100
96009327	COUNTING UNCERTAINTY	(%)	1.28
Notes	STANDARD BOOK NUMBER		53B56
0	STANDARD VALUE in µCi /mL		7.86E-04
Process Step			
NOT LISTED			
Process #			
NOT LISTED	One mL of the solution is equivalent to 0.0305 grams		
Preparation Code			
WC38831	Carrier Percent Recovery = (wt2-wt1)*100/0.0305		
Prepared By	I-129 µCi/mL = (I-129 GEA)(DF)(DDF) / [(Rec)(SS)]		
SEH			
Checked			
SAC			
Analyst			
SLH			
Date Submitted			
12/11/96			
Analysis Date			
12/06/96			
Analysis Time	Iodine 129 in µCi / mL		5.70E-04
11:30 PM	Carrier Percent Recovery		60.7%
Density Factor	Counting Uncertainty		1.3%
AP-106	Standard Recovery	=	72.6%

Analyst:		SLH	Date: 12/11/96
Signature of Chemist:		SAC	Date: DEC 12 1996

STANDARD.WB1 REV. 2.0 37810NML

WORKBOOK PAGE: BLANK2

I-129: LA-378-101 (C-0), 103 (C-0) **IODINE-129**

			BLANK
Type	GROSS WEIGHT	(wt2)	2.9702
BLNK	TARE WEIGHT	(wt1)	2.9546
Work Unit	MASS PRECIPITATE	(net wt)	0.0156
12887	I-129 µCi / SAMPLE from GEA	(I-129 GEA)	<7.4607E-6
Total Depth	SAMPLE VOLUME in mL	(SS)	1.0000
@I129-01	DILUTION FACTOR	(DF)	1.0000
Matrix	DIGEST DILUTION FACTOR	(DDF)	1.0000
LIQUID	CARRIER FRACTIONAL RECOVERY	(Rec)	0.5115
Read Number	COUNT TIME IN MINUTES		100
96009327	COUNTING UNCERTAINTY	(%)	N/A << N / A (please enter N/A)
Result	DETECTION LIMIT in µCi / mL	(DL)	1.4587E-05
0			
Sample Prep			
NOT LISTED			
Sample #			
NOT LISTED	One mL of the solution is equivalent to 0.0305 grams.		
Instrument Code			
WC38831	Carrier Percent Recovery = (wt2-wt1)*100/0.0305		
Counted By	I-129 µCi/mL = (I-129 GEA)(DF)(DDF) / [(Rec)(SS)]		
SEH	Detection Limit = I-129 µCi/mL		
Chemist			
SAC			
Analyst			
SLH			
Data Complete			
12/11/96			
Analysis Date			
12/05/96			
Analysis Time	Iodine 129 in µCi / mL	<	1.46E-05
11:30 PM	Carrier Percent Recovery		51.1%
Sample Point	Counting Uncertainty		0.0%
AP-106			

Analyst:		SLH	Date: 12/11/96
Signature of Chemist:	SAC	SAC	Date: 12/11/96

BLANK.WB1 REV 2.0 37810NML

WORKBOOK PAGE: SAM3

I-129: LA-378-101 (C-0), 103 (C-0) **IODINE-129**

			SAMPLE	
Type	GROSS WEIGHT	(wt2)	2.9965	
SAMPLE	TARE WEIGHT	(wt1)	2.9810	
Work Unit	MASS PRECIPITATE	(net wt)	0.0155	
12887	I-129 µCi / SAMPLE from GEA	(I-129 GEA)	7.121E-5	
Test Code	SAMPLE VOLUME in mL	(SS)	1.0000	
8I129-01	DILUTION FACTOR	(DF)	1.0000	
Matrix	DIGEST DILUTION FACTOR	(DDF)	1.0000	
LIQUID	CARRIER FRACTIONAL RECOVERY	(Rec)	0.5082	
Batch Number	COUNT TIME IN MINUTES		100	
96009327	COUNTING UNCERTAINTY	(%)	3.26	
Parent	DETECTION LIMIT in µCi / mL	(DL)	5.2244E-06	<< pre-determined
0				
Sample Path				
NOT LISTED				
Template #				
S96V00004B	One mL of the solution is equivalent to 0.0305 grams.			
Instrument Code				
WC38824	Carrier Percent Recovery = (wt2-wt1)*100/0.0305			
Program File	I-129 µCi/mL = (I-129 GEA)(DF)(DDF) / [(Rec)(SS)]			
AEH	Detection Limit = (2.655E-06)(DF)(DDF)/[(SS)(Rec)]			
Chemist				
SAC				
Analyst				
SLH				
Data Complete				
12/11/96				
Analysis Date				
12/06/96				

Analysis Time	Iodine 129 in µCi / mL 1.40E-04
11:30 PM	Carrier Percent Recovery 50.8%
Sample Point	Counting Uncertainty 3.3%
AP-106	

Analyst:	SLH	Date:	12/11/96
Signature of Chemist: SAC	SAC	Date:	DEC 12 1996

SAMPLE.WB1 REV 2. 37810NML

WORKBOOK PAGE: DUP4

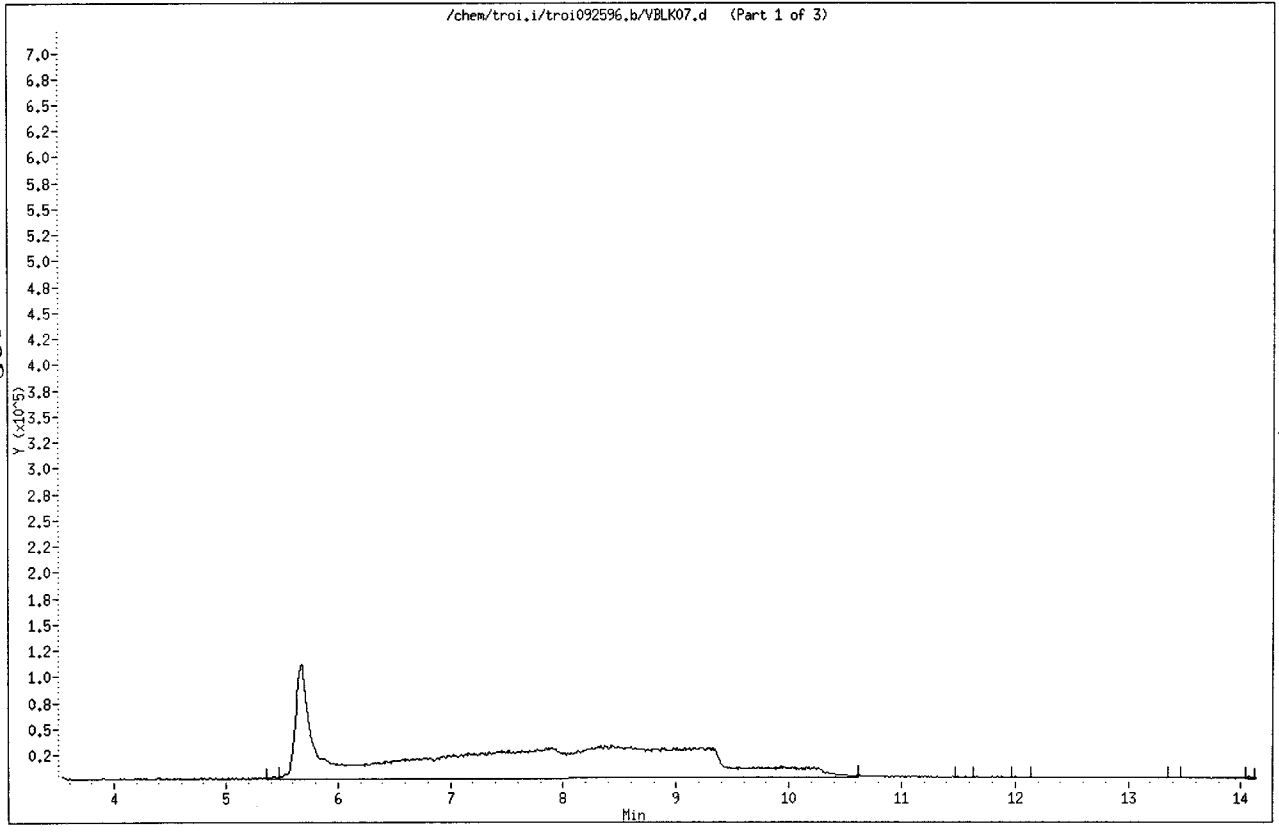
I-129: LA-378-101 (C-0), 103 (C-0)	IODINE-129		DUPLICATE	
Type	GROSS WEIGHT	(wt2)	2.8801	
DUP	TARE WEIGHT	(wt1)	2.8649	
Work Unit	MASS PRECIPITATE	(net wt)	0.0152	
12887	I-129 µCi / SAMPLE from GEA	(I-129 GEA)	7.183E-5	
Test Code	SAMPLE VOLUME in mL	(SS)	1.0000	
129-01	DILUTION FACTOR	(DF)	1.0000	
Matrix	DIGEST DILUTION FACTOR	(DDF)	1.0000	
LIQUID	CARRIER FRACTIONAL RECOVERY	(Rec)	0.4984	
Basis Number	COUNT TIME IN MINUTES		100	
96009327	COUNTING UNCERTAINTY	(%)	3.16	
Result	DETECTION LIMIT in µCi / mL	(DL)	5.3275E-06	<< pre-determined
0				
Sub-Set Prep				
NOT LISTED				
Density #				
S96V000048	One mL of the solution is equivalent to 0.0305 grams			
Instrument Code				
WC38931	Carrier Percent Recovery = (wt2-wt1)*100/0.0305			
Analyst ID#	I-129 µCi/mL = (I-129 GEA)(DF)(DDF) / [(Rec)(SS)]			
REH	Detection Limit = (2.655E-06)(DF)(DDF)/[(SS)(Rec)]			
Chem ID				
SAC				
Analyst				
SLH				
Date Completed				
12/11/96				
Analysis Date				
12/06/96				
Analysis Time	Iodine 129 in µCi / mL		1.44E-04	
11:30 PM	Carrier Percent Recovery		49.8%	
Sample Point	Counting Uncertainty		3.2%	
AP-106				

Analyst:	SLH	Date:	12/11/96
Signature of Chemist:	SAC	Date:	DEC 12 1996

SAMPLE.WB1 REV 2. 37810NML

Data File: /chem/troi.i/troi092596.b/VBLK07.d
Date : 25-SEP-1996 10:56
Client ID: VBLK07
Instrument: troi.i
Sample Info:
Purge Volume: 5.0
Operator: den
Column phase: db-624
Column diameter: 0.25

/chem/troi.i/troi092596.b/VBLK07.d (Part 1 of 3)



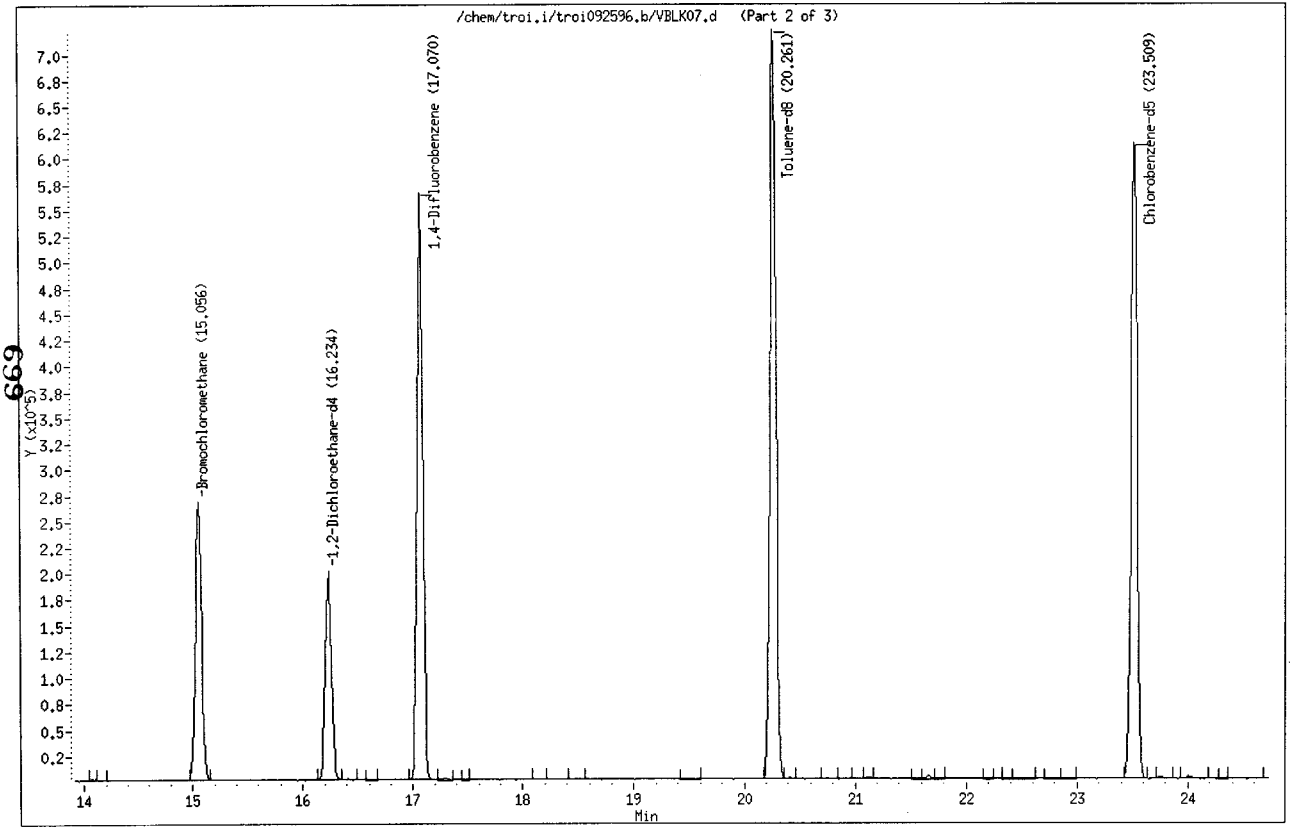
698

HWF-WHC-SD-WM-DP-202, REV. 1

Data File: /chem/troi.i/troi092596.b/VBLK07.d
Date : 25-SEP-1996 10:56
Client ID: VBLK07
Sample Info:
Purge Volume: 5.0
Column phase: db-624

Instrument: troi.i

Operator: den
Column diameter: 0.25



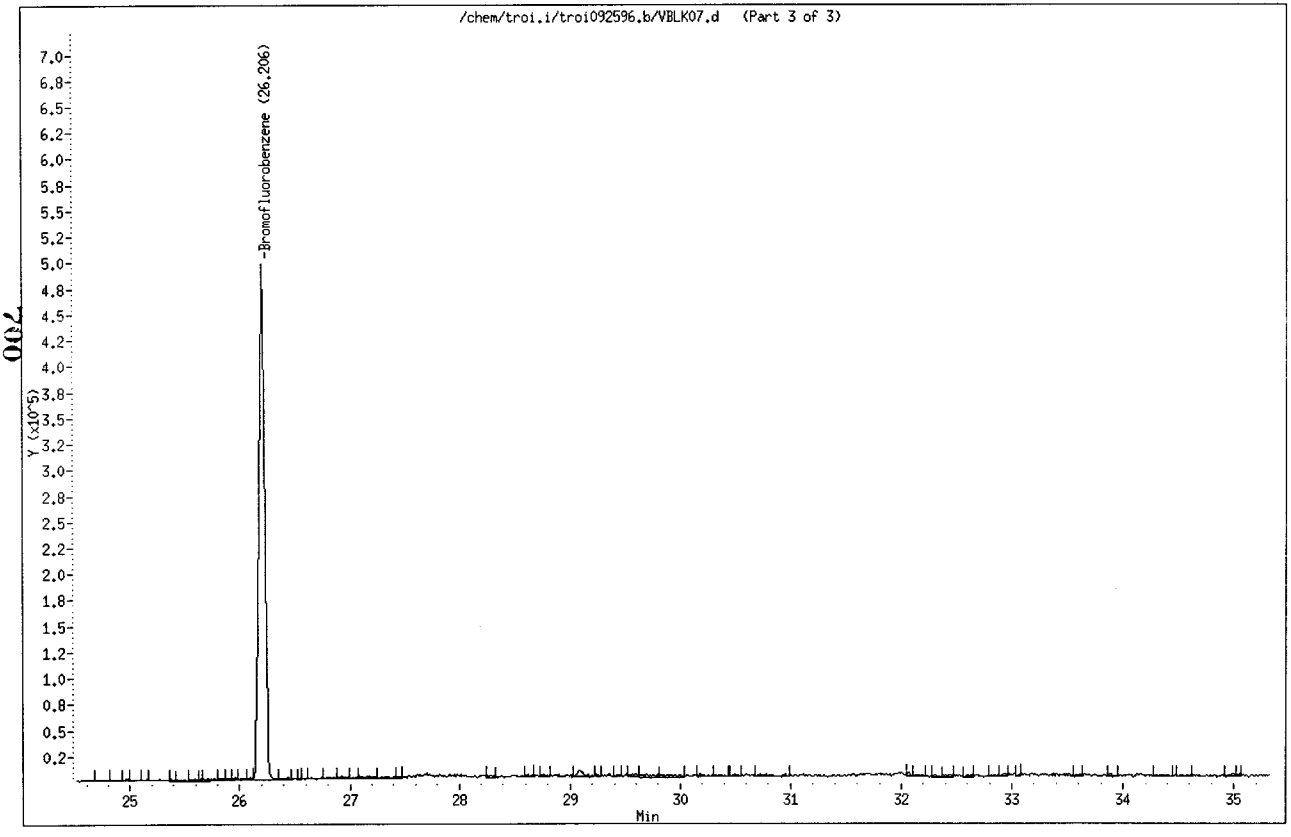
699

HNF-WHC-SD-WM-DP-202, REV. 1

Data File: /chem/troi.i/troi092596.b/VBLK07.d
Date : 25-SEP-1996 10:56
Client ID: VBLK07
Sample Info:
Purge Volume: 5.0
Column phase: db-624

Instrument: troi.i

Operator: den
Column diameter: 0.25



002

WORKBOOK PAGE: SPIKE5

I-129: LA-378-101 (C-0), 103 (C-0)	IODINE-129		SPIKE	
Type	GROSS WEIGHT	(wt2)	3.0007	
SPK	TARE WEIGHT	(wt1)	2.9865	
Work Sht	MASS PRECIPITATE	(net wt)	0.0142	
12887	SAMPLE + SPIKE I-129 µCi / SAMPLE from GEA	(I-129 GEA s+s)	3.653E-4	
Test Code	SPIKE VOLUME in mL	(SS spk)	1.0000	
@I129-01	DILUTION FACTOR	(Spk DF)	1.0000	
Matrix	DIGEST DILUTION FACTOR	(DDF)	1.0000	
LIQUID	CARRIER FRACTIONAL RECOVERY	(Rec)	0.4656	
Batch Number	SPIKE BOOK NUMBER		53856	
96009327	ACTIVITY OF SPIKE in µCi / mL	(Act)	7.86E-04	
Rerun	COUNTING UNCERTAINITY	(%)	1.29	
0	SAMPLE VOLUME USED IN SPIKE TEST in mL	(SS sam)	1.0000	
Sample Prep	SAMPLE I-129 µCi / SAMPLE from GEA	(sam GEA)	7.121E-5	<< imported from sample page
NOT LISTED	SAMPLE DILUTION FACTOR	(sam DF)	1.0000	<< imported from sample page
Sample #	SAMPLE VOLUME in mL	(sam SS)	1.0000	<< imported from sample page
S96V000048	SAMPLE RECOVERY	(sam Rec)	0.5082	<< imported from sample page
Instrument Code	COUNT TIME IN MINUTES		100	
WC59931				
Prepared By				
SEH	One mL of the solution is equivalent to 0.0305 grams			
Chemist				
SAC	Carrier Percent Recovery =((wt2-wt1)(100))/0.0305			
Analyst	QC Found µCi/mL = {[(I-129 GEA s+s) / (Rec)] - [(sam GEA)(samDF)(SS sam)/[(sam Rec)(samSS)]]} * [(Spk DF/SS spk)]			
SLH	QC Actual µCi/mL = Activity of Spike			
Data Complete	% Spike Recovery = (QC Found /QC Actual) * 100			
12/11/96				
Analysis Date				
12/06/96				
Analysis Time				
11:30 PM	**QC Actual in µCi/mL**	=	7.86E-04	
Sample Point	**QC Found in µCi/mL**	=	6.23E-04	
AP-106	**Percent Spike Recovery**	=	79.3%	

Analyst: SLH Date: 12/11/96

WORKBOOK PAGE: SP_DUP6

I-129: LA-378-101 (C-0), 103 (C-0)	IODINE-129		SPK-DUP	
3 PM	GROSS WEIGHT	(wt2)	2.9746	
SPK-DUP	TARE WEIGHT	(wt1)	2.9568	
Work Sheet	MASS PRECIPITATE	(net wt)	0.0178	
12887	SAMPLE + SPIKE I-129 µCi / SAMPLE from GEA	(I-129 GEA s+s)	4.415E-4	
Test Code	SPIKE VOLUME in mL	(SS spk)	1.0000	
@I129-01	DILUTION FACTOR	(Spk DF)	1.0000	
Matrix	DIGEST DILUTION FACTOR	(DDF)	1.0000	
LIQUID	CARRIER FRACTIONAL RECOVERY	(Rec)	0.5836	
Batch Number	SPIKE BOOK NUMBER		63B56	
96009327	ACTIVITY OF SPIKE in µCi / mL	(Act)	7.86E-04	
Batch	COUNTING UNCERTAINITY	(%)	1.19	
0	SAMPLE VOLUME USED IN SPIKE TEST in mL	(SS sam)	1.0000	
Sample Point	SAMPLE I-129 µCi / SAMPLE from GEA	(sam GEA)	7.121E-5	<< imported from sample page
NOT LISTED	SAMPLE DILUTION FACTOR	(sam DF)	1.0000	<< imported from sample page
Sample #	SAMPLE VOLUME in mL	(sam SS)	1.0000	<< imported from sample page
S96V000048	SAMPLE RECOVERY	(sam Rec)	0.5082	<< imported from sample page
Instrument Code	COUNT TIME IN MINUTES		100	
WC3880J				
Prepared By				
SEH	One mL of the solution is equivalent to 0.0305 grams.			
Checked				
SAC	Carrier Percent Recovery =((wt2-wt1)(100))/0.0305			
Analyzed	QC Found µCi/mL = {[(I-129 GEA s+s) / (Rec)] - [(sam GEA)(samDF)(SS sam)/[(sam Rec)(samSS)]]} * [(Spk DF/SS spk)]			
SLH	QC Actual µCi/mL = Activity of Spike			
Data Complete	% Spike Recovery = (QC Found /QC Actual) * 100			
12/11/96				
Analysis Date				
12/05/96				
Analysis Time				
11:30 PM	**QC Actual in µCi/mL**	=	7.86E-04	
Sample Point	**QC Found in µCi/mL**	=	6.16E-04	
AP-106	**Percent Spike Recovery**	=	78.4%	

Analyst:	SLH	Date:	12/11/96

CHAIN-OF-CUSTODY RECORD FOR AUGER/GRAB SAMPLING

(1) Shipment Number 200E-08-TF (2) Sample Number 5AP-96-4 (T) (3) Supervisor R.J. Praznik

(4) Tank AP-105 (5) Riser 1 @ 90° (6) Cask/PIG Shipping Container Serial Number 6003D

Radiation Survey Data For Cask/PIG:	(7) FIELD	(31) LABORATORY
Over Top Dose Rate	20.5 mR/hr	0.5 mR/hr
Side Dose Rate	1 mR/hr	1
Bottom Dose Rate	.8 mR/hr	1
Smearable Contamination	270 (Alpha)	1180 / LAS (Alpha)
	21K (Beta-Gamma)	11K / LAS (Beta-Gamma)
	RCT* (Signature)	RCT* (Signature)

(8) Shipment Description

A. Work Package Number	ES-96-00219/0
B. Cask/PIG Seal Number	10536
C. Date and Time Sample Removed from Tank	9-3-96 / 1145hrs
D. Expected Liquid Content	100%
E. Expected Solid Content	0%
F. Dose Rate Through Drill String (Auger)/On Contact (GRAB)	800mR/hr
G. Expected Sample Length (Auger)/ Volume (GRAB)	125ml.

(9) INFORMATION (Include statement of laboratory tests to be performed.)

01

(30) Field Comments

(32) Laboratory Comments

(11) Point of Origin	(12) Destination	(13) Sender Name (Sign and PRINT)	(14) Date/Time	(15) Sender Comments
AP105 1@90°	222-S	RJ, Praznik	9-4-96/1310	
(17) Relinquished By (Sign and PRINT)		(18) Received By (Sign and PRINT)	(19) Date/Time	(20) Receiver Comments
RJ Praznik		[illegible]	9-4-96/1317	
(21) Relinquished By (Sign and PRINT)		(22) Received By (Sign and PRINT)	(23) Date/Time	(24) Receiver Comments
[illegible]		[illegible]	9-4-96 14:00	
(25) Relinquished By (Sign and PRINT)		(26) Received By (Sign and PRINT)	(27) Date/Time	(28) Receiver Comments

(16) Seal Intact Upon Release?	(29) Seal Intact Upon Receipt?	(30) Seal Data Consistent with this Record?		
		Shipment No.	Seal No.	Sample No.
☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No	☒ Yes ☐ No

DISTRIBUTION: White - Office of Sample Management Yellow - Recipient of Sample Pink - Waste Tank Sampling Goldenrod - Tank Farm Operations.

BC-6001-326 (01/96)

WHC-SD-WM-DP-202, REV. 1

Sep. 4, 1996 2:10PM WHC 222S LAB ROOM 2F BACKSIDE No. 4724 P. 2/4

WORKBOOK PAGE: BLANK2

LA-220-101 / D-1 **Sr-89/90 : LA-220-101 (D-1), 102 (E-3), 104 (D-1)**

							BLNK-PREP
	DETECTOR NUMBER		12	CARRIER ADDED in mL	(CVA)		1.000
BLNK-PREP	TOTAL COUNTS	(TC)	66	GROSS WEIGHT	(W2)		7.7455
	COUNT TIME in MINUTES	(CT)	10	TARE WEIGHT	(W1)		7.6542
15408	BACKGROUND in cpm	(BKG)	4.1	NET WEIGHT	(W3)		0.0913
	SAMPLE VOLUME in mL	(SS)	2.500	DELTA TIME (HOURS)	(DT)		8.98
@SR90-01	DILUTION FACTOR	DF	1				
	DIGEST DILUTION FACTOR	(DDF)	50				
LIQUID	SAMPLE COUNT RATE	(Rs)	2.50	SR-90 EFFICIENCY FACTOR	(C1)		0.4180
	CRITICAL LEVEL	(Lc)	1.22	Y-90 EFFICIENCY FACTOR	(C2)		0.4660
96012021	TIME OF SEPARATION	(ST)	11:45	Rmax			N/A
	DATE OF SEPARATION	(SD)	12/08/96	DETECTION LIMIT	(Ld)		2.53
0	TIME OF COUNT	(TOC)	20:44	Sr-89/90 CONC in µCi/L			5.3503E-02
	DATE OF COUNT	(DOC)	12/08/96				
N/A							
WL15408							

Sample Count Rate (Rs) = (Total Counts (TC) / Count Time (CT)) - Background in cpm (BKG)

WB27811 Sr-89/90 CONC in µCi/L Replace RS with RMAX if RS<=Lc and RS>=0 or Replace RS with Lc if RS<0

RS*DF*DDF/((C1+C2*(1-e to the power of ((-natural log 2)/64.2*DT)))*SS*REC*2220000)

VAR NOTE: 64.2 = Half Life for Y-90 and Rec. = Fractional Carrier Recovery ((W2-W1) / (CVA * 0.1000))

Relative Counting Error = (The Square Root of (TC + BKG * CT) / (TC - BKG * CT))*1.96

SAC Percent Carrier Recovery = (Net Weight / Expected weight) * 100

NOTE: Expected weight = CVA * 0.1

JDS Detection Levels and Less Than Values are determined from Procedure LA-508-002.

Delta Time (hours) = ((DOC - SD) * 24) + (TOC - ST) / 100

12/09/96

12/08/96	Sr-89/90 CONCENTRATION	5.35E-05	µCi/mL	DETECTION LEVEL
08:15 PM	RELATIVE COUNTING ERROR	81.1%		5.42E-05 µCi/mL
AP-105	PERCENT CARRIER RECOVERY	91.3%		

Analyst:	JDS	Date:	09-Dec-96
Signature of Chemist:	SAC	Date:	DEC 11 1996

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