Analytical Data Package Prepared For

Pacific Northwest National Lab

Radiochemical Analysis By

STL Richland STLRL

2800 G.W. Way, Richland Wa, 99354, (509)-375-3131.

Data Package Contains _____ Pages

Report Nbr: 33109

SDG Nbr	ORDER Nbr	CLIENT ID NUMBER	LOT Nbr	WORK ORDER	RPT DB ID	BATCH
W04872 I	X06-020	B1HLM9	J6C060187-11	H0PJQ1AA	9H0PJQ10	6103453
		B1HLM3	J6C060187-17	H0PJ51AA	9H0PJ510	6103453
		B1HLN5	J6C060187-5	H0PJE1AA	9H0PJE10	6103453

RECEIVED
SEP 18 2012
EDMC

Comments:

1216903

SEVERN TRENT STL

STL Richland
2800 George Washington Way
Richland, WA 99354

Tel: 509 375 3131 Fax: 509 375 5590
www.stl-inc.com

Certificate of Analysis

Pacific Northwest National Laboratories
Sigma V Building
Richland, WA 99352

August 25, 2006

Attention: Dot Stewart

SAF Number	:	X06-020
Date SDG Closed	:	March 1, 2006
Number of Samples	:	Three (3)
Sample Type	:	Water
SDG Number	:	W04872I
Data Deliverable	:	45-Day / Summary

CASE NARRATIVE

I. Introduction

Between February 24, 2006 and March 1, 2006, twenty water samples were received at STL Richland (STLR) for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Pacific Northwest National Laboratories (PGW) specific IDs:

PGW ID#	STLR ID#	MATRIX	DATE OF RECEIPT
B1HLN5	HOPJE	WATER	3/1/06
BIHLM9	HOPJQ	WATER	3/1/06
B1HLM3	H0PJ5	WATER	3/1/06

II. Sample Receipt

The samples were received in good condition and no anomalies were noted during check-in.

III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analyses was:

Liquid Scintillation Counting
Enriched Tritium by method RICH-RC-5024

IV. Quality Control

The analytical results for each analysis performed includes a minimum of one laboratory control sample (LCS), one method (reagent) blank, and one duplicate sample analysis. Any exceptions have been noted in the "Comments" section.

QC and sample results are reported in the same units.

V. Comments

Liquid Scintillation Counting
Enriched Tritium by method RICH-RC-5024
The LCS, batch blank, samples and sample duplicate (B1H1R4) results are within contractual requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a designee as verified by the following signature.

Reviewed and approved:

Sandra Segre

Sherryl Adam
for Project Manager

Drinking Water Method Cross References

	DRINKING WATER ASTM METHOD CROSS REFERENCES	
Referenced Method	**Isotope(s)**	**STL Richland's SOP number**
EPA 901.1	Cs-134, I-131	RICH-RC-5017
EPA 900.0	Alpha & Beta	RICH-RC-5014
EPA 903.1	Ra-226	RICH-RC-5005
EPA 904.0	Ra-228	RICH-RC-5005
EPA 905.0	Sr89/90	RICH-RC-5006
ASTM D2460	Total Radium	RICH-RC-5027
Standard Method 7500-U-C & ASTM D5174	Uranium	RICH-RC-5058
EPA 906.0	Tritium	RICH-RC-5007
NOTE:		
The Gross Alpha LCS is prepared with Am-241 (unless otherwise specified in the case narrative)		
The Gross Beta LCS is prepared with Sr/Y-90 (unless otherwise specified in the case narrative)		

Uncertainty Estimation

STL Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, R = constants * f(x,y,z,...). The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties (u_i) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty (u_c) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value (S/vn), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

Report Definitions

Action Lev	An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit.
Batch	The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together.
Bias	Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30.
COC No	Chain of Custody Number assigned by the Client or STL Richland.
Count Error (#s)	Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background.
Total Uncert (#s) ***u_c - Combined Uncertainty.***	All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure of the uncertainty associated with the result, ***u_c the combined uncertainty.*** The uncertainty is absolute and in the same units as the result.
(#s), Coverage Factor	The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations.
CRDL (RL)	Contractual Required Detection Limit as defined in the Client's Statement Of Work or STL Richland "default" nominal detection limit. Often referred to the reporting level (RL)
Lc	Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. Lc=(1.645 * Sqrt(2*(BkgrndCnt/BkgrndCntMin)/SCntMin)) * (ConvFct/(Eff*Yld*Abn*Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero.
Lot-Sample No	The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot.
MDC|MDA	Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. MDC = (4.65 * Sqrt((BkgrndCnt/BkgrndCntMin)/SCntMin) + 2.71/SCntMin) * (ConvFct/(Eff * Yld * Abn * Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability.
Primary Detector	The instrument identifier associated with the analysis of the sample aliquot.
Ratio U-234/U-238	The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038.
Rst/MDC	Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Rst/TotUcert	Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Report DB No	Sample Identifier used by the report system. The number is based upon the first five digits of the **Work Order** Number.
RER	The equation Replicate Error Ratio = (S-D)/[sqrt($TPUs^2$ + $TPUd^2$)] as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUd is the total uncertainty of the duplicate sample.
SDG	Sample Delivery Group Number assigned by the Client or assigned by STL Richland upon sample receipt.
Sum Rpt Alpha Spec Rst(s)	The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units.
Work Order	The LIMS software assign test specific identifier.
Yield	The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method.

STL Richland Report

Lab Code: STLRL

FormNbr: R FormatType: FEAD Version: 05 Rpt Nbr: 33109 File Name: h:\Reportdb\edd\FeadIV\Rad\W04872.Edd, h:\Reportdb\edd\FeadIV\Rad\33109.Edd

Lab Sample Id:	Client Id:	Test User	Contract Nbr	SAF Nbr	Sdg Nbr:	QC Type:	Moisture/ Solids%*:	Distilled Volume	Sample On Date:	Collection Date:
9H0PJ510	B1HLM3		MW6-SBB-A1	X06-020	W04872					03/01/2006 09:30

Batch	Analyte	CAS#	Result	Unit	CntU 2S	TotU 2S	Qual	MDA	TrcYield	Method	Alq Size	Unit	Analy Date/Time	Act
6103453	H-3	10028-17-8	2.64E+02	pCi/L	1.4E+01	5.0E+01		6.38E+00	100.0	TRITIUM_ELECT_L	1.50E-01	L	08/23/2006 14:16	I

Lab Sample Id:	Client Id:	Test User	Contract Nbr	SAF Nbr	Sdg Nbr:	QC Type:	Moisture/ Solids%*:	Distilled Volume	Sample On Date:	Collection Date:
9H0PJE10	B1HLN5		MW6-SBB-A1	X06-020	W04872					03/01/2006 09:30

Batch	Analyte	CAS#	Result	Unit	CntU 2S	TotU 2S	Qual	MDA	TrcYield	Method	Alq Size	Unit	Analy Date/Time	Act
6103453	H-3	10028-17-8	2.54E+02	pCi/L	1.3E+01	4.9E+01		6.40E+00	100.0	TRITIUM_ELECT_L	1.50E-01	L	08/23/2006 11:41	I

Lab Sample Id:	Client Id:	Test User	Contract Nbr	SAF Nbr	Sdg Nbr:	QC Type:	Moisture/ Solids%*:	Distilled Volume	Sample On Date:	Collection Date:
9H0PJQ10	B1HLM9		MW6-SBB-A1	X06-020	W04872					03/01/2006 09:30

Batch	Analyte	CAS#	Result	Unit	CntU 2S	TotU 2S	Qual	MDA	TrcYield	Method	Alq Size	Unit	Analy Date/Time	Act
6103453	H-3	10028-17-8	2.57E+02	pCi/L	1.3E+01	4.9E+01		6.42E+00	100.0	TRITIUM_ELECT_L	1.50E-01	L	08/23/2006 12:59	I

U Qual - Analyzed for, but the result is less than the Mdc or gamma scan did not identify the nuclide.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit (CRDL).
B Qual- Analyte was found in the associated laboratory blank above the MDC.

Friday, August 25, 2006

STL Richland QC Blank Report

Lab Code: STLRL

FormNbr: R **FormatType:** FEAD **VersionNbr:** 05 **File Name:** h:\Reportdb\edd\FeadIV\Rad\W04872.Edd, h:\Reportdb\edd\FeadIV\Rad\33109.Edd

Lab Sample Id: H272J1AB **Sdg/Rept Nbr:** W04872 I 33109 **Collection Date:** 12/22/2005 09:23

Client Id: NA **Matrix:** WATER WATER **Sample On Date:**

Moisture/Solids%*: **QC Type:** BLK **Received Date:** 12/22/2005

SAF Nbr	Contract Nbr	Test User	Case Nbr	SAS Nbr	Suffix	Decant	Distilled Volume	File Id	FSuffix	RTyp
	MW6-SBB-A19981								AD	H

Batch # / Qc Type	Analyt/ CAS#	Result/ Orig Rst	Unit	Tot/Cnt Uncert 2S	Qu-al	MDC	Tracer Yield	Spk Conc/ %Rec	Analy Method	Aliq Size/	Date/Time Analyzed	RPD/ UCL	RER/ UCL	LCS LCL/UCL	R Typ
6103453	H-3	4.62E+00	pCi/L	5.8E+00	U	6.36E+00	100.0		TRITIUM_ELE	1.50E-01	08/22/2006				D
BLK	10028-17-8			4.5E+00						L	16:16				

U Qual - Analyzed for, but the result is less than the Mdc or gamma scan did not identify the nuclide.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit (CRDL).
B Qual- Analyte was found in the associated laboratory blank above the MDC.

Friday, August 25, 2006

STL Richland QC Control Sample Report

Lab Code: STLRL

FormNbr: R **FormatType:** FEAD **VersionNbr:** 05 **File Name:** h:\Reportdb\edd\FeadIV\Rad\W04872.Edd, h:\Reportdb\edd\FeadIV\Rad\33109.Edd

Lab Sample Id: H272J1CS **Sdg/Rept Nbr:** W04872 I 33109 **Collection Date:** 12/22/2005 09:23

Client Id: NA **Matrix:** WATER WATER **Sample On Date:**

Moisture/Solids%*: **QC Type:** BS **Received Date:** 12/22/2005

SAF Nbr	Contract Nbr	Test User	Case Nbr	SAS Nbr	Suffix	Decant	Distilled Volume	File Id	FSuffix	RTyp
	MW6-SBB-A19981								AE	H

Batch # / Qc Type	Analyt/ CAS#	Result/ Orig Rst	Unit	Tot/Cnt Uncert 2S	Qu-al	MDC	Tracer Yield	Spk Conc/ %Rec	Analy Method	Aliq Size/	Date/Time Analyzed	RPD/ UCL	RER/ UCL	LCS LCL/UCL	R Typ
6103453	H-3	4.21E+02	pCi/L	7.9E+01		6.36E+00	100.0	4.50E+02	TRITIUM_ELE	1.5001E-01	08/22/2006			70	D
BS	10028-17-8			1.7E+01				93.6		L	17:34			130	

U Qual - Analyzed for, but the result is less than the Mdc or gamma scan did not identify the nuclide.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit (CRDL).
B Qual- Analyte was found in the associated laboratory blank above the MDC.

Friday, August 25, 2006

STL Richland QC Duplicate Report

Lab Code: STLRL

FormNbr: R **FormatType:** FEAD **VersionNbr:** 05 **File Name:** h:\Reportdb\edd\FeadIV\Rad\W04872.Edd, h:\Reportdb\edd\FeadIV\Rad\33109.Edd

Lab Sample Id:	HTN4Q2JR	**Sdg/Rept Nbr:**	W04837I 33109	**Collection Date:**	12/22/2005 09:23
Client Id:	B1H1R4	**Matrix:**	WATER WATER	**Sample On Date:**	
Moisture/Solids%*:		**QC Type:**	DUP	**Received Date:**	12/22/2005

SAF Nbr	Contract Nbr	Test User	Case Nbr	SAS Nbr	Suffix	Decant	Distilled Volume	File Id	FSuffix	RTyp
S06-012	MW6-SBB-A19981								AF	H

Batch # / Qc Type	Analyt/ CAS#	Result/ Orig Rst	Unit	Tot/Cnt Uncert 2S	Qu-al	MDC	Tracer Yield	Spk Conc/ %Rec	Analy Method	Aliq Size/	Date/Time Analyzed	RPD/ UCL	RER/ UCL	LCS LCL/UCL	R Typ
6103453	H-3	3.73E+01	pCi/L	1.1E+01		6.36E+00	100.0		TRITIUM_ELE	1.5001E-01	08/22/2006	9.6	0.5		D
DUP	10028-17-8	3.39E+01		6.6E+00						L	20:09	20.0	3		

U Qual - Analyzed for, but the result is less than the Mdc or gamma scan did not identify the nuclide.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit (CRDL).
B Qual- Analyte was found in the associated laboratory blank above the MDC.

SEVERN TRENT STL

Data Review/Verification Checklist

RADIOCHEMISTRY, First Level Review

8/24/2006 10:31:23 AM

Lot No., Due Date: J6C060187,J6A050240,J6A050244,J5L220343,J6A240282,J6A100346,J6A260392;

Client, Site: 384868; PGW 615HANFORD HANFORD

QC Batch No., Method Test: 6103453; RH3EE H3EE by LSC

SDG, Matrix: W04872,W04842,W04837,W04853,W04846,W04854; WATER

1.0 COC			
1.1 Is the ICOC page complete; includes all applicable analysis, dates, SOP numbers, and revisions?	Yes ✓	No	N/A
2.0 QC Batch			
2.1 Do the Summary/Detailed Reports include a calculated result for each sample listed on the QC Batch Sheet?	Yes ✓	No	N/A
2.2 Are the QC appropriate for the analysis included in the batch?	Yes ✓	No	N/A
2.3 Is the Analytical Batch Worksheet complete; includes as appropriate, volumes, count times, etc?	Yes ✓	No	N/A
2.4 Does the Worksheets include a Tracer Vial label for each sample?	Yes	No	N/A ✓
3.0 QC & Samples			
3.1 Is the blank results, yield, and MDA within contract limits?	Yes ✓	No	N/A
3.2 Is the LCS result, yield, and MDA within contract limits?	Yes ✓	No	N/A
3.3 Are the MS/MSD results, yields, and MDA within contract limits?	Yes	No	N/A ✓
3.4 Are the duplicate result, yields, and MDAs within contract limits?	Yes ✓	No	N/A
3.5 Are the sample yields and MDAs within contract limits?	Yes ✓	No	N/A
4.0 Raw Data			
4.1 Were results calculated in the correct units?	Yes ✓	No	N/A
4.2 Were analysis volumes entered correctly?	Yes ✓	No	N/A
4.3 Were Yields entered correctly?	Yes	No	N/A ✓
4.4 Were spectra reviewed/meet contractual requirements?	Yes	No	N/A ✓
4.5 Were raw counts reviewed for anomalies?	Yes ✓	No	N/A
5.0 Other			
5.1 Are all nonconformances included and noted?	Yes	No	N/A ✓
5.2 Are all required forms filled out?	Yes ✓	No	N/A
5.3 Was the correct methodology used?	Yes ✓	No	N/A
5.4 Was transcription checked?	Yes ✓	No	N/A
5.5 Were all calculations checked at a minimum frequency?	Yes ✓	No	N/A
5.6 Are worksheet entries complete and correct?	Yes ✓	No	N/A

6.0 Comments on any No response:

First Level Review P Anderson **Date** 8-24-06

SEVERN TRENT STL

Data Review Checklist
RADIOCHEMISTRY
Second Level Review

QC Batch Number: 6103453

Review Item	Yes (√)	No (√)	N/A (√)
A. Sample Analysis 1. Are the sample yields within acceptance criteria?	√		
2. Is the sample Minimum Detectable Activity < the Contract Detection Limit?	√		
3. Are the correct isotopes reported?	√		
B. QC Samples 1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?	√		
2. Does the blank result meet the Contract criteria?	√		
3. Is the blank result < the Contract Detection Limit?	√		
4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?			√
5. Is the LCS recovery with contract acceptance criteria?	√		
7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?	√		
8. Do the MS/MSD results and yields meet acceptance criteria?			√
9. Do the duplicate sample results and yields meet acceptance criteria?	√		
C. Other 1. Are all Nonconformances included and noted?			√
2. Are all required forms filled out?	√		
3. Was the correct methodology used?	√		
4. Was transcription checked?	√		
5. Were all calculations checked at a minimum frequency?	√		
6. Were units checked?	√		

Comments on any "No" response:

Second Level Review: Sheryl R Adam Date: 8-23-06

PNNL

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # X06-020-5

Page 1 of 1

Collector: DURATEK K.B. HULSE	Contact/Requester: Dot Stewart	Telephone No.: 509-376-5056 MSIN FAX
SAF No.: X06-020	Sampling Origin: Hanford Site	Purchase Order/Charge Code
Project Title: SPECIAL SAMPLING, JANUARY 2006		Ice Chest No.: STL 020 Temp.
Shipped To (Lab): Severn Trent Incorporated, Richland	Method of Shipment: Govt. Vehicle	Bill of Lading/Air Bill No.: N/A
Protocol: SURV	Priority: 45 Days	Offsite Property No.: N/A

POSSIBLE SAMPLE HAZARDS/REMARKS
** **
W04872
JGC060187

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☑ No ☐
Batch all PNNL samples submitted under this X SAF into one SDG, not to exceed SDG closure of 14 days.
Submit invoices & deliverables to DL Stewart, PNNL.

Sample No.	Lab ID	*	Date	Time	No/Type Container	Sample Analysis		Preservative
B1HLL9		W	3/1/06	0930	1x1000-mL P	9310_ALPHABETA_GPC: Alpha + Beta (2)	HOPJT	HNO3 to pH <2
B1HLL9		W			1x20-mL P	Activity Scan		None
B1HLM0		W			1x20-mL P	Activity Scan		None
B1HLM0		W			1x1000-mL G/P	PUISO_PLATE_AEA: Pu-238 + 239/240 (2)	HOPJV	HNO3 to pH <2
B1HLM1		W			1x20-mL P	Activity Scan		None
B1HLM1		W			3x1000-mL G/P	SRISO_SEP_PRECIP_GPC: Sr-90 (1)	HOPJ1	HNO3 to pH <2
B1HLM2		W			1x20-mL P	Activity Scan		None
B1HLM2		W			1x500-mL P	TC99_ETVDSK_LSC: Tc-99 (1)	HOPJ3	HCl to pH <2
B1HLM3		W			1x20-mL P	Activity Scan		None
B1HLM3		W			3x1000-mL P	TRITIUM_ELECT_LSC_LL: H-3 (1)	HOPJ5	None
B1HLM4		W			1x20-mL P	Activity Scan		None
B1HLM4		W			1x500-mL G/P	UTOT_KPA: Uranium (1)	HOPJ7	HNO3 to pH <2

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
DURATEK K.B. HULSE			3/1/06 1110	David H. Barbinson			3/1/06 1110
Relinquished By			Date/Time	Received By			Date/Time
Relinquished By			Date/Time	Received By			Date/Time
Relinquished By			Date/Time	Received By			Date/Time

Matrix *

S = Soil		DS = Drum Solid	
SE = Sediment		DL = Drum Liqui	
SO = Solid		T = Tissue	
SL = Sludge		WI = Wine	
W = Water		L = Liquid	
O = Oil		V = Vegetation	
A = Air		X = Other	

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time

PNNL	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C. # X06-020-6
		Page 1 of 1

Collector: DURATEK K. B. HULSE	Contact/Requester: Dot Stewart	Telephone No.: 509-376-5056 MSIN FAX
SAF No.: X06-020	Sampling Origin: Hanford Site	Purchase Order/Charge Code
Project Title: SPECIAL SAMPLING, JANUARY 2006		Ice Chest No.: STL 020 Temp.
Shipped To (Lab): Severn Trent Incorporated, Richland	Method of Shipment: Govt. Vehicle	Bill of Lading/Air Bill No.: N/A
Protocol: SURV	Priority: 45 Days	Offsite Property No.: N/A

POSSIBLE SAMPLE HAZARDS/REMARKS
** **
W04872
JGC00087

SPECIAL INSTRUCTIONS **Hold Time** Total Activity Exemption: Yes ☑ No ☐
Batch all PNNL samples submitted under this X SAF into one SDG, not to exceed SDG closure of 14 days.
Submit invoices & deliverables to DL Stewart, PNNL.

Sample No.	Lab ID	*	Date	Time	No/Type Container	Sample Analysis	Preservative
B1HLM5		W	3/1/06	0930	1x1000-mL P	9310_ALPHABETA_GPC: Alpha + Beta (2) HOPJH	HNO3 to pH <2
B1HLM5		W			1x20-mL P	Activity Scan	None
B1HLM6		W			1x20-mL P	Activity Scan	None
B1HLM6		W			1x1000-mL G/P	PUISO_PLATE_AEA: Pu-238 + 239/240 (2) HOPJJ	HNO3 to pH <2
B1HLM7		W			1x20-mL P	Activity Scan	None
B1HLM7		W			3x1000-mL G/P	SRISO_SEP_PRECIP_GPC: Sr-90 (1) HOPJL	HNO3 to pH <2
B1HLM8		W			1x20-mL P	Activity Scan	None
B1HLM8		W			1x500-mL P	TC99_ETVDSK_LSC: Tc-99 (1) HOPJN	HCl to pH <2
B1HLM9		W			1x20-mL P	Activity Scan	None
B1HLM9		W			3x1000-mL P	TRITIUM_ELECT_LSC_LL: H-3 (1) HOPJQ	None
B1HLN0		W			1x20-mL P	Activity Scan	None
B1HLN0		W			1x500-mL G/P	UTOT_KPA: Uranium (1) HOPJR	HNO3 to pH <2

Relinquished By (Print / Sign)	Date/Time	Received By (Print / Sign)	Date/Time
DURATEK K. B. HULSE / K B Hulse	3/1/06 1110	DAVID HARBINSON / [signature]	3/1/06 1110
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time

Matrix *

S = Soil		DS = Drum Solid	
SE = Sediment		DL = Drum Liqui	
SO = Solid		T = Tissue	
SL = Sludge		WI = Wine	
W = Water		L = Liquid	
O = Oil		V = Vegetation	
A = Air		X = Other	

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time

PNNL	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	C.O.C. # X06-020-7
		Page 1 of 1

Collector DURATEK K.B. HULSE	Contact/Requester Dot Stewart	Telephone No. 509-376-5056 MSIN FAX
SAF No. X06-020	Sampling Origin Hanford Site	Purchase Order/Charge Code
Project Title SPECIAL SAMPLING, JANUARY 2006		Ice Chest No. STL020 Temp.
Shipped To (Lab) Severn Trent Incorporated, Richland	Method of Shipment Govt. Vehicle	Bill of Lading/Air Bill No. N/A
Protocol SURV	Priority: 45 Days	Offsite Property No. N/A

POSSIBLE SAMPLE HAZARDS/REMARKS
** **
JGC060187
SDG #: W04872 Due: 4/14/06
57671

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes ☑ No ☐
Batch all PNNL samples submitted under this X SAF into one SDG, not to exceed SDG closure of 14 days.
Submit invoices & deliverables to DL Stewart, PNNL.

Sample No.	Lab ID	*	Date	Time	No/Type Container	Sample Analysis	Preservative
B1HLN1		W	3/1/06	0930	1x1000-mL P	9310_ALPHABETA_GPC: Alpha + Beta (2) HOPHM	HNO3 to pH <2
B1HLN1		W			1x20-mL P	Activity Scan	None
B1HLN2		W			1x20-mL P	Activity Scan	None
B1HLN2		W			1x1000-mL G/P	PUISO_PLATE_AEA: Pu-238 + 239/240 (2) HOPHV	HNO3 to pH <2
B1HLN3		W			1x20-mL P	Activity Scan	None
B1HLN3		W			3x1000-mL G/P	SRISO_SEP_PRECIP_GPC: Sr-90 (1) HOPHX	HNO3 to pH <2
B1HLN4		W			1x20-mL P	Activity Scan	None
B1HLN4		W			1x500-mL P	TC99_ETVDSK_LSC: Tc-99 (1) HOPHI	HCl to pH <2
B1HLN5		W			1x20-mL P	Activity Scan	None
B1HLN5		W			3x1000-mL P	TRITIUM_ELECT_LSC_LL: H-3 (1) HOPJE	None
B1HLN6		W			1x20-mL P	Activity Scan	None
B1HLN6		W			1x500-mL G/P	UTOT_KPA: Uranium (1) HOPJF	HNO3 to pH <2

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time
DURATEK K.B. HULSE	KB Hulse		3/1/06 1110	DAVID HARBINSON			3/1/06 1110
Relinquished By			Date/Time	Received By			Date/Time
Relinquished By			Date/Time	Received By			Date/Time
Relinquished By			Date/Time	Received By			Date/Time

Matrix *

S	= Soil	DS	= Drum Solid
SE	= Sediment	DL	= Drum Liqui
SO	= Solid	T	= Tissue
SL	= Sludge	WI	= Wine
W	= Water	L	= Liquid
O	= Oil	V	= Vegetation
A	= Air	X	= Other

FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)	Disposed By	Date/Time

SEVERN TRENT STL

Sample Check-in List

Date/Time Received: 03 01 06 1110

Client: PGW SDG #: W04872 NA [ ] SAF #: X06-020 NA [ ]

Work Order Number: JTOC000187 Chain of Custody # X06-020-5, 6, 7

Shipping Container ID: STL 020 Air Bill # N/A

1. Custody Seals on shipping container intact? NA [ ] Yes [✓] No [ ]
2. Custody Seals dated and signed? NA [ ] Yes [✓] No [ ]
3. Chain of Custody record present? Yes [✓] No [ ]
4. Cooler temperature: _____ NA [✓] 5. Vermiculite/packing materials is NA [ ] Wet [ ] Dry [✓]
6. Number of samples in shipping container: 48
7. Sample holding times exceeded? NA [✓] Yes [ ] No [ ]
8. Samples have:
   - ____ tape
   - ✓ custody seals
   - ____ hazard labels
   - ✓ appropriate samples labels
9. Samples are:
   - ✓ in good condition
   - ____ broken
   - ____ leaking
   - ____ have air bubbles (Only for samples requiring head space)
10. Sample pH taken? NA [ ] pH<2 [✓] pH>2 [✓] adjusted pH [ ]
11. Sample Location, Sample Collector Listed? * Yes [✓] No [ ]
    *For documentation only. No corrective action needed.
12. Were any anomalies identified in sample receipt? Yes [ ] No [✓]
13. Description of anomalies (include sample numbers): _____

Sample Custodian: [signature] Date: 030206

Client Sample ID	Analysis Requested	Condition	Comments/Action

Client Informed on _____ by _____ Person contacted _____

[ ] No action necessary; process as is.

Project Manager _____ Date _____

LS-023, 12/05, Rev. 6

8/2/2006 2:58:48 PM

Sample Preparation/Analysis

384868, Pacific Northwest National Laboratory ,
Pacific Northwest National Lab

AS H-3 Prp/SepRC5024
U3 Enriched Tritium by Liquid Scint
5I CLIENT: HANFORD

Balance Id: 12424
Pipet #:
Sep1 DT/Tm Tech: 8-7-06 am
Sep2 DT/Tm Tech:
Prep Tech:

AnalyDueDate: 02/06/2006

Batch: 6103453 **WATER** **pCi/L** **PM, Quote: HC , 57671**
SEQ Batch, Test: None

W041837, 48412, 48116, 4853, 48571, 4872

Work Order, Lot, Sample DateTime	Total Amt/Unit	Initial Aliquot Amt/Unit	QC Tracer Prep Date	Count Time Min	Detector Id	Count On | Off (24hr) Circle	CR Analyst, Init/Date	Comments:
1 HTN4Q-2-AD J5L220343-1-SAMP dup HTN4Q2A5 added at transfer PA 8-24-06 12/22/2005 09:23	AmtRec: 20ML,500P,4XLP	#Containers: 6				Scr:	Alpha: 8.78E-04 uCi/Sa	Beta: -8.04E-04 uCi/Sa
2 HT59C-1-AA J6A050240-4-SAMP 01/04/2006 11:38	AmtRec: 20ML,3XLP	#Containers: 4				Scr:	Alpha: 2.84E-05 uCi/Sa	Beta: 9.72E-04 uCi/Sa
3 HT6AG-1-AA J6A050244-2-SAMP 01/04/2006 10:31	AmtRec: 20ML,3XLP	#Containers: 4				Scr:	Alpha: 4.86E-04 uCi/Sa	Beta: 4.75E-05 uCi/Sa
4 HT6AM-1-AA J6A050244-3-SAMP 01/04/2006 12:37	AmtRec: 20ML,3XLP	#Containers: 4				Scr:	Alpha: -1.26E-05 uCi/Sa	Beta: 4.77E-05 uCi/Sa
5 HT6AP-1-AA J6A050244-4-SAMP 01/04/2006 13:06	AmtRec: 20ML,3XLP	#Containers: 4				Scr:	Alpha: -3.63E-04 uCi/Sa	Beta: 2.26E-04 uCi/Sa
6 HVEGD-1-AA J6A100346-3-SAMP 01/10/2006 10:40	AmtRec: 20ML,3XLP	#Containers: 4				Scr:	Alpha: 8.36E-05 uCi/Sa	Beta: 7.02E-04 uCi/Sa
7 HVEGF-1-AA J6A100346-4-SAMP 01/10/2006 11:14	AmtRec: 20ML,3XLP	#Containers: 4				Scr:	Alpha: 2.06E-04 uCi/Sa	Beta: 4.87E-04 uCi/Sa

8/2/2006 2:58:48 PM

Sample Preparation/Analysis

384868, Pacific Northwest National Laboratory ,
Pacific Northwest National Lab

AS H-3 Prp/SepRC5024
U3 Enriched Tritium by Liquid Scint
5I CLIENT: HANFORD

AnalyDueDate: 02/06/2006

Batch: 6103453 **WATER** **pCi/L** **PM, Quote: HC , 57671**
SEQ Batch, Test: None

Balance Id: 12424
Pipet #:
Sep1 DT/Tm Tech: 8-7-06
Sep2 DT/Tm Tech:
Prep Tech:

Work Order, Lot, Sample DateTime	Total Amt/Unit	Initial Aliquot Amt/Unit	QC Tracer Prep Date	Count Time Min	Detector Id	Count On | Off (24hr) Circle	CR Analyst, Init/Date	Comments:
8 HV695-1-AA J6A240282-4-SAMP 01/24/2006 10:41	AmtRec: 20ML,3XLP	#Containers: 4				Scr:	Alpha:	Beta:
9 HV697-1-AA J6A240282-5-SAMP 01/24/2006 09:56	AmtRec: 20ML,3XLP	#Containers: 4				Scr:	Alpha:	Beta:
10 HWDM6-1-AE J6A260392-1-SAMP 01/26/2006 13:06	AmtRec: 20ML,4XLP,2X4LP	#Containers: 7				Scr:	Alpha: 1.40E-03 uCi/Sa	Beta: 4.73E-05 uCi/Sa
11 HWDM6-1-AG-X J6A260392-1-DUP 01/26/2006 13:06	AmtRec: 20ML,4XLP,2X4LP	#Containers: 7				Scr:	Alpha: 1.40E-03 uCi/Sa	Beta: 4.73E-05 uCi/Sa
12 HWDM7-1-AE J6A260392-2-SAMP 01/26/2006 08:00	AmtRec: 20ML,4XLP,2X4LP	#Containers: 7				Scr:	Alpha: -1.09E-04 uCi/Sa	Beta: -1.38E-03 uCi/Sa
13 H0PJE-1-AA J6C060187-5-SAMP 03/01/2006 09:30	AmtRec: 1000ML	#Containers: 3				Scr:	Alpha:	Beta:
14 H0PJQ-1-AA J6C060187-11-SAMP 03/01/2006 09:30	AmtRec: 1000ML	#Containers: 3				Scr:	Alpha:	Beta:

8/2/2006 2:58:49 PM

Sample Preparation/Analysis

384868, Pacific Northwest National Laboratory ,
Pacific Northwest National Lab

AS H-3 Prp/SepRC5024
U3 Enriched Tritium by Liquid Scint
5I CLIENT: HANFORD

Balance Id: 12424
Pipet #:
Sep1 DT/Tm Tech: 8-7-06 am
Sep2 DT/Tm Tech:
Prep Tech:

AnalyDueDate: 02/06/2006

Batch: 6103453 WATER pCi/L PM, Quote: HC , 57671
SEQ Batch, Test: None

Work Order, Lot, Sample DateTime	Total Amt/Unit	Initial Aliquot Amt/Unit	QC Tracer Prep Date	Count Time Min	Detector Id	Count On | Off (24hr) Circle	CR Analyst, Init/Date	Comments:
15H0PJ5-1-AA J6C060187-17-SAMP 03/01/2006 09:30		AmtRec: 1000ML	#Containers: 3			Scr:	Alpha:	Beta:
16H272J-1-AA-B J6D130000-453-BLK 12/22/2005 09:23		AmtRec:	#Containers: 1			Scr:	Alpha:	Beta:
17H272J-1-AC-C J6D130000-453-LCS 12/22/2005 09:23		AmtRec:	#Containers: 1			Scr:	Alpha:	Beta:
18H272J-1-AD-BN J6D130000-453-IBLK 12/22/2005 09:23		AmtRec:	#Containers: 1			Scr:	Alpha:	Beta:
19H272J-1-AE-BN J6D130000-453-IBLK 12/22/2005 09:23		AmtRec:	#Containers: 1			Scr:	Alpha:	Beta:

Comments: HTN4Q-SAMP "Comments: Beta aliq reduced as determined by wt scn due to dis-solid content. Bg"

All Clients for Batch:
384868, Pacific Northwest National Laboratory Pacific Northwest National Lab, HC , 57671

HTN4Q2AD-SAMP Constituent List:

8/2/2006 2:58:50 PM

Sample Preparation/Analysis

AS H-3 Prp/SepRC5024
U3 Enriched Tritium by Liquid Scint
5I CLIENT: HANFORD

Balance Id: 12424
Pipet #:
Sep1 DT/Tm Tech: 8-7-06 [illegible]
Sep2 DT/Tm Tech:
Prep Tech:

AnalyDueDate: 02/06/2006

Batch: 6103453 **pCi/L**
SEQ Batch, Test: None

Work Order, Lot, Sample DateTime	Total Amt/Unit	Initial Aliquot Amt/Unit	QC Tracer Prep Date	Count Time Min	Detector Id	Count On | Off (24hr) Circle	CR Analyst, Init/Date	Comments:

```
 H-3          RDL:1.00E+01    pCi/L     LCL:70      UCL:130     RPD:20
H272J1AA-BLK:
 H-3          RDL:1.00E+01    pCi/L     LCL:        UCL:        RPD:
H272J1AC-LCS:
 H-3          RDL:10          pCi/L     LCL:70      UCL:130     RPD:20
H272J1AD-IBLK:
 H-3          RDL:1.00E+01    pCi/L     LCL:        UCL:        RPD:
H272J1AE-IBLK:
 H-3          RDL:1.00E+01    pCi/L     LCL:        UCL:        RPD:

HTN4Q2AD-SAMP Calc Info:
     Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
H272J1AA-BLK:
     Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
H272J1AC-LCS:
     Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
H272J1AD-IBLK:
     Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
H272J1AE-IBLK:
     Uncert Level (#s).: 2     Decay to SaDt: Y     Blk Subt.: N     Sci.Not.: Y     ODRs: B
```

Approved By _____ Date: _____

8/24/2006 10:11:54 AM

ICOC Fraction Transfer/Status Report

ByDate: 8/24/2005, 8/29/2006, Batch: '6103453', User: *ALL Order By DateTimeAccepting

Q Batch	Work Ord	CurStatus	Accepting			Comments
6103453						
AC		**CalcC**	**McDowellD**	4/13/2006 3:12:03 PM		
SC			andersonp	IsBatched	4/13/2006 1:17:28 PM	ICOC_RADCALC v4.8.20
SC			McDowellD	InPrep	4/13/2006 3:12:03 PM	RICH-RC-5024 REVISION 2
SC			McDowellD	Sep1C	8/22/2006 8:32:42 AM	RICH-RC-5024 REVISION 2
SC			BlackCL	InCnt1	8/22/2006 8:54:15 AM	RICH-RD-0001 REVISION 3
SC			BlackCL	CalcC	8/24/2006 6:02:11 AM	RICH-RD-0001 REVISION 3
AC			**McDowellD**	8/22/2006 8:32:42		
AC			**BlackCL**	8/22/2006 8:54:15		
AC			**BlackCL**	8/24/2006 6:02:11		

AC: Accepting Entry; SC: Status Change

STL Richland

Richland Wa.

Grp Rec Cnt: 4

ICOCFractions v4.8.18