

Analytical Data Package Prepared For  
**Pacific Northwest National Lab**

Radiochemical Analysis By

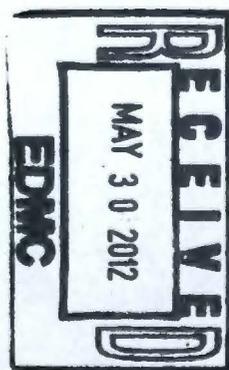
**STL Richland STLRL**

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

*Data Package Contains \_\_\_\_\_ Pages*

**Report Nbr: 30579**

SDG Nbr	ORDER Nbr	CLIENT ID NUMBER	LOT Nbr	WORK ORDER	RPT DB ID	BATCH
W04797	U06-001	B1F692	J5J170228-1	HMXHX1AC	9HMXHX10	5292238
		B1F692	J5J170228-1	HMXHX3AA	9HMXHX30	5322327



Comments:

1214354

# Certificate of Analysis

Pacific Northwest National Laboratories  
Sigma V Building  
Richland, WA 99352

November 21, 2005

Attention: Dot Stewart

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SAF Number : U06-001  
Date SDG Closed : October 17, 2005  
Number of Samples : One (1)  
Sample Type : Water  
SDG Number : W04797  
Data Deliverable : 15-Day / Summary

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## CASE NARRATIVE

### I. Introduction

On October 21, 2005, one 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:

<u>PGW ID#</u>	<u>STLR ID#</u>	<u>MATRIX</u>	<u>DATE OF RECEIPT</u>
B1F692	HMXHX	WATER	10/17/05

### 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 were:

**Liquid Scintillation Counting**

Technetium-99 by TEVA method RICH-RC-5065

**Laser Induced Phosphorimetry**

Total Uranium by method RICH-RC-5058

**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**

Technetium-99 by TEVA method RICH-RC-5065:

The duplicate for the first batch of this analysis was outside of acceptance limits. The batch was reanalyzed and these results are accepted. The LCS, batch blank, samples, sample duplicate (B1F692), and sample matrix spike (B1F692) results are within contractual requirements.

**Total Uranium**

Total Uranium by method RICH-RC-5058:

The LCS, batch blank, samples, sample duplicate (B1F692), and sample matrix spike (B1F692) 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:



Hans Carman  
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,  $R = \text{constants} * f(x,y,z,\dots)$ . 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 ( $S/\sqrt{n}$ ), 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

<b>Action Lev</b>	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.
<b>Batch</b>	The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together.
<b>Bias</b>	Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30.
<b>COC No</b>	Chain of Custody Number assigned by the Client or STL Richland.
<b>Count Error (#s)</b>	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.
<b>Total Uncert (#s) <i>u<sub>c</sub> - Combined Uncertainty.</i></b>	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, <i>u<sub>c</sub> the combined uncertainty.</i> The uncertainty is absolute and in the same units as the result.
<b>(#s), Coverage Factor</b>	The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations.
<b>CRDL (RL)</b>	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)
<b>Lc</b>	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%. $Lc = (1.645 * \text{Sqrt}(2 * (\text{BkgndCnt} / \text{BkgndCntMin}) / \text{SCntMin})) * (\text{ConvFct} / (\text{Eff} * \text{Yld} * \text{Abn} * \text{Vol})) * \text{IngrFct}$ . 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.
<b>Lot-Sample No</b>	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.
<b>MDC MDA</b>	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%. $MDC = (4.65 * \text{Sqrt}((\text{BkgndCnt} / \text{BkgndCntMin}) / \text{SCntMin}) + 2.71 / \text{SCntMin}) * (\text{ConvFct} / (\text{Eff} * \text{Yld} * \text{Abn} * \text{Vol})) * \text{IngrFct}$ . For LSC methods the batch blank is used as a measure of the background variability.
<b>Primary Detector</b>	The instrument identifier associated with the analysis of the sample aliquot.
<b>Ratio U-234/U-238</b>	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.
<b>Rst/MDC</b>	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.
<b>Rst/TotUcert</b>	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.
<b>Report DB No</b>	Sample Identifier used by the report system. The number is based upon the first five digits of the <b>Work Order</b> Number.
<b>RER</b>	The equation Replicate Error Ratio = $(S-D) / [\text{sqrt}(\text{TPUs}^2 + \text{TPUD}^2)]$ 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.
<b>SDG</b>	Sample Delivery Group Number assigned by the Client or assigned by STL Richland upon sample receipt.
<b>Sum Rpt Alpha Spec Rst(s)</b>	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.
<b>Work Order</b>	The LIMS software assign test specific identifier.
<b>Yield</b>	The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method.

11/21/2005 4:14:36 PM

# STL Richland Report

Lab Code: STLRL

FormNbr: R      FormatType: FEAD      Version: 05      Rpt Nbr: 30579      File Name: h:\Reportdb\edd\FeadIV\Rad\W04797.Edd, h:\Reportdb\edd\FeadIV\Rad\30579.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:				
9HMXHX10	B1F692		MW6-SBB-A1	U06-001	W04797					10/17/2005 11:27				
Batch	Analyte	CAS#	Result	Unit	CntU 2S	TotU 2S	Qual	MDA	TrcYield	Method	Alq Size	Unit	Analy Date/Time	Act
5292238	Uranium	7440-61-1	1.43E+02	ug/L	1.7E+01	1.7E+01		8.06E-02		UTOT_KPA	2.60E-02	ML	11/11/200 10:41	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:				
9HMXHX30	B1F692		MW6-SBB-A1	U06-001	W04797					10/17/2005 11:27				
Batch	Analyte	CAS#	Result	Unit	CntU 2S	TotU 2S	Qual	MDA	TrcYield	Method	Alq Size	Unit	Analy Date/Time	Act
5322327	TC-99	14133-76-7	7.59E+02	pCi/L	1.6E+01	5.0E+01		1.03E+01	100.0	TC99_ETVDSK_LS	1.294E-01	L	11/21/200 09:26	I

Monday, November 21, 2005

# STL Richland QC Blank Report

Lab Code: STLR

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\Fead\Rad\W04797.Edd, h:\Reportdb\edd\Fead\Rad\30579.Edd

Lab Sample Id: HM2321AB

Sdg/Rept Nbr: W04797

30579

Collection Date: 10/17/2005 11:27

Client Id: NA

Matrix: WATER

WATER

Sample On Date:

Moisture/Solids%\*:

QC Type: BLK

Received Date: 10/17/2005

SAF Nbr	Contract Nbr	Test User	Case Nbr	SAS Nbr	Suffix	Decant	Distilled Volume	File Id	FSuffix	RTyp					
	MW6-SBB-A19981								AC	H					
Batch # / Qc Type	Analy/ CAS#	Result/ Orig Rst	Unit	Tot/Cnt Uncert 2S	Qu- al	MDC	Tracer Yield	Spk Conc/ %Rec	Analy Method	Aliq Size/ ML	Date/Time Analyzed	RPD/ UCL	RER/ UCL	LCS LCL/UCL	R Typ
5292238 BLK	Uranium 7440-61-1	1.14E-02	ug/L	1.2E-03 1.2E-03	U	7.94E-02			UTOT_KPA	2.64E-02 ML	11/11/2005 10:32				D

Monday, November 21, 2005

# STL Richland QC Blank Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\Fead\Rad\W04797.Edd, h:\Reportdb\edd\Fead\Rad\30579.Edd

Lab Sample Id: HQHXA1AB

Sdg/Rept Nbr: W04797 30579

Collection Date: 10/17/2005 11:27

Client Id: NA

Matrix: WATER WATER

Sample On Date:

Moisture/Solids%\*:

QC Type: BLK

Received Date: 10/17/2005

SAF Nbr	Contract Nbr	Test User	Case Nbr	SAS Nbr	Suffix	Decant	Distilled Volume	File Id	FSuffix	RTyp					
	MW6-SBB-A19981								AJ	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
5322327 BLK	TC-99 14133-76-7	-9.21E+00	pCi/L	5.2E+00 3.5E+00	U	8.48E+00	100.0		TC99_ETVDSK	1.201E-01 L	11/21/2005 10:28				D

Monday, November 21, 2005

# STL Richland QC Control Sample Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\Fead\Rad\W04797.Edd, h:\Reportdb\edd\Fead\Rad\30579.Edd

Lab Sample Id: HM2321CS

Sdg/Rept Nbr: W04797 30579

Collection Date: 10/17/2005 11:27

Client Id: NA

Matrix: WATER WATER

Sample On Date:

Moisture/Solids%\*:

QC Type: BS

Received Date: 10/17/2005

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
5292238 BS	Uranium 7440-61-1	3.60E+01	ug/L	4.2E+00 4.2E+00		8.42E-02		3.64E+01 98.7	UTOT_KPA	2.49E-02 ML	11/11/2005 10:35			70 130	D

Monday, November 21, 2005

# STL Richland QC Control Sample Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\FeadIV\Rad\W04797.Edd, h:\Reportdb\edd\FeadIV\Rad\30579.Edd

Lab Sample Id: HM2321DS

Sdg/Rept Nbr: W04797

30579

Collection Date: 10/17/2005 11:27

Client Id: NA

Matrix: WATER

WATER

Sample On Date:

Moisture/Solids%\*:

QC Type: BS

Received Date: 10/17/2005

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
5292238 BS	Uranium 7440-61-1	3.11E+00	ug/L	3.2E-01 3.2E-01		7.65E-02		3.34E+00 92.9	UTOT_KPA	2.74E-02 ML	11/11/2005 10:38			70 130	D

Monday, November 21, 2005

# STL Richland QC Control Sample Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\eddd\FeadIV\Rad\W04797.Edd, h:\Reportdb\eddd\FeadIV\Rad\30579.Edd

Lab Sample Id: HQHXA1CS

Sdg/Rept Nbr: W04797

30579

Collection Date: 10/17/2005 11:27

Client Id: NA

Matrix: WATER

WATER

Sample On Date:

Moisture/Solids%\*:

QC Type: BS

Received Date: 10/17/2005

SAF Nbr	Contract Nbr	Test User	Case Nbr	SAS Nbr	Suffix	Decant	Distilled Volume	File Id	FSuffix	RTyp					
	MW6-SBB-A19981								AK	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
5322327 BS	TC-99 14133-76-7	4.01E+02	pCi/L	2.9E+01 1.2E+01		1.00E+01	100.0	5.36E+02 74.9	TC99_ETVDSK	1.258E-01 L	11/21/2005 11:31			70 130	D

Monday, November 21, 2005

# STL Richland QC Duplicate Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\Fead\I\Rad\W04797.Edd, h:\Reportdb\edd\Fead\I\Rad\30579.Edd

Lab Sample Id: HMXHX1ER

Sdg/Rept Nbr: W04797 30579

Collection Date: 10/17/2005 11:27

Client Id: B1F692

Matrix: WATER WATER

Sample On Date:

Moisture/Solids%\*:

QC Type: DUP

Received Date: 10/17/2005

SAF Nbr	Contract Nbr	Test User	Case Nbr	SAS Nbr	Suffix	Decant	Distilled Volume	File Id	FSuffix	RTyp					
U06-001	MW6-SBB-A19981								AG	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/ ML	Date/Time Analyzed	RPD/ UCL	RER/ UCL	LCS LCL/UCL	R Typ
5292238 DUP	Uranium 7440-61-1	1.31E+02 1.43E+02	ug/L	1.5E+01 1.5E+01		8.15E-02			UTOT_KPA	2.57E-02 ML	11/11/2005 10:54	8.8 20.0	1.1 3		D

Monday, November 21, 2005

# STL Richland QC Duplicate Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\Fead\Rad\W04797.Edd, h:\Reportdb\edd\Fead\Rad\30579.Edd

Lab Sample Id: HMXHX1JR

Sdg/Rept Nbr: W04797 30579

Collection Date: 10/17/2005 11:27

Client Id: B1F692

Matrix: WATER WATER

Sample On Date:

Moisture/Solids%\*:

QC Type: DUP

Received Date: 10/17/2005

SAF Nbr	Contract Nbr	Test User	Case Nbr	SAS Nbr	Suffix	Decant	Distilled Volume	File Id	FSuffix	RTyp					
U06-001	MW6-SBB-A19981								AI	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
5322327 DUP	TC-99 14133-76-7	6.87E+02 6.01E+02	pCi/L	4.6E+01 1.4E+01		9.71E+00	100.0		TC99_ETVDSK	1.209E-01 L	11/21/2005 08:24	13.3 20.0	2.6 3		D

Monday, November 21, 2005

# STL Richland Qc Matrix Spike Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\FeadIV\Rad\W04797.Edd, h:\Reportdb\edd\FeadIV\Rad\30579.Edd

Lab Sample Id: HMXHX1DW

Sdg/Rept Nbr: W04797 30579

Collection Date: 10/17/2005 11:27

Client Id: B1F692

Matrix: WATER WATER

Sample On Date:

Moisture/Solids%\*:

QC Type: MS

Received Date: 10/17/2005

SAF Nbr	Contract Nbr	Test User	Case Nbr	SAS Nbr	Suffix	Decant	Distilled Volume	File Id	FSuffix	RTyp					
U06-001	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
5292238 MS	Uranium 7440-61-1	2.67E+01	ug/L	2.6E+01 2.6E+01		8.45E-02		3.65E+01 73.0	UTOT_KPA	2.48E-02 ML	11/11/2005 10:48			60 140	D

Monday, November 21, 2005

# STL Richland Qc Matrix Spike Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\FeadIV\Rad\W04797.Edd, h:\Reportdb\edd\FeadIV\Rad\30579.Edd

Lab Sample Id: HMXHX1HW

Sdg/Rept Nbr: W04797

30579

Collection Date: 10/17/2005 11:27

Client Id: B1F692

Matrix: WATER

WATER

Sample On Date:

Moisture/Solids%\*:

QC Type: MS

Received Date: 10/17/2005

SAF Nbr	Contract Nbr	Test User	Case Nbr	SAS Nbr	Suffix	Decant	Distilled Volume	File Id	FSuffix	RTyp					
U06-001	MW6-SBB-A19981								AH	H					
Batch # / Qc Type	Analy/ 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
5322327 MS	TC-99 14133-76-7	3.31E+03	pCi/L	2.5E+02 3.5E+01		1.06E+01	100.0	3.58E+03 92.5	TC99_ETVDSK	1.258E-01 L	11/21/2005 07:21			60 140	D

Lot No., Due Date: J5J170228; 11/16/2005  
 Client, Site: 384868; PGW 615HANFORD HANFORD  
 QC Batch No., Method Test: 5322327; RTC99 Tc-99 by LSC  
 SDG, Matrix: W04797; 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:  
 See NCM. 10-06990

First Level Review Pam Anderson Date 11-21-05



# STL

Data Review Checklist  
RADIOCHEMISTRY  
Second Level Review

QC Batch Number: 5322327

Review Item	Yes (✓)	No (✓)	N/A (✓)
<b>A. Sample Analysis</b>			
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>B. QC Samples</b>			
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?	✓		
<b>C. Other</b>			
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: *[Signature]*

Date: 11-21-05

# Clouseau Nonconformance Memo



NCM #: <b>10-06990</b>	Classification: <b>Anomaly</b>
NCM Initiated By: Pam Anderson	Status: <b>GLREVIEW</b>
Date Opened: 11/21/2005	Production Area: Environmental - Sep
Date Closed:	Tests: Tc-99 by LSC
	Lot #'s (Sample #'s): J5J170228 (1),
	QC Batches: 5322327
Nonconformance: Other (describe in detail)	
Subcategory: Other (explanation required)	

### Problem Description / Root Cause

<u>Name</u>	<u>Date</u>	<u>Description</u>
Pam Anderson	11/21/2005	The dup was out 30% on the original analysis. A recount did not help. The batch was reanalyzed with acceptable results.

### Corrective Action

<u>Name</u>	<u>Date</u>	<u>Corrective Action</u>
Pam Anderson	11/21/2005	The batch was recounted, then reanalyzed to meet requirements.

### Client Notification Summary

<u>Client</u>	<u>Project Manager</u>	<u>Notified</u>	<u>Response</u>	<u>How Notified</u>	<u>Note</u>
			<u>Response</u>		<u>Response Note</u>

### Quality Assurance Verification

<u>Verified By</u>	<u>Due Date</u>	<u>Status</u>	<u>Notes</u>
			This section not yet completed by QA.

### Approval History

<u>Date Approved</u>	<u>Approved By</u>	<u>Position</u>
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\*\*\* RE-ANALYSIS REQUEST \*\*\*

DUE DATE 11-16-05

CUSTOMER PLW

ANALYSIS Tc

MATRIX water

LOT NUMBER J5J170228

SAMPLE DELIVERY GROUP W104797

OLD BATCH NUMBER 5292239, 532123 (recount)

NEW BATCH NUMBER 5322327

LAB SAMPLE ID	REASON FOR REQUEST & ANALYSIS COMMENTS
1) <u>Hm x HX 2.44</u>	<u>dups out</u>
2)	
3)	
4)	
5)	
6)	
7)	
8)	
9)	
10)	
11)	
12)	
13)	
14)	
15)	
16)	
17)	
18)	
19)	
20)	
LAB QC ID	Assigned with new batch.

Lot No., Due Date: J5J170228; 11/16/2005  
 Client, Site: 384868; PGW 615HANFORD HANFORD  
 QC Batch No., Method Test: 5292238; RUNAT UNat by KPA  
 SDG, Matrix: W04797; WATER

<b>1.0 COC</b>		
1.1 Is the ICOC page complete; includes all applicable analysis, dates, SOP numbers, and revisions?	Yes	No N/A
<b>2.0 QC Batch</b>		
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
<b>3.0 QC &amp; Samples</b>		
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
<b>4.0 Raw Data</b>		
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
<b>5.0 Other</b>		
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 Pam Anderson

Date 11-15-05



# STL

Data Review Checklist  
RADIOCHEMISTRY  
Second Level Review

QC Batch Number: 5292238

Review Item	Yes (✓)	No (✓)	N/A (✓)
<b>A. Sample Analysis</b>			
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>B. QC Samples</b>			
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?	✓		
<b>C. Other</b>			
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: *[Signature]* Date: 11-21-05

Collector: <b>DWYKES</b> <b>E. M. HALL</b>	Contact/Requester	Telephone No. <b>MSIN FAX</b>
SAF No. U06-001	Sampling Origin	Purchase Order/Charge Code
Project Title LTMC/2UP1-Rebound, OCTOBER 2005	<b>DTS-SAWS-H93</b>	Ice Chest No. <b>SAWS 212</b> Temp.
Shipped To (Lab) Severn Trent Incorporated, Richland	Method of Shipment	Bill of Lading/Air Bill No.
Protocol LTMC	Priority: 30 Days <b>PRIORITY</b>	Offsite Property No.

<b>POSSIBLE SAMPLE HAZARDS/REMARKS</b> ** ** <div style="text-align: center; font-size: 1.2em;"> <b>W04797</b>  <b>J5J170228</b>  <i>Due 11 16 05</i> </div>	<b>SPECIAL INSTRUCTIONS</b> Hold Time    Total Activity Exemption: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
--	--

Sample No.	Lab ID	*	Date	Time	No/Type Container	Sample Analysis	Preservative
B1F692		W	10-17-05	1627	1x20-mL P	Activity Scan <span style="float: right;"><b>HMX HX</b></span>	None
B1F692		W	↓	↓	1x500-mL P	TC99_ETVDSK_LSC: Tc-99 (1)	HCl to pH <2
B1F692		W	↓	↓	1x500-mL G/P	UTOT_KPA: Uranium (1)	HNO3 to pH <2

Relinquished By <b>DWYKES</b> <b>E. M. HALL</b>	Print	Sign	Date/Time <b>OCT 17 2005</b>	Received By <b>Jeff Jensen</b>	Print	Sign	Date/Time <b>OCT 17 2005</b>	<b>&lt;100 CRMx *</b>
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time	Relinquished By
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time	Relinquished By
Relinquished By	Date/Time	Received By	Date/Time	Relinquished By	Date/Time	Received By	Date/Time	Relinquished By
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g., Return to customer, per lab procedure, used in process)			Disposed By			Date/Time	

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



# STL

## Sample Check-in List

Date/Time Received: 10/17/05 1999

Client: Palw SDG #: W09797 NA  SAF #: 406-001 105-098 NA

Work Order Number: JST170228 Chain of Custody # 406-001-49 105-098-51

Shipping Container ID: SMWS 212 Air Bill # \_\_\_\_\_

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: 7
7. Sample holding times exceeded? NA  Yes  No
8. Samples have:
  - tape \_\_\_\_\_ hazard labels
  - custody seals \_\_\_\_\_ appropriate samples labels
9. Samples are:
  - in good condition \_\_\_\_\_ leaking
  - broken \_\_\_\_\_ have air bubbles
 (Only for samples requiring head space)
10. Sample pH taken? NA  pH < 2  pH > 2  pH > 9
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: 10/17/05

Client Sample ID	Analysis Requested	Condition	Comments/Action

Client Informed on \_\_\_\_\_ by \_\_\_\_\_ Person contacted \_\_\_\_\_

[ ] No action necessary; process as is.

Project Manager \_\_\_\_\_ Date \_\_\_\_\_

11/18/2005 10:59:01 AM

### Sample Preparation/Analysis

Balance Id: \_\_\_\_\_

384868, Pacific Northwest National Laboratories ,  
Pacific Northwest National Lab

FP Tc-99 Prp/SepRC5065  
S5 Technetium-99 by Liquid Scint  
SI CLIENT: HANFORD

Pipet #: \_\_\_\_\_

Report Due: 11/16/2005 *WO4797*

Sep1 DT/Tm Tech: \_\_\_\_\_

Batch: 5322327 WATER pCi/L

PM, Quote: SS , 57671

Sep2 DT/Tm Tech: \_\_\_\_\_

SEQ Batch, Test: None

Prep Tech: \_\_\_\_\_



Work Order, Lot, Sample Date	Total Amt /Unit	Total Acidified/Unit	Initial Aliquot Amt/Unit	Adj Aliq Amt (Un-Acidified)	QC Tracer Prep Date	Count Time Min	Detector Id	Count On   Off (24hr) Circle	CR Analyst, Init/Date	Comments:
1 HMXHX-1-AH-S J5J170228-1-MS  10/17/2005 11:27										
			AmtRec: 20ML,2X500P	#Containers: 3				Scr: Alpha: 3.22E-04 uCi/Sa	Beta: 2.62E-04 uCi/Sa	
2 HMXHX-1-AJ-X J5J170228-1-DUP  10/17/2005 11:27										
			AmtRec: 20ML,2X500P	#Containers: 3				Scr: Alpha: 3.22E-04 uCi/Sa	Beta: 2.62E-04 uCi/Sa	
3 HMXHX-3-AA J5J170228-1-SAMP  10/17/2005 11:27										
			AmtRec: 20ML,2X500P	#Containers: 3				Scr: Alpha: 3.22E-04 uCi/Sa	Beta: 2.62E-04 uCi/Sa	
4 HQHXA-1-AA-B J5K180000-327-BLK  10/17/2005 11:27										
			AmtRec:	#Containers: 1				Scr: Alpha:	Beta:	
5 HQHXA-1-AC-C J5K180000-327-LCS  10/17/2005 11:27										
			AmtRec:	#Containers: 1				Scr: Alpha:	Beta:	
6 HQHXA-1-AD-BN J5K180000-327-IBLK  10/17/2005 11:27										
			AmtRec:	#Containers: 1				Scr: Alpha:	Beta:	

# ICOC Fraction Transfer/Status Report

ByDate: 11/21/2004, 11/26/2005, Batch: '5322327', User: \*ALL Order By DateTimeAccepting

Q Batch	Work Ord	CurStatus	Accepting	Comments
<b>5322327</b>				
AC	<b>CalcC</b>	<b>GiroirB</b>	11/18/2005 1:32:55	
SC		andersonp	IsBatched	11/18/2005 10:58:59 AM
SC		GiroirB	InPrep	11/18/2005 1:32:55 PM
SC		GiroirB	Prep1C	11/18/2005 1:45:38 PM
SC		DAWKINSO	InCnt1	11/20/2005 1:06:53 PM
SC		DAWKINSO	CalcC	11/21/2005 2:52:22 PM
AC		<b>GiroirB</b>	11/18/2005 1:45:38	ICOC_RADCALC v4.8.16
AC		<b>DAWKINSO</b>	11/20/2005 1:06:53	RICH-RC-5016 REVISION 5
AC		<b>DAWKINSO</b>	11/21/2005 2:52:22	RICH-RC-5016 REVISION 5
				RICH-RD-0001 REVISION 3
				RICH-RD-0001 REVISION 3

AC: Accepting Entry; SC: Status Change

11/8/2005 6:35:37 AM

### Sample Preparation/Analysis

Balance Id:1120482733

384868, Pacific Northwest National Laboratories ,  
Pacific Northwest National Lab

DH UNat\_Laser PrpRC5015  
SS Total Uranium by KPA  
SI CLIENT: HANFORD

Pipet #: \_\_\_\_\_

Report Due: 11/16/2005 *1004797*

Sep1 DT/Tm Tech: \_\_\_\_\_

Batch: 5292238 WATER ug/L  
SEQ Batch, Test: None

PM, Quote: SS , 57671

Sep2 DT/Tm Tech: \_\_\_\_\_

Prep Tech: ,GiroirB *Scott*



Work Order, Lot, Sample Date/Time	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:
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1 HMXHX-1-AC J5J170228-1-SAMP <i>Kind Uo (0,0m)</i>	26.00g,in							
10/17/2005 11:27	AmtRec: 20ML,2X500P	#Containers: 3				Scr: Alpha: 3.22E-04 uCi/Sa	Beta: 2.62E-04 uCi/Sa	
2 HMXHX-1-AD-S J5J170228-1-MS	24.80g,in	UNSF2733	11/03/05,pd					
10/17/2005 11:27	AmtRec: 20ML,2X500P	#Containers: 3				Scr: Alpha: 3.22E-04 uCi/Sa	Beta: 2.62E-04 uCi/Sa	
3 HMXHX-1-AE-X J5J170228-1-DUP	25.70g,in							
10/17/2005 11:27	AmtRec: 20ML,2X500P	#Containers: 3				Scr: Alpha: 3.22E-04 uCi/Sa	Beta: 2.62E-04 uCi/Sa	
4 HM232-1-AA-B J5J190000-238-BLK	26.40g,in							
10/17/2005 11:27	AmtRec:	#Containers: 1				Scr: Alpha:	Beta:	
5 HM232-1-AC-C J5J190000-238-LCS	24.90g,in	UNSF2734	11/03/05,pd					
10/17/2005 11:27	AmtRec:	#Containers: 1				Scr: Alpha:	Beta:	
6 HM232-1-AD-C J5J190000-238-LCS	27.40g,in	UNSC0913	11/05/05,pd					
10/17/2005 11:27	AmtRec:	#Containers: 1				Scr: Alpha:	Beta:	

### Sample Preparation/Analysis

DH UNat\_Laser PrpRC5015  
SS Total Uranium by KPA  
SI CLIENT: HANFORD

Pipet #: \_\_\_\_\_

Report Due: 11/16/2005

Sep1 DT/Tm Tech: \_\_\_\_\_

Batch: 5292238  
SEQ Batch, Test: None

ug/L

Sep2 DT/Tm Tech: \_\_\_\_\_

Prep Tech: ,GiroirB



Work Order, Lot, Sample Date/Time	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:
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**Comments:**

*12/11/05  
11-8-05  
added 2nd LCS  
rev QA 1/5/8*

*Samples kept on hotplate overnight  
to dryness ~ 200° (zetex)*

**All Clients for Batch:**

384868, Pacific Northwest National Laboratories Pacific Northwest National Lab, SS , 57671

**HMXHX1AC-SAMP Constituent List:**

Uranium RDL:1.44E-01 ug/L LCL: UCL: RPD:

**HMXHX1AD-MS Constituent List:**

**HM2321AA-BLK:**

Uranium RDL:1.44E-01 ug/L LCL: UCL: RPD:

**HM2321AC-LCS:**

Uranium RDL:0.144343 ug/L LCL:70 UCL:130 RPD:20

**HM2321AD-LCS:**

Uranium RDL:0.144343 ug/L LCL:70 UCL:130 RPD:20

**HMXHX1AC-SAMP Calc Info:**

Uncert Level (#s): 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B

**HMXHX1AD-MS Calc Info:**

Uncert Level (#s): 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B

**HM2321AA-BLK:**

Uncert Level (#s): 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B

**HM2321AC-LCS:**

Uncert Level (#s): 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B

**HM2321AD-LCS:**

Uncert Level (#s): 2 Decay to SaDt: Y Blk Subt.: N Sci.Not.: Y ODRs: B

Approved By \_\_\_\_\_ Date: \_\_\_\_\_

# ICOC Fraction Transfer/Status Report

ByDate: 11/15/2004, 11/20/2005, Batch: '5292238', User: \*ALL Order By DateTimeAccepting

Q Batch	Work Ord	CurStatus	Accepting	Comments
<b>5292238</b>				
AC		<b>Cnt1C</b>	<b>GiroirB</b> 11/3/2005 6:22:38	
SC		wagarr	IsBatched 10/19/2005 9:35:59 AM	ICOC_RADCALC v4.8.15
SC		GiroirB	InPrep 11/3/2005 6:22:38 AM	RICH-RC-5015 REVISION 4
SC		GiroirB	Prep1C 11/4/2005 12:36:21 PM	RICH-RC-5015 REVISION 4
SC		ScottM	Prep2C 11/8/2005 4:46:47 PM	RICH-RC-5015 REVISION 4
SC		BarbosaH	Cnt1C 11/11/2005 2:27:50 PM	RICH-RC-5058 REVISION 6
AC		<b>GiroirB</b>	11/4/2005 12:36:21	
AC		<b>ScottM</b>	11/8/2005 4:46:47 PM	
AC		<b>BarbosaH</b>	11/11/2005 2:27:50	