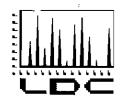
## APPENDIX D DATA VALIDATION REPORT



#### LABORATORY DATA CONSULTANTS, INC.

7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

LDC #15720/15767/15896 December 26, 2006

Windward Environmental, LLC 200 West Mercer Street, Suite 401 Seattle, WA 98119 ATTN: Ms. Marina Mitchell

SUBJECT: Lower Duwamish Waterway Group Sediment Sample Data Validation

Dear Ms. Mitchell,

Enclosed is our EPA Level III data validation of analytical chemistry results generated in support of the Lower Duwamish Waterway Group project. The analyses were performed by Analytical Resources, Inc. Samples were analyzed for GC/MS Semivolatiles by EPA SW 846 Methods 8270D and 8270D-SIM, GC Polychlorinated Biphenyls by EPA SW 846 Method 8082, Butyltins by EPA SW 846 Methods 8270D-SIM/Krone Method, Metals by EPA SW 846 Methods 200.8/7471A, Total Organic Carbon by Plumb Method, Grain Size by PSEP Method, Total Solids by EPA Method 160.3 and HRGC/HRMS Dioxins/Dibenzofurans by EPA Method 1613B. Samples are referenced under the following Sample Delivery Groups: JZ15, JZ53, KA18, and DPWG20754/WG20336. See the Sample Analysis Table (Attachment 1) for the number of samples reviewed.

Please feel free to contact us if you have any questions.

Sincerely,

Stella S. Cuenco

Rei Fring In

Project Manager/Senior Chemist

Attachment 1 LDC #15720 (Windward Environmental, LLC - Seattle WA / Lower Duwamish Waterway Group) SVOA Metals Grain (3) Total DATE DATE SVOA (8270D **PCBs** (200.8/ TOC Solids Size (8082) (7471A) (Plumb) (160.3) LDC SDG# REC'D DUE (8270D) -SIM) (PSEP) w s w s w s w s w s w s w s ws w | s | w | s w s w s Matrix: Water/Sediment 0 11 0 11 0 11 0 11 0 11 0 11 11/02/06 11/27/06 0 11 JZ15

B/SC

Total

11 0 11 0 11

0 11 0

0 0 0 0 0 0 0

															nmer																				_
		LDC :	#15767	' (W	/inc	lwa	rd l	Env	riro	nm	ent	al, I	LLC	: - \$	Sea	ttle	W	<b>\ / L</b>	_OV	/er	Du	wai	nis	h W	ate	rwa	ay (	Gro	up)	)					
.DC	SDG#	DATE REC'D	(3) DATE DUE		OA 70D)	SV (82) -SI	OA 70D M)	PC (80	Bs 82)	(20	tais 0.8/ /1A)	Bu -tir (Kro	ns	TC (Plu		To Sol (166	ids	Gra Sia (PS	ze																
Matrix:	Water/Sediment			w	s	W	s		S	W	s	W	S	W	s	W	s	W		W	s	W	s	W	s	W	s	W	s	W	s	W	s	w	s
А	JZ53	11/10/06	12/05/06	a	19	0	19	0	19	0	<u>တ</u> -	0	4	Q.	19	0	19	0	9																
В	KA18	11/10/06	12/05/06	0	17	0	17	0	17	0	17	- 1	-	0	17	0	17	0	17																
																																		П	
	-																																		
	-																																		
																													· · · ·					-1	
																										- ""-									
																																		$\Box$	
$\neg$	<del>-</del>																																		_
$\dashv$		1					<b></b>																					<b></b>							
$\neg \vdash$	·	1			T																	$\vdash$													
		1		<b></b>	$\top$															<u> </u>															
			_	<del> </del>																														$\Box$	
$\dashv$					<del>                                     </del>															$\Box$														一	
		1		<del>                                     </del>	-															t —															
	-	1																											$I^-$						
-  -				$\vdash$					$\vdash$																		<b> </b>							$\Box$	<u> </u>
$\dashv$					$t^-$	<del> </del>	<del> </del>															<b></b>													Π
$\dashv$				$\vdash$																		$\vdash$												П	
-					1																	t					<b></b>				$\Box$			$\Box$	_
_		1	<u> </u>										<u> </u>								T		1												
otal	B/SC	+		0	36	0	36	0	36	0	36	0	4	0	36	0	36	0	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250

														ttach																				
		LDC #	£15896	W)	/ind	lwa	rd I	Env	iro	nm	ent	al, I	LLC	: - 8	sea <sup>*</sup>	ttle	WA	4 / L	.OV	er l	Du۱	wan	nisl	h W	ate	rwa	ay C	iro	up)					
.DC	SDG#	DATE REC'D	(3) DATE DUE	Dio: (16	xins (13)										-																			
Matri:	x: Water/Sediment			W	ş	W	S	W	s	W	s	w	s	W	s	W	S	W	s	W	S	W	S	W	s	W	S	W	S	W	S	W	s	W
А	DPWG20754/WG20336	12/01/06	12/22/06	O	5																													
-										<u> </u>																								
$\dashv$																																		丰
$\dashv$																																		寸
																																		$\frac{1}{1}$
																																		$\dashv$
											<u> </u>																							#
																																		_
																:																		$\Rightarrow$
									<b></b>		<u> </u>	<u> </u>																						$\frac{1}{2}$
																																		$\dashv$
																																		$\dashv$
																																		$\Rightarrow$
																																		<del> -</del>
otal	B/SC		<u> </u>	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

15896ST.wpd

Shaded cells indicate Level IV validation (all other cells are Level II validation). These sample counts do not include MS/MSD, and DUPs

## CHEMICAL DATA QUALITY REVIEW FOR SUBSURFACE SEDIMENT SAMPLES (ROUND 3)

#### Lower Duwamish Waterway Group LDC#s 15720, 15767, 15896

This report details the findings of an EPA Level III and EPA Level IV data validation of analytical chemistry results generated in support of the Lower Duwamish Waterway Group project. The analyses were performed by Analytical Resources, Inc. Samples were analyzed for GC/MS Semivolatiles by EPA SW 846 Methods 8270D and 8270D-SIM, GC Polychlorinated Biphenyls by EPA SW 846 Method 8082, Butyltins by EPA SW 846 Methods 8270D-SIM/Krone Method, Metals by EPA SW 846 Methods 200.8/7471A, Total Organic Carbon by Plumb Method, Grain Size by PSEP Method, Total Solids by EPA Method 160.3 and HRGC/HRMS Dioxins/Dibenzofurans by EPA Method 1613B. Samples are referenced under the following Sample Delivery Groups: JZ15, JZ53, KA18, and DPWG20754/WG20336. See the Sample Analysis Table (Attachment 1) for the number of samples reviewed and the Sample Validation Table (Attachment 2) for the sample identifications and analyses. Sample IDs ending in "\*\*" underwent Level IV review.

The QC guidelines used for data qualification are those specified in the National Functional Guidelines for Organic Data Review (October 1999) and the National Functional Guidelines for Inorganic Data Review (July 2002). Specific QC criteria used follow the Final Surface Sediment Sampling for Chemical Analyses in the Lower Duwamish Waterway Round 3 Addendum Quality Assurance Project Plan (September 26, 2006). Where specific guidance is not available, the data has been evaluated in a conservative manner using professional experience.

The following items were evaluated during the review:

L	Holding Times
	Sample Preservation
	Cooler Temperatures
	Instrument Calibration
	Blanks
	Surrogates
	Matrix Spike/Matrix Spike Duplicates
	Internal Standards
	Laboratory Control Samples
	Target Compound Identifications*
	Compound Quantitation and CRQLs
	System Performance
П	Field Replicates

<sup>\*</sup>Data were not reviewed for Level III.

082.55					Maria Maria	000000000000000000000000000000000000000	91=199	**************************************							hme		96:572°7					Materia.													
		LDC	#15720	) (V	Vinc	swl	ırd	Em	viro	nm	eni	al,	LL		Sea	ttle	W,	4/	Lov	ver	Du	war	nis	hΜ	late	rw	ay (	Gre	up)						
LDC	SDG#	DATE REC'D	(3) DATE DUE	SV (82	/OA 70D)	(82	OA 70D IM)	PC (80	CBs (82)	(20	tals  0.8/  71A		OC Imb)	So	otal lids (0.3)	Si	ain ze EP)																		
Matri	x: Water/Sediment			$\overline{}$	s	_	s		s		s	_	s	W		W	s	w	s	W	S	W	S	W	s	W	s	w	s	W	s	W	s	w	s
A	JZ15	11/02/06	11/27/06	0	11	0	11	0	11	0	11	0	11	0	11	0	11																		
	<del>-</del>																																		
																										-									
		_																													-				
																							_												
		_																			,														
Total	B/SC			0	11	0	11	0	11	0	11	0	11	0_	11	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77

SDG#; JZ15				VALID	ATION S	SAMPLE	TABLE				300000 260000	andria Privinging	LDC#: 1	5720A
Project Name: Lower Du	wamish Waterway G	roup		Paran	neters/Ar	nalytical	Method					Proje	ect #04-0	8-06-24
Client ID #	Lab ID #	Matrix_	Date Collected	SVOA (8270D)	SVOA (8270D -SIM)	PCBs (8082)	Metals (SW846)	TOC (Plumb)	Total Solids (160.3)	Grain Size (PSEP)				
LDW-SS330-010	JZ15A	sediment	10/02/06	Х	х	Х	X	х	х	х				
LDW-SS327-010	JZ15B	sediment	10/02/06	Х	Х	х	Х	Х	х	X_				
LDW-SS328-010	JZ15C	sediment	10/02/06	Х	х	Х	Х	х	х	х				
LDW-SS329-010	JZ15D	sediment	10/02/06	Х	х	х	Х	х	х	x				
LDW-SS401-010	JZ15E	sediment	10/02/06	Х	х	х	х	х	X	х				
LDW-SS331-010	JZ15F	sediment	10/02/06	X	х	х	X	X	х	х				
LDW-SS332-010	JZ15G	sediment	10/02/06	X	х	х	Х	X	х	х		ļ		
LDW-SS334-010	JZ15H	sediment	10/02/06	Х	х	х	х	х	x	х				
LDW-SS333-010	JZ15I	sediment	10/02/06	Х	х	X	х	х	х	х				
LDW-SS337-010	JZ15J	sediment	10/02/06	Х	х	Х	X	x	X	х		ļ		
LDW-SS402-010	JZ15K	sediment	10/02/06	Х	х	Х	Х	х	Х	х				
LDW-SS330-010MS	JZ15AMS	sediment	10/02/06				х	х						
LDW-SS330-010DUP	JZ15ADUP	sediment	10/02/06				X	Х	х					
LDW-SS330-010TRP	JZ15ATRP	sediment	10/02/06						Х					
LDW-SS331-010MS	JZ15FMS	sediment	10/02/06			х								
LDW-SS331_010MSD	JZ15FMSD	sediment	10/02/06			Х								
LDW-SS337-010MS	JZ15JMS	sediment	10/02/06	X	х									
LDW-SS337-010MSD	JZ15JMSD	sediment	10/02/06	Х	х									
LDW-SS337-010DUP	JZ15JDUP	sediment	10/02/06							Х				<u> </u>
LDW-SS337-010TRP	JZ15JTRP_	sediment	10/02/06							х	<u> </u>	<u> </u>		
														<u> </u>
														<u> </u>
										ļ				
													-	-

		LDC	#15767	' (W	linc	lwa	rd	Εn\	/iro	nm	ent	al,			Sea		W	\/i	_OW	/er	Du	war	nis	h W	/ate	rwa	ay (	≩ro	up)						Min.
LDC	SDG#	DATE REC'D	(3) DATE DUE	SV (827	OA 70D)	(82	OA 70D IM)	PC (80	:Bs (82)	(20	tals 0.8/ /1 <b>A</b> )	Bu -ti (Kro	ns	TC (Plu	DC mb)	To Sol (160	ids	Gra Si: (PS	ze											·					
Matri			12/05/06	W	s	W	S	W	S	W	s	W	S	W	S	W	s	W	S	W	s	W	s	W	s	W	Ş	W	s	W	s	W	s	W	s
Α	JZ53											0	4														_					_			<b></b>
В	KA18	11/10/06	12/05/06	0	17	0	17	0	17	0	17	-		0	17	0	17	0	17													_			
		<u> </u>				ļ																				-					_				$\dashv$
								$\vdash$			<u> </u>						$\dashv$																		
												<u> </u>				Н																			_
Ì		_				├											$\dashv$				_														
	<del></del>				┝				_		<u> </u>	<u> </u>							_					_									_		
	-			<del>                                     </del>	-			<del> </del>	-																										
						ļ ···			-						L			_																	
													_														_								
					<del> </del>					l												_													
				ļ <u>-</u>																															
																																			<b></b>
					<u> </u>		<u> </u>																												
					<u> </u>				L_	<u> </u>	ļ																								
				L_	<u> </u>					<u> </u>																						_			
						ļ		<u> </u>																											
							<u> </u>					<u> </u>									<u> </u>														<u> </u>
						ļ	<u> </u>																								-				
				ļ	<del> </del>				ļ				ļ		ļ						_														
			<u> </u>		<u> </u>	<u> </u>			ļ	<u> </u>		<del> </del>		_																					
				├—	├	$\vdash$	$\vdash$	├	├	├-			├─	ļ					<b></b> -		<del>                                     </del>	$\vdash$	$\vdash$		_										
					$\vdash$	-		<del> </del>	<del> </del>		├	<del> </del>	<b> </b>		$\vdash$				<del> </del>		<del> </del>	<u> </u>	-		<del> </del>			_							
_				$\vdash$		╁┈	<del> </del>	<del>  -</del>	$\vdash$					<del>                                     </del>	<del> </del>	<del> </del>		_	<del> </del>																
				<del> </del>	+				1				$\vdash$																						
					<del>                                     </del>	+-		t				T			<del> </del>	<b></b>			<u> </u>		<b></b>	<b></b>							<u> </u>						
			<del> </del>		T		$\vdash$		1			t		<del>                                     </del>	<u> </u>																				
				<u> </u>	1					<del>                                     </del>																									
Total	B/SC			0	36	0	36	0	36	0	36	0	4	0	36	0	36	0	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	256

SDG#: JZ53				VALID	ATION S	SAMPLE	TABLE				nd behil Henk sid		LDC#. 1	5767A
Project Name: Lower	Duwamish Waterway	Group		Paran	neters/A	nalytical	Method			jede trulin Srudnje (ist		Proje	ct #04-08	3-06-24
Client ID #	Lab ID #	Matrix	Date Collected	SVOA (8270D)	SVOA (8270D -SIM)	PCBs (8082)	Metals (SW846)	Butyl- tins (Krone)	TOC (Plumb)	Total Solids (160.3)	Grain Size (PSEP)			
LDW-S\$344-RB	JZ53A	water	10/03/06	X	х	Х	Х	x	х					
LDW-SS344-010	JZ53B	sediment	10/03/06	х	X	х	Х		х	х	х			
LDW-SS342-010	JZ53C	sediment	10/03/06	x	х	Х	Х		х	x	х			
LDW-SS343-010	JZ53D	sediment	10/03/06	Х	х	х	х		Х	х	х		_	
LDW-SS341-010	JZ53E	sediment	10/03/06	Х	х	х	х		x	х	X			
LDW-SS339-010	JZ53F	sediment	10/03/06	Х		х	Х		Х	х	х			
LDW-SS340-010	JZ53G	sediment	10/03/06	Х	х	х	Х		Х	х	х			
LDW-SS338-010	JZ53H	sediment	10/03/06	X	х	х	X		Х	х	X			
LDW-SS336-010	JZ53I	sediment	10/03/06	Х	x	Х	Х		х	х	Х			
LDW-SS301-010	JZ53J	sediment	10/03/06	Х	x	Х	Х	х	Х	Х	х			
LDW-SS302-010	JZ53K	sediment	10/03/06	Х	X	Х	Х	х	Х	Х	х			
LDW-SS305-010	JZ53L	sediment	10/03/06	Х	х	×	Х		Х	х	х			
LDW-SS307-010	JZ53M	sediment	10/03/06	Х	х	Х	х		х	Х	х			
LDW-SS306-010	JZ53N	sediment	10/03/06	Х	х	х	Х		Х	Х	х			
LDW-SS308-010	JZ53O	sediment	10/03/06	Х	х	х	х		X	х	х			
LDW-SS308-RB	JZ53P	water	10/03/06	Х	x	Х	Х	х	Х					
LDW-SS309-010	JZ53Q	sediment	10/03/06	Х	х	Х	Х		Х	Х	х			
LDW-SS310-010	JZ53R	sediment	10/03/06	Х	х	х	Х	х	х	Х	х			
LDW-SS311-010	JZ53S	sediment	10/03/06	х	х	х	Х		Х	х	х			
LDW-SS312-010	JZ53T	sediment	10/03/06	Х	х	х	х		х	х	х			
LDW-SS312-010DL	JZ53TDL	sediment	10/03/06	Х		х								
LDW-SS403-010	JZ53U	sediment	10/03/06	Х	х	х	Х	х	Х	х	х			
LDW-SS344-010MS	JZ53BMS	sediment	10/03/06				х							
LDW-SS344-010DUP	JZ53BDUP	sediment	10/03/06				Х			_				
LDW-SS306-010MS	JZ53NMS	sediment	10/03/06	Х	x									

SDG#: JZ53				VALID	ATION S	SAMPLE	TABLE	60 90 GA 64 1646: 165 GA	en en en General				LDC#: 1	5767A
Project Name: Lower	Duwamish Waterway	Group		Paran	neters/Ai	nalytical	Method					Proje	ct #04-0	8-06-24
Client ID #	Lab ID#	Matrix	Date Collected	SVOA (8270D)	SVOA (8270D -SIM)	PCBs (8082)	Metals (SW846)	Butyl- tins (Krone)	TOC (Plumb)	Total Solids (160.3)	Grain Size (PSEP)			
LDW-SS306-010MSD	JZ53NMSD	sediment	10/03/06	х	Х									
LDW-SS306-010DUP	JZ53NDUP	sediment	10/03/06								Х			
LDW-SS306-010TRP	JZ53NTRP	sediment	10/03/06								Х			
LDW-SS308-010MS	JZ53OMS	sediment	10/03/06			Х			Х					
LDW-SS308-010MSD	JZ53OMSD	sediment	10/03/06			Х								
LDW-SS308-010DUP	JZ53ODUP	sediment	10/03/06						Х	Х				
LDW-SS308-010TRP	JZ53OTRP	sediment	10/03/06						х	X				
LDW-SS403-010MS	JZ53UMS	sediment	10/03/06					Х						
LDW-SS403-010MSD	JZ53UMSD	sediment	10/03/06					X						

SDG#: KA18				VALID	ATION S	SAMPLE	TABLE			adbağı üz d				LDC#: 1	5767B
Project Name: Lower D	Duwamish Waterway G	roup		Paran	neters/Ar	nalytical	Method			riidhdig Garrii		c o 718. Louis augus	Proje	ct #04-0	3-06-24
Client ID #	Lab ID #	Matrix	Date Collected	SVOA (8270D)	SVOA (8270D -SIM)	PCBs (8082)	Metals (SW846)	Butyl- tins (Krone)	TOC (Plumb)	Total Solids (160.3)	Grain Size (PSEP)				
LDW-SS335-010	KA18A	sediment	10/04/06	X	Х	X	х		Х	х	Х				
LDW-SS335-010DL	KA18ADL	sediment	10/04/06			х				_					
LDW-SS313-010	KA18B	sediment	10/04/06	Х	Х	X	Х		х	х	Х				
LDW-SS314-010	KA18C	sediment	10/04/06	Х	X_	Х	x		Х	Х	х				
LDW-SS322-010	KA18D	sediment	10/04/06	Х	X	х	х		х	х	Х		_		
LDW-S\$323-010	KA18E	sediment	10/04/06	Х	х	х	Х		Х	х	Х				
LDW-SS320-010	KA18F	sediment	10/04/06	Х	Х	х	X		х	Х	Х				
LDW-SS319-010	KA18G	sediment	10/04/06	Х	Х	Х	Х		х	Х	х				
LDW-SS324-010	KA18H	sediment	10/04/06	Х	Х	Х	х		Х	х	х				ļ
LDW-SS321-010	KA18I	sediment	10/04/06	Х	х	х	Х		X	Х	х				
LDW-SS318-010	KA18J	sediment	10/04/06	X	Х	Х	Х		х	х	Х				
LDW-SS317-010	KA18K	sediment	10/04/06	Х	Х	х	х		Х	Х	х				
LDW-SS317-010DL	KA18KDL	sediment	10/04/06			Х									
LDW-SS316-010	KA18L	sediment	10/04/06	Х	Х	Х	Х		Х	Х	Х				
LDW-SS316-010DL	KA18LDL	sediment	10/04/06	Х		х									ļ
LDW-SS315-010	KA18M	sediment	10/04/06	Х	Х	Х	Х		Х	Х	Х				
LDW-SS315-010DL	KA18MDL	sediment	10/04/06			х									
LDW-SS303-010	KA18N	sediment	10/04/06	Х	х	Х	х		Х	х	Х				
LDW-SS303-010DL	KA18NDL	sediment	10/04/06			х									
LDW-SS325-RB	KA180	water	10/04/06	X	X	х	х								ļ
LDW-SS3 <u>25</u> -010	KA18P	sediment	10/04/06	Х	Х	х	х		х	х	х				
LDW-SS325-010DL	KA18PDL	sediment	10/04/06			х									<u> </u>
LDW-SS326-010	KA18Q	sediment	10/04/06	Х	Х	х	х		Х	X	Х				
LDW-SS326-010DL	KA18QDL	sediment	10/04/06			х									
LDW-S\$304-010	KA18R	sediment	10/04/06	Х	Х	X	х		X	Х	Х			<u> </u>	

SDG#: KA18				VALID	ATION S	SAMPLE	TABLE						LDC#: 1	15767B
Project Name: Lower	Duwamish Waterway (	3roup		Paran	neters/Ar	nalytical	Method					Proje	ct #04-0	8-06-24
Client ID #	Lab ID#	Matrix	Date Collected	SVOA (8270D)	SVOA (8270D -SIM)	PCBs (8082)	Metals (SW846)	Butyl- tins (Krone)	TOC (Plumb)	Total Solids (160.3)	Grain Size (PSEP)			
LDW-\$\$304-010DL	KA18RDL	sediment	10/04/06			Х								
LDW-SS335-010MS	KA18AMS	sediment	10/04/06				Х		Х					
LDW-\$\$335-010DUP	KA18ADUP	sediment	10/04/06				Х		Х	Х				
LDW-SS335-010TRP	KA18ATRP	sediment	10/04/06						Х	X				
LDW-SS316-010MS	KA18LMS	sediment	10/04/06	Х	Х									
LDW-SS316-010MSD	KA18LMSD	sediment	10/04/06	X	Х		_							
LDW-SS316-010DUP	KA18LDUP	sediment	10/04/06								Х			
LDW-\$\$316-010TRP	KA18LTRP	sediment	10/04/06								Х			
LDW-SS304-010MS	KA18RMS	sediment	10/04/06			Х								
LDW-SS304-010MSD	KA18RMSD	sediment	10/04/06			Х								

		LDC #	15896	(W	/ind	lwa	rd E	Ξnv	iro	nm	ent	ai, I		- 5			WA	4 / L	_OV	ver	 Du	war	nisl	า W	ate	rwa	ay (	Gro	up)		_			
LDC	SDG#	DATE REC'D	(3) DATE DUE	Dio	-											-											Ť							
Matri	ix: Water/Sediment			W	s	W	S	W	S	w	s	W	s	W	s	w	s	w	s	w	s	W	s	W	S	W	S	W	S	W	S	W	s	W S
į	DPWG20754/WG20336	12/01/06	12/22/06	0	5																													
					0,0,000								Ů								<b></b>								-					
																				<u> </u>	<del> </del>													
												_								<del>                                     </del>			· · · ·										$\overline{}$	
																				$\vdash$	┧													
				<u> </u>											_				$\vdash$	<del> </del>	<del> </del>		_											
																		<del>                                     </del>																
										_				$\vdash$				├─	$\vdash$	<del> </del>												$\vdash \vdash \vdash$		
					-						<u> </u>							<u>                                     </u>	├	├	<del> </del>	<del> </del>	<u> </u>									$\vdash$		
					├	ļ				ļ	<del> </del>							ļ		╄	<del> </del>	ļ										<b></b>		
				<u> </u>	ļ							_								↓	<u> </u>	ļ										<b> </b>		
																		ļ	_	<u> </u>	<u> </u>											<b> </b>		
																						<u> </u>										L		
														- "																				
																						<b></b>						-						
																				<b>†</b>	<del>                                     </del>													
																			<del>                                     </del>	$\vdash$	T	<u> </u>	<del> </del>											
		<del>-</del>							-		-									╁┈╴	<del>                                     </del>	├				-						$\vdash$		
												<u> </u>	ļ <u> </u>			H			├─	<del>                                     </del>	$\vdash$	╁┈┈╴			├─					-				—— <del> -</del> -
		_	<u> </u>									-							├	-	┢	<del> </del>										<del> </del>		
						ļ			<u> </u>		ļ					ļ	<b></b>		├	┢	<b>├</b>	<del> </del>											لــــا	
					ļ									<u> </u>						<u> </u>	ļ	ļ	ļ									ļ!	<del></del>	
		<u> </u>		L		<u> </u>	<u> </u>				<u> </u>		٠., ٠				,·		<u> </u>	<u> </u>	$ldsymbol{ldsymbol{ldsymbol{eta}}}$	<u> </u>	<u> </u>			ļ	<u> </u>	ļ	L			<u> </u>		<u> </u>
	<u> </u>	<u> </u>					<u> </u>					<u> </u>	<u> </u>	- 3	* } *	:,		ļ.,	<u> </u>	<u> </u>		<u> </u>	<u> </u>		ļ	<u> </u>			ļ	ļ				
						<u> </u>							<u> </u>	<u> </u>				<u> </u>	ļ		<u> </u>	$oxed{oxed}$	<u> </u>									<u> </u>	<u> </u>	
															<u> </u>				<u> </u>		<u> </u>					<u> </u>						ļ	<sup> </sup>	
												L			Ŀ										<u></u>									
												`			, <u>,,</u>		::																	
	_															,		Ī .																
																				1					····									
Total	B/SC			0	5	0	_0	0	0	0	0	0	0 -	0	0	0	0	0	0	0	0	0	٥	0	0	0	0	0	0	0	0	0	0	0 5

Α	tta	ch	m	er	ıt	2	

SDG#: DPWG20754/	WG20336_			VALID	ATION S	SAMPLE	TABLE				_			LDC#:	15896A
Project Name: Lower	Duwamish Waterway	Group		Paran	neters/Ar	nalytical l	Method	···	<del>,</del>				Proje	ect #04-0	8-06-24
Client ID #	Lab ID #	Matrix	Date Collected	Dioxins (1613)											
LDW-SS318-010	L9675-4	sediment	10/04/06	х											
LDW-\$\$321-010	L9675-5	sediment	10/04/06	х											
LDW-SS322-010	L9675-6	sediment	10/04/06	Х					<u> </u>						
LDW-SS323-010	L9675-7	sediment	10/04/06	Х		:									
LDW-SS324-010	L9675-8	sediment	10/04/06	Х											
LDW-SS323-010DUP	L9675-7DUP	sediment	10/04/06	Х											
					,										
							_			·					
_		•		_		,									
	_														
												_			-

Only issues which require comment or action are discussed in this report. Data deficiencies are arranged by method. Potential effects of data anomalies have been described where possible.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.

#### **Overall Data Assessment**

#### I. Usability

A.	-	iment calibration, method blank contamination, compound quantitation and us QC exceedance problems warranted the qualification of a portion of the set.
		Due to initial calibration %RSD and continuing calibration %D problems, results for several compounds were qualified as estimated (J/UJ) in the semivolatile and semivolatile-SIM analyses.
		Due to method blank contamination, phenol was qualified as non-detected (U) in the semivolatile analysis.
		Due to compound quantitation %RPD problems, several detected results were qualified as estimated (J) in the PCB analyses.
		Due to various QC accuracy and precision problems, results were qualified as estimated (J/UJ) in the semivolatile, semivolatile-SIM, PCB, and metal analyses.

B. No action was taken when the SRM results were outside the limit of Mean ± Standard Deviation for the organic analyses since the SRM standards were outdated and there were no certified QC limits established.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J/UJ) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

#### GC/MS Semivolatiles by EPA SW 846 Method 8270D

#### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

#### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

All ion abundance requirements were met.

#### III. Initial Calibration

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

SDG	Date	Compound	%RSD	Associated Samples	Flag	A or P
JZ15 KA18	10/12/06	2,4-Dinitrophenol	30.810	LDW-SS330-010 LDW-SS327-010 LDW-SS328-010 LDW-SS329-010 LDW-SS331-010 LDW-SS333-010 LDW-SS333-010 LDW-SS333-010 LDW-SS335-010 LDW-SS313-010 LDW-SS314-010 LDW-SS314-010 LDW-SS314-010 LDW-SS314-010 LDW-SS322-010 LDW-SS322-010 LDW-SS323-010 LDW-SS321-010 LDW-SS318-010 LDW-SS318-010 LDW-SS318-010 LDW-SS316-010 LDW-SS316-010 LDW-SS316-010 LDW-SS316-010 LDW-SS316-010 LDW-SS336-010 LDW-SS325-010 LDW-SS325-010 LDW-SS325-010 LDW-SS326-010 LDW-SS326-010 LDW-SS326-010 LDW-SS326-010 LDW-SS326-010 LDW-SS326-010 LDW-SS326-010	J (all detects) UJ (all non-detects)	A

Average relative response factors (RRF) for all semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required.

#### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

SDG	Date	Compound	%D	Associated Samples	Flag	A or P
KA18	10/28/06	Hexachlorocyclopentadiene	26.6	LDW-SS335-010 LDW-SS313-010 LDW-SS314-010 LDW-SS322-010 LDW-SS323-010 LDW-SS329-010 LDW-SS319-010 LDW-SS318-010 LDW-SS318-010 LDW-SS315-010 LDW-SS315-010 LDW-SS303-010 LDW-SS325-010 LDW-SS326-010 LDW-SS304-010	J (all detects) UJ (all non-detects)	А
KA18	10/30/06	Hexachlorocyclopentadiene	27.9	LDW-SS316-010DL	J (all detects) UJ (all non-detects)	A

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were within validation criteria.

#### V. Blanks

Method blanks were reviewed for each matrix as applicable. No semivolatile contaminants were found in the method blanks with the following exceptions:

SDG	Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
JZ53	MB-101706	10/17/06	Phenol	64 ug/Kg	LDW-SS344-010** LDW-SS342-010** LDW-SS343-010** LDW-SS339-010** LDW-SS339-010** LDW-SS338-010** LDW-SS336-010** LDW-SS305-010** LDW-SS305-010** LDW-SS305-010** LDW-SS308-010** LDW-SS308-010** LDW-SS308-010** LDW-SS308-010** LDW-SS308-010** LDW-SS311-010** LDW-SS311-010** LDW-SS312-010DL** LDW-SS312-010DL** LDW-SS312-010DL** LDW-SS312-010**

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated method blanks with the following exceptions:

SDG	Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
JZ53	LDW-SS336-010**	Phenol	250 ug/Kg	250U ug/Kg
JZ53	LDW-SS305-010**	Phenol	85 цд/Кд	85U ug/Kg
JZ53	LDW-SS306-010**	Phenol	120 ug/Kg	120U ug/Kg
JZ53	LDW-SS312-010**	Phenol	75 ug/Kg	75U ug/Kg

#### VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

#### VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

SDG	Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
KA18	LDW-SS316-010MS/MSD (LDW-SS316-010)	Benzo(g,h,i)perylene	35.5 (40-130)	32.5 (40-130)	-	J (all detects) UJ (all non-detects)	A

#### **VIII. Laboratory Control Samples (LCS)**

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

SDG	LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
JZ15	LCS-101606	4-Chloroaniline 3,3'-Dichlorobenzidine	29.3 (40-130) 36.2 (40-130)	LDW-SS330-010 LDW-SS327-010 LDW-SS328-010 LDW-SS329-010 LDW-SS401-010 LDW-SS331-010 LDW-SS332-010 LDW-SS333-010 LDW-SS333-010 LDW-SS337-010 LDW-SS402-010	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P
JZ53	LCS-101706	Aniline	25.4 (40-130)	LDW-SS344-010** LDW-SS342-010** LDW-SS343-010** LDW-SS349-010** LDW-SS340-010** LDW-SS336-010** LDW-SS336-010** LDW-SS305-010** LDW-SS305-010** LDW-SS306-010** LDW-SS306-010** LDW-SS308-010** LDW-SS308-010** LDW-SS310-010** LDW-SS310-010** LDW-SS311-010** LDW-SS312-010** LDW-SS312-010DL** LDW-SS312-010DL**	J (all detects) UJ (all non-detects)	Р
KA18	LCS-101806	Aniline	34.1 (40-130)	LDW-SS335-010 LDW-SS313-010 LDW-SS314-010 LDW-SS322-010 LDW-SS322-010 LDW-SS319-010 LDW-SS319-010 LDW-SS321-010 LDW-SS318-010 LDW-SS318-010 LDW-SS316-010 LDW-SS316-010 LDW-SS315-010 LDW-SS315-010 LDW-SS303-010 LDW-SS325-010 LDW-SS326-010 LDW-SS304-010	J (all detects) UJ (all non-detects)	Р

Standard reference material was performed at the required frequencies.

### IX. Regional Quality Assurance and Quality Control

Not applicable.

#### X. Internal Standards

All internal standard areas and retention times were within QC limits.

#### XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

#### XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

SDG	Sample	Compound	Finding	Criteria	Flag	A or P
JZ53	LDW-SS312-010**	Fluoranthene	Sample result exceeded calibration range.	Reported result should be within calibration range.	N/A	-
KA18	LDW-SS316-010	Fluoranthene	Sample result exceeded calibration range.	Reported result should be within calibration range.	N/A	-

N/A = Not applicable

For the results above flagged "Not applicable", the affected compound results in the associated samples were deemed unusable and did not warrant qualification of the data.

Raw data were not evaluated for the samples reviewed by Level III criteria.

#### XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

#### XIV. System Performance

The system performance was acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

#### XV. Overall Assessment

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

SDG	Sample	Compound	Flag	A or P
JZ53 KA18	LDW-SS312-010** LDW-SS316-010	Fluoranthene	R	А
JZ53 KA18	LDW-SS312-010DL** LDW-SS316-010DL	All TCL compounds except Fluoranthene	R	A

Data flags are summarized at the end of this report if data has been qualified.

#### XVI. Field Duplicates

Samples LDW-SS329-010 and LDW-SS401-010 (SDG JZ15), samples LDW-SS337-010 and LDW-SS402-010 (SDG JZ15), and samples LDW-SS301-010\*\* and LDW-SS403-010\*\* (SDG JZ53) were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

		Concentrat	tion (ug/Kg)	
SDG	Compound	LDW-SS329-010	LDW-SS401-010	RPD (Limits)
JZ15	Bis(2-ethylhexyl)phthalate	140	180	25 (≤50)
JZ15	Benzo(g,h,i)perylene	68	53	25 (≤50)
JZ15	Phenanthrene	72	39	59 (≤50)
JZ15	Anthracene	36	62U	Not calculable
JZ15	Fluoranthene	170	94	58 (≤50)
JZ15	Pyrene	210	140	40 (≤50)
JZ15	Benzo(a)anthracene	97	49	66 (≤50)
JZ15	Chrysene	170	73	80 (≤50)
JZ15	Benzo(b)fluoranthene	110	100	10 (≤50)
JZ15	Benzo(k)fluoranthene	99	59	51 (≤50)
JZ15	Benzo(a) pyrene	97	63	43 (≤50)
JZ15	Indeno(1,2,3-cd)pyrene	53	38	33 (≤50)

		Concentral	ion (ug/Kg)	
SDG	Compound	LDW-S\$337-010	LDW-SS402-010	RPD (Limits)
JZ15	Bis(2-ethylhexyl)phthalate	140	150	7 (≤50)
JZ15	Benzo(g,h,i)perylene	42	44	5 (≤50)
JZ15	Phenanthrene	46	54	16 (≤50)
JZ15	Fluoranthene	130	140	7 (≤50)
JZ15	Pyrene	100	110	10 (≤50)
JZ15	Benzo(a)anthracene	46	52	12 (≤50)
JZ15	Chrysene	71	78	9 (≤50)
JZ15	Benzo(b)fluoranthene	65	72	10 (≤50)
JZ15	Benzo(k)fluoranthene	62	55	12 (≤50)
JZ15	Benzo(a)pyrene	49	60	20 (≤50)
JZ15	Indeno(1,2,3-cd)pyrene	37	35	6 (≤50)

		Concentra		
SDG	Compound	LDW-\$\$301-010**	LDW-SS403-010 **	RPD (Limits)
JZ53	Phenanthrene	130	270	70 (≤50)
JZ53	Anthracene	73	290	120 (≤50)
JZ53	Fluoranthene	350	620	56 (≤50)
JZ53	Pyrene	590	3100	136 (≤50)
JZ53	Benzo(a)anthracene	310	2200	151 (≤50)
JZ53	Bis(2-ethylhexyl)phthalate	190	180	5 (≤50)
JZ53	Chrysene	520	3600	150 (≤50)

		Concentrat		
SDG	Compound	LDW-SS301-010**	LDW-SS403-010 **	RPD (Limits)
JZ53	Benzo(b)fluoranthene	520	4600	159 (≤50)
JZ53	Benzo(k)fluoranthene	280	2200	155 (≤50)
JZ53	Benzo(a)pyrene	320	2600	156 (≤50)
JZ53	Indeno(1,2,3-cd)pyrene	120	1100	161 (≤50)
JZ53	Benzo(g,h,i)perylene	110	1000	160 (≤50)
JZ53	Fluorene	61U	39	Not calculable
JZ53	Di-n-Butylphthalate	61U	32	Not calculable

#### XVII. Field Blanks

Samples LDW-SS344-RB\*\*, LDW-SS308-RB\*\* (SDG JZ53), and sample LDW-SS325-RB (SDG KA18) were identified as rinsate blanks. No semivolatile contaminants were found in these blanks with the following exceptions:

SDG	Rinsate Blank ID	Compound	Concentration (ug/L)
KA18	LDW-SS325-RB	Bis(2-ethylhexyl)phthalate	1.1

### Lower Duwamish Waterway Group Semivolatiles - Data Qualification Summary - SDGs JZ15, JZ53, and KA18

SDG	Sample	Compound	Flag	A or P	Reason
JZ15 KA18	LDW-SS330-010 LDW-SS327-010 LDW-SS328-010 LDW-SS329-010 LDW-SS331-010 LDW-SS331-010 LDW-SS334-010 LDW-SS333-010 LDW-SS337-010 LDW-SS335-010 LDW-SS335-010 LDW-SS335-010 LDW-SS314-010 LDW-SS314-010 LDW-SS314-010 LDW-SS314-010 LDW-SS314-010 LDW-SS318-010 LDW-SS318-010 LDW-SS318-010 LDW-SS318-010 LDW-SS318-010 LDW-SS318-010 LDW-SS318-010 LDW-SS318-010 LDW-SS316-010 LDW-SS315-010 LDW-SS315-010 LDW-SS315-010 LDW-SS325-010 LDW-SS326-010 LDW-SS326-010 LDW-SS326-010 LDW-SS326-010	2,4-Dinitrophenol	J (all detects) UJ (all non-detects)	A	Initial calibration (%RSD)
KA18	LDW-SS335-010 LDW-SS313-010 LDW-SS314-010 LDW-SS322-010 LDW-SS323-010 LDW-SS329-010 LDW-SS319-010 LDW-SS318-010 LDW-SS318-010 LDW-SS315-010 LDW-SS315-010 LDW-SS303-010 LDW-SS325-010 LDW-SS325-010 LDW-SS304-010 LDW-SS316-010DL	Hexachlorocyclopentadiene	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D
KA18	LDW-SS316-010	Benzo(g,h,i)perylene	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)

SDG	Sample	Compound	Flag	A or P	Reason
JZ15	LDW-SS330-010 LDW-SS327-010 LDW-SS328-010 LDW-SS329-010 LDW-SS401-010 LDW-SS331-010 LDW-SS332-010 LDW-SS333-010 LDW-SS333-010 LDW-SS337-010 LDW-SS402-010	4-Chloroaniline 3,3'-Dichlorobenzidine	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	Р	Laboratory control samples (%R)
JZ53 KA18	LDW-SS344-010** LDW-SS342-010** LDW-SS343-010** LDW-SS343-010** LDW-SS341-010** LDW-SS339-010** LDW-SS338-010** LDW-SS302-010** LDW-SS305-010** LDW-SS305-010** LDW-SS305-010** LDW-SS305-010** LDW-SS305-010** LDW-SS305-010** LDW-SS305-010** LDW-SS305-010** LDW-SS305-010** LDW-SS310-010** LDW-SS310-010** LDW-SS310-010** LDW-SS312-010** LDW-SS312-010DL** LDW-SS312-010DL** LDW-SS313-010 LDW-SS314-010 LDW-SS314-010 LDW-SS322-010 LDW-SS319-010 LDW-SS319-010 LDW-SS319-010 LDW-SS318-010 LDW-SS316-010 LDW-SS316-010 LDW-SS316-010 LDW-SS316-010 LDW-SS315-010 LDW-SS325-010 LDW-SS325-010 LDW-SS325-010 LDW-SS326-010 LDW-SS326-010 LDW-SS326-010 LDW-SS326-010	Aniline	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)
JZ53 KA18	LDW-SS312-010** LDW-SS316-010	Fluoranthene	R	A	Overall assessment of data
JZ53 KA18	LDW-SS312-010DL** LDW-SS316-010DL	All TCL compounds except Fluoranthene	R	A	Overall assessment of data

#### Lower Duwamish Waterway Group Semivolatiles - Laboratory Blank Data Qualification Summary - SDGs JZ15, JZ53, and KA18

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P
JZ53	LDW-SS336-010**	Phenol	250U ug/Kg	A
JZ53	LDW-SS305-010**	Phenol	85U ug/Kg	Α
JZ53	LDW-SS306-010**	Phenol	120U ug/Kg	Α
JZ53	LDW-SS312-010**	Phenol	75U ug/Kg	A

## GC/MS Semivolatiles by EPA SW 846 Method 8270D using Selected Ion Monitoring (SIM).

#### I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

#### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

All ion abundance requirements were met.

#### III. Initial Calibration

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for all compounds.

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination ( $r^2$ ) were greater than or equal to 0.990.

Average relative response factors (RRF) for all semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required.

#### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% with the following exceptions:

SDG	Date	Compound	%D	Associated Samples	Flag	A or P
JZ15	10/26/06	2,4-Dimethylphenol	38.1	LDW-SS330-010 LDW-SS327-010 LDW-SS328-010 LDW-SS329-010 LDW-SS3401-010 LDW-SS331-010 LDW-SS332-010 LDW-SS334-010 LDW-SS333-010 MB-101606	J (all detects) UJ (all non-detects)	A
JZ15 KA18	10/27/06	Dibenz(a,h)anthracene	35.9	LDW-SS337-010 LDW-SS402-010 LDW-SS335-010 LDW-SS313-010 LDW-SS314-010 LDW-SS322-010 LDW-SS323-010 LDW-SS320-010 LDW-SS319-010 LDW-SS318-010 LDW-SS318-010 LDW-SS317-010 LDW-SS316-010	J (all detects) UJ (all non-detects)	А

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds with the following exceptions:

SDG	Date	Compound	%D	Associated Samples	Flag	A or P
JZ15	10/25/06	2,4-Dimethylphenol Dimethylphthalate N-Nitrosodiphenylamine	37.12 54.92 70.92	LDW-SS330-010 LDW-SS327-010 LDW-SS328-010 LDW-SS329-010 LDW-SS401-010 LDW-SS331-010 LDW-SS332-010 LDW-SS334-010 LDW-SS333-010 LDW-SS333-010 LDW-SS337-010 LDW-SS402-010	J (all detects) UJ (all non-detects)	A

SDG	Date	Compound	%D	Associated Samples	Flag	A or P
JZ53 KA18	11/1/06	Benzyl alcohol	29.24	LDW-SS344-010** LDW-SS342-010** LDW-SS343-010** LDW-SS341-010** LDW-SS339-010** LDW-SS338-010** LDW-SS336-010** LDW-SS301-010** LDW-SS305-010** LDW-SS305-010** LDW-SS307-010** LDW-SS303-010 LDW-SS303-010 LDW-SS303-010 LDW-SS304-010	J (all detects) UJ (all non-detects)	A

All of the continuing calibration RRF values were within validation criteria.

#### V. Blanks

Method blanks were reviewed for each matrix as applicable. No semivolatile contaminants were found in the method blanks.

#### VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

SDG	Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
JZ53	LDW-SS302-010**	2-Fluorobiphenyl Terphenyl-d14	36.8 (40-130) 36.4 (40-130)	All base neutral compounds	J (all detects) UJ (all non-detects)	Р
JZ53	LDW-SS307-010**	2-Fluorobiphenyl Nitrobenzene-d5	31.1 (40-130) 36.1 (40-130)	All base neutral compounds	J (all detects) UJ (all non-detects)	Р
KA18	LDW-SS317-010	2-Fluorobiphenyl Nitrobenzene-d5	38.4 (40-130) 38.4 (40-130)	All base neutral compounds	J (all detects) UJ (all non-detects)	P

#### VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

#### VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

SDG	LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
JZ15	LCS-101606	2,4-Dimethylphenol	24.4 (40-140)	LDW-SS330-010 LDW-SS327-010 LDW-SS328-010 LDW-SS329-010 LDW-SS401-010 LDW-SS331-010 LDW-SS332-010 LDW-SS334-010 LDW-SS333-010 LDW-SS333-010 LDW-SS337-010 LDW-SS402-010	J (all detects) UJ (all non-detects)	P

Standard reference material was performed at the required frequencies.

#### IX. Regional Quality Assurance and Quality Control

Not applicable.

#### X. Internal Standards

All internal standard areas and retention times were within QC limits.

#### XI. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

#### XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

#### XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

#### XIV. System Performance

The system performance was acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

#### XV. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

#### XVI. Field Duplicates

Samples LDW-SS329-010 and LDW-SS401-010 (SDG JZ15), samples LDW-SS337-010 and LDW-SS402-010 (SDG JZ15), and samples LDW-SS301-010\*\* and LDW-SS403-010\*\* (SDG JZ53), were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

		Concentra		
SDG	Compound	LDW-SS329-010	LDW-SS401-010	RPD (Limits)
JZ15	Dibenz(a,h)anthracene	13	9.2	34 (≤50)
JZ15	Dimethylphthalate	6.2	6.2U	Not calculable
JZ15	Butylbenzylphthalate	12	12	0 (≤50)

		Concentration (ug/Kg)		
SDG	Compound	LDW-SS337-010	LDW-SS402-010	RPD (Limits)
JZ15	Dibenz(a,h)anthracene	6.7	6,8	2 (≤50)
JZ15	Butylbenzylphthalate	20	19	5 (≤50)

		Concentration (ug/Kg)		
SDG	Compound	LDW-SS301-010**	LDW-SS403-010**	RPD (Limits)
JZ53	Dibenz(a,h)anthracene	50	340	149 (≤50)
JZ53	Butylbenzylphthalate	11	14	24 (≤50)

#### XVII. Field Blanks

Samples LDW-SS344-RB and LDW-SS308-RB (SDG JZ53) and samples LDW-SS325-RB (SDG KA18) were identified as rinsate blanks. No semivolatile contaminants were found in these blanks with the following exceptions:

SDG	Rinsate Blank ID	Compound	Concentration (ug/L)
KA18	LDW-SS325-RB	Benzyl alcohol	3.0

No benzyl alcohol results were found in the associated samples.

# Lower Duwamish Waterway Group Semivolatiles(SIM) - Data Qualification Summary - SDGs JZ15, JZ53, and KA18

			<u> </u>		
SDG	Sample	Compound	Flag	A or P	Reason
JZ15	LDW-SS330-010 LDW-SS327-010 LDW-SS328-010 LDW-SS329-010 LDW-SS310-010 LDW-SS331-010 LDW-SS332-010 LDW-SS334-010 LDW-SS333-010	2,4-Dimethylphenol	J (all detects) UJ (all non-detects)	А	Continuing calibration (%D)
JZ15 KA18	LDW-SS337-010 LDW-SS402-010 LDW-SS335-010 LDW-SS313-010 LDW-SS314-010 LDW-SS322-010 LDW-SS323-010 LDW-SS320-010 LDW-SS319-010 LDW-SS318-010 LDW-SS318-010 LDW-SS316-010	Dibenz(a,h)anthracene	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D)
JZ15	LDW-SS330-010 LDW-SS327-010 LDW-SS328-010 LDW-SS329-010 LDW-SS401-010 LDW-SS331-010 LDW-SS332-010 LDW-SS334-010 LDW-SS333-010 LDW-SS337-010 LDW-SS402-010	2,4-Dimethylphenol Dimethylphthalate N-Nitrosodiphenylamine	J (all detects) UJ (all non-detects)	A	Continuing calibration (ICV %D)
JZ53 KA18	LDW-SS344-010** LDW-SS342-010** LDW-SS343-010** LDW-SS341-010** LDW-SS339-010** LDW-SS338-010** LDW-SS336-010** LDW-SS301-010** LDW-SS305-010** LDW-SS305-010** LDW-SS305-010** LDW-SS305-010 LDW-SS305-010 LDW-SS305-010 LDW-SS305-010 LDW-SS305-010 LDW-SS305-010 LDW-SS305-010 LDW-SS305-010	Benzyl alcohol	J (all detects) UJ (all non-detects)	A	Continuing calibration (ICV %D)

SDG	Sample	Compound	Flag	A or P	Reason
JZ53 KA18	LDW-SS302-010** LDW-SS307-010** LDW-SS317-010	1,4-Dichlorobenzene 1,2-Dichlorobenzene N-Nitroso-di-n-propylamine 1,2,4-Trichlorobenzene Hexachlorobutadiene Dimethylphthalate N-Nitrosodiphenylamine Hexachlorobenzene Butylbenzylphthalate Dibenz(a,h)anthracene N-Nitrosodimethylamine Benzyl alcohol	J (all detects) UJ (all non-detects)	Р	Surrogate recovery (%R)
JZ15	LDW-SS330-010 LDW-SS327-010 LDW-SS328-010 LDW-SS329-010 LDW-SS331-010 LDW-SS332-010 LDW-SS334-010 LDW-SS333-010 LDW-SS337-010 LDW-SS337-010	2,4-Dimethylphenoi	J (all detects) UJ (all non-detects)	Р	Laboratory control samples (%R)

Lower Duwamish Waterway Group Semivolatiles(SIM) - Laboratory Blank Data Qualification Summary - SDGs JZ15, JZ53, and KA18

No Sample Data Qualified in these SDGs

# Polychlorinated Biphenyls by EPA SW 846 Method 8082

# I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

#### II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

#### III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Retention time windows were evaluated and considered technically acceptable for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

## IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 15.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits for samples on which an EPA Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

#### V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

# VI. Surrogate Spikes and Internal Standards

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

SDG	Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
JZ53	LDW-SS305-010**	ZB35	Decachlorobiphenyl	159 (50-150)	All TCL compounds	J (all detects)	P
KA18	LDW-SS321-010	Not specified	Decachlorobiphenyl	192 (50-150)	All TCL compounds	J (all detects)	Р

All internal standard areas and retention times were within QC limits.

# VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits for SDG JZ53.

Percent recoveries (%R) and relative percent differences (RPD) were not within QC limits in SDGs JZ15 and KA18. Since the MS/MSD samples were diluted out, no data were qualified.

# VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

Standard reference material was performed at the required frequencies.

## IX. Regional Quality Assurance and Quality Control

Not applicable.

#### X. Pesticide Cleanup Checks

## a. Florisil Cartridge Check

Although sulfur and acid cleanup was not required by the method, it was performed by the laboratory.

Florisil cleanup was not required and therefore not performed.

#### b. GPC Calibration

GPC cleanup was not required and therefore not performed.

# XI. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

# XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

SDG	Sample	Compound	Finding	Criteria	Flag
JZ53	LDW-SS312-010**	Aroclor-1254	Sample result exceeded calibration range.	Reported result should be within calibration range.	N/A
KA18	LDW-SS335-010 LDW-SS317-010 LDW-SS315-010 LDW-SS325-010 LDW-SS326-010	Araclar-1248 Araclar-1254 Araclar-1260	Sample result exceeded calibration range.	Reported result should be within calibration range.	N/A N/A N/A
KA18	LDW-SS316-010 LDW-SS303-010 LDW-SS304-010	Aroclor-1254 Aroclor-1260	Sample result exceeded calibration range.	Reported result should be within calibration range.	N/A N/A

N/A = Not applicable

For the results above flagged "Not applicable", the affected compound results in the associated samples were deemed unusable and did not warrant qualification of the data.

The sample results for detected compounds from the two columns were within 40.0% relative percent differences (RPD) with the following exceptions:

SDG	Sample	Compound	%RPD	Flag	A or P
JZ15	LDW-SS331-010	Aroclor-1260	53	J (all detects)	А
JZ53	LDW-SS340-010**	Aroclor-1260	45	J (all detects)	А
KA18	LDW-SS313-010	Aroclor-1248	51	J (all detects)	Α
KA18	LDW-SS320-010	Aroclor-1260	43	J (all detects)	А
KA18	LDW-SS321-010	Aroclor-1260	68	J (all detects)	А
KA18	LDW-SS318-010	Aroclor-1260	51	J (all detects)	А

SDG	Sample	Compound	%RPD	Flag	A or P
KA18	LDW-SS317-010	Aroclor-1248 Aroclor-1254	62 62	N/A N/A	-
KA18	LDW-SS315-010	Aroclor-1248 Aroclor-1254	57 53	N/A N/A	-
KA18	LDW-SS325-010	Aroclor-1248 Aroclor-1254	68 61	N/A N/A	-
KA18	LDW-SS304-010	Aroclor-1254	42	N/A	-

N/A = Not applicable

For the results above flagged "Not applicable", the affected compound results in the associated samples were deemed unusable and did not warrant qualification of the data.

The pattern of peaks on detected samples were possibly weathered aroclors. The results were reported by the laboratory on the best possible match in SDGs JZ53 and KA18.

Raw data were not evaluated for the samples reviewed by Level III criteria.

#### XIII. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

SDG	Sample	Compound	Flag	A or P
JZ53	LDW-S\$312-010**	Aroclor-1254	R	A
JZ53	LDW-SS312-010DL**	All TCL compounds except Aroclor-1254	R	A
KA18	LDW-SS335-010 LDW-SS317-010 LDW-SS315-010 LDW-SS325-010 LDW-SS326-010	Aroclor-1248 Aroclor-1254 Aroclor-1260	R R R	А
KA18	LDW-SS335-010DL LDW-SS317-010DL LDW-SS315-010DL LDW-SS325-010DL LDW-SS326-010DL	All TCL compounds except Aroclor-1248 Aroclor-1254 Aroclor-1260	R	А

SDG_	Sample	Compound	Flag	A or P
KA18	LDW-SS316-010 LDW-SS303-010 LDW-SS304-010	Aroclor-1254 Aroclor-1260	R R	A
KA18	LDW-SS316-010DL LDW-SS303-010DL LDW-SS304-010DL	All TCL compounds except Aroclor-1254 , Aroclor-1260	R	A

Data flags are summarized at the end of this report if data has been qualified.

# XIV. Field Duplicates

Samples LDW-SS329-010 and LDW-SS401-010 (SDG JZ15), samples LDW-SS337-010 and LDW-SS402-010 (SDG JZ15), and samples LDW-SS301-010\*\* and LDW-SS403-010\*\* (SDG JZ53) were identified as field duplicates. No polychlorinated biphenyls were detected in any of the samples with the following exceptions:

		Concentration (ug/Kg)		
SDG	Compound	LDW-\$\$329-010	LDW-SS401-010	RPD (Limits)
JZ15	Aroclor-1248	33	36	9 (≤50)
JZ15	Aroclor-1254	46	43	7 (≤50)
JZ15	Aroclor-1260	45	43	5 (≤50)

		Concentration (ug/Kg)		
SDG	Compound	LDW-SS337-010	LDW-SS402-010	RPD (Limits)
JZ15	Aroclor-1254	20	16	22 (≤50)
JZ15	Aroclor-1260	20	18	11 (≤50)

		Concentration (ug/Kg)		
SDG	Compound	LDW-SS301-010**	LDW-SS403-010**	RPD (Limíts)
JZ53	Aroclor-1248	32	30U	Not calculable
JZ53	Aroclor-1254	38	49	25 (≤50)
JZ53	Aroclar-1260	38	46	19 (≤50)

# XV. Field Blanks

Samples LDW-SS344-RB (SDG JZ53), LDW-SS308-RB (SDG JZ53), and sample LDW-SS325-RB (SDG KA18) were identified as rinsate blanks. No polychlorinated biphenyl contaminants were found in these blanks.

# Lower Duwamish Waterway Group Polychlorinated Biphenyls - Data Qualification Summary - SDGs JZ15, JZ53, and KA18

SDG	Sample	Compound	Flag	A or P	Reason
JZ53 KA18	LDW-SS305-010** LDW-SS321-010	All TCL compounds	J (all detects)	P	Surrogate recovery (%R)
JZ15 JZ53 KA18	LDW-SS331-010 LDW-SS340-010** LDW-SS320-010 LDW-SS321-010 LDW-SS318-010	Aroclor-1260	J (all detects)	A	Compound quantitation and CRQLs (RPD)
KA18	LDW-SS313-010	Aroclor-1248	J (all detects)	A	Compound quantitation and CRQLs (RPD)
JZ53	LDW-SS312-010**	Aroclor-1254	R	A	Overall assessment of data
JZ53	LDW-SS312-010DL**	All TCL compounds except Aroclor-1254	R	A	Overall assessment of data
KA18	LDW-SS335-010 LDW-SS317-010 LDW-SS315-010 LDW-SS325-010 LDW-SS326-010	Aroclor-1248 Aroclor-1254 Aroclor-1260	R R R	A	Overall assessment of data
KA18	LDW-SS335-010DL LDW-SS317-010DL LDW-SS315-010DL LDW-SS325-010DL LDW-SS326-010DL	All TCL compounds except Aroclor-1248 Aroclor-1254 Aroclor-1260	R	A	Overall assessment of data
KA18	LDW-SS316-010 LDW-SS303-010 LDW-SS304-010	Aroclor-1254 Aroclor-1260	R R	A	Overall assessment of data
KA18	LDW-SS316-010DL LDW-SS303-010DL LDW-SS304-010DL	All TCL compounds except Aroclor-1254 Aroclor-1260	R	Α	Overall assessment of data

Lower Duwamish Waterway Group Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDGs JZ15, JZ53, and KA18

No Sample Data Qualified in these SDGs

# Butyltins By EPA SW 846 Method 8270D using Selected Ion Monitoring (SIM) & Krone Method

# I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

### II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

All ion abundance requirements were met.

### III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for all compounds.

# IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% for all compounds.

#### V. Blanks

Method blanks were reviewed for each matrix as applicable. No butyltin contaminants were found in the method blanks.

# VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

#### VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

# VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

Standard reference material was performed at the required frequencies.

# IX. Regional Quality Assurance and Quality Control

Not applicable.

#### X. Internal Standards

All internal standard areas and retention times were within QC limits.

# XI. Target Compound Identifications

All target compound identifications were within validation criteria.

### XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria.

# XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

# XIV. System Performance

The system performance was acceptable for samples.

#### XV. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

## XVI. Field Duplicates

Samples LDW-SS301-010\*\* and LDW-SS403-010\*\* were identified as field duplicates. No butyltins were detected in any of the samples with the following exceptions:

		Concentration (ug/Kg)		-
SDG	Compound	LDW-SS301-010**	LDW-SS403-010**	RPD (Limits)
JZ53	Tributyltin ion	17	14	19 (≤50)
JZ53	Dibutyltin ion	6.9	5.7U	Not calculable

# XVII. Field Blanks

Samples LDW-SS344-RB and LDW-SS308-RB were identified as rinsate blanks. No butylin contaminants were found in these blanks.

# Lower Duwamish Waterway Group Butyltins - Data Qualification Summary - SDG JZ53

No Sample Data Qualified in these SDGs

Lower Duwamish Waterway Group
Butyltins - Laboratory Blank Data Qualification Summary - SDG JZ53

No Sample Data Qualified in these SDGs

# Metals by EPA SW 846 Methods 200.8/7471A

# I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

#### III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

# IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

# V. Matrix Spike Analysis

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

SDG	Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
JZ15	LDW-SS330-010MS (LDW-SS330-010 LDW-SS327-010 LDW-SS328-010 LDW-SS329-010 LDW-SS31-010 LDW-SS331-010 LDW-SS332-010 LDW-SS334-010 LDW-SS333-010 LDW-SS337-010 LDW-SS337-010 LDW-SS300-010DUP)	Antimony Silver	1.9 (70-130) 36.4 (70-130)	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

SDG	Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
JZ53	LDW-SS344-010MS (LDW-SS344-010** LDW-SS344-010** LDW-SS343-010** LDW-SS341-010** LDW-SS339-010** LDW-SS336-010** LDW-SS336-010** LDW-SS305-010** LDW-SS310-010** LDW-SS310-010** LDW-SS310-010** LDW-SS310-010** LDW-SS310-010**	Antimony	3.4 (70-130)	J (all detects) UJ (all non-detects)	A
KA18	LDW-SS335-010MS (LDW-SS335-010 LDW-SS313-010 LDW-SS314-010 LDW-SS322-010 LDW-SS322-010 LDW-SS323-010 LDW-SS319-010 LDW-SS319-010 LDW-SS318-010 LDW-SS318-010 LDW-SS315-010 LDW-SS315-010 LDW-SS315-010 LDW-SS303-010 LDW-SS326-010 LDW-SS335-010 LDW-SS335-010 LDW-SS335-010 LDW-SS335-010 LDW-SS335-010 LDW-SS335-010DUP)	Antimony Silver	2.5 (70-130) 17.6 (70-130)	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

Although the percent recoveries of antimony and silver were severely low (<30%) in the MS samples above, the results in all the associated samples were qualified as estimated (J/UJ) since the post spike recoveries for antimony and silver were within the 70-130% QC limits.

# VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

# VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

Standard reference material was performed at the required frequencies.

#### VIII. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

# IX. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in these SDGs.

#### X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

# XI. Sample Result Verification

All sample result verifications were acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

#### XII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIII. Field Duplicates

Samples LDW-SS329-010 and LDW-SS401-010 (SDG JZ15), samples LDW-SS337-010 and LDW-SS402-010 (SDG JZ15), and samples LDW-SS301-010\*\* and LDW-SS403-010\*\* (SDG JZ53) were identified as field duplicates. No metal contaminants were detected in any of the samples with the following exceptions:

		Concentration (mg/Kg)		
SDG	Analyte	LDW-SS329-010	LDW-SS401-010	RPD (Limits)
JZ15	Arsenic	8.4	8.9	6 (≤30)
JZ15	Chromium	26.5	38.8	38 (≤30)
JZ15	Cobalt	6.1	6.4	5 (≤30)

		Concentra		
SDG	Analyte	LDW-SS329-010	LDW-SS401-010	RPD (Limits)
JZ15	Copper	629	41.9	39 (≤30)
JZ15	Lead	303	44	149 (≤30)
JZ15	Mercury	0.06	0.10	50 (≤30)
JZ15	Nickel	18.9	16,9	11 (≤30)
JZ15	Vanadium	39.0	41.1	5 (≤30)
JZ15	Zinc	75	74	1 (≤30)
JZ15	Molybdenum	0.5	0.6	18 (≤30)

		Concentrat		
SDG	Analyte	LDW-S\$337-010	LDW-\$\$402-010	RPD (Limits)
JZ15	Arsenic	8.8	8.5	3 (≤30)
JZ15	Chromium	23	23	0 (≤30)
JZ15	Cobalt	7.5	7.2	4 (≤30)
JZ15	Copper	30.5	29.6	3 (≤30)
JZ15	Lead	14	13	7 (≤30)
JZ15	Mercury	0.11	0.11	0 (≤30)
JZ15	Nickel	18.9	17.9	5 (≤30)
JZ15	Silver	0.9	0.3U	Not calculable
JZ15	Vanadium	50.6	48.3	5 (≤30)
JZ15	Zinc	85	72	17 (≤30)
JZ15	Molybdenum	0.4	0.3U	Not calculable

		Concentral	iion (mg/Kg)	
SDG	Analyte	LDW-SS301-010	LDW-SS403-010	RPD (Limits)
JZ53	Arsenic	7.8	7.6	3 (≤30)
JZ53	Chromium	15.8	17.8	12 (≤30)
JZ53	Cobalt	4.9	5.0	2 (≤30)
JZ53	Copper	34.5	35.9	4 (≤30)
JZ53	Lead	27	25	8 (≤30)
JZ53	Mercury	0.91	0.16	140 (≤30)
JZ53	Nickel	10.9	11.9	9 (≤30)
JZ53	Vanadium	37.4	40.6	8 (≤30)
JZ53	Zine	106	74	36 (≤30)
JZ53	Molybdenum	0.5	0.5	0 (≤30)

# XIV. Field Blanks

Samples LDW-SS344-RB (SDG JZ53), LDW-SS308-RB (SDG JZ53), and sample LDW-SS325-RB (SDG KA18) were identified as rinsate blanks. No metal contaminants were found in these blanks with the following exceptions:

SDG	Rinsate Blank ID	Analyte	Concentration (ug/L)
JZ53	LDW-SS344-RB	Copper	0.6
JZ53	LDW-SS308-RB	Copper	1.5
KA18	LDW-SS325-RB	Copper Zinc	2.2 5

# Lower Duwamish Waterway Group Metals - Data Qualification Summary - SDGs JZ15, JZ53, and KA18

SDG	Sample	Analyte	Flag	A or P	Reason
JZ15 KA18	LDW-SS330-010 LDW-SS327-010 LDW-SS328-010 LDW-SS329-010 LDW-SS331-010 LDW-SS331-010 LDW-SS333-010 LDW-SS333-010 LDW-SS337-010 LDW-SS335-010 LDW-SS335-010 LDW-SS313-010 LDW-SS314-010 LDW-SS312-010 LDW-SS322-010 LDW-SS322-010 LDW-SS321-010 LDW-SS318-010 LDW-SS318-010 LDW-SS318-010 LDW-SS315-010 LDW-SS315-010 LDW-SS315-010 LDW-SS315-010 LDW-SS315-010 LDW-SS325-010 LDW-SS325-010 LDW-SS325-010 LDW-SS335-010	Antimony Silver	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)
JZ53	LDW-SS344-010** LDW-SS343-010** LDW-SS343-010** LDW-SS341-010** LDW-SS339-010** LDW-SS338-010** LDW-SS336-010** LDW-SS301-010** LDW-SS305-010** LDW-SS305-010** LDW-SS306-010** LDW-SS306-010** LDW-SS306-010** LDW-SS306-010** LDW-SS308-010** LDW-SS311-010** LDW-SS311-010** LDW-SS311-010** LDW-SS312-010** LDW-SS312-010** LDW-SS3144-010DUP**	Antimony	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)

Lower Duwamish Waterway Group Metals - Laboratory Blank Data Qualification Summary - SDGs JZ15, JZ53, and KA18

No Sample Data Qualified in these SDGs

Total Organic Carbon by Plumb Method Total Solids by EPA Method 160.3 Grain Size by PSEP Method

# I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

#### II. Calibration

#### a. Initial Calibration

All criteria for the initial calibration of each method were met.

#### b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

#### III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

## IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## V. Duplicates

Duplicate (DUP) and Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Relative percent differences (RPD) and relative standard deviation (RSD) were within QC limits.

## VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

Standard reference material was performed at the required frequencies.

# VII. Sample Result Verification

All sample result verifications were acceptable for samples on which a EPA Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

# IX. Field Duplicates

Samples LDW-SS329-010 and LDW-SS401-010 (SDG JZ15), samples LDW-SS337-010 and LDW-SS402-010 (SDG JZ15), and samples LDW-SS301-010\*\* and LDW-SS403-010\*\* (SDG JZ53) were identified as field duplicates. No concentrations were detected in any of the samples with the following exceptions:

		Concentration (%)		
SDG	Analyte	LDW-SS329-010	LDW-SS401-010	RPD (Limits)
JZ15	Total solids	70.30	68.80	2 (≤20)
JZ15	Total organic carbon	0.972	1.59	48 (≤30)

		Concent		
SDG	Analyte	LDW-SS337-010	LDW-SS402-010	RPD (Limits)
JZ15	Total solids	55.80	56.10	1 (≤20)
JZ15	Total organic carbon	2.20	2.16	2 (≤30)

		Percent Finer Th		
SDG	Analyte	LDW-SS329-010	LDW-S\$401-010	RPD-(Limits)
JZ15	Gravel (-2)	100	99.4	1 (≤30)
JZ15	Gravel (-1)	98.4	97.8	1 (≤30)
JZ15	Very Coarse Sand (0)	96.5	96.3	0 (≤30)
JZ15	Coarse Sand (1)	86.1	86.1	0 (≤30)
JZ15	Medium Sand (2)	71.8	46.2	43 (≤30)

		Percent Finer Th	an Indicated Size	
SDG	Analyte	LDW-\$\$329-010	LDW-SS401-010	RPD (Limits)
JZ15	Fine Sand (3)	46.2	34.5	29 (≤30)
JZ15	Very Fine Sand (4)	26.5	26.2	1 (≤30)
JZ15	Silt (5)	22.1	21.5	3 (≤30)
JZ15	Silt (6)	17.0	16.7	2 (≤30)
JZ15	Silt (7)	11.4	11.4	0 (≤30)
JZ15	Silt (8)	7.8	7.8	0 (≤30)
JZ15	Clay (9)	5,3	5.4	2 (≤30)
JZ15	Clay (10)	3.5	3.6	3 (≤30)

		Percent Finer Th		
SDG	Analyte	LDW-SS337-010	LDW-\$\$402-010	RPD (Limits)
JZ15	Gravel (-2)	99.8	100	0 (≤30)
JZ15	Gravel (-1)	99.8	99.8	0 (≤30)
JZ15	Very Coarse Sand (0)	98.9	99.2	0 (≤30)
JZ15	Coarse Sand (1)	97.5	97.7	0 (≤30)
JZ15	Medium Sand (2)	94.9	94.9	0 (≤30)
JZ15	Fine Sand (3)	70.9	71.3	1 (≤30)
JZ15	Very Fine Sand (4)	46.7	46.4	1 (≤30)
JZ15	Silt (5)	32.7	30,8	6 (≤30)
JZ15	Silt (6)	21.0 19.9		5 (≤30)
JZ15	Silt (7)	13.0	12.5	4 (≤30)

		Percent Finer Th		
SDG	Analyte	LDW-SS337-010	LDW-SS402-010	RPD (Limits)
JZ15	Silt (8)	8,2	8.1	1 (≤30)
JZ15	Clay (9)	6.0	5.9	2 (≤30)
JZ15	Clay (10)	4.3	4.2	2 (≤30)

		Concent		
SDG	Analyte	LDW-SS301-010** LDW-SS403-010*		RPD (Limits)
JZ53	Total solids	67.50	66.80	1 (≤20)
JZ53	Total organic carbon	1.55	1.95	23 (≤30)

		Percent Finer Th		
SDG	Analyte	LDW-SS301-010	LDW-SS403-010	RPD (Limits)
JZ53	Gravel (-2)	97.1	98.0	1 (≤30)
JZ53	Gravel (-1)	91,4	92.8	2 (≤30)
JZ53	Very Coarse Sand (0)	87.7	88.8	1 (≤30)
JZ53	Coarse Sand (1)	78.1	79.1	1 (≤30)
JZ53	Medium Sand (2)	41.2	41.6	1 (≤30)
JZ53	Fine Sand (3)	22.4	21.9	2 (≤30)
JZ53	Very Fine Sand (4)	18.2	17.8	2 (≤30)
JZ53	Silt (5)	15.6	14.8	5 (≤30)
JZ53	Silt (6)	12.2	11.7	4 (≤30)
JZ53	Silt (7)	8.6	8.3	4 (≤30)
JZ53	Silt (8)	6.0 5.7		5 (≤30)
JZ53	Clay (9)	4.2	4.0	5 (≤30)

		Percent Finer Th		
SDG	Analyte	LDW-SS301-010	LDW-SS403-010	RPD (Limits)
JZ53	Clay (10)	2.7	2.5	8 (≤30)

# X. Field Blanks

Samples LDW-SS344-RB (SDG JZ53) and LDW-SS308-RB (SDG JZ53) were identified as rinsate blanks. No contaminant concentrations were found in these blanks.

Lower Duwamish Waterway Group Wet Chemistry - Data Qualification Summary - SDGs JZ15, JZ53, and KA18

No Sample Data Qualified in these SDGs

Lower Duwamish Waterway Group Wet Chemistry - Laboratory Blank Data Qualification Summary - SDGs JZ15, JZ53, and KA18

No Sample Data Qualified in these SDGs

# HRGC/HRMS Dioxins/Dibenzofurans By EPA Method 1613B

# I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all homologues. The chromatographic resolution between <sup>13</sup>C-2,3,7,8-TCDD and <sup>13</sup>C-1,2,3,4-TCDD was less than or equal to 25%.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

#### III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all native compounds and less than or equal to 30.0% for all labelled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was technically acceptable.

## IV. Routine Calibration (Continuing)

Routine calibration was performed at the required frequencies.

All of the routine calibration concentrations were within the QC limits.

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

#### V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated dioxin/dibenzofuran contaminants were found in the method blanks with the following exceptions:

Associated SDG	Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples	
DPWG20754/ WG20336	WG20336-101	10/18/06	1,2,3,4,6,7,8-HpCDD OCDD 2,3,4,7,8-PeCDF OCDF Total HpCDD	0.057 ng/Kg 0.069 ng/Kg 0.050 ng/Kg 0.057 ng/Kg 0.057 ng/Kg	LDW-SS318-010 LDW-SS321-010 LDW-SS322-010 LDW-SS323-010 LDW-SS324-010 LDW-SS323-010DUP	

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks.

# VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

# VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. The percent recoveries (%R) were within QC limits.

Standard reference material was performed at the required frequencies.

# VIII. Regional Quality Assurance and Quality Control

Not applicable.

#### IX. Internal Standards

All internal standard recoveries were within QC limits.

#### X. Target Compound Identifications

All target compound identifications were within validation criteria.

## XI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

Associated SDG	Sample	Compound	Flag	A or P
DPWG20754/ WG20336	LDW-SS321-010 LDW-SS323-010	1,2,3,7,8,9-HxCDF was reported by the lab as estimated (K) maximum possible concentration (EMPC)	U	Α

# XII. System Performance

The system performance was acceptable.

## XIII. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Associated SDG	Sample	Compound	Flag	A or P
DPWG20754/ WG20336	LDW-SS318-010 LDW-SS321-010 LDW-SS322-010 LDW-SS323-010 LDW-SS324-010 LDW-SS323-010DUP	2,3,7,8-TCDF on DB-5	R	A

Data flags have been summarized at the end of the report if data has been qualified.

# XIV. Field Duplicates

No field duplicates were identified in this SDG.

# XV. Field Blanks

No field blanks were identified in this SDG.

# Lower Duwamish Waterway Group Dioxins/Dibenzofurans - Data Qualification Summary - SDG DPWG20754/WG20336

SDG	Sample Compound		Flag	A or P	Reason
DPWG20754/ WG20336	LDW-SS321-010 LDW-SS323-010	1,2,3,7,8,9-HxCDF was reported by the lab as estimated (K) maximum possible concentration (EMPC)	U	A	Compound quantitation and CRQLs (EMPC)
DPWG20754/ WG20336	LDW-SS318-010 LDW-SS321-010 LDW-SS322-010 LDW-SS323-010 LDW-SS324-010 LDW-SS323-010DUP	2,3,7,8-TCDF on DB-5	R	A	Overall assessment of data

Lower Duwamish Waterway Group Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG DPWG20754/WG20336

No Sample Data Qualified in this SDG

LDC #:	15720A2a	VALIDATION COMPLETENESS WORKSHEET	Date:_///8/00
SDG#:_	JZ1 <u>5</u>	Level III	Page: /of /
Laborato	ry: Analytical Resou	rces, Inc.	Reviewer:
METHOR	): GC/MS Semivola	tiles (EDA SW 846 Method 82700)D	2nd Reviewer:

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area	_	Comments
<u> </u>	Technical holding times	<u> </u>	Sampling dates: 10 2 0 6
11.	GC/MS Instrument performance check	Α	
UE.	Initial calibration	SW	
IV.	Continuing calibration	Δ	1CV = 25
V.	Blanks	Α	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples /SRM	جس	<b>▶८</b> >
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentitatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	$ \uparrow $	
XVI.	Field duplicates	ಶ್ರಬ	D=445 10 + 11
XVII.	Field blanks	N	

Note:

A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank

D ≍ Duplicate TB = Trip blank EB = Equipment blank

Validated Samples sediment

1	LDW-SS330-010	11	LDW-SS402-010	21	MB -101606	31	
2	LDW-SS327-010	12	LDW-SS337-010MS	22		32	
3	LDW-SS328-010	13	LDW-SS337-010MSD	23		33	
4_	LDW-SS329-010	14		24		34	
5	LDW-SS401-010	15		25		35	
6	LDW-SS331-010	16		26		36	
7	LDW-SS332-010	17		27		37	
8	LDW-SS334-010	18		28		38	
9_	LDW-SS333-010	19		29		39	
10	LDW-SS337-010	20	<u></u>	30		40	

# **VALIDATION FINDINGS WORKSHEET**

# METHOD: GC/MS BNA (EPA SW 846 Method 8270)

. PhenoI**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachiorophenoi**	III. Benzo(a)pyrene**
3. Bis (2-chloroethyl) ether	Q. 2,4-Dichlaropheno!**	FF. 3-Nitroanifine	UU, Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
2. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	W. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,l)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chioroaniline	II. 4-Nitrophenol*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ, Dibenzofuran	YY, Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrataluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalone	LL. Diethylphthalate	AAA, Butyibenzyiphthalate	PPP, Benzoic Acid
i. 4-Methyiphenoi	X. Hexachiorocyclopentadiene*	MM. 4-Chiorophenyi-phenyl ether	BBB. 3,3'-Dichtorobenzidine	QQQ, Benzyl alcohol
J, N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO, 4-Nitroanliine	DDD. Chrysene	SSS. Benzidine
L. Nitropenzene	AA. 2-Chioronaphthalene	PP, 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	тт.
M. Isophorone	EB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF, Di-n-octylphthalate**	ยบบ.
N. 2-Nitrophenoi**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	w.
O. 2,4-Dimethylphenoi	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	www.

LDC #:	15720A2a
SDG #:	JZ15

# VALIDATION FINDINGS WORKSHEET Initial Calibration

	Page:_	_/_of_	1
	Reviewer:_	P	,
2nd	Reviewer:	М	

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

N/A Did the laboratory conduct an acceptable 5 point calibration prior to sample analysis?

Y/N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?

Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation?

A Did the initial calibration meet the acceptance criteria?

Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF?

#	Date	Standard ID	Compound	Finding %RSD (Limit: <u>&lt;</u> 30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	10/12/06	ICAL	HH	30.810		All + Blank	J/NJ/A
	. ,						,
<u> </u>							
<u> </u>		·					
<u> </u>	<del>                                     </del>						
⊩			,				· · · · · · · · · · · · · · · · · · ·
<u></u>	<u> </u>	<u> </u>				<u>.                                    </u>	
<u> </u>						}	·
<u> </u>		<u> </u>					
							· -
┢							
_			·	- 1			
   <u> </u>					<u> </u>	<u> </u>	
<u> </u>	<u> </u>	:		,			
<u> </u>	<u> </u>						
<u> </u>		·					
<u> </u>	,						· ·
$\vdash$			<u> </u>			<u> </u>	
┢═	<del> </del>					ì	
<b> </b>	1						
	1				•		
				·			
					, ,		

LDC #: 15720A 20 SDG #: 1215

# VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Page:	/_of	_
Reviewer:	ر عر	
2nd Reviewer:	a	

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Rease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Not applicable questions are identified as "N/A". Was a LCS required?

Y N N/A Was a LCS required?
Y N N/A Were the LCS/LCSD

Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		105-101606	Τ	29.3 (40-130)	( ')	( )	A11+815-	J NJ /P
			888	36.2( )	( , )	( )	J	\ \frac{1}{\sqrt{1}}\sqrt{1}
				( )	( )	()	1	
				( )	( )	( , )		
<b> </b>				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( ).	( )	( )		
				( )	( )			
				( )	( )	· ( )		
$\vdash$		· <u> </u>		( )	( )	( )	<u> </u>	
		<u> </u>		( )	( )	( )		
				( )	( ' )	( )	•	
				( )	( )	( )		·
				( )	( )	(		
				( )	( )	( )		
				. ( )	()	( )		
				()	( )	()		
				( )	( )	( )		
				( )	. ( - )	( )		
				( )	( )	( )		
$\vdash \vdash$			_	( )	( )	( )		
		-		( )	( )	( )		
$\vdash$	· _		-	( )	( )	( )		
$\vdash \dashv$		<del>-</del>		( )	( )	( )		

LDC#: <u>15720A2a</u> SDG#: <u>JZ15</u>

# VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: \_/ of \_\_2~ Reviewer: \_\_\_/5\_ 2nd Reviewer: \_\_\_/4\_\_\_.

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Y	N	NA
ĺΫ	N	NA
. ~	,	

Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

,	Concentra	ition (uglKg)	450	•
Compound	4	5	RPD	
bis (2-Ethylhexyl) phthalate	140	180	25	
Benzo (g,h,i) perylene	68	53	25	
Phenanthrene	72	39	59	
Anthracene	36	62u	280 NC	
Fluoranthene	170	94	58	
Рутеле	210	140	40	
Benzo(a)anthracene	97	49	66	
Chrysene	170	73	80	
Benzo(b)fluoranthene	110	100	10	
Benzo(k)fluoranthene	99	59	51	
Benzo(a)pyrene	97	63	43	
Indeno(1,2,3-cd)pyrene	53	38	33	

V:\FIELD DUPLICATES\Windward\15720A2a.wpd

# LDC#: 15720A2a

# **VALIDATION FINDINGS WORKSHEET** Field Duplicates

Page:\_2of Reviewer: 2nd Reviewer:

SDG#: JZ15

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

/	$\overline{\mathbf{Y}}$	N	NA	
	$\overline{Y}$	N	NA	

Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

	Concentra	Concentration (ug/Kg)		
Compound	30	11	RPD	
Bis (2-Ethylhexyl) phthalate	140	150	7 .	
Benzo (g,h,i) perylene	42	44	5	
Phenanthrene	46	54	16	
Fluoranthene	130	140	7	
Pyrene	100	110	10	
Benzo(a)anthracene	46	52	12	
Chrysene	71	78	9	
Benzo(b)fluoranthene	65	72	10	
Benzo(k)fluoranthene	62	55	12	,
Benzo(a)pyrene	49	60	20	
Indeno(1,2,3-cd)pyrene	37	35	6	

V:\FIELD DUPLICATES\Windward\15720A2a.wpd

LDC #:_	15 <u>767A2a</u>	VALIDATION COMPLETENESS WORKSHEET	Date: 1//15/0
SDG #:_	JZ53	_ Level IV	Page: <u>/</u> of <u>/</u>
Laborato	ory: <u>Analytical Reso</u> i	urces, Inc.	Reviewer:
			2nd Reviewer: /⁴/∠

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270%) 🏷

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	Α	Sampling dates: 10/3/06
11.	GC/MS Instrument performance check	Δ	
III.	Initial calibration	<u>A</u>	1CV = 25
IV.	Continuing calibration	Δ	
V	Blanks	تىي	
VI.	Surrogate spikes	3W_	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples /S RM	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	Δ	
XI.	Target compound identification	A_	
XII.	Compound quantitation/CRQLs	ىسى	
XIII.	Tentitatively identified compounds (TICs)	И	not reported
XIV.	System performance	٨	·
XV.	Overall assessment of data	لبهي	
XVI.	Field duplicates	SW	P= 10-122 RB=1+16
XVII.	Field blanks	ND	RB = 1 + 16

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

#### Validated Samples + water Seliments

	255000001									
1	LDW-SS344-RB	V	11	LDW-SS302-010	5	21	LDW-SS312-010DL	5	31/	MB-101706
2	LDW-SS344-010	ج	12	LDW-SS305-010		22	LDW-SS403-010		32	
3	LDW-SS342-010		13	LDW-SS307-010		23	LDW-SS306-010MS		33	
4	LDW-SS343-010		14	LDW-SS306-010		24	LDW-SS306-010MSD	$\downarrow$	34	
5	LDW-SS341-010		15	LDW-SS308-010	$\downarrow$	25			35	
6	LDW-\$\$339-010		16	LDW-SS308-RB	2	26			36	
7	LDW-SS340-010		17	LDW-SS309-010	۶	27			37	
8	LDW-SS338-010		18	LDW-SS310-010		28			38	
9	LDW-SS336-010		19	LDW-SS311-010		29			39	
10	LDW-SS301-010	$\downarrow$	20	LDW-SS312-010	$\downarrow$	30			40	

LDC#: 5767A2a SDG#: 1753

# VALIDATION FINDINGS CHECKLIST

Page: of Z Reviewer: 5 2nd Reviewer: 4

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
1- Technical holding times (2.4)				
All technical holding times were met.				
Cooler temperature criteria was met.	000000000000000000000000000000000000000			
II: GO/MS/Instrument performance check : 기구 기가				
Were the DFTPP performance results reviewed and found to be within the specified criteria?				
Were all samples analyzed within the 12 hour clock criteria?				
Ilisinual calibration s	•			
Did the laboratory perform a 5 point calibration prior to sample analysis?	/			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Was a curve fit used for evaluation?		/	-	
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			_	<del>-</del>
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) ≥ 0.05?			V.	
IV Continuing calibration To See			1	
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?				
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?		-		
VtBlanks	4			
Was a method blank associated with every sample in this SDG?				
Was a method blank analyzed for each matrix and concentration?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
VI. Surrogate spikes			*15	
Were all surrogate %R within QC limits?				
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?				
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?				
VII. Matrix spike/Matrix spike duplicates			¥,	
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.				
Was a MS/MSD analyzed every 20 samples of each matrix?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				
VIII/X Laboratory confrol samples 1% % 62.7				
Was an LCS analyzed for this SDG?	/			

### VALIDATION FINDINGS CHECKLIST

Page: Zof Z Reviewer: 75 2nd Reviewer: 1

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
IX: Regional Quality Assurance and Quality Control 3 4 5 5				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				
X:Internal standards 👲 😹 👂				
Were internal standard area counts within -50% or +100% of the associated callbration standard?				
Were retention times within ± 30 seconds from the associated calibration standard?				
Xt at arget compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				
Were chromatogram peaks verified and accounted for?			OCCUPANT OF THE PARTY.	
XII Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?				
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?				
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?				
XIV. System performance.			r .*	
System performance was found to be acceptable.		- '		
XV overall assessment of data.				
Overall assessment of data was found to be acceptable.			I	
XVI)-Eleid An pacates (17 - 2.19 - 2.19 - 2.19 - 2.19 - 2.19 - 2.19 - 2.19 - 2.19 - 2.19 - 2.19 - 2.19 - 2.19	4	, A		
Field duplicate pairs were identified in this SDG.				
Target compounds were detected in the field duplicates.		•		
XVII. Field blanks		1,-		
Field blanks were identified in this SDG.				
Target compounds were detected in the field blanks.				

### **VALIDATION FINDINGS WORKSHEET**

### METHOD: GC/MS BNA (EPA SW 846 Method 8270)

. Phenoi**	P. Bis (2-chloroethoxy) methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	III. Benzo(a)pyrene**
. Bis (2-chloroethyl) ether	Q. 2,4-Dichloropheno!**	FF. 3-Nitroaniline	UU. Phenanthrens	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichiorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(s,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalone	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,l)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chioroaniline	II. 4-Nitrophenoi*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Flucranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenoi**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzolc Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenoi**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO, 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	πт.
M. isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	UUU.
N. 2-Nitrophenoi**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)!luoranthene	vvv.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachiorobenzene	HHH. Benzo(k)fluoranthene	www.

LDC #:	576	ZAZa
SDG #:	125	3

#### VALIDATION FINDINGS WORKSHEET **Bianks**

Page:_	<u>/</u> _of_	_
Reviewer:	15	
2nd Reviewer:	´ <b>∧</b> ~	

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Rease see qualifications below for all questions answered "N". Not applicable questions are identified the second control of the sec	ntified as "N/A".
--	-------------------

Was a method blank analyzed for each matrix?

N N/A Was a method blank analyzed for each concentration preparation level?

Blank analysis date:

Was a method blank associated with every sample? YIN N/A

Y N N/A Was the blank contaminated? If yes, please see qualification below. Blank extraction date: 10/11/06 Blank analysis date: 10/31/06

All sulinento Conc. units: ualka Associated Samples:

Compound	Blank ID	,	Sample Identification					
	MB- 101706	9	12	14	20			
<u> </u>	64.	50/4	85/U	120/11	15/4			
				, , , , , , , , , , , , , , , , , , , ,	,			
			_			_		
			_					

Compound	Blank ID	Sample Identification							
				•					
	•								
			-				-	,	
			1	-					

Associated Samples:

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:

Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

blan	k.w	ρd
	bian	blank.w

Blank extraction date:

Conc. units:

LDC #:	15767AZa
SDG #:_	1253

#### **VALIDATION FINDINGS WORKSHEET** Surrogate Recovery

Page:_	
Reviewer:_	_5
nd Reviewer	

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Plaase see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N M/A Were percent recoveries (%R) for surrogates within QC limits?

If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?

Y N NA If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

`#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
			PHL	30,9 (40-130)	no ona L
				· ( )	
		. 8	TPH	39.2 ( V )	V
				( .)	
		[6	PH L	31.2 ( )	· · · · · · · · · · · · · · · · · · ·
		<del></del>		( )	
		in Intenti	0.11.1	38.7 ( 1 )	1.
		MB-101006	PHL	38.7 ( 1 )	<i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>
			<del> </del>	( )	
<del></del>		<del></del>	<del>                                     </del>	( )	
	<del></del> .			( )	
				( )	
				( )	
\ <del></del>				( )	
				( )	
				( )	
			· ·	( )	
	<del></del> ; <del>.</del>			( )	
				( )	
				( )	
		<u> </u>		( )	
				()	
				( )	

* QC limits are advisory QC Limits (Soll)	QC Limits (Water)		QC Limits (Soll)		QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5 23-120	35-114	S5 (2FP)= 2-Fluorophenol	25-121		21-100
S2 (FBP) = 2-Fiuorobiphenyl 30-115	43-116	S6 (TBP) = $2,4,6$ -Tribromophenol	19-122	_	10-123
S3 (TPH) = Terphenyl-d14 18-137	33-141	S7 (2CP) = 2-Chiorophenol-d4	20-130*		33-110*
S4 (PHL) = Phenol-d5 24-113	10-94	S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	-	16-110*

LDC #:	5	767A2a
SDG #:	•	

### **VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)**

	Page: _	1	_of <u>/</u>	_
	Reviewer:	_/	9	
2nd	Reviewer:	Ė	/	

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". YN N/A Was a LCS required?

Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? Y/N/N/A

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD • %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LC3-101704	NNN	25.4 (40-134)	()_	( )	all sedimento	J/UJ/P
				( )	( )	( )		<b>,</b> — <b>,</b> ,
				.( ).	( )	( )		
				( )	( )	( )		
				( )	( )	( _)		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
	=			(		()_		
				( )	( )	( )		
				( )	( , , ) ,			
	<del> </del>		<u> </u>	( )	( )	( )		
_		<u>-</u>			( )	( )		
_			<del> </del>					
	<del></del>			( )	( )	( )		
				( )	( )	( )		
				( )	_( )	( )		
				( )	( )	( )		
-				( )	( )	( )		
	····		<u></u>	( )	( )	( )		<u> </u>
				( )	()	( )		
				( )	( )	( )		
				( )	( )	( )		
	İ			( )	_()_	( )		

LDC #:	15767A2a
SDG #:	1253

# VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLs

Page:	0f
Reviewer:	73
2nd Reviewer:	

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

PI	ase se	e qua	lifications	below for	all	questions	answered	"N".	Not	applicable of	questions	are	identified	as "N/A".

 $\frac{\sqrt{y/N} N/A}{\sqrt{x}}$  Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

		compound						
#	Date	compound Sample ID	Finding	Associated Samples	Qualifications			
		77	exceeded cal Range	20	NA			
		·		-				
		· · · · · · · · · · · · · · · · · · ·		<u> </u>	· · · · · · · · · · · · · · · · · · ·			
L			<u> </u>	<u> </u>				
			,		<u> </u>			
		<u> </u>						
				·				
ı								
					· · · · · · · · · · · · · · · · · · ·			
	<u></u>	<u> </u>	<u> </u>		<u> </u>			

Comments:	See sample calculation	verification worksheet for recalculations				
·-			<u> </u>	· .		
		<del></del>				

LDC #: 15767A200 SDG #: 1253

# VALIDATION FINDINGS WORKSHEET <u>Overall Assessment of Data</u>

Page:	of
Reviewer:	P.
2nd Reviewer:	<del></del>

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	compound Sample-ID	Finding	Associated Samples	Qualifications
		YY	exceeded cal Range	20	R/A
		all except YY	Liluted	<b>\$</b> /	R/A
				_	

Comments: _		 	 _				
					_	•	

LDC#:15767A2a SDG#:JZ53

# **VALIDATION FINDINGS WORKSHEET**

**Field Duplicates** 

Page:of/	
Reviewer:	
2nd Reviewer:	

METHOD: GCMS method 8270D

Were field duplicate pairs identified in this SDG? Y N NA

Y/N NA Were target analytes detected in the field duplicate pairs?

	Concentra	ation (ug/Kg)	250
Compound	10	_ 22	RPD
Phenanthrene	130	270	70
Anthracene	73	290	120
Fluoranthene	350	620	56
Ругепе	590	3100	136
Benzo (a) anthracene	310	2200	200-15
bis (2-Ethylhexyl) phthalate	190	180	5
Chrysene	520	3600	150
Benzo (b) fluoranthene	520	4600	159
Benzo (k) fluoranthene	280	2200	155
Benzo (a) pyrene	320	2600	156
Indeno (1,2,3-cd) pyrene	120	1100	161
Benzo (g,h,i) perylene	110	1000	160
Fluorene	61 น	39	-200 VC
Di-n-Butylphthalate	61u	32	290 ↓

LDC #: 15767A29 SDG #: 1253

### **VALIDATION FINDINGS WORKSHEET** Initial Calibration Calculation Verification

	Page:_	<u>of_</u>	_
F	Reviewer:_	*	,
2nd F	leviewer:_		

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

 $RRF = (A_x)(C_{ix})/(A_{ix})(C_x)$ 

 $A_{x} =$ Area of compound,

A<sub>h</sub> = Area of associated internal standard

average RRF = sum of the RRFs/number of standards %RSD = 100 \* (S/X)

 $C_x = Concentration of compound,$ S = Standard deviation of the RRFs. X = Mean of the RRFs

C<sub>k</sub> = Concentration of Internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF	Recalculated  RRF ( 2 std)	Reported  Average RRF (Initial)	Recalculated  Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	10/12/06	Phenol (1st internal standard)	2.247	2-247	2.279	2.279	7.4	7.4
			Naphthalene (2nd internal standard)	1.074	1.076	1.088	1.08	5.3	5.3
		]	Fluorene (3rd internal standard)	1.384	1.384	1-376	1.376	2.9	2.9
		]	Pentachlorophenal (4th internal standard)	1.224	1.224	1.231	1.23/	3 -	3./
		1 .	Bis(2-ethylhexyl)phthalate (5th internal standard)	0.499	0.499	0.499	0.499	2.0	2.0
		<u> </u>	Benzo(a)pyrene (6th internal standard)	1.153	1-153	1.169	1.169	4.3	4.3
2			Phenol (1st internal standard)						
		]	Naphthalene (2nd Internal standard)					<u>-</u>	
		]	Fluorene (3rd internal standard)						
		]	Pentachlorophenol (4th internal standard)						
		]	Bis(2-ethylhexyl)phthalate (5th internal standard)						
	<u> </u>		Benzo(a)pyrene (6th Internal standerd)						
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
		1	Pentachiorophenol (4th Internal standard)						
		<b>j</b>	Bis(2-ethylhexyl)phthalate (5th internal standard)						
		1	Benzo(a)pyrene (6th internal standard)						

Comments:	Refer to	Initial	<u>Calibration</u>	findings	worksheet	for lis	t of	qualifications	and	associated	samples	when	reported	results	do n	ot agre	e within	10.0%	of the
recalculated	results.		<u> </u>																
			· .					-											
								-											

LDC #: 15767A2a SDG #: 1753

### **VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification**

Page:_	of
Reviewer:	F
2nd Reviewer:	A

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF  $RRF = (A_{\nu})(C_{\mu})/(A_{\nu})(C_{\nu})$ 

Where: ave, RRF = initial calibration average RRF

RRF = continuing calibration RRF

 $A_x =$ Area of compound,  $C_{x}$  = Concentration of compound, A<sub>b</sub> = Area of associated internal standard

C<sub>k</sub> = Concentration of internal standard

					Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (Initial)	RRF (CC)	RRF (CC)	%D	%D
1	cer	10/17/06	Phenol (1st internal standard)	2.279	2.240	2.240	1.7	1.7.
	0957		Naphthalene (2nd internal standard)	1-088	1-088	1.088	0.0	0.0
			Fluorena (3rd internal standard)	1.376	1.359	1. 359	1.2	1.2
			Pentachlerophenol (4th internal standard)	1.23/	1.226	1.226	0.4	0.4
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.499	0.483	0.483	3.2	3.2
			Benzo(a)pyrene (6th internal standard)	1-169	1.160	1-140	0.8	0.8
2	cer	10/30/06	Phenol (1st internal standard)	1	2.002	2.002	12.2	12.2
-	15001		Naphthalene (2nd internal standard)		1.085	1-085	0.3	0.3
	——————————————————————————————————————		Fluorene (3rd Internal standard)		1.362	1-362	1.0	1.0
			Pentadiforophenol (4th Internal standard)		1.200	1-200	2.5	2-5
			Bis(2-ethylhexyl)phthalate (5th internal standard)		0.5700	0-5700	2.2	2.2
			Benzo(a)pyrene (6th internal standard)		1.154	1-154	1.3	/^3
з	car	10/31/06	Phenol (1st internal standard)	1	2-035	2.035	10-7	10-7
	0940		Naphthalene (2nd internal standard)		1.082	1-082	0-6	0.6
		-	Fluorene (3rd internal standard)		1-345	1.345	2.2	2.2
			Pentachiorophenol (4th internal standard)		1.204	1.204	2.2	2.2
			Bis(2-ethylhexyl)phthalate (5th internal standard)		0.49/	0.49/	1.6	1.6
		-"	Benzo(a)pyrene (6th internal standard)		1.147	1-147	1.9	1.9

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 15767A2a SDG #: 1253

# VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:	<u></u>
Reviewer:	٦
2nd reviewer:	r-1

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

Sample ID:\_\_\_

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	1525	811.0	57.2	57.1	0
2-Fluorobiphenyl	1525	867.9	56.8	56.9	
Terphenyl-d14	1525	४०६.४	5mg/	528	
Phenoi-d5	rws	1274	55,7	55.7	
2-Fluorophenol	2258	1244	24.4	54.4	
2,4,6-Tribromophenol	22 48	1350	58.9	59.0	
2-Chlorophenol-d4	ney	1209	55.5	55.5	
1,2-Dichlorobenzene-d4	1525	845.4	55.6	55.4	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:\_\_\_\_\_

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					·
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					_
2-Chlorophenoi-d4					
1,2-Dichlorobenzene-d4					

LDC #: 15767A29 SDG #: 1253

### **VALIDATION FINDINGS WORKSHEET** Matrix Spike/Matrix Spike Duplicates Results Verification

Page:_	<u>of</u>
Reviewer:	/9
2nd Reviewer:	M /

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SSC - SC)/SA

Where: SSC = Spiked sample concentration SA = Spike added

SC = Sample concentation

RPD = IMS - MSDI\*2/(MS + MSD)

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

MS/MSD samples: ユョムコンリ

		pike	Sample		Concentration		Spike	Matrix Spike Duplicate		MS/	MSD
Compound	( uc	Ided 1 Kgy	Concentration hg				Percent Recovery		Percent Recovery		PD
	MS	MSD	0 0	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol	2280	2240	122	1280	1350	50.8	50.8	54.3	54-3	5,3	5-3
N-Nitrese-di-n-prepylamine											
4-Chloro-3-methylphenol	2280	2240	ND	1540	1600	67.5	67.5	7018	70.8	3.8	3.8
Acenaphthene	1520	1500	NO	985	1050	64.8	64.8	70.0	70.0	6.4	6.4
-Pentachlorophenol					_						
Pyrene	1520	1500	an	962	1010	63.3	63.3	67-3	67.3	4-9	4.9
				_							
											1000

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0%
of the recalculated results.

LDC#: 15767A2a

### **VALIDATION FINDINGS WORKSHEET** Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

	Page:_	
	Reviewer:	<u></u>
2nd	Reviewer:	1

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SC/SA

Where: SSC = Spike concentration

SA = Spike added

RPD = | LCS - LCSD | \* 2/(LCS + LCSD)

LCS = Laboratory control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: LCS - 10/70 C

	Si	pike		Spike		LCS		LCSD		LCS/LCSD	
Compound	(119	lded 1Kg)	( M	Concentration ( ng//kg Percent Recovery		Percent Recovery		RPD			
	LCS	LCSD	LCS	icsn	Reported	Recalc	Reported	Recalc	Reported	Recalculated.	
Phenol	1560	NA	1080	NA	69.2	69.2					
N-Nitroso-di-n-propylamine				,							
4-Chloro-3-methylphenol	1560	1	1190		76-3	76.3					
Acenaphthene	1560		1190		76.3	76.3					
Pentachlorophenol						_					
Pyrene	1560		1250	1	80./	80,/	NA				
								•			

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associations	ited samples when reported
results do not agree within 10.0% of the recalculated results.	

LDC #:_	15767A2a
SDG #:	1253

#### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	/_of/
Reviewer:	ħ
2nd reviewer:	O1

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Y	N	N/A
Y	N	N/A

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration =  $(A_s)(I_s)(V_s)(DF)(2.0)$  $(A_k)(RRF)(V_o)(V_s)(%S)$ 

A<sub>x</sub> = Area of the characteristic ion (EICP) for the compound to be measured

A<sub>a</sub> = Area of the characteristic ion (EICP) for the specific internal standard

I<sub>s</sub> = Amount of internal standard added in nanograms (ng)

V<sub>o</sub> = Volume or weight of sample extract in milliliters (m!) or grams (g).

V<sub>t</sub> = Volume of extract injected in microliters (ul)

V<sub>t</sub> = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 5 Phenanthrene

Conc. = (18211)( 20 )( 2000 )( )( )( )( )

= 13 ug /kg/

		,
	·	
	_	
`		
<del> </del>		
1		
	· · · · · · · · · · · · · · · · · · ·	
T.		

LDC #: 15767B2a VALIDATIO	N COMF	PLETENESS WORKSHEET	Date: 11/14/06
SDG #: KA18		Level III	Page:
Laboratory: Analytical Resources, Inc.			Reviewer: 1/5_ 2nd Reviewer: 1/4.
METHOD: GC/MS Semivolatiles (EPA SW 846	6 Method 8	3270/210	Zild Reviewer.
The samples listed below were reviewed for ea validation findings worksheets.	ch of the f	following validation areas. Validation findir	ngs are noted in attached
Validation Area		Comments	
I. Technical holding times	A	Sampling dates: 10   4   10 1	
II GC/MS lastrument performance check			

	Validation Area		Comments
l.	Technical holding times	A	Sampling dates: 10   4   b 1
II.	GC/MS Instrument performance check	Δ	1
III.	Initial calibration	<u>კ</u> ჟ	
IV.	Continuing calibration	ე გ	1cv = 25
V.	Blanks	AGUE	-
VI.	Surrogate spikes	ر س	
VII.	Matrix spike/Matrix spike duplicates	ر ای	
VIII.	Laboratory control samples	3	Les
IX.	Regional Quality Assurance and Quality Control	N	
X	Internal standards	$\triangle$	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentitatively identified compounds (TICs)	N	· ·
XIV.	System performance	N	
XV.	Overall assessment of data	sw	
XVI.	Field duplicates	2	
XVII.	Field blanks	5W	RB = 16

Note:

ND = No compounds detected R = Rinsate FB = Field blank

A = Acceptable N = Not provided/applicable SW = See worksheet

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples

1 (	LDW-SS335-010	11	LDW-SS317-010	21	LDW-SS316-010MSD	31	MB- 101806
2	LDW-SS313-010	12	LDW-SS316-010	22		32 V	MB-101106
3	LDW-SS314-010	13	LDW-SS316-010DL	23		33	
4	LDW-SS322-010	14	LDW-SS315-010	24		34	
5	LDW-SS323-010	15	LDW-SS303-010	25		35	
6	LDW-SS320-010	162	LDW-SS325-RB W	26		36	
7	LDW-SS319-010	17	LDW-SS325-010	27		37	
8	LDW-SS324-010	18	LDW-SS326-010	28		38	
9	LDW-SS321-010	19	LDW-SS304-010	29		39	
10	LDW-SS318-010	20	LDW-SS316-010MS	30		40	

### **VALIDATION FINDINGS WORKSHEET**

### METHOD: GC/MS BNA (EPA SW 846 Method 8270)

A. Phenoi**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachiorophenoi**	III. Benzo(a)pyrene**
3. Bis (2-chloroethyl) ether	Q. 2,4-Dichloropheno!**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK, Dibenz(a,h)anthracene
D. 1,3-Dichierobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroanitine	II. 4-Nitrophenoi*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichiorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Anliine
G. 2-Methylphenol	V. 4-Chloro-3-methylphenoi**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butyibenzyiphthalate	PPP. Benzoic Acld
i. 4-Methylphenol	X. Hexachicrocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroaniline	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chioronaphthalene	PP. 4,8-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	π.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octy/phthalate**	UUU.
N. 2-Nitrophenal**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	vvv.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH. Benzo(k)fluoranthene	www.

LDC #:	15767B2a
SDG #:	KAIB

Y N/A

# VALIDATION FINDINGS WORKSHEET Initial Calibration

Page:_	 of_	
Reviewer:	2	2
2nd Reviewer:	1	

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

N/A Did the laboratory conduct an acceptable 5 point calibration prior to sample analysis?

Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?

Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation?

NON/A Did the initial calibration meet the acceptance criteria?

Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF?

#	Date	Standard ID	Compound	Finding %RSD (Limit: <u>&lt;</u> 30.0%)	Finding RRF (Limit: <u>&gt;</u> 0.05)	Associated Samples	Qualifications
	10/2/06	KAL	HH	30.810		All samples	Jus/A
						All samples except Bank	
				-			
	, .						<u> </u>
							•
_		_					
						·	
							•
			. <u></u>				
		•					
		•					
							·
						,	<u> </u>
				,			
						·	
_	1					-	

LDC #: 15767B2a SDG #: KA18

Y/N/N/A

#### **VALIDATION FINDINGS WORKSHEET Continuing Calibration**

Page:_	_/of_/	,
Reviewer:_	F	
2nd Réviewer		

METHOD: GC/MS BNA (EPA SW 848 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

| Y | N | N/A | Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument? Y/N\N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	10 28 06	CC 1028	X	26.6		1-08, 10-012,	ALVIL
						1-08, 10-012,	
				· · ·	·		
					<u> </u>		
		<del></del>		<u> </u>			Paragram Managhaman
	1						
<u> </u>	10/30/01	CC103 0	×	27.9		13	
_	1,5 30 100	00100			<del></del> -		*
-					,		
		,					
<u> </u>					<u> </u>		
							·
		•				<u> </u>	
<u> </u>			· ·		,	<del> </del>	
						<del>_</del>	
			·				<u> </u>
Ì	<del>                                     </del>						<del></del>
-	<del> </del>		<del> </del>				
				-		<u> </u>	
	<del>                                       </del>	<u> </u>					
	,				·		
						,	-

### LDC #: 15767B2a SDG #: KALK

### **VALIDATION FINDINGS WORKSHEET Surrogate Recovery**

	Page:_		1
	Reviewer:	F	Ż
2nd	Reviewer:	1	

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A

Were percent recoveries (%R) for surrogates within QC limits?

If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?

Y N NA If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

	Sample ID	Surrogate		Limits)		Qualifications
	14	TPH	37.8	(40-130	)	NO GUAL
				(	)	
		·		(	)	
				(	)	
				(	)	
			•	(	)	
				(	)	
				(	)	
				(	)	
				(	)	5. 6
		·		(	)	
,				. (	)	
				(	.)	
				(	)	
				(	)	
			2.2	(	)	
				( -	)	
			<u> </u>	"(	)	
				(	)	
				(	)	
				(	)	
			1	(	)	
			-	(	)	
		•		•	<u>,</u>	

* QC limits are advisory	QC Limits (Soil)	QC Limits (Water)		QC Limits (Soil)		QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5 2	3-120	35-114	S5 (2FP)= 2-Fluorophenol	25-121		21-100
\$2 (FBP) = 2-Fluorobiphenyl 3	30-115	43-116	S6 (TBP) = 2,4,6-Tribromophenol	19-122	-	10-123
S3 (TPH) = Terphenyl-d14 1	8-137	33-141	S7 (2CP) = 2-Chlorophenol-d4	20-130*		33-110*
S4 (PHL) = Phenol-d5 2	24-113	10-94	S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	-	16-110*

LDC #: 15767B2a SDG #: KAIX

# VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

	Page:_	of/
	Reviewer:	127
2nd	Reviewer:	1/

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

WN N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water

associated MS/MSD. Soil / Water.

Y N\N/A Was a MS/MSD analyzed every 20

Was a MS/MSD analyzed every 20 samples of each matrix?

Y/N/N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		20+21	77	0 (40-130)	0 (40-130)	( ')	12	m outl
			*	( , )	( )	( )		parent 72x
				( )	( )	( )		spike Amit
			1-1-1	35.5 ( V )	32.5 ( )	( )		ALWIL
		· <del>    -</del>		• ( )	( )	( )		
				()	( )	( )		
				( )	( )	( )		
				( )	( )	( )	<u></u>	
				(	( )	()		
		•		( )	( )	( )		
				( )	. ( )	( )		
		·		( )	( )	( )		<u> </u>
				( )	( )	( )		
				( )	( )	( )		
		<u> </u>		( )	( )	( )		
				( )	( )	( )		
		·		( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soll)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	<u>≤</u> 35%	12-110%	<u>&lt;</u> 42%	GG.	Acenaphthene	31-137%	≤ 19%	46-118%	<u>&lt;</u> 31%
C.	2-Chìorophenol	25-102%	<u>&lt;</u> 50%	27-123%	≤ 40%	II.	4-Nitrophenol	11-114%	≤ 50%	10-80%	_ ≤ 50%
E.	1,4-Dichlorobenzene	28-104%	<u>&lt;</u> 27%	· 36-97%	<u>&lt;</u> 28%	KK.	2,4-Dinitrotoluene	28-89%	<u>&lt; 47%</u>	24-96%	<u>&lt;</u> 38%
J,	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	<u>&lt;</u> 38%	π.	Pentachiorophenol	17-109%	<u>&lt;</u> 47%	9-103%	<u>&lt;</u> 50%
R.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	<u>&lt;</u> 28%	ZZ.	Pyrene	35-142%	<u>&lt;</u> 36%	26-127%	<u>≤</u> 31%
V.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	<u>&lt;</u> 42%						

LDC #: 15767B2a SDG #: KAIX

# VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)

Page: _	<u></u>
Reviewer:	#1
2nd Reviewer:	

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A

Was a LCS required?

Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD · %R (Limits)	RPD (Limits)	Associated Samples €7	Qualifications
		105-101806	777	34.) (40-134	) ( )	()_	MB-101806	JIWIP
				( )	( )	( )	All sediments	
				( )	()	( )	coupt BIE	
				( ).	( )	( )		
				_ ( )	( )	( )		
<u> </u>				( )	()	( )		
				( )	( )	( )		
	<del></del>			( )	( )	( )		
					( )	()		
				( )	( )	(,)		
				( )	( )	( )		
<b></b>	<u> </u>			()_		( )		
ļ				( )		( )		
·	<u> </u>		1	( )		( )	<u> </u>	
			<del>                                     </del>			( )		
		<u></u>	1	<del>'</del>	( )	( )		
		,		( )				
		<u> </u>		( )				
-		<del> </del>	<del> </del>	( )		( )		
				( )	( )	( )		
	<del> </del>		1	. ( )		( )		
<b> </b>	ļ							
	<u> </u>			( )	, ,	( )		
	<del> </del>			( )	( )	( )		
		<u> </u>		( )		<u>    (         )                       </u>	<u> </u>	<u> </u>

LDC #: 15767872 SDG #: KA18

# VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLs

	Page:	/_of/
	Reviewer:	
nd	Reviewer:	

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A | Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	compound -Sample ID	Finding	Associated Samples	Qualifications
		71	exceeded cal Range		νA
			0		
		<u> </u>	_		
				<u> </u>	
				<u> </u>	· ·
				, <u> </u>	
				,	
					1

Comments:	See sample calculation verific	ation worksheet for recalculations		
		_		
<u> </u>				

LDC #:_	15767B	ya
SDG #:	KAIN	٠.

# VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

	Page:	of
	Reviewer:	
2nd	Reviewer:	<b>F</b> .

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

<u> Y N/N/A/</u>

Was the overall quality and usability of the data acceptable?

#	Date	conpound  Sample-ID	Finding	Associated Samples	Qualifications	
			exceeded and Pange	12	R/A	
	<u>.</u>	all except above	dilutuo	13	P/A	
		<u> </u>		· · · · · · · · · · · · · · · · · · ·		
	<u>.</u> .					
				<u> </u>		
	-			·		
	<u></u>					
		•		·		

Comments:							
				•			
					,		•
	-	•					

OVR.25

LDC #: 15767820 SDG #: KA18

### VALIDATION FINDINGS WORKSHEET Field Blanks

Page:_	_/_of	
Reviewer:_	7	7
2nd reviewer:	Ń	

N N/A		is identified in this SDG?  npounds identified in the field blanks?	
mple:	<u></u>	Field Blank / Trip Blank / Rinsate (circle one)	
		Compound	Concentration Units ( Mg/)
		<del>EEE</del>	1.1
nple:		Field Blank / Trip Blank / Rinsate (circle one)	
		Compound	Concentration Units ( )
nple:		Field Blank / Trip Blank / Rinsate (circle one)	
_		Compound	Concentration Units ( )
			,

									1.1.1.
LDC:		\	/ALIDATIO				WORKSHEE	T	Date: ///8/06
SDG		_		ļ	_evel	Ш			Page:
	ratory: <u>Analytical Reso</u> r				fz.				Date: ///8/06 Page:/of/ Reviewer:/ 2nd Reviewer:/
MET	HOD: GC/MS Semivola	atiles	(EPA SW 846	Method 8	2700/-5	SIM)			
					- (		on areas. Valida	ation findir	ngs are noted in attached
valida	ation findings workshee	ts.							•
					<u> </u>				
-	Validatio	on Ar	<u>ea</u>				7 4	nments	
<u> </u>	Technical holding times			A	Samplin	ng dates:	10/2/0	06	
H.	GC/MS Instrument perfo	rmanc	e check	Δ	0/				
311.	Initial calibration		<del>-</del> ·	<u> </u>	0/0	PSD	T	2.99U	
IV.	Continuing calibration			سي	1	CV =	25		
<u>V.</u>	Blanks			Α					
VI.	Surrogate spikes			sw					
VII.	Matrix spike/Matrix spike	duplic	ates	_A_					
VIII.	Laboratory control samp	es	SRM_	SAV	<u> </u>	° %			
IX.	Regional Quality Assura	nce an	d Quality Control	N.					
X.	internal standards			Δ	<u> </u>				
XI.	Target compound identif	cation		N					
XII.	Compound quantitation/0	CRQLs		N					
XIII.	Tentitatively identified co	mpour	ids (TICs)	N					
XIV.	System performance	_		N					
XV.	Overall assessment of da	ata		Α_					
<u> </u>				<del> </del>				1	
XVI.	Field duplicates			SW	D -	405	1	0 4-1	
XVII	Field blanks			Ŋ					
Note:	A = Acceptable N = Not provided/applica SW = See worksheet	ble	R = Rin	o compound sate eld blank	s detecte	ed	D = Duplicate TB = Trip blank EB = Equipment b	olank	
Validat	ed Samples Sealime of								
1	LDW-SS330-010	11	LDW-SS402-01	 0	21	MB-	101606	31	
2	LDW-SS327-010	12	LDW-SS337-01		22		•	32	
3	LDW-\$\$328-010	13	LDW-SS337-01		23		<u> </u>	33	
4	LDW-SS329-010	14			24			34	
5	LDW-SS401-010	15			25			35	
6	LDW-SS331-010	16			26			36	
7	LDW-SS332-010	17			27			37	
8	LDW-SS334-010	18			28		·	38	

LDW-SS333-010

LDW-S\$337-010

### **VALIDATION FINDINGS WORKSHEET**

### METHOD: GC/MS BNA (EPA SW 846 Method 8270)

A. Phenoi**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenoi**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichloropheno!**	FF. 3-Nitroaniline	UU, Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	W. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h.i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenol*	XX. Di-n-butyiphthalate	MMM. Bis(2-Chlorolsopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN, Anline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOQ. N-NitrosodImethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA, Butyibenzyiphthalate	PPP. Benzoic Acid
i. 4-Methylphenol	X. Hexachlorocyclopentadiens*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ, Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenol**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroanliine	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenot	EEE. Bis(2-ethylhexyl)phthalate	тт.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	uuu.
N. 2-Nitrophenoi**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phonylether	GGG. Benzo(b)fluoranthene	vw.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachiorobenzene	HHH. Benzo(k)fluoranthene	www.

LDC #:	572	OA 26
SDG #:_	JZ	15

# VALIDATION FINDINGS WORKSHEET Continuing Calibration

	Page:_	1	_of_	
	Reviewer:		1	ラ
2nd	Reviewer:		4	

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Prease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?

Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?

Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF?

#	Date	Standard ID	Compound	Finding %D (Limit: <u>&lt;</u> 25.0%)	Finding RRF (Limit: <u>&gt;</u> 0.05)	Associated Samples	Qualifications
	10 25 06	101 1025	<u> </u>	37-12		AlltBK	J/113/A
			. ೦೦	37-12 54.92		· 1	7 \
			ଷ୍ଷ	70.92		<u> </u>	
				.,			
		·			···		
<u>.                                    </u>	10/26/06	CC1026-CW	Θ⁄	38.		1-79.	ALNIL
	10:0		· · · · · · · · · · · · · · · · · · ·			MB-101606	
<u> </u>				·			
ļ	1						
<u> </u>				·			
ļ			· · · · · · · · · · · · · · · · · · ·	· - · · · · · · · · · · · · · · · · · ·	<u>'</u>	<u> </u>	
	1 1 .		1		l. 		11111
<u> </u>	10 27 06	cc1027 -ccV	KKK	35.9		10-173	1/w/A.
<u> </u>	15:36						
<del> </del>		· ·		<u> </u>			
ļ	<u> </u>			<u> </u>			
ļ							
<u> </u>	<del>                                     </del>			<u> </u>			
			, , , , , , , , , , , , , , , , , , ,		·	<u> </u>	
				·			
	<del> </del>	-		,	-		
· ·					<del>-</del>		
ļ							· · · · · · · · · · · · · · · · · · ·
<b> </b>		_	<u> </u>		<u>'</u>		
				·	<u> </u>		<u></u>

# SDG #: 17 15

#### **VALIDATION FINDINGS WORKSHEET** Surrogate Recovery

Page:	_/ of/
Reviewer:	77
2nd Reviewer:	1/4

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A

Were percent recoveries (%R) for surrogates within QC limits?

Y N N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R? Y N N/A

If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limit	(2)	Qualifications	
		\ <u>\</u>	NBZ	28.2 (	40-140)	mo ana L	
				1	)		
		2	7	32-8 (	ν,	J	
				(	. )	· · · · · · · · · · · · · · · · · · ·	
_		. 3	Ψ	30.0 (	· · · · · · · · · · · · · · · · · · ·	<u>\</u>	
<del></del>		4	1,	33.\ (	<u> </u>		
		<u> </u>	Y	33.1	)		
		5	7	32-3 (			<del></del>
			<del></del>	(	)		
		6	1	31.3 (	1	<b>↓</b>	
				(	)		
			<u> </u>	27.9 (	4 )	<u> </u>	<del></del>
		8	- L	3/ \	, , , , , , , , , , , , , , , , , , ,		
			ν	36.)	<b>V</b> )	<u> </u>	
-		a	1	32.3 (	<u> </u>		
				(	)		
		10	. 4	31.3 (	1 )		
			,	. (	)		
		1\ .	<u> </u>	31.8 (	)		
				(	)		
				(	)		
				. (	)		

* QC limits are advisory QC Limits (Soil)	QC Limits (Water)	•	QC Limits (Soil)		QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5 23-120	35-114	S5 (2FP)= 2-Fluorophenol	25-121		21-100
S2 (FBP) = 2-Fluorobiphenyl 30-115	43-116	S6 (TBP) = $2.4,6$ -Tribromophenol	19-122		10-123
S3 (TPH) = Terphenyl-d14 18-137	33-141	S7 (2CP) = 2-Chlorophenol-d4	20-130*		33-110*
S4 (PHL) = Phenol-d5 24-113	10-94	S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	-	16-110*

LDC #: 15720A26 SDG #: 1715

#### **VALIDATION FINDINGS WORKSHEET Laboratory Control Samples (LCS)**

	Page:	<u>/of/</u>
	Reviewer:	
2nd	Reviewer:	- A(

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

| YN -N/A | Was a LCS required?

Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		Les-101606	8	24.4 (40-140)	( · )	( )	All+BlK	JMIP
		<del></del> -		( ' ' )	( , , )	( )	<b>,</b>	
				( )	( )	( )	·	
				( )	( )	( )		
\ \				( )	( )	( )	·	_
				( )	( )	( )		
				( )	( )	( )		
				. ( ).	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				()	( )	_( )		
				( )	( )	( )		-
				( )	( )	( )	·	
<b></b>				( )	( )	( )	<del></del>	
			<u> </u>	( )	( )			
				,	( )	( ' )		
				( )	( )	( )		
	<del></del>		<u> </u>	( )	( )	)		
<u> </u>				( )	( )	( )	·	
				( )	( )	( )		
				( )	( )	( )		
				( .)	( )	( )		
				( )	( )	( )		
	••••		•	( )	( )	( )		
				( )	( )	( )		

LDC #: 15720A2b SDG #: JZ 15

# VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:_	/of_	_
Reviewer:_	P	7_
2nd reviewer:_	<u> </u>	

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Y	h	N/A
<u>Y</u> /	N	N/A

Were field duplicate pairs identified in this SDG?

Were target compounds identified in the field duplicate pairs?

	Ţ	Concentration	ir nglkgi	450
Compound		4	S S	RPD
KKK	L	13	9.2	34
		6.2	6.24	200110
AAA	<u> </u>	12	12	D
·				
				·

	Concentration	± 50	
Compound	10	0.01	RPD
KKK	6.7	6.8	2
AAA	20	19.	5
		· <del>-</del>	
. :			

	Concentration	()	
Compound			RPD
	· ·		,
		,	· -
	· · · · · · · · · · · · · · · · · · ·	· .	- <del>-</del>

		Concentration	1( .)	
. Сотроиз	d			RPD
			- 0	
		,	· .	
	<u></u>			
	· ·			

LDC # SDG #	:JZ53		PLETENESS WORKSHEET Date: ///// Level IV Page: _/of_/
Labora	atory: Analytical Resources, Inc.		Reviewer: 15
METH	OD: GC/MS Semivolatiles (EPA SW 846	Method 8	2nd Reviewer: <u>&amp;</u> 270⊄SIM)
	·		D i
	amples listed below were reviewed for ear ion findings worksheets.	ch of the fo	ollowing validation areas. Validation findings are noted in attached
vallual	ion indings worksneets.		
	Validation Area		Comments
l.	Technical holding times	Α	Sampling dates: 1013/04
11.	GC/MS Instrument performance check	A	
III.	Initial calibration	Δ	% RSD, 12 20.99U
IV.	Continuing calibration	<u>sw</u>	10 = X
V.	Blanks	A	
VI.	Surrogate spikes	ريي	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples /SRM F	15K/A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
Χ.	Internal standards		
XI.	Target compound identification	Δ	
XII.	Compound quantitation/CRQLs	Δ	
XIII.	Tentitatively identified compounds (TICs)	N	not Reported
XIV.	System performance	Δ	j
XV.	Overall assessment of data	A.	
XVI.	Field duplicates	V	10 + 21
XVII.	Field blanks	94	RB = 1, 16
Note:	N = Not provided/applicable R = Rin	o compounds sate eld blank	s detected D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples

	30001140		<u> </u>						
12	LDW-SS344-RB	11	LDW-SS302-010 5	•	21	LDW-SS403-010	5	31 \	MB-10170C
<u>-</u>	LDW-SS344-010 - 5	12	LDW-SS305-010		22	LDW-SS306-010MS		32 2	MB- 101006
3	LDW-SS342-010	13	LDW-SS307-010		23	LDW-SS306-010MSD	$\bigvee$	33	
4	LDW-SS343-010	14	LDW-SS306-010		24			34	
<u>‡</u>	LDW-SS341-010	15	LDW-SS308-010	/	25			35	
<del>†</del>	LDW-SS339-010	16 2	LDW-SS308-RB ✓	)	26			36	
† 7	LDW-SS340-010	17	LDW-SS309-010 S	_	27			37	
۲ 8	LDW-SS338-010	18	LDW-SS310-010		28	_		38	
9	LDW-SS336-010	19	LDW-SS311-010	·	29			39	
10	LDW-SS301-010	20	LDW-SS312-010	/	30			40	

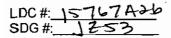
## LDC#: 15767A29 SDG#: 1753

#### **VALIDATION FINDINGS CHECKLIST**

Page: /of \_2 Reviewer: \_5 2nd Reviewer: \_4

Method: Semivolatiles (EPA SW 846 Method 8270C) SIM

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times		<b>.</b>		general experience
All technical holding times were met.				
Cooler temperature criteria was met.				
II GC/MS instrument performance check	<b>3</b> Y			
Were the DFTPP performance results reviewed and found to be within the specified criteria?				
Were all samples analyzed within the 12 hour clock criteria?				
III Anitial Calibration	191	10.70	er e man	
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	/	<u>-</u> -		
Was a curve fit used for evaluation?		,		
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?				
Were all percent relative standard deviations (%RSD) $\leq$ 30% and relative response factors (RRF) $\geq$ 0.05?		an Berna		
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	/			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	/			
Were all percent differences (%D) $\leq$ 25% and relative response factors (RRF) $\geq$ 0.05?		/		
V. Blanks	1000			
Was a method blank associated with every sample in this SDG?	/			
Was a method blank analyzed for each matrix and concentration?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	manus nz e	/		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	,	<b>'</b>		
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?		/		
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			•	
VII Matrix spike/Matrix spike duplicates	12			
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	/			
Was a MS/MSD analyzed every 20 samples of each matrix?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	/	كعد		
VIII. Laboratory control samples		504		The state of the s
Was an LCS analyzed for this SDG?	/			



#### **VALIDATION FINDINGS CHECKLIST**

Page: Zef Z Reviewer: Z 2nd Reviewer: A

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?		-		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?			A 100 Page 121	>20
IX. Regional Quality Assurance and Quality Control 2 2 2				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?		1940		
X Internal standards				A DATE OF THE PARTY OF THE PART
Were internal standard area counts within -50% or +100% of the associated calibration standard?				
Were retention times within ± 30 seconds from the associated calibration standard?		76 (BA) (SS		
XI. Target compound identification	11			
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				
Were chromatogram peaks verified and accounted for?		V 100		
XII Compound quantitation/CROEs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?			<u> </u>	
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII. Tentatively identified compounds (TICs)		Av., Sand	N.	A second of the
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			/	
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?			/	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?			/	
XIV, System performance	* 10			The second secon
System performance was found to be acceptable.				
XV Overall assessment of data				
Overall assessment of data was found to be acceptable.		***************************************		
XVISField duplicates 2				
Field duplicate pairs were identified in this SDG.				
Target compounds were detected in the field duplicates.			_	
XVII. Field blanks				
Field blanks were identified in this SDG.				
Target compounds were detected in the field blanks.			_	

### **VALIDATION FINDINGS WORKSHEET**

METHOD: GC/MS BNA (EPA SW 846 Method 8270) 5 [M

A. Phenoi**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenoi**	III. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrene	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R)1,2,4-Trichlorobenzene	GG. Acenaphthene**	VV. Anthracene	KKK. Dibenz(a,h)anthracens
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. ,4-Dichlorobenzene**	T. 4-Chloroaniline	II. 4-Nitrophenoi*	XX, DI-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachlorobutadisne**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Anliine
G. 2-Methylphenol	V. 4-Chloro-3-methylphenoi**	KK. 2,4-Dinitrotoluene	ZZ. Pyrene	OOO.N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butylbenzylphthalate	PPP. Benzolc Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chlorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenoi**	NN. Fluorene	CCC. Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichlorophenol	OO. 4-Nitroanilins	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chloronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	тп.
M. isophorone	BB. 2-Nitroanfline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octy/phthalate**	UUU.
N. 2-Nitrophenol**	CC.Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG. Benzo(b)fluoranthene	vw.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS.)Hexachlorobenzene	HHH. Benzo(k)fluoranthene	www.

#### **VALIDATION FINDINGS WORKSHEET Continuing Calibration**

Page:_	1	_of_	1
Reviewer:		1	2
nd Reviewer:		ď	

METHOD: GC/MS BNA (EPA SW 846 Method 8270) SIM

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

N N/A Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument? Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ? /N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF?

21

#	Date	Standard ID	Compound	Finding %D (Limit: <u>&lt;</u> 25.0%)	Finding RRF (Limit: <u>&gt;</u> 0.05)	Associated Samples	Qualifications
	10/24/06	CC1026	9	38.1		All water +	1/41/A N
	· ' _ '	<u> </u>			<u>.</u>	MB-10100(P)	
				· ·			
	11/1 06	1cv 101	000	29.24		2-13	ALUIL
		<u> </u>	<u> </u>	, ,			- 1- 1
<u> </u>							
	10/20/06	1001025	200	40.16		All water +	1 1u3/A
	1-1-1-1	100 100	6	37.12		MB-101006 FT	
			<u> </u>	54.92			
<u> </u>			= 5 0	70.92		- V '-	
					· · · · · · · · · · · · · · · · · · ·	<u> </u>	·
ļ				·			· · · · · · · · · · · · · · · · · · ·
					<u> </u>	<u> </u>	
							·
	-						
			· .				
						· <u> </u>	
	<u> </u>						<u> </u>

LDC #:	15767	ALB
--------	-------	-----

SDG #: 」 と 5ス

#### **VALIDATION FINDINGS WORKSHEET** Surrogate Recovery

Page:_	1 of 1
Reviewer:	15
2nd Reviewer:	d-

METHOD: GC/MS BNA (EPA SW 846 Method 8270) SIM

Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

YNA

Were percent recoveries (%R) for surrogates within QC limits?

Y (NO N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?

Y N/N/A If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	ate Sample ID Surrogate %R (Limits)		%R (Limits)	Qualifications
		8	TPH	36.2 (40-130)	no outal
	_			(	
			FBP	36.8 ( 1)	JUJP GUAL AND BIN
			TPH	36.4 ( )	
<u> </u>			FBP	36.9 (40-130)	NO OUAL
<u> </u>			1 21	( 402(30)	June Court C
		13	FBP	31.1 ( )	1/11/P QUAN AN B/N
			TBP	39.5 ( )	
	_		NBZ	36.1 ( )	J
				( )	
				()	
			_	( )	
				( )	
					<del>-</del>
<b> </b>					
<del></del>	-	<del>_</del>		( )	<del> </del>
				( )	
		·		( )	
			<del> </del>	( )	· ·
				( )	
				( )	
				( )	

* QC limits are advisory QC	Limits (Soil)	QC Limits (Water)		QC Limits_(Soll)	QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5 23-1	120	35-114	S5 (2FP)= 2-Fluorophenol	25-121	21-100
S2 (FBP) = 2-Fluorobiphenyl 30-1	115	43-116	S6 (TBP) = 2,4,6-Tribromophenol	19-122	10-123
S3 (TPH) = Terphenyl-d14 18-1	137	33-141	S7 (2CP) = 2-Chlorophenol-d4	20-130*	33-110*
S4 (PHL) = Phenot-d5 24-1	113	10-94	S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	16-110*

LDC #: 15767AAb SDG #: 17253

# VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:	of
Reviewer:	<u> </u>
2nd reviewer	. 1

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

$\hat{K}$	Ν	N/A
Y	N	N/A

Were field duplicate pairs identified in this SDG?

Were target compounds identified in the field duplicate pairs

	Concentr	ation ( ug ka)	450
Compound	10	21	RPD
KKK	50	340	149
444	11	14	2 4
	•		
1	. •	e e e e e e e e e e e e e e e e e e e	
		1	1
· (			,
, _	Concentra	ation (	
Compound	•		RPD

	Concentration (		
Compound	٠,		RPD
		1	
,		1	
	• .	N.	
			.1

	Concentration ( )		
Compound			_ RPD
·			
	•		•
·			

	Concentration (	
Compound		RPD
1 ,		
,		

LDC# 5767A2b SDG# 1253

## VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

METHOD:\_\_\_\_8270SIM

Callibration Date	Column/ Detector	Compound	Standard	Y	х
10/25/06	GCMS	Dimethylthphalate	Point 1	0.0736340945	0.05
			Point 2	0.3346058796	0.25
			Point 3	0.7596718216	0.5
			Point 4	1.54879891	1.25
			Point 5	2.815998469	2.5
			Point 6	5.1375934352	5
			Point 7		
			Point 7		
			Point 8		

	Recalculated Result	Result Reported by the La
Regression Output:		
Constant	0	0
Std Err of Y Est	0.1800163973928209	
R Squared	0.99121	0.992
No. of Observations	6	
Degrees of Freedom	5	
X Coefficient(s)	1.06048241102818 -4.709533374922748	1.06509
Std Err of Coef.	0.03127647028597 0.9001142278087764	

LDC# 5767+25 SDG# 253

## VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

METHOD:\_\_\_8270SIM

Callibration Date	Column/ Detector	Compound	Standard	Y	x
11/01/06	GCMS	Benzyl Alcohol	Point 1	0.0594781139	0.05
			Point 2	0.2945850298	0.25
			Point 3	0.656939863	0.5
			Point 4	1.9166307774	1.25
			Point 5	4.1104257298	2.5
1			Point 6	8.678557657	5
			Point 7	·	_
			Point 7		
			Point 8		

	Recalculated Result	Result Reported by the Laborato
Regression Output:		
Constant	0	0
Std Err of Y Est	0.1726306662894031	
R Squared	0.99730	0.99662
No. of Observations	6	
Degrees of Freedom	5	
X Coefficient(s)	1.70461795111601 -4.709533374922748	1.70728
Std Err of Coef.	0.02999325607469 0.9001142278087764	

LDC# | 5767A26 SDG# JZ53

## VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

METHOD:\_\_\_8270SIM

Callibration Date	Column/ Detector	Compound	Standard	Υ	X
11/01/06	GCMS	Dimethylthphtalate	Point 1	0.1607317499	0.05
			Point 2	0.5057958744	0.25
			Point 3	0.9764078877	0.5
			Point 4	2.3047845822	1.25
			Point 5	4.4068839915	2.5
			Point 6	8.9297711996	5
			Point 7		
			Point 7		
			Point 8		

	Recalculated Result	Result Reported by the Laborato
Regression Output:		
Constant	0	0
Std Err of Y Est	0.06953771186691	-
R Squared	0.99957	0.99958
No. of Observations	6	
Degrees of Freedom	5	_
X Coefficient(s)	1.78612138568295 -4.709533374922748	1.78653
Std Err of Coef.	0.01208164484157	

LDC #: 15767 A26 SDG #: 1 = 53

#### **VALIDATION FINDINGS WORKSHEET** Initial Calibration Calculation Verification

Page:_	<u>_</u> 4_of_	4
Reviewer:	F	

2nd Reviewer:

METHOD: GC/MS BNA (EPA SW 846 Method 8270) 5 | M

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

 $RRF = (A_x)(C_h)/(A_h)(C_x)$ average RRF = sum of the RRFs/number of standards %RSD = 100 \* (S/X)

 $A_x$  = Area of compound,

 $A_{la}$  = Area of associated internal standard

 $C_x =$  Concentration of compound,  $C_h =$  Concentration of S = Standard deviation of the RRFs, X = Mean of the RRFs

C<sub>b</sub> = Concentration of Internal standard

				Reported	Recalculated	Reported	Recalculated	Reported	Recaiculated
#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	RRF ( 2.6 std)	RRF ( 2-5 std)	Average RRF (Initial)	Average RRF (initial)	%RSD	%RSD
1	ICAL	10/25/06	Phenol (1st internal standard)	1. 33288	1.33286	1.25284	1-25284	8. 50201)	8.50291
		· 1	Naphitherene (2nd internal standard)	b. 3886X	0.34868	6.41556	0.41556	4-95277	4-95277
			Aluerene (3rd internal standard)	se cur					
			Pentachlorophenol (4th internal standard)	0.13462	0.13462	0.1140	0.11440	74183	24.183
			Bis(2-offyllesyl)propagate (5th internal standard)  Benzo(a)pyrane Ill(th internal standard)	0.63342	0.63342	0.58374	0.58374	5-012	5.012
<u></u>				1.15710	1.15710	1.16346	1.16346	4.3661	4-3667
2	LCAZ_	11/1/06	Phone! (1st internal standard)	pu sur	<u> </u>				
		•	Naphthelene (2nd Internal standard)  Naphthelene (2nd Internal standard)  Processes (3rounternal standard)	0.68037	0.68037	0.73262	073262	11.4178	11.4178
			Huerene (3rd internal standard)	see curv	e				
			Pentachlorophenol (4th internal standard)	0.10828	0.10828	0.10300	0.10300	28 6119	28.6119
			Genzo(a)pyrene (6th internal standard)	6.56327	0.56327	0.60269	0.60269	6.72319	6.72319
<u></u>				1.13595	1.13595	1-13891	1- (389)	6.61906	6.61906
3	ICAL	11/3/06	Ben 2   Alcoho Phenel (1st internal standard)	1-49655	1-49655	1.53974	1.53974	10,637	10.637
		171	Naphthalene (2nd internal standard)	0.15342	0.15342	0.1806	0.18061	22.869	22-869
			Eluorone (3rd)niernal standard)	6.93255	0.93755	0.95280	0.95680	15.885	12.855
			Pentachlorophenol (4th internal standard)	0.13029	0.13029	0.122 88	0.12288	9.233	4.533
			Bis(2-othylhenyl)phthalage (5th internal standard)	0.64075	0.64075	0.64001	0.6400)	8.325	8.325
			Benze(a)pyrene (6th internal standard)	1.134 20	1.13420	1.16549	1.16549	7.091	7.091

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

INICLC.2S

LDC#: 15767A2か SDG#: 1753

# VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

	Page:_	1	_of_	
	Reviewer:		19	
2nd	Reviewer:		Á	

METHOD: GC/MS BNA (EPA SW 846 Method 8270) S 1 M

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF RRF =  $(A_{\nu})(C_{\nu})/(A_{\nu})(C_{\nu})$ 

Where:

ave, RRF = initial calibration average RRF

RRF = continuing calibration RRF

A<sub>x</sub> ≒ Area of compound,

A<sub>b</sub> = Area of associated internal standard

 $C_x$  = Concentration of compound,

C<sub>b</sub> = Concentration of internal standard

					Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	RRF (CC)	RRF (CC)	%D	%D
1	cer	10/24/06	Phendi (1 st internal standard)	1.25284	1.31462	1.3146	4.93	4.93
		1001	Naphthalene (2nd internal standard)	0.41556	0.37415	0.3787	8. 457	ধ-ধ্য-
-			Huorene (3re internal standard)	2.50	3.023	3.023	20.0	20.9
			Pentachlorophenol (4th internal standard)	0.11440	0.11669	0.11669	2.005	2.01
			Suct at Berry   pm fluctions   Standard)	0,58314	0.60120	0.60120	29918	2.99
			Benzo(a)byrene (6th Internal standard)	1.16346	1.14631	1.1463)	1.434	1.474
2	cer	11/106	Ph <del>enol (1st internal standard</del> )	2.50	2.062	2.062	17.5	17-5
		1345	Naphthalene (2nd internal standard)	0.73262	0.71967	0.71967	1-76828	1-76828
			Fluorene (3rd joternal standard)	2.5	2.425	2.425	3.0	3.0
			Pentachlorophenol (4th internal standard)	0.103	0.09985	0.09985	3.0539	3.0539
			Bis(2 ethylhexyl)phthalate (5th Internal standard)	0.60269	0.57952	0.57952	3.844	3-844
			Renzo(a)pyrene (6th internal standard	1.13691	1.08112	1-08112	5.6739	5-0137
3			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)		,			
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10,0% of the recalculated results.

LDC #: 15767 A26 SDG #: 1 253

#### **VALIDATION FINDINGS WORKSHEET Surrogate Results Verification**

Page:_	 _of_	
Reviewer:	Þ	5
2nd reviewer:	a/	

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found

Sample ID:

SS = Surrogate Spiked

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	1511	933.0	61.6	61.6	0
2-Fluorobiphenyl	1511	825.O	54.8	ડ્યું·૪	
Terphenyl-d14	1511	684.0	425.6	45.6	
Phenol-d5	2267	1553	64.5	UB.S	
2-Fluorophenol	2267	2323	102	102	•
2,4,6-Tribromophenol	2267	1436	63.5	b3.S	'
2-Chlorophenoi-d4	2267	1872	82.7	82.7	
1,2-Dichlorobenzene-d4	1511	936.1	62.0	62.0	Ų ·

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4		_			
1,2-Dichlorobenzene-d4	_				

LDC #: 15767A26 SDG #: 1 753

#### **VALIDATION FINDINGS WORKSHEET** Matrix Spike/Matrix Spike Duplicates Results Verification

Page:_	/ of_	1
Reviewer:	13	
2nd Reviewer:_	Ø	

METHOD: GC/MS BNA (EPA SW 846 Method 8270) > 114

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SSC - SC)/SA

Where: SSC = Spiked sample concentration SA = Spike added

SC = Sample concentation

RPD = 1 MS - MSD 1 \* 2/(MS + MSD)

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

MS/MSD samples:  $\gamma \gamma + \gamma \gamma$ 

		oike	Sample		Sample	Matrix	Spike	Matrix Spik	Matrix Spike Duplicate		MS/MSD	
Compound		ded	Concentration		ntration	Percent	Recovery	Percent F	Recovery	RPD		
	MS	MSD		MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated	
Phenol												
N-Nitroso-di-n-propylamine 🛩	152	152	ND	59.8	80.91	59.8	59.8	53.7	53.7	11-6	ط-۱۱	
4-Chloro-3-methylphenol				90.9								
Acenaphthene												
Pentachiorophenoi ✓	227	228	DA	198	179	87.2	84.2	78,5	78.5	10-	10.1	
Pyrene												

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0%
of the recalculated results.

MSDCLC.2S

LDC #: 15767A26 SDG #: 1753

### VALIDATION FINDINGS WORKSHEET <u>Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification</u>

METHOD: GC/MS BNA (EPA SW 846 Method 8270) 5 1 M

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SC/SA

Where: SSC = Spike concentration

SA = Spike added

RPD = ILCS - LCSD I \* 2/(LCS + LCSD)

LCS = Laboratory control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: LCS-101704

Compound	∦ Adi	oike ded \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Conce	Spike ICS Concentration (ualka) Percent Recovery		LCSD Percent Recovery		CS/LCSD RPD		
10 /	CS	LCSD	LCS	I CSD_	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine	156	NA	108	NA	69.2	69.2				
4-Chloro-3-methylphenol								ļ		
Acenaphthene										
Pentachlorophenol	156	NA	144	NA	92.3	92-3	NA			
Pyrene										
										_
_										

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported
results do not agree within 10.0% of the recalculated results.
reading to not agree within 10.0 // of the reading test reading.

LDC 7	#:_	15	16	7 F	12	0
SDG				5		

#### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	6f
Reviewer:	ħ
and reviewer	Λ.

METHOD	GC/MS RNA	(EPA SW 846	Method 82	7015111
VILLIGOU.	. GOMEO DING		MELITUR 02	./ ()   /   ( )

Y	N	N/A
Ý/	N	N/A

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

#### Concentration = $(A_{\star})(I_{\star})(V_{\star})(DF)(2.0)$ $(A_{\star})(RRF)(V_{o})(V_{\star})(\%S)$

A<sub>x</sub> = Area of the characteristic ion (EICP) for the compound to be measured

A<sub>a</sub> = Area of the characteristic ion (EICP) for the specific internal standard

I<sub>s</sub> = Amount of internal standard added in nanograms (ng)

V<sub>o</sub> = Volume or weight of sample extract in milliliters (ml) or grams (g).

V<sub>I</sub> = Volume of extract injected in microliters (ul)

V<sub>t</sub> = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. #4. Dibenzo (a, h) Anthracenc

Conc. = (55521)(2)(2)(2)(2)(365537)(1.1389)(33.1)(33

= 16 ug/kg

2.0	= Factor of 2 to accou	unt for GPC cleanup			1	<del></del>
#	Sample ID	Compound		Reported Concentration ( )	Calculated Concentration ( )	Qualification
						,
	_					, ,
$\vdash$				_		
$\vdash$						
					,	
		_				
			_			

LDC #:_	15767B2b _	VALIDATION COMPLETENESS WORKSHEET	
SDG #:	KA18	Level III	

Laboratory: Analytical Resources, Inc.

Reviewer: 2nd Reviewer:

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
l.	Technical holding times	1	Sampling dates: 10 14 0 6
II.	GC/MS Instrument performance check	Δ	1 1
III.	Initial calibration	A	% RSD, r2 Za 990
IV.	Continuing calibration	ડ્ડ	,
٧.	Blanks	$\triangle$	
VI.	Surrogate spikes	دىرى	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples SRIM	Love	Les
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	Δ	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentitatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	Δ	
XVI.	Field duplicates	N	
XVII.	Field blanks	) ND	RB = 15

Note: A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples sidinent + warm

	SCANTEON			<del></del>					
1 1	LDW-SS335-010	5	11	LDW-SS317-010	5	21 1	MB -10180L	31	
2	LDW-SS313-010		12	LDW-SS316-010		227	MB- 101104	32	
3	LDW-SS314-010		13	LDW-SS315-010		23		33	
4	LDW-SS322-010		14	LDW-SS303-010	/	24		34	
5	LDW-SS323-010		15 <b>2</b>	LDW-SS325-RB V	j	25		35	
6	LDW-SS320-010		16	LDW-SS325-010	5	26		36	
7	LDW-SS319-010		17	LDW-SS326-010		27		37	
8	LDW-SS324-010		18	LDW-SS304-010		28		38	
9	LDW-SS321-010		19	LDW-SS316-010MS		29		39	
10	LDW-SS318-010	V	20	LDW-SS316-010MSD \	/	30		40	

### **VALIDATION FINDINGS WORKSHEET**

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

A. Phenoi**	P. Bis(2-chloroethoxy)methane	EE. 2,6-Dinitrotoluene	TT. Pentachlorophenol**	iii. Benzo(a)pyrene**
B. Bis (2-chloroethyl) ether	Q. 2,4-Dichlorophenol**	FF. 3-Nitroaniline	UU. Phenanthrens	JJJ. Indeno(1,2,3-cd)pyrene
C. 2-Chlorophenol	R. 1,2,4-Trichlorobenzene	GG. Acenaphthene**	W. Anthracene	KKK. Dibenz(a,h)anthracene
D. 1,3-Dichlorobenzene	S. Naphthalene	HH. 2,4-Dinitrophenol*	WW. Carbazole	LLL. Benzo(g,h,i)perylene
E. 1,4-Dichlorobenzene**	T. 4-Chloroaniline	li. 4-Nitrophenai*	XX. Di-n-butylphthalate	MMM. Bis(2-Chloroisopropyl)ether
F. 1,2-Dichlorobenzene	U. Hexachiorobutadiene**	JJ. Dibenzofuran	YY. Fluoranthene**	NNN. Aniline
G. 2-Methylphenol	V. 4-Chloro-3-methylphenol**	KK. 2,4-Dinitrotaluene	ZZ. Pyrene	OOO. N-Nitrosodimethylamine
H. 2,2'-Oxybis(1-chloropropane)	W. 2-Methylnaphthalene	LL. Diethylphthalate	AAA. Butyibenzyiphthalate	PPP. Benzoic Acid
I. 4-Methylphenol	X. Hexachlorocyclopentadiene*	MM. 4-Chiorophenyl-phenyl ether	BBB. 3,3'-Dichlorobenzidine	QQQ. Benzyl alcohol
J. N-Nitroso-di-n-propylamine*	Y. 2,4,6-Trichlorophenoi**	NN. Fluorene	CCC, Benzo(a)anthracene	RRR. Pyridine
K. Hexachloroethane	Z. 2,4,5-Trichtorophenol	OO, 4-Nitroaniilne	DDD. Chrysene	SSS. Benzidine
L. Nitrobenzene	AA. 2-Chioronaphthalene	PP. 4,6-Dinitro-2-methylphenol	EEE. Bis(2-ethylhexyl)phthalate	тт.
M. Isophorone	BB. 2-Nitroaniline	QQ. N-Nitrosodiphenylamine (1)**	FFF. Di-n-octylphthalate**	UUU.
N. 2-Nitraphenoi**	CC. Dimethylphthalate	RR. 4-Bromophenyl-phenylether	GGG, Benzo(b)fluoranthene	w.
O. 2,4-Dimethylphenol	DD. Acenaphthylene	SS. Hexachlorobenzene	HHH, Benzo(k)fluoranthene	www.

LDC #: 15767B2b SDG #: KA18

#### VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page:	/of_	1
Reviewer:	77	
2nd Reviewer:		

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y/N N/A
Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?
Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?

Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF?

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	10/26/06	CC1026	6	38.1		All water +	1/43/4
					- ,	MB-101106 P	
						·	
<u> </u>	10 27 06	cc 1027	KKK .	35.9	•	1-12,19	7/10/10
		· · ·				1-8, 10-12	
<u></u>			<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
				ļ <u> </u>			
			<b>6</b>	101 - 11		4.1)	
\ <u> </u>	10 25 06	1001075	<u> </u>	40.16		All water	
<del> </del>			8	37.12		MB-1011067	
-	· ·		20	300	_	\	
-			9.00	70.92			
		<u> </u>					·
	11/106	1011101	000	29.24		20, 13-14	
	11/108	100 110 1				16-718	7
						1.5 / 1.5	
				-			
			_				
		<del></del>					
			<u> </u>		<del>                                     </del>	<del> </del>	
-							
-		<del> </del>			<del>                                     </del>		
ļ		ļ					
						·	
	•						
	i						<u>-</u>

LDC #:_	15767B26
SDG #:	KA18

#### **VALIDATION FINDINGS WORKSHEET** Surrogate Recovery

Page:_		of	_
Reviewer:		17	
2nd Reviewer:	1	7	

METHOD: GC/MS BNA (EPA SW 846 Method 8270) 5 1 M

Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

YUR N/A

Were percent recoveries (%R) for surrogates within QC limits?

If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?

If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
		3	FBP	39.9 (40-130)	no anal
				( )	
		. 5	NBZ	32.8 ( )	<u> </u>
		<del></del>		( .)	
			FBP	38.8 ( )	
		<u> </u>		( )	
			FBP	38.4 (40-130)	1111/10 5 21 111 111
<b> </b>		11	NBZ	38.4 (40-130) 38.4 ( 1 )	J/UJ/P OUAL AII B/N
-			14 D.5	( )	
		\ 2	FBP	39.2 ( )	po our
			1,2	( )	
		13	TPH	36.2 ( )	
		<del></del>		( )	
		16	FBP	39,5 ( )	1
				( )	
<u> </u>		18	TPH	38.6 ( )	
				( )	
<u> </u>				( )	<del></del>
				· · · · · · · · · · · · · · · · · · ·	
		<u> </u>		( )	
			<u> </u>	( )	
				( )	
				( )	

* QC limits are advisory QC I	Limits (Soil)	QC Limits (Water)		QC Limits (Soil)		QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5 23-1;	120	35-114	S5 (2FP)= 2-Fluorophenol	25-121		21-100
\$2 (FBP) = 2-Fluorobiphenyl 30-1	115	43-116	S6 (TBP) = 2,4,6-Tribromophenol	19-122	-	10-123
S3 (TPH) = Terphenyl-d14 18-1:	137	33-141	S7 (2CP) = 2-Chlorophenol-d4	20-130*		33-110*
S4 (PHL) = Phenol-d5 24-1	113	10-94	S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*		16-110*

LDC 7	#:1	576	1826
SDG -	# '	KA 1	V

#### VALIDATION FINDINGS WORKSHEET Field Blanks

Page:	<u>/</u> of/
Reviewer:	/-
2nd Reviewer:	Á

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Y N N/A Were field blanks identified in this SDG?

Y/ N N/A Were target compounds detected in the field blanks?

Blank units: ug | Associated sample units: ug | kg

Compound	Blank ID			Sample Identific	ation		/
	15						
Diethylphthalate							
Di-n-buty/phthalate							
3jz (2-ethylhexyl)phthalate							
888	3.0						
-							

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:

Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

CRQL

VALIDATION COMPLETENESS WORKSHEET	<sub>Date:_</sub> 11/8/0し
Level III	Page: <u>/</u> of_/
ces, Inc.	Reviewer:
A Dishamila (EDA OMIO 40 Maila al 0000)	2nd Reviewer:
	Level III

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
lf_	Technical holding times	٨	Sampling dates: 10 2 06
1/.	GC/ECD Instrument Performance Check	NΔ	
111.	Initial calibration	Δ	
IV.	Continuing calibration	Δ.	
v.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	5W	
VIII.	Laboratory control samples / >R M	Δ	LC9
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	Sulfur + Acid Clean up performed
Xb.	GPC Calibration	N	, , , , , , , , , , , , , , , , , , ,
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	\$W	
XIII.	Overall assessment of data	Δ	
XIV.	Field duplicates	s₩	0=445 10411
XV.	Field blanks	N	

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank

#### Validated Şamples:

	Sedi ment						
1	LDW-SS330-010	† 11	LDW-SS402-010	21	MB-101606	31	
2	LDW-SS327-010	12	LDW-SS331-010MS	22		32	
3	LDW-SS328-010	13	LDW-SS331-010MSD	23		33	
7	LDW-SS329-010	14		24		34	
5	LDW-SS401-010	15		<b>2</b> 5		35	
6	LDW-S\$331-010	16		26		36	
7	LDW-SS332-010	17		27		37	
<del>*</del> 8	LDW-S\$334-010	18		28		38	
9	LDW-SS333-010	19		29		39	
10	LDW-SS337-010	20		30		40	

NO 1CV

### VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A alpha-BHC	i. Dieldrin	Q. Endrin ketone	Y. Arocior-1242	GG.
B. beta-BHC	J. 4,4'-DDE	R, Endrin aldehyde	Z. Aroclor-1248	нн.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Arocior-1254	11.
D. gamma-BHC	L. Endosulfan il	T. gamma-Chlordane	BB. Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. DB 1701	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Araclor-1221	EE.	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF.	NN.

Notes:					_	
-	,	_	 			

LDC#: 15720A3b SDG#: J Z / S

#### **VALIDATION FINDINGS WORKSHEET** Matrix Spike/Matrix Spike Duplicates

Page:_	<u>of</u>
Reviewer:	19
2nd Reviewer:	d

METHOD: VGC \_ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?

Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits? N/N/A

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	12+13	BB	0 (50-151)	( )	( _ )	<u></u>	NO ONAL
			( )	()	( _ )		3× DIL
<u> </u>				()	()		
			( )	( )	( )		
	· 	<u> </u>	()	()	( )		
	<del></del>	<u> </u>		( )			<del></del>
		<del></del>		<u></u>	( )		
			(	(			
-			( )		( )		
			( )	( )	( )		<u> </u>
		<u> </u>	( )	( )	( )		
╘═╌╪		<del> </del>			<u> </u>		
		<u>.                                    </u>	( )	( )	( )		
			( )	( )	( )		
	*		· ( )	( )	()		
	*		()	( )	( )		
ĹĹ	_		( )	_ ( _ )	( )	_	
			()	( )			
			( · )	( )	( )		
			( )	(. )	( )		
			( )	( )	( )		
<del>                                     </del>	<del></del>	<del></del>	. ( )	( )	( )		
<u> </u>		<u> </u>	( )	<del></del>	- ( )		
			( )	( )	( )		
		<u> </u>	· ()	(	( 1.		

LDC #:_	15720436
SDG #:	JZ15

#### **VALIDATION FINDINGS WORKSHEET** Compound Quantitation and Reported CRQLs

	Page:	 _
Ond.	Reviewer:	 7
2110	Reviewer:	 

METHOD:	GC	_ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Level 1000 Only

Y N WA

Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

#	Compound Name	% RPD Bet solumn Finding =40	Associated Samples	Qualifications
	ВВ	53%	6	J/A dut
	<u> </u>			
	<del></del>			
-		· · ·		
				· ·
	<del></del>		<del></del>	
				·
	·			
\ <u></u>			<del></del>	
<del></del>				
	<del></del>			

Comments: _	See sample calculation	verification we	orksheet for recalculations			
	<u> </u>				_	

LDC #: 15720A3b

#### VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:_	_/_of
Reviewer:_	P7
2nd reviewer:	<i>M</i>

METHOD: GC Pesticides/PCBs (EPA SW846 Method 8081/8082)

/	Y	N	N/A
	Y	N	N/A
	$\overline{}$		

Were field duplicate pairs identified in this SDG?

Were target compounds detected in thie field duplicate pairs?

	Concentration	Concentration ( 49 Kg)		
Compound	Ц	5	. ≤ 50° RPD	
Z	事 33	36	9	
AA	46	43	7	
ВВ	45	43	الما	

	Concentrati	ion (ug lkg)	
Compound	[0		RPD
AA	20	16	22
B <del>3</del>	20	18	11

:	Concentration		
Compound .			RPD
		_	•
		,	

	Concentration	( )	
Compound			RPD
			,

LDC #: <u>15767A3b</u>	VALIDATION COMPLETENESS WORKSHEET	Date: <u>/////</u> 00
SDG #: <u>JZ53</u>	Level IV	Page:_/of/
Laboratory: Analytical Resource	es, Inc.	Reviewer:
		2nd Reviewer:

METHOD: GC Polychiorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 19 3 00
li.	GC/ECD Instrument Performance Check	NA	· '
III.	Initial calibration	Δ	
IV.	Continuing calibration	<b>A</b>	1CV = 15
V.	Blanks	Δ	
VI.	Surrogate spikes	5 <b>W</b>	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples /SRM	A	Les
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil_cartridge check	N	Sulpur + Acid Chan up performed on
Xb.	GPC Calibration	N	all sediments?
XI.	Target compound identification	A	
XII.	Compound quantitation and reported CRQLs	ふくし	
XIII.	Overall assessment of data	SWA	Internal standard Acceptable
XIV.	Field duplicates	5W	Intural standard Acceptable  500 = 10 + 2
XV.	Field blanks	NP	RB = 1 + 14

Note:	A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

	3(0):10							
72	LDW-SS344-RB . W	11	LDW-SS302-010	5	21	LDW-SS403-010 >	31 1	MB-101806
<u>†</u> 1	LDW-SS344-010 S -	12	LDW-SS305-010		22	LDW-SS308-010MS	32 2	MB-101006
3	LDW-SS342-010 /	13	LDW-SS307-010 /		23	LDW-SS308-010MSD	33	
4	LDW-SS343-010 ,	14	LDW-SS306-010		24_	LDW-55312-010D	34	
5	LDW-SS34 <u>1-010</u>	15	LDW-SS308-010	$\downarrow$	25	Low-ss	35	,
6	LDW-SS339-010 ~	162	LDW-SS308-RB \$	N	26		36	
7	LDW-SS340-010	17	LDW-SS309-010	<u>`</u>	27		37	
8	LDW-SS338-010 /	18	LDW-SS310-01 <u>0</u>		28		38	
9	LDW-SS336-010 /	19	LDW-SS311-010		29		39	
10	LDW-SS301-010 / V	20	LDW-SS312-010		30		40	

LDC #: 15767A3b SDG #: 1753 Page: \_ of \_ 2 Reviewer: \_ \_ 5 2nd Reviewer: \_ \_ 2

Method:	GC _	HPLC

Validation Area  Yes No  J. Fechnical holding times  All technical holding times were met.	NA Findings/Comments
	。 (1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(1)(
All technical holding times were met	
The Both Holding street from Hot.	
Cooler temperature criteria was met.	
AL Initial calibration 4	
Did the laboratory perform a 5 point calibration prior to sample analysis?	
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) < 20%?	
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?	
Did the initial calibration meet the curve fit acceptance criteria?	
Were the RT windows properly established?	
IV: Continuing calibration	
What type of continuing calibration calculation was performed?%D or%R	
Was a continuing calibration analyzed daily?	
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	
Were all the retention times within the acceptance windows?	
Ÿ.Blanks	
Was a method blank associated with every sample in this SDG?	
Was a method blank analyzed for each matrix and concentration?	
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	
ÿł: Surrogate spikes	
Were all surrogate %R within the QC limits?	
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?	1
VII. Matrix spike/Matrix spike duplicates 5	
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	
Was a MS/MSD analyzed every 20 samples of each matrix?	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	
VIII. Laboratory control samples	
Was an LCS analyzed for this SDG?	
Was an LCS analyzed per extraction batch?	

LDC#: 15767A36 SDG#: 1753

#### **VALIDATION FINDINGS CHECKLIST**

Page:\_\_of\_\_\_ Reviewer:\_\_f\_2 2nd Reviewer:\_\_d\_

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
IX Regional Quality Assurance and Quality Ganbol	7.00			
Were performance evaluation (PE) samples performed?	1			
Were the performance evaluation (PE) samples within the acceptance limits?				
X Target compound identification:				
Were the retention times of reported detects within the RT windows?	-		West of the	
XI Compound quantifation/CROEs		T -		
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				v
XII System performance:				
System performance was found to be acceptable.	/	1		
XIII Overali assessment of data.				
Overall assessment of data was found to be acceptable.		_		
XIV: Field duplicates				
Were field duplicate pairs identified in this SDG?	;	\	\	
Were target compounds idetected in the field duplicates?			1	
XV/Fieldblanks.co				
Were field blanks identified in this SDG?				
Were target compounds detected in the field blanks?			,	

### **VALIDATION FINDINGS WORKSHEET**

METHOD: Pesticide/PCBs (EPA SW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	нн.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	n.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Araclor-1016	DD. DB 1701	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE.	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF.	NN.

Notes:		

LDC #:	15767A36

### **VALIDATION FINDINDS WORKSHEET Surrogate Recovery**

Page:_	of_	_/
Reviewer:	F	2_
2nd Reviewer:	d	_

METHOD: HPLC

Are surrogates required by the method? Yes\_\_\_ or No\_\_\_.

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N NA Were surrogates spiked into all samples and blanks?

Did all surrogate recoveries (%R) meet the QC limits?

# #	Sample ID	Detector/ Column	Surrogate Compound		%R (Limits)		Qા	alifications
•	12	ZB35	DCB	159	(	50-150)	J/Part	
					(	)		
				_	(	)		
	16		beB	<del>-41</del> .	<b>~</b>	- <del>1</del> /	J/41 1P	
				, , ,	(	)	<del></del>	
		,				)		
						• )	,	
							,	
		,	-	·		<i>.</i> .		
				Ī	(	1.		
	<del></del>			<del></del>			T	
			-			)		
	<del></del>			<u> </u>				
	<u>-</u>							
						)	-	
						)		
					(	)	_	
					{	)		
					(	)		
		_			(			
						)		
<del>-  </del>	Surrogate Cor	·	Surrogate Comp		C	gate Compound		Surrogate Compound

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound
Α	Chlorobenzene (CBZ)	G	Octacosane	м	Benzo(e)Ругепе	s	1-Chloro-3-Nitrobenzene
В	4-Bromofluorobenzene (BFB)	н	Ortho-Terphenyl	N	Terphenyl-D14	Т	3,4-Dinitrotoluene
С	a,a,a-Trifluorotoluene	ţ	Fluorobenzene (FBZ)	O	Decafluorobiphenyl (DCB)	U	Tripentyltin
D	Bromochlorobenene	J	n-Triacontane	Р	1-methylnaphthalene		Tri-n-propyllin
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	w	Tribulyi Phosphate
F	1,4-Difluorobenzene (DF8)	L	Bromobenzene	R	4-Nitrophenol	X ·	Triphenyl Phosphate

LDC #:	5767A36
SDG #:_	1253

## VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLs

	Page:	<u>/</u>	_0f	-Z- 
	Reviewer:		B	
2nd	Reviewer:		d	

METHOD: \_\_\_GC \_\_ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Level IV/D Only

Y N N/A

Y N N/A

Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

4	Commonwed Marrie	% RPD But column Finding 440	Accepted Comple	Confidentions
#	Compound Name	Finding /	Associated Samples	Qualifications
	BB	45%	]. 7	J/A dit
			_	
	_			_

Comments:	See sample calculation verification worksheet for recalculations	

LDC #:	576	7 A36
	175	_

## VALIDATION FINDINGS WORKSHEET <u>Compound Quantitation and Reported CRQLs</u>

Page:	of	
Reviewer:	_F>_	
nd Reviewer	~/	

METHOD: \_\_GC HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Level IV/D Only

Y N N/A Y N N/A

Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

	<del></del>			
#	Compound Name	Finding	Associated Samples	Qualifications
	AA	exceeded al fange	20	NA
		Ú		
	The laborator		the courty PCB p	re Text
	closest pattern		the early PCB p	attern
	13 most lil	cely a mixture.		
		0		
	<u> </u>			

Comments:	See sample calculation verification worksheet for recalculations	

LDC #: 15767 A3b SDG #: 1253

# VALIDATION FINDINGS WORKSHEET <u>Overall Assessment of Data</u>

Page: _	
Reviewer:	17
2nd Reviewer:	d

METHOD: \_\_GC HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A

Was the overall quality and usability of the data acceptable?

#	Compound Name	Finding	Associated Samples	Qualifications
	AA	exceeded eal Pange	20	R/A
	all except above	diluted	24	R/A
		<u></u>		
				_
				_
			_	

Comments:			
	 _	<del></del>	
			·

OVRNew.wpd

LDC #:	15767A3b
SDG #:_	J253

### **VALIDATION FINDINGS WORKSHEET** Field Duplicates

Page:_	
Reviewer:	B
nd reviewer	/

Were field duplicate pairs identified in this SDG?
Were target compounds detected in the field duplicate pairs? Y/N N/A

y iv iv/A vvere target compounds detected in the field duplicate pairs?							
	ug ITY	%RPD LimitSO	Qualification Parent only / All Samples				
		NC 200	<u>·                                    </u>				
38	49	25					
38	46	a					
		<u> </u>					
		<u>.  </u>					
		•					
		-	·				
	Concentration 10 32 38	Concentration ( ug   44	Concentration ( $ug HY$ $ug $				

Compound	Concentration ( )		%RPD	Qualification  Parent only / All Samples	
	<i>Y</i>				
	·	· •			
				·	
			<u> </u>		

LDC #: 15767A3b SDG #: 1253

## VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

	Page:_	<u>of</u>
	Reviewer:_	更
2nd	Reviewer:	4

40.0

METHOD: GC	HPLC	

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C

average CF = sum of the CF/number of standards %RSD = 100 \* (S/X)

A = Area of compound,

C = Concentration of compound,

S = Standard deviation of the CF

X = Mean of the CFs

slated Reported Recalculated	Reported Recalculated	Recalculated.	Reported					
e CF al) %RSD %RSD	Average CF Average CF (initial)	CF. (250 std)	CF ( w <sup>U</sup> std)	and .	Compoun	Calibration Date	Standard ID	#
13 6.1 6-1	0.1513 0.1513	0. 505	0.1505	285	Arodol 1260-1	10/19/06	ICAL	1
14 10.0 10.0	0.1094 0.1094	0.1051	0.1051	2835	Aroclos 1260-1			ļ
		<u> </u>			· ·	<del> </del>	·	
			<u> </u>					2
		·	<u> </u> -	<u>-</u>				ļ
		<u> </u>	┦ <del></del>		<del></del>	<u> </u>	<del></del>	
			<u></u>			•		3.
			<u> </u>					<b></b>
	<u> </u>	<u> </u>	-				<u> </u>	
			<del> </del>		<u> </u>			4
	<u> </u>		<del> </del>					
								4_

Comments: Refer to Initia	Calibration findings worksheet for l	ist of qualifications and asso	ciated samples when repo	rted results do not agr	ee within 10.0% of the re	<u>calculated</u>
results.						
	<u> </u>	-				
				<del></del>		

LDC #: 15767A3b SDG#: 1253

#### **VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification**

Page:	
Reviewer	:_ <i>F</i> >
2nd Reviewer	: 7

METHOD: GC	HPLC

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 \* (ave. CF - CF)/ave. CF CF = A/C

Where: ave. CF = initial calibration average CF

CF = continuing calibration CF

A = Area of compound

C = Concentration of compound

					Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	CF/Conc. CCV	CF/Conc. CCV	%D	%Đ
1	car	10/20/06	Arodor 1260-1 (283)	ə <b>5</b> 19.10	254.8	254.8	١.٩	1-9
		1841	( <del>2</del> 835)	_ \ \	251. 1	25/.	0.4	0.4
		<b></b>						
2	cov	10/21/06		250.0	235.	235.1	6.0	6.0
		1952	<u>/</u>	ν	247.5	247.5	1.0	1.0
3								
4								·

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 15	767A	36 /
SDG #: 15		

### **VALIDATION FINDINGS WORKSHEET Surrogate Results Verification**

Page:_	<u> 1</u> of <u>1</u>
Reviewer:	97
nd reviewer.	

METHOD: \_\_\_ &C \_\_ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found

Sample ID:

#2

,			-4110946	· ourse
	SS	=	Surrogate	Spike

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
	28-35			Reported	Recalculated	
DCB	not specified	40.0	31.0	77.5 .	77.5	0
TCMX	1,1	↓	26.8	67.0	67.0	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
	·			Reported	Recalculated	
	· .					

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
-	_					
	-					

LDC#: 15767A36 SDG#: 1=53

## VALIDATION FINDINGS WORKSHEET <u>Matrix Spike/Matrix Spike Duplicates Results Verification</u>

Page:_	
Reviewer:	F
2nd Reviewer:	Ŋ

METHOD:

SC \_\_HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 \* (SSC - SC)/SA

Where

SSC = Spiked sample concentration

SC = Sample concentration

RPD =(({SSCMS - SSCMSD} \* 2) / (SSCMS + SSCMSD))\*100

SA = Spike added MS = Matrix spike

MSD = Matrix spike duplicate

MS/MSD samples:\_\_\_

27473

		Sp	ike	Sample	Sample Spike Sample		Matri	Matrix spike Percent Recovery		Duplicate	MS/MSD	
Comp	ound	( uq	ded (	Conc.	Conce ( ५५	Concentration (uq kg)				Percent Recovery		D
		MS T	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline	(8015)									3		
Diesel	(8015)											
Benzene	(8021B)											
Methane	(RSK-175)											-
2,4-D	(8151)											
Dinoseb	(8151)				_							
Naphthalene	(8310)				_							
Anthracene	(8310)											
НМХ	(8330)								_			
2,4,6-Trinitrot	oluene (8330)											
Aroclar 1	260	183	188	104	252	300	40.9	80.4	104	104	17.4	17.4
	_											
				· -								

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #:_	1216.	[A3b
SDG #:		

### **VALIDATION FINDINGS WORKSHEET** Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page:_	<u>/</u> of_/
Reviewer:	Ħ
Ind Reviewer:	Ĺ

METHOD:

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100\* (SSC-SC)/SA

Where: SSC = Spiked sample concentration

SC = Concentration

RPD = I LCS - LCSD I \* 2/(LCS + LCSD)

SA = Spike added LCS = Laboratory control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 1,00

		Spike	Spike	f Sample	L	cs	LCS	SD	LCS/	LCSD
Compound		Added us led	Concentration		Percent Recovery		Percent Recovery		RPD	
To area.	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										_
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)				_						
HMX (8330)										
2,4,6-Trinitrotoluene (8330)					. –					
Arodor 1260	14.2	NA	20.0	NA	71.0	71.0	NA_			

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #:_	15767A3V
	1253

### **VALIDATION FINDINGS WORKSHEET Sample Calculation Verification**

Page: _	_/of_/
Reviewer:	13
2nd Reviewer:	1

METHOD:	GC	HPLO

/	Ý	h	N/A
	$\overline{Y}$	N	N/A
	$\overline{}$	$\overline{}$	

Were all reported results recalculated and verified for all level IV samples?
Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= (A)(Fv)(Df)	Example:	
(RF)(Vs or Ws)(%S/100)	Sample ID. # 2 Compound Name Arocher 1254	
A= Area or height of the compound to be measured Fv= Final Volume of extract Df= Dilution Factor		
RF= Average response factor of the compound	Concentration = 126.2 × 1	
In the initial calibration Vs= Initial volume of the sample Ws= Initial weight of the sample	25.5	
%S≖ Percent Solid	= 4.95 malka	

#	Sample ID	Compound	Reported Concentrations	Recalculated Results Concentrations (	Qualifications
	Arroclar 1254-1-	2139949 × 80	108.64		
		26396230 0.05960			
			1		
	Arochor 1254-11+2	t3+4+5 \= 108.7 +	142.4 + 108.6 +171.5	+ H9.9 = 126.2	•
		5	5		
		,			

Comments:	,		
		· · · · · · · · · · · · · · · · · · ·	

LDC #: 15767B3b	VALIDATION COMPLETENESS WORKSHEET	Date:
SDG #: KA18	Level III	Page:_/of/
Laboratory: Analytical Resou	urces, Inc.	Reviewer: 2nd Reviewer:
METHOD: GC Polychlorinal	ted Biphenyls (EPA SW 846 Method 8082)	

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
l.	Technical holding times	۸	Sampling dates: 10 4 0 4
11.	GC/ECD Instrument Performance Check	NA	
111.	Initial calibration	۵	
IV.	Continuing calibration	4	1cv = 15
V.	Blanks	۵	
VI.	Surrogate spikes	مي	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples /SRM	A	209
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	Sultur + Acid clean up performed on all
XI.	Target compound identification	SW A	sediments
XII.	Compound quantitation and reported CRQLs	SW	
XIII.	Overall assessment of data	SW	
XIV.	Field duplicates	N	
XV.	Field blanks	NR	RB = 20

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

ND = No compounds detected R = Rinsate

D = Duplicate TB = Trip blank EB = Equipment blank

FB = Field blank

Validated Samples:

Valida ——	sed Samples: Scalinents	av	d water					
1 I	LDW-SS335-010 5	11	LDW-SS318-010	5	21	LDW-SS325-010 5	31 \	MB -101806
2	LDW-SS335-010DL	12	LDW-SS317-010		22	LDW-SS325-010DL	32 2	MB - 10 1106
3	LDW-SS313-010	13	LDW-SS317-010DL		23	LDW-SS326-010	33	
4	LDW-SS314-010	14	LDW-SS316-010		24	LDW-SS326-010DL	34	_
5	LDW-SS322-010	15	LDW-SS316-010DL		25	LDW-SS304-010	35	
6	LDW-SS323-010	16	LDW-SS315-010		26	LDW-SS304-010DL	36	
7	LDW-\$\$320-010	17	LDW-SS315-010DL		27	LDW-SS304-010MS	37	
8	LDW-SS319-010	18	LDW-SS303-010		28	LDW-SS304-010MSD	38	
9	LDW-SS324-010	19	LDW-SS303-010DL		29		39	
10	LDW-SS321-010	20 2	LDW-SS325-RB	M	30		40	

#### **VALIDATION FINDINGS WORKSHEET**

METHOD: Pesticide/PCBs (EPA SW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y, Arocior-1242	GG.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	нн.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA, Aroclor-1254	a.
D. gamma-BHC	L. Endosulfan li	T. gamma-Chlordane	BB. Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Arocior-1016	DD. DB 1701	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE.	MM.
H. Endosulfan i	P. Methoxychlor	X. Arocior-1232	FF.	NN.

	1			
Notes:			 	
	·			

LDC #:_	15767B35
SDG #:	KAIX

## VALIDATION FINDINDS WORKSHEET <u>Surrogate Recovery</u>

Page: <u>/</u> of_	_
Reviewer:	
2nd Reviewer:	_

METHOD: GC \_\_ HPLC

Are surrogates required by the method? Yes\_\_\_\_ or No\_\_\_\_

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Were surrogates spiked into all samples and blanks?

Y/N N/A

Did all surrogate recoveries (%R) meet the QC limits?

#	Sample ID	Detecto Colum		Surrogate Compound			%R (Limits		,	Qualific	ations
,	10	not >P	wired		192			50-150		J/P dut	
		)						)		<u> </u>	
_								(			
	5			DUB	15	2		( 1	N	DUAL	SX DIV
				1	-			( )		-	•
			•	_		_		( )			
				_				( )			
	·							( )			_
					<del>.</del>			( )	·		
								( )			
L.					,			( )			
								(		_	
					•			( )			
				,				()			
								( )			
								( )			
								(			
							_	()			
							(				
							(	. )			
							(	)	<u></u>		
	Surrogate C	ompound		Surrogate Comp	ound		Suri	ogate Compound		Surro	ate Compound
Α	Chlorobenze	ne (CBZ)	G	Octacosan	e	М		Benzo(e)Pyrene	s	1-Chloro-	3-Nitrobenzene
В	4-Bromofluorobe	enzene (BFB)	н	Ortho-Terpheny	yl	N	_	Terphenyl-D14	Т	3,4	-Dinitrotoluene
1						1					

0

P

Q

R

Decafluorobiphenyl (DCB)

1-methylnaphthalene

Dichlorophenyl Acetic Acid (DCAA)

4-Nitrophenol

υ

ν

W

х

Tripentyltin

Tri-n-propyltin

Tributyl Phosphate

Triphenyl Phosphate

Fluorobenzene (FBZ)

n-Triacontane

Hexacosane

Bromobenzene

κ

l,

a,a,a-Trifluorotoluene

**Bromachtorobenene** 

1,4-Dichlorobutane

1,4-Difluorobenzene (DFB)

С

D

Ε

F

LDC #:	15767836
	KAIX

#### **VALIDATION FINDINGS WORKSHEET** Matrix Spike/Matrix Spike Duplicates

Page: /of/
Reviewer:
2nd Reviewer:

METHOD: 4GC HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?

N<sub>2</sub>N/A Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Y/N/N/A

Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits?

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	_RPD (Limits)	Associated Samples	Qualifications
	27+28	Y	0 (50-159	0 (50-150)	_ ()	25, 26	no ouar
		BB	0 ( 1)	0 ( 1)	( )		5x PIL
		, <del></del>		( )	_ ()_		
			( )	( )	( )		
			( )	( )	( )		
				()			
	<del></del>		( )	. ( )	()		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
	L, _		_ ( )	( )	()	<u> </u>	
			()	( )			
			( )	( _ )	( )		_
		_	( )	( )	_( )		
			( )	( )	_( )		
			( )	( _ )	_( )		
			( )	( )	( )		
			(	( )	()		
			( · )	( )	( )		
	<del></del>		( )	( )	( )		
<b> </b>	<del> </del>	-	( )	( )	( )	<del>                                     </del>	
		<del></del>	( )	<del>                                     </del>	( )		
		<del> </del>	<del>\</del> \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	<del>                                     </del>	<del>'</del>		
	<u> </u>		( )	<del>                                     </del>	( )		
\ <u></u>							

LDC#: 15767835 SDG#: <u>KA18</u>

### VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLs

Page: _	1013
Reviewer:	
2nd Reviewer:	_7

METHOD: \_\_GC \_\_ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Level IX/D Only

Y N N/A

Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N N/A

Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

Did the percent difference of detected compounds between two columns,/detectors <40%?

If no, please see findings bellow.

#	Compound Name	Sample ID	深ら Between Two Columns/Detectors % Rチロ Limit (≤ 40%)	Qualifications
	Z	.3	51	J/A aut
	<u>\$8</u>	7 .	43	· ·
	<b>BB</b>	10	68	
	88	11	51	7
	7	12	62	WA_
	AA	<u> </u>	62	
_	 모	16	57	
	AA		53	

Comments:	See sample calculation verification worksheet for recalculations		
•	· · · · · · · · · · · · · · · · · · ·		
-		<del></del>	•

COMQUA%DNew.wpd

LDC #:_	157	<u> 6</u> 7	B35
SDG #:	KA	18	

### VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLs

Page: _	<u> 20f_3</u>
Reviewer:	, Kg
2nd Reviewer:	

METHOD: \_\_@C \_\_ HPLO

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Level IM/D Only

Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

Did the percent difference of detected compounds between two columns./detectors ≤40%?

If no, please see findings bellow.

#	Compound Name	Sample ID	Between Two Columns/Detectors % RFD Limit (≤ 40%)	Qualifications
	<b>せ</b>	2	68	N/A aut
	AA	J	61	<u> </u>
	AA	25	42	
		·		

Comments:	See sample calculation verification worksheet for recalculations

COMQUA%DNew.wpd

#### **VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLs**

Page:	3	of_	3
Reviewer:		72	,

2nd Reviewer:

METHOD:

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Level IV/D Only
Y N N/A Y N/N/A/

Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

#	Compound Name	Finding	Associated Samples	Qualifications
	Z, AA, BB	exceeded and Pany	1. 12, 16, 21, 23	S/Acatt NA
	AA, BB	\	14, 18, 25	
	The laborator	y noted that the a	moder patterns	Text
		of montaked with Arrawith Arocher 1248, an		
	likely a m	xture of the two	p Arochors.	

Comments:	See sample calculation verification worksheet for recalculations	
-		
	•	

LDC #:	1576	18	36
SDG #:_	KA	18	,

## VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Page: _	<u>/of_/</u>
Reviewer:	<u></u>
2nd Reviewer:	_1

METHOD: \_\_GC \_\_ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

N N/A Was the overall quality and usability of the data acceptable?

<del>/</del>			<del>_</del>	
#	Compound Name	Finding	Associated Samples	Qualifications
	¥, AA, BB	exceeded and Pange	1, 12, 16, 21, 23	R/A
	All except above	diluted	2, 13, 17, 22, 24	P/A
	AA, BB	exceeded cal Pange	14, 18, 25	R/A
	All except above	diluted	15, 19, 26	P/A
_				

Comments:		
		 _
	-	

OVRNew.wpd

SDG	#:15767A19 VALIDATIO #:JZ53 ratory:_Analytical Resources, Inc.		<b>PLETENE</b> Level IV	SS WORKSHE	EET	Date: ///14/06 Page: _/of _/ Reviewer:F7 2nd Reviewer: _/(
MET	HOD: GC/MS Butyltins (Krone)	700		,		Ziid Nevieweli
	samples listed below were reviewed for e ation findings worksheets.	ach of the f	ollowing val	idation areas. Vali	idation findin	gs are noted in attached
	Validation Area				Comments	
I.	Technical holding times	<b>A</b>	Sampling da	tes: 10 3 0	6	
II.	GC/MS Instrument performance check	<u> </u>				
111.	Initial calibration	A				
IV.	Continuing calibration	<u> </u>				
V.	Blanks	A				
VI.	Surrogate spikes	<u> </u>	ļ. <u> </u>			
VII.	Matrix spike/Matrix spike duplicates	<u> </u>				
VIII.	Laboratory control samples /SRM	A	LCS			
IX.	Regional Quality Assurance and Quality Control					
<u>X.</u>	Internal standards					
XI.	Target compound identification		<u> </u>			
XII.	Compound quantitation/CRQLs					
XIII.	Tentitatively identified compounds (TICs)	N	not	reported	_	
XIV.	System performance	<u>A</u>		4		
XV.	Overall assessment of data	A				
XVI.	Field duplicates S	1 1	D=	246		
XVII.	. Field blanks	NO	RB .	= 1 , 4		
Note:	N = Not provided/applicable R = R	No compound nsate Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipmen		
Validat	ted Samples: Nater & Sidiment					
ī 1	LDW-SS344-RB W 11 MB -1	01006	21		31	
2 <b>v</b>	LDW-SS301-010 / . 5 12 7 MB-1	01706	22		32	
3	LDW-SS302-010 / 13		23		33	
<u>4</u> 1	LDW-SS308-RB > 14		24		34	
5	LDW-SS310-010 / 15		25		35	
6	LDW-SS403-010 / . 16		26		36	
7	LDW-SS403-010MS 17		27		37	
8	LDW-SS403-010MSD V 18		28		38	

No ter

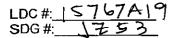
#### LDC#: 5767A19 SDG#: 1253

#### **VALIDATION FINDINGS CHECKLIST**

Butyltin > (knone)

Method: Semivolatiles (EPA-SW-846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
I∉Tachnical holding times + √ / 2 / 2 / 2 / 2 / 2 / 2 / 2 / 2 / 2 /				Course Appropriate Course (Course Course)
All technical holding times were met.				
Cooler temperature criteria was met.				
III- 66/MS Instrument performance check				face and a state of the state o
Were the DFTPP performance results reviewed and found to be within the specified criteria?	/	,		<u> </u>
Were all samples analyzed within the 12 hour clock criteria?				
III. Initialicalibration				4 4 4
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Was a curve fit used for evaluation?				
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			_	
Were all percent relative standard deviations (%RSD) $\leq$ 30% and relative response factors (RRF) $\geq$ 0.05?	سن ا	_		
IV. Continuing Calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	_			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?		•		
V Blanks				
Was a method blank associated with every sample in this SDG?		-		
Was a method blank analyzed for each matrix and concentration?	<u> </u>			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
VI. Surropate spikes				The second secon
Were all surrogate %R within QC limits?				
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?				
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			_	
VII Matrix spike/Matrix spike duplicates	1			
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		-		
Was a MS/MSD analyzed every 20 samples of each matrix?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				
VIII Laboratory control samples		, i		77. H. 11 11 11 11 11 11 11 11 11 11 11 11 11
Was an LCS analyzed for this SDG?		ľ		



#### **VALIDATION FINDINGS CHECKLIST**

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
IX Regional Quality Assurance and Quality Control	l			
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?	anien kirie			
X internal standards Kills (8 / 14)				
Were internal standard area counts within -50% or +100% of the associated calibration standard?				
Were retention times within ± 30 seconds from the associated calibration standard?  XI. Target compound identification			ı	
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	/			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				
Were chromatogram peaks verified and accounted for?  XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/	_		
XIII. Tegrafively identified compounds (TICs)		-yuviğ		
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?				
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?			/	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?			_	
XIV Sysjem performance		40.77 <b>4</b>		
System performance was found to be acceptable.				
XV. Overall assessment of data.				
Overall assessment of data was found to be acceptable.				
XVI. Field duplicates.				And the second s
Field duplicate pairs were identified in this SDG.			-	
Target compounds were detected in the field duplicates.	70		\ <u>\</u>	
XVII. Field blanks				
Field blanks were identified in this SDG.		<u> </u>		<u></u>
Target compounds were detected in the field blanks.			Ì	

LDC #: 15767A 19 SDG #: 1753

# VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:	/_of_/_
Reviewer:_	
2nd reviewer:	<i>"</i> .

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Y	N	N/A
$\nabla$	N	N/A

Were field duplicate pairs identified in this SDG?
Were target compounds identified in the field duplicate pairs?

	Concentration	i ug kr	£5D
2	2		1
Compound		6	RPD
Tributyl Tin lon		14	19
Dibuty! Tin lon	6.9	5-7U	200 NC
			•
			•
The second of th	<del></del>	* *	
	Concentration	( )	
Compound			RPD
			1
			<u> </u>
	,	`(	
	(	·	<u> </u>
		<del></del>	
	Concentration	ſ 1	
. Compound			RPD
		ĺ	
· ·			
<u></u>			
·	Concentration	( )	
			RPD
Compound			
Compound			
Compound			

#### **VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification**

Page:_	<u>/of_/</u>
leviewer:	B

2nd Reviewer:

Butyltins (Knone)

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

 $RRF = (A_x)(C_h)/(A_h)(C_x)$ average RRF = sum of the RRFs/number of standards  $A_x =$ Area of compound,

A<sub>is</sub> = Area of associated internal standard

 $C_{x}$  = Concentration of compound,

C<sub>k</sub> = Concentration of internal standard

%RSD = 100 \* (S/X)S = Standard deviation of the RRFs,

X = Mean of the RRFs

		Calibration		Reported	Recalculated	Reported Average RRF	Recalculated Average RRF	Reported_	Recalculated %RSD
#	Standard ID	Date	Compound (Reference Internal Standard)	(1/2 std)	( リン std)	(initial)	(Initial)	, , , , , , , , , , , , , , , , , , ,	, sitted
1	ICAL	8/30/06	Rhench (1st internal standard) Tributy Tin Hexy	0.603	0.603	0.607	0.607	3.)	3.)
			Naphthalene (2nd internal standard) Bufy Tin	0.048	0.048	0.050	0.050	3.0	3.0
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						_
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
2			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)		. ,				
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)		-				
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene [6th internal standard)						
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)					,	
			Benzo(a)pyrene (6th internal standard)						

Comments:	Refer to Initia	al Calibration	<u>ı findings</u>	worksheet	for list of	of qualifications	and a	associated	samples whe	<u>n reported</u>	results de	<u>o not agre</u>	<u>∍ within</u>	<u>10.0% o</u>	f the
recalculated	results.					٠.									
		•				-									

#### **VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification**

Page:	
Reviewer:_	/5
2nd Reviewer:	A

Butyltins (Knone)

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 \* (ave, RRF - RRF)/ave, RRF  $RRF = (A_x)(C_k)/(A_k)(C_x)$ 

Where: ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

A, = Area of compound,

A<sub>k</sub> = Area of associated internal standard

C, = Concentration of compound, Ck = Concentration of internal standard

					Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	RRF (CC)	RRF (CC)	%D	%D
1	cov	10/17/06	Phenol (1st internal standard)	0.607	0.677	0.677	11.5	11.3
		<del>                                      </del>	Naphtharene (2nd internal standard)	0,050	0.053	0.053	6.0	6.0
			Fluorene (3rd internal standard)					_
		_	Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo[a)pyrene (6th internal standard)					
2	cw_	10 19 06	Phonei (1st internal standard)	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	0.639	0.639	5.3	5.3
		1	Naphthalene (2nd internal standard)	V _	0.032	0.032	3.2	3.2
			Fluorene (3rd internal standard)			_		_
			Pentachlorophenol (4th Internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)	_			_	
			Pentachlorophenol (4th internal standard)					
ļ			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)				,	

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: \	5767A19
	17

### **VALIDATION FINDINGS WORKSHEET**

Page:_	of/
Reviewer:	ħ
2nd reviewer:	1

SDG #: 1753

Surrogate Results Verification

Butyltins (From 1)

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample ID:\_\_\_\_\_\_

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene de Tin Unbride	47.23	32.37 ×0.850	584	58.4	0
2-Fluorobiphenyl Tin chilo na	V	41-22 X 0.8609	76-8	76.8	D
Terphenyi-d14	•	,			
Phenol-e5					
2-Fluerophenol					
2,4,6-Tribromophenol					
7-Chlorophenol-d4					

Sample ID:

1.2-Dichlorobenzene-d4

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:\_

	Surragate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					_
1,2-Dichlorobenzene-d4					

#### **VALIDATION FINDINGS WORKSHEET** Matrix Spike/Matrix Spike Duplicates Results Verification

Page:	
Reviewer:_	E
2nd Reviewer:	1

Butyltins (knone)

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SSC - SC)/SA

Where: SSC = Spiked sample concentration

SC = Sample concentation

SA = Spike added

RPD = IMS - MSDI \* 2/(MS + MSD)

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery \_\_\_\_\_

MS/MSD samples: \_\_\_\_\_1+8

	Sp	ike	Sample	Spiked	Sample	Matrix	Matrix Spike Mat		Matrix Spike Duplicate		/ISD
Compound	Ad (ug)	ded (g )	Concentration (ug \Kg)	Concer ( Mg	tration	Percent F	Recovery	Percent Recovery		RPD	
	MS	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
Tributy Tin	44.0	44.	13-5	51.4	60.	86.1	86.	100	106	15-6	15-6
2-Chlorophenoi											
1,4-Dichlorobenzene											
N-Nitroso-di-n-propylamine											
1,2,4-Trichlorobenzene											
4-Chloro-3-methylphenol							_				
Acenaphthene											
4-Nitrophenol											
2,4-Dinitrotoluene											
Pentachlorophenol											
Pyrene 7											

Comments: Refer to Matrix Spike/Matrix Spike Duplic	ates findings worksheet for list of	qualifications and associated samples v	vhen reported res	sults d <u>o not agr</u> e	ee within
10.0% of the recalculated results.					
			·		
		<u> </u>			

LDC #:	15767A19
	17-53

#### **VALIDATION FINDINGS WORKSHEET** Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

	Page:_	of/_
	Reviewer:_	13
2nd	Reviewer:	á-

Bufyltins (knone)

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SC/SA

Where: SSC = Spike concentration

SA = Spike added

RPD = I LCS - LCSD I \* 2/(LCS + LCSD)

LCS = Laboratory control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: Les - 101706

Compound	Spike Added d ( )		Spike Concentration ( )		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
Phenety Tin	44.0	NA	40.8	NA	91-5	91.5	NA			
2-Chlorophenol										
1,4-Didhlorobenzene										
N-Nitr pso-di-n-propylamine										
1,2,4 Trichlorobenzene										
4-Chloro-3-methylphenol										
Acenaphthene										
4 Nitrophenol										
2,4-Dinitrotoluene		:								
Pentachlorophenol										
Pyrene										

Comments: Refer to Laboratory C	Control Sample/Laboratory Control	Sample Duplicates finding	s workshe <u>et for list of c</u>	qualifications and associa	<u>ated samples when reported</u>
results do not agree within 10.0%	of the recalculated results.				

<del></del>	DATION FINDINGS WORKSHEET Imple Calculation Verification	Page:of/ Reviewer: 2nd reviewer:
	liculated and verified for all level IV samples? or detected target compounds agree within	
Concentration = $(A_*)(I_*)(V_*)(DF)(2.0)$ $(A_*)(RRF)(V_*)(V)(\%S)$	Example:	La Tara Marid

Conc	erkrauc	$(A_{\bullet})(RRF)(V_{\circ})(V)(\%S)$	exemple:
A <sub>x</sub>	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D. # 2 . Tributy! Tin Ion wo
A <sub>k</sub>	<del></del>	Area of the characteristic ion (EICP) for the specific internal standard	15036
l <u>.</u>	=	Amount of internal standard added in nanograms (ng)	Conc. = (27)49 11 2 11 0.5 11 1000 11 0.8675 (89 213877 0.607 5.29 11 )( )
V,	=	Volume or weight of sample extract in milliliters (ml) or grams (g).	2130 11 0,601 5.0
V,	=	Volume of extract injected in microliters (ul)	=
V,	=	Volume of the concentrated extract in microliters (ul)	16.9 ng
Df	=	Dilution Factor.	
%S	=	Percent solids, applicable to soil and solid matrices only.	Kay

= Factor of 2 to accou	unt for GPC cleanup		-	
Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification
-				
				<u> </u>
	-			
	_			<del></del>
-				
-				
	<del></del>			
	-	_		
	Sample ID	Sample ID Compound	Sample ID Compound Reported Concentration ( )	Reported Calculated Concentration ( ) ( )

SDG Labor <b>METI</b> The s	#: 15720A4 #: JZ15 ratory: <u>Analytical Resource</u> <b>HOD:</b> Metals (EPA Methodal) ramples listed below were atton findings worksheets.	es <u>, In</u> d 200	c. .8/EPA SW	/ 846 Meti	Level	III 71A)	SS WORKSHEET	ı findir	Date: 11/8/6/6 Page:
	Validation	Δτωρ		_	Τ		Comme	nte	<del></del>
1.	Technical holding times		_	Λ	Sampli	na det	es: (°/2/06		
H.	Calibration		<u></u>	A	Campa	ng usi			
101.	Blanks			A					
IV.	ICP Interference Check Sam	ole (IC	CS) Analysis	A					
V.	Matrix Spike Analysis		7	SW					
VI.	Duplicate Sample Analysis	_		A-					
VII.	Laboratory Control Samples	(LCS)		A	1.5	RIY			
VIII.	Internal Standard (ICP-MS)	•		A		, ,			
IX.	Furnace Atomic Absorption (	2C		N	Vet	<u>-</u> ,	stelije 1		
X.	ICP Serial Dilution			A			d.		
XI.	Sample Result Verification		-	Ņ					
XII.	Overall Assessment of Data			A-					
XIII.	Field Duplicates	_		SW	(4.	5)	((0,11)		
XIV.	Field Blanks			W					
Note: Validat	A = Acceptable N = Not provided/applicable SW = See worksheet ed Samples:		R = Rin	o compound sate eid blank	ds detecte	ed	D = Duplicate TB = Trip blank EB = Equipment blank		
	LDW-SS330-010	14 0	LDW-\$\$402-	010		24		24	
2	LDW-SS330-010	12				21		31	
3	LDW-SS328-010	13	LDW-SS330- LDW-SS330-			22 23		32	
4 ,	LDW-SS329-010	14	7 P	-0 IODOP		24	<u>.                                    </u>	34	
5	LDW-SS401-010	15	<del>                                     </del>			25	<u> </u>	35	
6	LDW-\$\$331-010	16				26		36	
7	LDW-SS332-010	17				27		37	
0	1 DIM C0324 040	4.0	_			20		20	

Notes:_				
		_	 	

LDW-SS333-010

LDW-SS337-010

LDC #: 15120A4 SDG #: 1715

#### VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page:	of	
Reviewer:	MH	
2nd reviewer:	A.	

All circled elements are applicable to each sample.

	1	
Sample ID	Matrix	Target Analyte List (TAL):
1-11	selvet	Al, Sb, As Ba, Be, Cd Ca, Cr, Co, Cu, Fe, (Pb) Mg, Mn, Hg (N) K, (Se/Ag) Nd, Tl, V, Zn, Mo, B, Si, CN,
12,13	P	AI, Sb. As, Ba, Be, Cd, Ca; Cr. Co, Cu, Fe, PP, Mg, Mn, Hg(N) K, (Se, Ag) Na, (1, V, Zn, Mo)B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, So, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Π, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
_		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		AJ, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb. As. Ba. Be, Cd. Ca. Cr. Co. Cu. Fe. Pb. Mg, Mn. Hg. Ni, K. Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
1		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Analysis Method
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, 8, Si, CN,
ICP-MS		AI, SD, AS, Ba, Be, CO, Ca, CO, CO, Fe, FD, Mg, Mn, Hg, N, K, SD, Ma, M, MD, Na, M, B, Si, CN',
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,

Comments: Mercury by CVAA if performed

LDC #:_	15/2044
SDG #:_	

#### **VALIDATION FINDINGS WORKSHEET** Matrix Spike Analysis

Page:	
Reviewer:	1My
2nd Reviewer:	d

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

| N N/A | Was a matrix spike analyzed for each matrix in this SDG?

Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor Y (N) N/A of 4 or more, no action was taken.

70-13-5

Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

YN NA W LEVEL IV ONLY:

YNA Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications	
ī	12_	Selvet	Sb.	1.9	411 +13	J/hJ/ff (port sp.in 98.	7 12
	,		Ag	36,4	\ \ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	93.7	7 9
			0				
_							_
_							_
_	. '	_					
-							4
_	<del></del>					-	-[
-		<u> </u>					-
-	<del> </del>				<del></del>		-
							╣
-							-
7							-
	1						<u> </u>
						,	
	44.	•					
_							_
4				<u> </u>			$\dashv$
Ц.			·				

Comments:		
· · · · · · · · · · · · · · · · · · ·	•	

LDC#:	(5)20AL
SDG#:	1215

### VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page: of > Reviewer: v= 2nd Reviewer: #

METHOD: Metals (EPA Method 200.8/7000)

(Y)N NA (Y)N NA Were field duplicate pairs identified in this SDG?

Were target analytes detected in the field duplicate pairs?

	Concentra	Concentration (mg/kg)				
Compound	4	5	(430) RPD			
Arsenic	8.4	8.9	6			
Chromium	26.5	38.8	38			
Cobalt	6.1	6.4	5			
Copper	629	41.9	39			
Lead	303	44	149			
Мегситу	0.06	0.10	50			
Nickel	18.9	16.9	11			
Vanadium	39.0	41.1	5			
Zinc	75	74	1			
Molybdenum	0.5	0.6	18			

V:\FIELD DUPLICATES\FD\_inorganic\15720A4.wpd

LDC#:	15/20/4
SDG#:	77-11

#### **VALIDATION FINDINGS WORKSHEET**

Field Duplicates

Page:_	rof_
Reviewer:	$\sim$
2nd Reviewer:	. #
-	

METHOD: Metals (EPA Method 200.8/7000)

VN NA VN NA

Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

	Concentra	( 622)		
Compound	10	11	(£3°)	
Arsenic	8.8	8.5	3	
Chromium	23	23	0	
Cobalt	7.5	7.2	4	
Соррег	30.5	29.6	3	
Lead	14	13	7	
Mercury	0.11	0.11	0	
Nickel	18.9	17.9	5	
Silver	0.9	0.3U	NC	
Vanadium	50.6	48.3	5	
Zinc	85	72	17	
Mołybdenum	0.4	0.30	NC	

V:\FIELD DUPLICATES\FD\_inorganic\15720A4.wpd

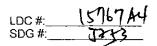
### METHOD: Metals (EPA Method 200 8/EPA SW 846 Method 7471A)  The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attact validation findings worksheets.    Validation Area	SDG	#: <u>15767A4</u> #: <u>JZ53</u> ratory: <u>Analytical Resourc</u>				PLETE ∟evel l'		SS WOI	RKSHEET		Date: 11/13/6 Page:
Validation Area	MET	HOD: Metals (EPA Metho	d 200	0.8/EPA SW	/ 846 Meth	nod 747	1A)				
I.   Technical holding times				ewed for ea	ch of the fo	ollowing	ya	lidation are	eas. Validatio	on findii	ngs are noted in attached
II.   Calibration		Validation	Area						Comn	ents	
III.   Blanks	l.	Technical holding times			4	Sampling	g da	tes: [0]	3/06		
IV.   ICP Interference Check Sample (ICS) Analysis   A	H.	Calibration			\ A				'		
IV.   ICP Interference Check Sample (ICS) Analysis   A	III.	Blanks	_		A						
VI.   Duplicate Sample Analysis	IV.	ICP Interference Check Sam	nple (It	CS) Analysis	Ä						
VII.         Laboratory Control Samples (LCS)         A         L ∠ Ś, Ś h M           VIII.         Internal Standard (ICP-MS)         A         Yew Yew L         MI           IX.         Furnace Atomic Absorption QC         N         XII.         A         Yew Yew L         MI           XI.         Sample Result Verification         A         XII.         Sample Result Verification         A         XIII.         Yew L         Yew L	V.	Matrix Spike Analysis			5W						
IX.   Furnace Atomic Absorption QC   X   ICP Serial Dilution   A   XII.   Sample Result Verification   A   XIII.   Overall Assessment of Data   A   XIII.   Field Duplicates   FW   (	VI.	Duplicate Sample Analysis			A _						
IX.   Furnace Atomic Absorption QC   X   ICP Serial Dilution   A   XII.   Sample Result Verification   A   XIII.   Overall Assessment of Data   A   XIII.   Field Duplicates   FW   (	VII.	Laboratory Control Samples	(LCS)	ı	A	Lug	5,	SRM			
IX.   Furnace Atomic Absorption QC   X   ICP Serial Dilution   A   XII.   Sample Result Verification   A   XIII.   Overall Assessment of Data   A   XIII.   Field Duplicates   FW   (	VIII.	Internal Standard (ICP-MS)			A	he	vile	ut for	All		
XII.   Overall Assessment of Data   XIII.   Field Duplicates   SW   ( lo, > I )	IX.	Furnace Atomic Absorption	QC		N			<u> </u>			
XIII.   Overall Assessment of Data   A	X.	ICP Serial Dilution			A						
XIII.   Field Duplicates   YW   (	XI.	Sample Result Verification			4						
Note:   A = Acceptable   ND = No compounds detected   R = Rinsate   FB = Trip blank   EB = Equipment blank	XII.	Overall Assessment of Data			A						
Note: A = Acceptable	XIII.	Field Duplicates			5W	(6	د ,ه	<u>1)                                    </u>			
N = Not provided/applicable SW = See worksheet       R = Rinsate FB = Field blank       TB = Trip blank EB = Equipment blank         Validated Samples:         1       LDW-SS344-RB       11       LDW-SS302-010       21       LDW-SS403-010       31         2       LDW-SS344-010       12       LDW-SS305-010       22       LDW-SS344-RBMS       32         3       LDW-SS342-010       13       LDW-SS307-010       23       LDW-SS344-RBDUP       33         4       LDW-SS343-010       14       LDW-SS306-010       24       LDW-SS344-010MS       34         5       LDW-SS341-010       15       LDW-SS308-010       25       LDW-SS344-010DUP       35         6       LDW-SS339-010       16       LDW-SS308-RB       26       VID       36         7       LDW-SS340-010       17       LDW-SS309-010       27       37         8       LDW-SS338-010       18       LDW-SS310-010       28       38         9       LDW-SS336-010       19       LDW-SS311-010       29       39	XIV.	Field Blanks			<del>5</del> W	RB	=	1, 16			
1	Note:	N = Not provided/applicable		R = Rins	sate	s detected	d	TB = T	Trip blank	ık	
2       LDW-SS344-010       12       LDW-SS305-010       22       LDW-SS344-RBMS       32         3       LDW-SS342-010       13       LDW-SS307-010       23       LDW-SS344-RBDUP       33         4       LDW-SS343-010       14       LDW-SS306-010       24       LDW-SS344-010MS       34         5       LDW-SS341-010       15       LDW-SS308-010       25       LDW-SS344-010DUP       35         6       LDW-SS339-010       16       LDW-SS308-RB       26       VI>       36         7       LDW-SS340-010       17       LDW-SS309-010       27       37         8       LDW-SS338-010       18       LDW-SS310-010       28       38         9       LDW-SS336-010       19       LDW-SS311-010       29       39	Validat	ed Samples: Se Liment									
3 LDW-SS342-010 13 LDW-SS307-010 23 LDW-SS344-RBDUP 33   4 LDW-SS343-010 14 LDW-SS306-010 24 LDW-SS344-010MS 34   5 LDW-SS341-010 15 LDW-SS308-010 25 LDW-SS344-010DUP 35   6 LDW-SS339-010 16 LDW-SS308-RB 26   7 LDW-SS340-010 17 LDW-SS309-010 27   8 LDW-SS338-010 18 LDW-SS310-010 28   9 LDW-SS336-010 19 LDW-SS311-010 29   39	1 .	LDW-SS344-RB	11	LDW-SS302-	-010	2	21	LDW-SS40	3-010	31	
4 LDW-SS343-010 14 LDW-SS306-010 24 LDW-SS344-010MS 34  5 LDW-SS341-010 15 LDW-SS308-010 25 LDW-SS344-010DUP 35  6 LDW-SS339-010 16 LDW-SS308-RB 26	2	LDW-SS344-010	12	LDW-SS305-	-010	2	22	<del>LDW-3334</del>	<del>4-RBMS</del>	32	
5     LDW-SS341-010     15     LDW-SS308-010     25     LDW-SS344-010DUP     35       6     LDW-SS339-010     16     LDW-SS308-RB     26     16     17     16     17     16     17     16     17     16	3	LDW-SS342-010	13	LDW-SS307-	-010	2	23	EDW-SS34	4-RBDUP	33	
6 LDW-SS339-010 16 LDW-SS308-RB 26 VD 36  7 LDW-SS340-010 17 LDW-SS309-010 27 37  8 LDW-SS338-010 18 LDW-SS310-010 28 38  9 LDW-SS336-010 19 LDW-SS311-010 29 39	4	LDW-SS343-010	14	LDW-SS306-	010	2	24	LDW-SS34	4-010MS	34	
7         LDW-SS340-010         17         LDW-SS309-010         27         37           8         LDW-SS338-010         18         LDW-SS310-010         28         38           9         LDW-SS336-010         19         LDW-SS311-010         29         39	5	LDW-SS341-010	15	LDW-SS308-	-010	2	25	LDW-SS34	4-010D <u>UP</u>	35	
8     LDW-SS338-010     18     LDW-SS310-010     28     38       9     LDW-SS336-010     19     LDW-SS311-010     29     39	6	LDW-SS339-010	16	LDW-SS308-	кв	2	26	PB		36	
9 LDW-SS336-010 19 LDW-SS311-010 29 39	7	LDW-\$\$340-010	17	LDW-SS309-	010	2	27			37	
	8	LDW-\$\$338-010	18	LDW-SS310-	010	2	28			38	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	9	LDW-SS336-010	19	LDW-SS311-	010	2	29			39	
10 LDW-SS301-010 20 LDW-SS312-010 30 40	10	LDW-SS301-010	20	LDW-SS312-	010	3	30			40	

#### VALIDATION FINDINGS CHECKLIST

Page: of Reviewer: Mul

Method: Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	1			
Cooler temperature criteria was met.				
II. Calibration				Mestical and the second of the
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/	<u> </u>		
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?	1		·	
Were all initial calibration correlation coefficients ≥ 0.995? (Level IV only)	/		S92-15866	
III Blánks		i i		
Was a method blank associated with every sample in this SDG?				_
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.			40.27.25 that	
IV/ICR Interierence Check Sample.				
Were ICP interference check samples performed daily?	_			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
IV-Matrix-spike/Matrix-spike-duplicates		4		
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		_/		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	/			_
V 1 aboratory control samples				
Was an LCS anaylzed for this SDG?				
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?				
VI. Famacs-Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			/	
Do all applicable analysies have duplicate injections? (Level IV only)			_	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			^	
Were analytical spike recoveries within the 85-115% OC limits?				



#### **VALIDATION FINDINGS CHECKLIST**

Page: <u>&gt;</u>	_of
Reviewer:	IM
2nd Reviewer:	t-

	_	_		
Validation Area	Yes	No	NA	Findings/Comments
VII/ICP Senal Oliutorica	遊園			en de la companya de
Was an ICP serial dilution analyzed if analyte concentrations were > 50% the IDL?				
Were all percent differences (%Ds) < 10%?	/			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.	l .			
Vill Internal Standards (EPA SW: 846 Method: 6020)				<b>《美国中华美尔斯斯斯</b>
Were all the percent recoveries (%R) within the 39-130% of the intensity o	xt	/		
If the %Rs were outside the criteria, was a reanalysis performed?	<b>V</b>		X	-
IX::Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				<u>-</u>
Were the performance evaluation (PE) samples within the acceptance limits?				
X Sample Result Vertications				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<b>V</b>			
Xis Overall assessment of data and the second of the secon				Control of the second of the s
Overall assessment of data was found to be acceptable.	V			
XIII Field dublicates 45 at 1998 And 1992 And 1997 And 19				And the second s
Field duplicate pairs were identified in this SDG.	/			
Target analytes were detected in the field duplicates.	~			,
XIII Fjeld blanks 25 4 5 5				
Field blanks were identified in this SDG.	/	,		
Target analytes were detected in the field blanks.	V			

# VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page:_	1 of 1
Reviewer:	MH
2nd reviewer:	A-/

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
2/15/19-	1 Selvet	Al, Sb/Ag, Ba, Bp, Co, Ca, Cr, Co, Co, Fe, FB, Mg, Mn, Hg, Ni) K, Sg/Ag, Na(T)(V) Zn Mo) B, Si, CN,
		Al, Sb, As, Ba, Ba, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
wyt,vs	لتسلما	AI, (Sb, As, Ba, Be, Cd, Ca, Cf, Co, Cit, Fe, Pk, Mg, Mn, Hg, Ni, K, Se, Ag, Na, T, V, Zn, Mo B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
·		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni; K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN';
	·	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN <sup>*</sup> ,
, <u> </u>		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
,		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al. Sb. As. Ba, Be, Cd. Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
	<u>.                                    </u>	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al. Sb. As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
,		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
<u> </u>		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Analysis Method
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
ICP-MS	<u> </u>	AI, (Sb) (As) Ba, Be, (Cd) Ca, (Cr) (Co) (Cu) Fe, (Pb), Mg, Mn, Hg, (Ni) K, (Se) (Ag), Na, (TI) (V) (Zh, (Mo), B, Si, CN',
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,

Comments: Mercury by CVAA if performed

LDC #:	15767A4
SDG #:	73+3

### VALIDATION FINDINGS WORKSHEET <u>Matrix Spike Analysis</u>

Page:_	of
Reviewer:_	<u> </u> mu
2nd Reviewer:_	1

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

-	••		_			I I	4 1	1	4	110. 411	1 1 . I .					118	1 7 A M
_				allaum	TOUCHE	- $        -$	TOP OI	יחתוזייתות ו	ancularea.	"INI"	$\Gamma \cap \Gamma \subset$	NINGALIA	At Iootiane	Dra.	IMANTITIAN	~ n	
	45.0	LO E	366	uuanii	Jauviis	DOIGN	IVI ai	i anesiioiis	answered		INULE	ivulluanie	uuesuuns	<b>21 2</b>	IUCHUNEU	יו כם	v. r

√ N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A
Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

V N N/A Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

LEVEL IV ONLY:

Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	24	Sebut	4b	3,4	An + 25	J/hJ/A (North spike 99.2)
	-					
	· · · · · · · · · · · · · · · · · · ·					
$\vdash$	`					
┝╾┥						-
	<del></del>	_	<u> </u>		<del>                                     </del>	<del>                                     </del>
H	<del>-</del>					<del></del>
一十	<u> </u>				-	
					•	
-						
┝╾┼						
<u></u>		<u> </u>			<u> </u>	<u> </u>
$\vdash$	No.			<u> </u>		
<del></del>						
		_	_			

Comments:	
	·

LDC#:	5767A4
SDG#:	J243

### **VALIDATION FINDINGS WORKSHEET**

Field Duplicates

Page:_	of
Reviewer:	V
2nd Reviewer:	2

METHOD: Metals (EPA Method 200.8/7000)

N NA N NA

Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

	Concentrat	(530)		
Сотроила	1	2	RPD	
Arsenic	7.8	7.6	3	
Chromium	15.8	17.8	12	
Cobalt	4.9	5.0	2	
Copper	34.5	35.9	4	
Lead	27	25	8	
Mercury	0.91	0.16	140	
Nickel	10.9	11.9	9	_
Vanadium	37.4	40.6	8	
Zinc	106	74	36	
Molybdenum	0.5	0.5	0	_

V:\FIELD DUPLICATES\FD\_inorganic\15767A4wpd.wpd

LDC #:\SDG #:	767 A4 1243
METHOD: Tra	ace Metals (EPA SW
N N/A	Were field blanks Were target analy
Sample:	

### VALIDATION FINDINGS WORKSHEET

Page:	of
Reviewer:	. [ฯผ
2nd reviewer:	
- '	

SDG #:	OG #: 1213 Field Blanks				144
METHOD: Tr	ace Metals (EPA S	W 846 Method 6010/7000)			
9) N N/A		ks identified in this SDG? alytes detected in the field blanks?			
Sample:		Field Blank / Trip Blank / Rinsate / Other	R 13	_(circle one)	
		Analyte		Concentration Units ( )	vg/2
		Cu		0.6	
			-		
Sample:	1,6	Field Blank / Trip Blank / Rinsate / Other	KB	(circle one)	
		Analyte		Concentration Units (	ugh
		Cu	_	1.5	
		· · · · · · · · · · · · · · · · · · ·	-		
			_	<u> </u>	
<u> </u>		<del>-</del>			
		<del>_</del>			

LDC #: \$767 A4 SDG #: 723

#### VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page:	of
Reviewer:	jun-
2nd Reviewer:	A

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recaluculated using the following formula:

%R = Found x 100 True Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = 1S-D1 \times 100$ (S+D)/2 Where, S = Original sample concentration

D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

%D = 11-SDR1 x 100

Where, I = Initial Sample Result (mg/L)

SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample iD	Type of Analysis	Element	Found / S / t (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAR	ICP interference check	Ag	18.676	20	93.4	925.	γ :
10%	Laboratory control sample	Ni	24.96	25	(%)	100	<u> </u>
24	Matrix spike	Zŋ	(SSR-SR) 91.3	104	87.8	8.7.5	
r	Duplicate	in	U.S.	[3.]	194	10,4	/
.1.	ICP serial dilution	V	32.93	30.047	9.6	9.7	<i>y</i>

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 15767A4 SDG #: JE13

### VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Page:	
Reviewer:	<u> </u>
2nd Reviewer:	

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 True Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution

True = concentration (in ug/L) of each analyte in the ICV or CCV source

	,				Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (4g/L)	True (vg/L)	%R	%R	Acceptable (Y/N)
TW	ICP/(Initial calibration)	Sb	48.95	50	9925	97.9	7
	GFAA (Initial calibration)						
IN	CVAA (Initial calibration)	Hy	8.07	8.0	100-9	W 9	Y
CeV	ICP (Continuing calibration)	Pb	51.89	So	(3.9	(3.8	
	GFAA (Continuing calibration)		•	-			
CeV	CVAA (Continuing calibration)	ıtg	435	4.0	108.8	(08.8	7
	Cyanide (Initial calibration)	<del>- 0</del>					,
:	Cyanide (Continuing calibation)		-				

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10,0% of the recalculated results.

CALCLC.4SW

LDC #:	<u>(8767</u>	AY
SDG #:	113	13

Detected analyte results for \_\_\_

Dil

%S

Dilution factor

Decimal percent solids

#### **VALIDATION FINDINGS WORKSHEET** Sample Calculation Verification

Page:	of
Reviewer:	MW
2nd reviewer:	4
ZIIG Tevlewel	<del></del>

were recalculated and verified using the

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Have results been reported and calculated correctly? (Y N N/A

Are results within the calibrated range of the instruments and within the linear range of the ICP? N N/A

N N/A Are all detection limits below the CRDL?

followi	ng equal	tion:		
Concent	ration =	<u>(RD)(FV)(Dil)</u> (Iri. Vol.)(%S)	Recalculation:	
RD	=	Raw data concentration		welling
F۷	=	Final volume (ml)	Co 0.719 x 10689 - b.56	1 0/mg
In. Vol.	=	Initial volume (ml) or weight (G)	Co 0.719 x 1.0689	' <b>B</b>

V

Sample ID	Analyte	Reported Concentration ( ) ( )	Calculated Concentration ( W.J./// )	Acceptable (Y/N)
2	As	bio	600	7
	Cr	(3-)	3~]	
	Co	6.6	6.6	
	Cu	16.2	162	
_	Pb	b	6	
	Mo	0.3	۵,3	
	<u>Vì</u>	14-1	14-5	
	<u> </u>	39.	390)	
	<u> </u>	51)	57)	
	_		/	
V	A-y	5.2	12.5	
	ld	0.5	0.5	·
	W	33	33	
	Lo	8-6	8.5	
	<u>Cu</u>	84	84	
	Pb	63	63	
_	<u> </u>	0.59	0,59	
	Mo <sup>U</sup>	<u> </u>	1.0	
		23	23	
	by	0,5	0,5	
		640	640	
	2n	15	15)	

SDG #	#: <u>15767B4</u> #:KA18 atory: <u>Analytical Resourc</u>		LIDATIOI		<b>PLETENE</b> Level III	SS WOR	KSHEET	Date: \(\ll \frac{1}{2}\right)^{\sigma} Page: \(\ll \text{of} \) Reviewer: \(\ll \text{V}\) 2nd Reviewer: \(\ll \text{V}\)
METH	IOD: Metals (EPA Metho	d 200	).8/EPA SW	/ 846 Metl	hod 7471A)			Ziid Neviewei. // C
			wed for ead	ch of the f	ollowing val	idation area	as. Validation fin	idings are noted in attached
valida	tion findings worksheets.							
	Validation	Area				_	Comments	
I.	Technical holding times			A	Sampling da	tes: 10/4	lob	
II.	Calibration			À	, ,	<del>/</del>		
111.	Blanks		_	A				
IV.	ICP Interference Check Sam	nple (IC	CS) Analysis	A				
V.	Matrix Spike Analysis			sw		-		
VI.	Duplicate Sample Analysis			N				
VII.	Laboratory Control Samples	(LCS)		A	Les 9	RM		
VIII.	Internal Standard (ICP-MS)			A		1		
IX.	Furnace Atomic Absorption	QC			N.T	Morad.		
Χ.	ICP Serial Dilution			A	,	Town or the second		
Xſ.	Sample Result Verification			ZZ				
XII.	Overall Assessment of Data			A		_		
XIII.	Field Duplicates			, ✓				
XIV.	Field Blanks			5W	RB=	15		
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet		R = Rins	compound sate eld blank	s detected		olicate ip blank quipment blank	
Validatio	Se Limit		T		<u></u>			
1	LDW-SS335-010	11	LDW-SS317-	010	21	PB.	31	
2	LDW-SS313-010	12	LDW-SS316-	010	22		32	
3	LDW-SS314-010	13	LDW-SS315-	-010	23		33	
4	LDW-SS322-010	14	LDW-SS303-	010	24		34	
5	LDW-SS323-010	15	<del>LDW-SS325-</del>	<del>RB</del>	25		35	
6	LDW-SS320-010	16	LDW-SS325-	010	26		36	
7	LDW-SS319-010	17	LDW-SS326-	010	27	_	37	
8	LDW-SS324-010	18	LDW-SS304-	-010	28		38	
9	LDW-SS321-010	19	LDW-SS335-	010MS	29	<u> </u>	39	
10	LDW-SS318-010	20	LDW-SS335-	010DUP	30		40	

LDC #: \576784 SDG #: KALS

## VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page:	Lof_
Reviewer:	MH
2nd reviewer:	A-/

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
14 16-18	Elint	AI, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg(N), K, Se, Ag, Na, Ti, V, Zn, Mo/B, Si, CN,
<del>                                    </del>		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
219,20	1	Al, Sb, As, Ba, Be, Cd, Ca, Er, Co, Cy, Fe Pb, Mg, Mn, Hg, Ni) K, Se, Ag, Na, II, V, Zn, Mg, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN'.
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
ļ		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al. Sb. As. Ba. Be, Cd. Ca. Cr. Co. Cu. Fe, Pb. Mg. Mn. Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Ai, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
	-	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN <sup>-</sup> ,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
	,·	Analysis Method
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN',
ICP-MS		AI, (SI), (Ag), Ba, Be, (Cg), Ca(Gr, Ca(Cg), Fe, (Ph), Mg, Mn, Hg, (N), K, Se) (Ag) Na(T)(V).(Zi), Mg, B, Si, CN',
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Si, CN,

Comments: Mercury by CVAA if performed.

LDC #:	15767B4
SDG #:_	VAI8

#### VALIDATION FINDINGS WORKSHEET Matrix Spike Analysis

	Page:_	of	
	Reviewer:_	My	1
2nd	Reviewer:	16	

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

YN N/A Was a matrix spike analyzed for each matrix in this SDG?

Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

(Y) N N/A Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
T	19	gelut	36	2.5	An +20	Thus/A ( port spike : loss
			Ag	12-6	/	V (V 99.1
			8			/
┝╾┝╾						-
						<del>                                     </del>
	_					
		<u>-</u>  -				
-	<del></del>				<u> </u>	
	_					
1						
	•					
	,					
		<u> </u>			<u>-</u>	<u> </u>
				. <del>-</del>		
<del>                                     </del>	· · · · · · · · · · · · · · · · · · ·					

Comments:	
	•
·	

SDG #:	, , ,	VALIDATION FINDINGS WORKSHEET <u>Field Blanks</u>	Page: of Reviewer: 4
		SW 846 Method 6010/7000)	
ON N/A ON N/A		ks identified in this SDG? alytes detected in the field blanks?	
Sample:	15	Field Blank / Trip Blank / Rinsate / Other RB	(circle one)
	-	Analyte	Concentration ug/
		Cu	2.2
		<del>2</del> n	
			· · · · · · · · · · · · · · · · · · ·
		<del></del>	
			<u> </u>
<u> </u>			· · · · · · · · · · · · · · · · · · ·
-			· · ·
Sample:		Field Blank / Trip Blank / Rinsate / Other	(circle one)
		Analyte	Concentration Units ( )
\ <u></u>			
	<del>-</del>		

LDC #: 15720A6 VALIDATION COMPLETENESS WORKSHEET SDG #: JZ15 Level III Laboratory: Analytical Resources, Inc.					•	Date: <u>₩/\$/•</u> Page: Lof Reviewer: 2nd Reviewer:				
The:	HOD: Grain Size (PSEP), samples listed below were ation findings worksheets	e revie	•					•	on fin	dings are noted in attached
	Validation	Area						Comm	nents	
Į.	Technical holding times			A	Sampli	ing da	ates:	10/2/06		
lia.	Initial calibration		_	4						
lib.	Calibration verification			A						
181.	Blanks			A						
iv	Matrix Spike/Matrix Spike D	uplicat	es	Á						
v	Duplicates		_	Á	Thi	<del>uli</del> a	t			
VI.	Laboratory control samples			A	145	<u> </u>	<u>-</u>			
VII	Sample result verification			N.			-, ,			
VIII	. Overall assessment of data			A						
IX.	Field duplicates			SW	(	(4.	<del>(</del> )	. (10,11)		
X	Field blanks			N						
Note: A = Acceptable ND = No compounds detected D = Duplicate N = Not provided/applicable R = Rinsate TB = Trip blank SW = See worksheet FB = Field blank EB = Equipment blank  Validated Samples: 1 1										
1	LDW-SS330-010	11	LDW-SS402-	010		21			31	
	LDW-SS327-010	12	LDW-SS330-			22			32	
]	LDW-SS328-010		_			23			33	_
II I	LDW-SS329-010	14		LDW-S\$330-010DUP		24			34	
	LDW-SS401-010	15		LDW-SS337-010DUP LDW-SS337-010TRP		25			35	
	LDW-SS331-010	16	LDW-553			26			36	
	LDW-SS332-010	17	_MB	1	' I	27			37	
	LDW-SS334-010	18				28			38	

Notes:		_		

LDW-SS333-010

10 LDW-SS337-010

LDC #: 572/6 SDG #: 17/5

#### VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page: of
eviewer:H.
eviewer: <u>พ</u> ฯ

All circled methods are applicable to each sample.

Sample ID	Parameter
[-1]	PH TDS CI F NO, NO, SO, PO, ALK CN NH, TKN FOR CHO+ (75) (420)
m 11,1213	PH TDS CI F NO, NO, SO, PO, ALK CN NH, TKN (OC) CHO+
14,4,0	PH TDS CI F NO, NO, SO, PO, ALK CN NH, TKN TOC CHO+
V 17, 16	PH TDS CI F NO, NO, SO, PO, ALK CN NH, TKN TOC CR TS
	ph tds ci f No <sub>3</sub> No <sub>2</sub> So <sub>4</sub> Po <sub>4</sub> Alk CN NH <sub>3</sub> TKN TOC CR <sup>8+</sup>
	ph tds ci f No <sub>3</sub> No <sub>2</sub> So <sub>4</sub> Po <sub>4</sub> Alk cn NH <sub>3</sub> Tkn toc CR <sup>8+</sup>
	PH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup>
	ph TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>0+</sup>
	pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>8+</sup>
	ph tds ci f No <sub>3</sub> No <sub>2</sub> So <sub>4</sub> Po <sub>4</sub> Alk CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup>
	ph TDS CI F NO, NO, SO, PO, ALK CN NH, TKN TOC CR8+
	PH TDS CI F NO, NO, SO, PO, ALK CN' NH, TKN TOC CR8+
	ph tds ci f NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>5</sub> TKN TOC CR <sup>8+</sup>
	pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>2</sup> NH <sub>3</sub> TKN TOC CR <sup>6+</sup>
	pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN' NH <sub>3</sub> TKN TOC CR <sup>6+</sup>
	pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN' NH <sub>3</sub> TKN TOC CR <sup>5+</sup>
	pH TDS CI F NO, NO, SO, PO, ALK CN' NH, TKN TOC CR8+
	PH TDS CLF NO, NO, SO, PO, ALK CN, NH, TKN TOC CR8+
	PH TDS CLF NO, NO, SO, PO, ALK CN' NH, TKN TOC CROT
	ph TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CNT NH <sub>3</sub> TKN TOC CR <sup>6+</sup>
	PH TDS CLF NO, NO, SO, PO, ALK CN. NH, TKN TOC CR8+
	PH TDS CI F NO, NO, SO, PO, ALK CN NH, TKN TOC CROT
	PH TDS CLF NO, NO, SO, PO, ALK CNT NH, TKN TOC CROT
	pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN' NH <sub>3</sub> TKN TOC CR <sup>8+</sup>
	pH TDS CLF NO, NO, SO, PO, ALK CN NH, TKN TOC CR**

Comments:		.× 		

SDG#:	VALIDATION FINDINGS WORKSHEET Field Duplicates  Method Con Con-	Page: of 3 Reviewer: 2nd Reviewer:
Y N NA Y N NA	Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?	

-	Concent			
Analyte	4	5	RPD	
TS	70.30	68.80	2 ( 4 >	)
тос	0.972	1.59	48 (5)	?)

	Concentration (%)			
Analyte	10	11	RPD	
TS	- 55.80	56.10	1 (420	)
тос	2.20	2.16	2 (43	·)

V:\FIELD DUPLICATES\FD\_inorganic\15720A6.wpd

LDC#:	5	20	A6	
SDG#:	7	213		

#### **VALIDATION FINDINGS WORKSHEET** Field Duplicates

Page:\_ Reviewer:\_ 2nd Reviewer:

Inorganics,	Method	4	یعد	thou/
,		$\overline{}$		**

Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

	Percent Finer Th	an Indicated Size	(4,60)	
Phi Size	4	5	RPD	
Gravel (-2)	100	99.4	1	
Gravel (-1)	98.4	97.8	1	
Very Coarse Sand (0)	96.5	96.3	0	
Coarse Sand (1)	86.1	86.1	0	
Medium Sand (2)	71.8	46.2	43	
Fine Sand (3)	46.2	34.5	29	<u> </u>
Very Fine Sand (4)	26.5	26.2	1	
Silt (5)	22.1 .	21.5	3	
Silt (6)	17.0	16.7	2	
Silt (7)	11.4	11.4	0	
Silt (8)	7.8	7.8	0	
Clay (9)	5.3	5.4	2	
Clay (10)	3.5	3.6	3	

V:\FIELD DUPLICATES\FD\_inorganic\ARIparticlesize.wpd

LDC#:	15/20 A6
SDG#:	1715

### **VALIDATION FINDINGS WORKSHEET**

Field Duplicates

Page:_	<u>} of 3</u>
Reviewer:	h
2nd Reviewer:	и

Inorganics, Method Lee www

(YN NA (Y)N NA

Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

	Percent Finer Th	(530)		
Phi Size	10	11	RPD	
Gravel (-2)	99.8	100	0	
Gravel (-1)	99.8	99.8	0	
Very Coarse Sarid (0)	98.9	99.2	0	
Coarse Sand (1)	97.5	97.7	0	
Medium Sand (2)	94.9	94.9	0	
Fine Sand (3)	70.9	71.3	1	
Very Fine Sand (4)	46.7	46.4	1	
Silt (5)	32.7	30.8	. 6	_
Silt (6)	21.0	19.9	5.	
Silt (7)	13.0	12.5	4	
Silt (8)	8.2	8.1	1	
Clay (9)	6.0	5.9	2	
Clay (10)	4.3	4.2	2	

V:\FIELD DUPLICATES\FD\_inorganic\ARIparticlesize.wpd

# LDC #: 15767A6 VALIDATION COMPLETENESS WORKSHEET SDG #: JZ53 Level IV Laboratory: Analytical Resources, Inc. Date: 1/13/05/ Reviewer: 2nd Reviewer: 1/2

METHOD: Grain Size (PSEP), Total Solids (EPA Method 160.3), TOC (Plumb)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
l	Technical holding times	A	Sampling dates: (°/3/ ° 6
lla.	Initial calibration	A	
llb.	Calibration verification	A	
III.	Blanks	A_	
IV	Matrix Spike/Matrix Spike Duplicates	A	ms
V_	Duplicates	A	Toplicati
VI.	Laboratory control samples	A	Toplication Les SRM
VII.	Sample result verification	A	7 7
VIII.	Overall assessment of data	A	
IX.	Field duplicates	9U	(10, 21)
L <sub>x</sub>	Field blanks	UD	RB21.16

Note: A = Acceptable

A = Acceptable N = Not provided/applicable ND = No compounds detected

D = Duplicate

SW = See worksheet

R = Rinsate FB = Field blank TB = Trip blank EB = Equipment blank

Validated Samples:

Eliment

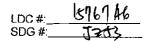
	Seat the 1						
1-	LDW-SS344-RB	11	LDW-SS302-010	21	LDW-SS403-010	31	
2	LDW-SS344-010	12	LDW-SS305-010	22	LDW-SS344-RBMS	32	
3_	LDW-SS342-010	13	LDW-SS307-010	23	LDW-SS344-RBDUP	33	
4_	LDW-SS343-010	14	LDW-SS306-010	24	LDW-SS306-010DUP	34	
5	LDW-SS341-010	15	LDW-SS308-010	25	LDW-SS306-010TRP	35	
6	LDW-SS339-010	16	LDW-SS308-RB	26	LDW-SS308-010MS	36	
7	LDW-SS340-010	17	LDW-SS309-010	27	LDW-SS308-010DUP	37	
8	LDW-SS338-010	18	LDW-SS310-010	28	V TRP	38	
9	LDW-SS336-010	19	LDW-SS311-010	29	MB	39	
16	LDW-SS301-010	20	LDW-SS312-010	30		40	

Notes:	
_	

Page: <u>1</u>	of
Reviewer:_	MH
2nd Reviewer:	

Method: Inorganics (EPA Method Lee wer

Method:Inorganics (EPA Method Lee Co)				
Validation Area	Yes	No	NA	Findings/Comments
i Technical holding times				的。 1987年 - 1988年 br>- 1988年 - 198
All technical holding times were met.	_			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?				
Were all initial calibration correlation coefficients ≥ 0.995?				
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/			
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)				
III. Blankstadt (48. 19. augusta)				
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
N. Matrix spike Matrix spike duplicates and Ouplicates				5条号从"全位"的CSA、163年6月3日 1887年
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	\			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL.				
Waliaboratory-control samples:		4		The state of the s
Was an LCS anaylzed for this SDG?	1			
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			New year and the least of the l
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PF) samples within the acceptance limits?				



#### **VALIDATION FINDINGS CHECKLIST**

Page: of Reviewer: My 2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification		s de la companya de l		
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	J			_
Were detection limits < RL?				
VIII Overall assessment of data with the control of				
Overall assessment of data was found to be acceptable.	$\mathcal{J}$			
1X Field duplicates				
Field duplicate pairs were identified in this SDG.	V			
Target analytes were detected in the field duplicates.				
X Field blanks		j.		The second of th
Field blanks were identified in this SDG.		,		
Target analytes were detected in the field blanks.				

LDC #: \5767 MG SDG #: J773

#### VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

Page:_	of	
Reviewer:	พฯ	
2nd reviewer:	<u>+</u>	

All circled methods are applicable to each sample.

Sample ID	Parameter
2-15, 19-21	pH TDS CI F NO, NO, SO, PO, ALK CN' NH, TKN TOO CHO! (TS) (Size)
	ph TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>8+</sup>
m74,25	PH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN' NH <sub>3</sub> TKN TOC CR <sup>6+</sup> (Yrich)
J-16. M 28	PH TDS CI F NO, NO, SO, PO, ALK CN' NH, TKN TOO CROT
V-79,-8	PH TDS CI F NO, NO, SO, PO, ALK CN' NH, TKN TOC CRO+ (T5)
	PH TDS CI F NO, NO, SO, PO, ALK CN' NH, TKN TOC CRO+
	ph tds ci f NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup>
	pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN' NH <sub>3</sub> TKN TOC CR <sup>6+</sup>
	ph TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN' NH <sub>3</sub> TKN TOC CR <sup>6+</sup>
	PH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>8+</sup>
	PH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>8+</sup>
	pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN' NH <sub>3</sub> TKN TOC CR <sup>6+</sup>
	pH TDS CI F NO, NO, SO, PO, ALK CN NH, TKN TOC CR6+
	ph tds ci f No, No, So, Po, Alk cn. NH, Tkn toc cr
	pH TDS CI F NO, NO, SO, PO, ALK CN' NH, TKN TOC CR*+
	pH TDS CI F NO3 NO2 SO4 PO4 ALK CN' NH3 TKN TOC CR8+
	pH TDS CI F NO <sub>s</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup>
	PH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>8+</sup>
	PH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR8+
	PH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup>
	PH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR8+
	PH TDS CI F NO3 NO2 SO4 PO4 ALK CNT NH3 TKN TOC CR8+
	ph TDS CI F NO <sub>s</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CNT NH <sub>3</sub> TKN TOC CR <sup>6+</sup>
	PH TDS CIF NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR8+
	pH TDS CI F NO, NO, SO, PO, ALK CN' NH, TKN TOC CR®+

Comments:		

LDC#: USN 7 ASSDG#: T2KS	Field Duplicates	Page:o Reviewer:v 2nd Reviewer:4
N NA Were t	field duplicate pairs identified in this SDG? target analytes detected in the field duplicate pairs?	

	Concent			
Analyte	10	21	RPD	
Total Solids	67.50	66.80	1	(520)
тос	1.55	1.95	23	(530)

V:\FIELD DUPLICATES\FD\_inorganic\15767A6.wpd

## LDC#:

#### **VALIDATION FINDINGS WORKSHEET** Field Duplicates

2nd Reviewer:

Grain Size, Method PSEP

Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

•	% Fir	% Finer (%)		
Phi Size	10	21	(530) RPD	
-2	97.1	98.0	1	
-1	91.4	92.8	2	_
0	87.7	88.8	1	
1	78.1	79.1	1	
2	41.2	41.6	1	
3	22.4	21.9	2	
4	18.2	17.8	2	
5	15.6	14.8	5	
6	12.2	11.7	4	
7	8.6	8.3	4	
8	6.0	5.7	5	
9	4.2	4.0	5	
10	2.7	2.5	8	

V:\FIELD DUPLICATES\FD\_inorganic\15767A6P.wpd

LDC #: 15767 A)

#### VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

	Page:_	L of ]
	Reviewer:_	mi
2nd	Reviewer:_	

METHOD: Inorganics, Method	See Co	<u>u</u>
----------------------------	--------	----------

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

 $%R = \frac{Found}{True} \times 100$  Where,

Found =

concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True =

concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = \frac{|S-D|}{|S-D|} \times 100$  Where,

S =

Original sample concentration

(S+D)/2

D =

Duplicate sample concentration

Sample (D	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
Les	Laboratory control sample	To C	0.50	دمځ.ه	100.2	[ <b>*</b> 0. \_	4
16	Matrix spike sample	Tou	(SSR-SR)	1:76	81,2	8/.)	
γ¶. <b>\</b> %	Duplicate sample	19	t23,53.)	t2,4	K2P 0-8	P3D 0,8	j j

Comments: results.	Refer to appropriate worksheet for	r list of qualifications and assoc	ciated samples when reporte	d results do not agree within	10.0% of the recalculated

TOTCLC.6

LDC #:_	(2/16)	AL
SDG #:	3363	<u></u>

### VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

	Page:	of
	Reviewer:	My
2nd	Reviewer:	

METHOD: Inorganics, Method See toke	
The correlation coefficient (r) for the calibration of was recalculated. Calibration date:	
An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:	
%R = Found x 100 Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution	

					Recalculated	Reported	
Type of Analysis	Analyte		(units)	(units)	r or %R	r or %R	Acceptable (Y/N)
Initial calibration		Blank					
Calibration verification		Standard 1					
		Standard 2					
		Standard 3					1
	Tree	Standard 4					
	TOLL	Standard 5					
	NA	Standard 6					
		Standard 7					
Childration verification	TOL	5000	4875		97-5	97-5	7
Galibration verification	て・レ	2000	5133		(02.7	102.7	1
Calibration verification							y

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.\_\_\_\_\_

LDC #:	1576786
SDG #:	72+3

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	$\mathcal{V}_{\text{of}}$	2
Reviewer:	MH	
	- 4	

SUG #:	<u> </u>	Sample Calculation Vernication	neviewer. My
			2nd reviewer:
METHOD: Inorg	anics, Method	Ellow	
	Have results been report	estions answered "N". Not applicable quested and calculated correctly?	stions are identified as "N/A".
73	Are results within the cal Are all detection limits b	ibrated range of the instruments? elow the CRQL?	
Compound (ana recalculated and	I verified using the follow	<b>-</b> •	reported with a positive detect were
Concentration =	TS= (3:76	63 Recalculation: (455- 1-0174) ×100 73 -1-1663 - 1-0154	49.65%
		6.5375	

#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
		75 12)	49.70	49.9	4
<u> </u>		ToC L	2.32	3.32	<b>J</b>
		Phi Size	% Times	7. FALL	
		-2	99.		Υ
		-	98.4	98. Y	
			96.5	96-5	
			94.2	94.2	
		2		21.4	
		<b>3</b>	65-1	650	
		<u> </u>	\$1,2	th2	,
		<u>t</u>	52.0	5/19	
		<u> </u>	37.8	37.6	
		<u> </u>	73-6	>3,3	
		۶	13.5	17.4	
	_	9	12.9	12.5	
		- P	8-6	8-	<u> </u>

Note:					
<u>-</u>	-		 _		
			 •	 _	

LDC #:_	15767 AG
SDG #:	TREZ

#### **VALIDATION FINDINGS WORKSHEET**

Sample Calculation Verification

Page:	
Reviewer:	MY
2nd reviewer:	Ä

		2nd reviewer:
METHOD: Inorganics, Met	nod see an	
N N/A Have results N N/A Are results N N/A Are all determined.  Compound (analyte) results	ts been reported and calculated correctly within the calibrated range of the instrumention limits below the CRQL?	
Concentration =	Recalculation:	
#2 700=	13445 W8/4 × 15.27	-=13882 wghy =1:3889,

#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
1	2_	T\$ (9.7)	1290	72.5	φ
		TIC V	1,39	1.39	y
			1. Times	7. Ther	7
		Mi 5) 24 -1	99.91	99.1	Y
			82.4	8214	./
			40.9	40,9	
			24.9	24.9	
		3	₩°-('	(8~)	
		4	10-6	10.6	
		5	10	6.9	
		<u> </u>	48	4.8	
		7	1.2	12	
		<i>\$</i>	2.0	20	
		9	L. 4	1.4	
		Į o	0-9	0.9	<u> </u>
<b></b>					
<b> </b>	· <del></del>				

Note:				
	-			
		-		

#### **VALIDATION COMPLETENESS WORKSHEET** LDC #: 15767B6 Level III SDG #: KA18

Page:\_ Reviewer: 2nd Reviewer:\_

Laboratory: Analytical Resources, Inc.

METHOD: Grain Size (PSEP), Total Solids (EPA Method 160.3), TOC (Plumb)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: le/4/56
IIa.	Initial calibration	A	
IIb.	Calibration verification	<u> </u>	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	Wy
v	Duplicates	A	Triplicate
VI.	Laboratory control samples	A	Triplicate LCS SRM
VII.	Sample result verification	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
x	Field blanks	N	

Note:

A = Acceptable

ND = No compounds detected

D = Duplicate

N = Not provided/applicable SW = See worksheet

R = Rinsate

FB = Field blank

TB = Trip blank EB = Equipment blank

Validated Samples:

Setiment

	/A-  4( /						
1	LDW-SS335-010	11	LDW-SS317-010	21	LDW-SS316-010TRP	31	
2	LDW-SS313-010	12	LDW-SS316- <u>010</u>	22	LOW-SSZS-10TRP	32	
3	LDW-SS314-010	13	LDW-SS315-010	23	14B	33	
4	LDW-SS322-010	14	LDW-SS303-010	24		34	
5	LDW-SS323-010	15	LDW-SS325-010	25		35	
6	LDW-SS320-010	16	LDW-SS326-010	26		36	
7	LDW-SS319-010	17	LDW-SS304-010	27		37	
8	LDW-SS324-010	18	LDW-SS335-010MS	28		38	
9	LDW-SS321-010	19	LDW-SS335-010DUP	29		39	
10	LDW-SS318-010	20	LDW-SS316-010DUP	30		40	

Notes:	

LDC #: \576786 SDG #: KAIR

#### VALIDATION FINDINGS WORKSHEET Sample Specific Analysis Reference

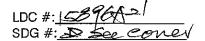
Page:_	of	
Reviewer:	MY	
2nd reviewer:	d	

All circled methods are applicable to each sample.

Sample ID	Parameter
(-17	PH TDS CI F NO, NO, SO, PO, ALK CN' NH, TKN (OC CRS+ (TS)
	PH TDS CI F NO, NO, SO, PO, ALK CN NH, TKN TOC CRª+
r/18,19.	APH TDS CIF NO3 NO2 SO4 PO4 ALK CN' NH3 TKN FOR CR®+
1 19.00	PH TDS CLF NO3 NO2 SO4 PO4 ALK CN' NH3 TKN TOC CR"T (TS)
1 20,21	PH TDS CI F NO3 NO2 SO4 PO4 ALK CN' NH3 TKN TOC CR8+
	PH TDS CLF NO3 NO2 SO4 PO4 ALK CN' NH3 TKN TOC CR8+
	pH TDS CI F NO, NO, SO, PO, ALK CN' NH, TKN TOC CR8+
	ph tos ci f no, no, so, po, alk cn nh, tkn toc cr
	PH TDS CI F NO, NO, SO, PO, ALK CN NH, TKN TOC CR -
	pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>6+</sup>
	ph tds cif no, no, so, po, alk cn nh, tkn toc cr +
	pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN <sup>*</sup> NH <sub>3</sub> TKN TOC CR <sup>8+</sup>
	pH-TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN' NH <sub>3</sub> TKN TOC CR <sup>6+</sup>
	ph tos ci f No, No, So, Po, Alk Cn. NH, TKN toc CR
	PH TDS CI F NO3 NO2 SO4 PO4 ALK CNT NH3 TKN TOC CR8+
	ph tds ci f no, no, so, po, alk cn nh, tkn toc cr
	PH TDS CLF NO3 NO2 SO4 PO4 ALK CN' NH3 TKN TOC CR8+
	pH TDS CI F NO3 NO2 SO4 PO4 ALK CN: NH3 TKN TOC CR8+
	pH TDS CI F NO3 NO2 SO4 PO4 ALK CN NH3 TKN TOC CR®+
	pH TDS CI F NO <sub>3</sub> NO <sub>2</sub> SO <sub>4</sub> PO <sub>4</sub> ALK CN NH <sub>3</sub> TKN TOC CR <sup>8+</sup>
	PH TDS CI F NO, NO, SO, PO, ALK CN NH, TKN TOC CR
	PH TDS CI F NO3 NO2 SO4 PO4 ALK CNT NH3 TKN TOC CR8+
	PH TDS CIF NO, NO, SO, PO, ALK CNT NH, TKN TOC CR8+
	pH TDS CI F NO, NO, SO, PO, ALK CN' NH, TKN TOC CR"+
	PH TDS CLF NO, NO, SO, PO, ALK CN NH, TKN TOC CR8+

Comments:		
	•	
		<del></del>

SDG	#:15896A21VALIDATIO #:DPWG20754/WG20336 atory:_AXYS_Analytical Services Ltd.		PLETENI _evel IV	ESS WORK	SHEET	Date: 14/0. Page: _/of _/ Reviewer: 2nd Reviewer: \www.
METI	HOD: HRGC/HRMS Dioxins/Dibenzofurar	ns (EPA Me	ethod 161	3)≥		Zild Noviewel. Work
The s /alida	amples listed below were reviewed for ea tion findings worksheets.	ch of the fo	ollowing va	alidation areas	. Validation findir	gs are noted in attached
	Validation Area				Comments	
t.	Technical holding times	4	Sampling d	ates: <i>[0]</i>	4/6	
11.	HRGC/HRMS instrument performance check	₩				
III.	Initial calibration	A	76 ES T	< 20/3	0	
IV.	Routine calibration	\$	Qe li	wits		
V,	Blanks	w		,		
VI.	Matrix spike/Matrix spike duplicates	N/A				
VII.	Laboratory control samples	<b>√</b> 4	1CS	CPM		
VIII.	Regional quality assurance and quality control	N				
IX.	Internal standards	<u> </u> ◆				
X.	Target compound identifications					
XI.	Compound quantitation and CRQLs	mas				
XII.	System performance					
XIII.	Overall assessment of data	SN				
XIV.	Field duplicates	N.				
XV.	Field blanks					
lote: /alidat	N = Not provided/applicable R = Rin	o compounds isate ield blank	s detected	D = Dupli TB = Trip EB = Equ		
	LDW-SS318-010 11 W4-203	36-101	21		31	
	LDW-SS321-010 12	· / · /	22		32	
3	LDW-SS322-010 13		23		33	
	LDW-SS323-010 14		24		34	
	LDW-SS324-010 15		25		35	
	LDW-SS323-010DUP 16		26		36	
7	17		27		37	
8	. 18		28		38	
9	19		29		39	
10	20		30		40	
•	-		1 00	<u> </u>	1-10	
otes						



#### **VALIDATION FINDINGS CHECKLIST**

Page: /of > Reviewer: 2nd Reviewer: 4

Method: Dioxins/Dibenzofurans (EPA SW 846 Method 8290) (613B)

Validation Area	Yes	No	NA	Findings/Comments
t. Technical holding times				
All technical holding times were met.	1			
Cooler temperature criteria was met.				
II: GC/MS Instrument performance check				
Was PFK exact mass 380.9760 verified?				
Were the retention time windows established for all homologues?				
Was the chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomers ≤ 25% ?				
Is the static resolving power at least 10,000 (10% valley definition)?	(			
Was the mass resolution adequately check with PFK?				
Was the presence of 1,2,8,9-TCDD and 1,3,4,6,8-PeCDF verified?		**********		
III, Initial calibration				
Was the initial calibration performed at 5 concentration levels?				
Were all percent relative standard deviations (%RSD) $\leq$ 20% for unlabeled standards and $\leq$ 30% for labeled standards?				
Did all calibration standards meet the Ion Abundance Ratio criteria?				
Was the signal to noise ratio for each target compound $\geq$ 2.5 and for each recovery and internal standard $\geq$ 10?				`
W. Continuing calibration				
Was a routine calibration performed at the beginning and end of each 12 hour period?				
Were all percent differences (%D) $\leq$ 20% for unlabeled standards and $\leq$ 30% for labeled standards?				
Did all routine calibration standards meet the Ion Abundance Ratio criteria?				
V. Blanks				
Was a method blank associated with every sample in this SDG?				
Was a method blank performed for each matrix and concentration?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet?				
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		/		DUP
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				
VII. Laboratory control samples	,			
Was an LCS analyzed for this SDG?				

LDC #: 15016A2 SDG #: DPW = 2015A

#### **VALIDATION FINDINGS CHECKLIST**

Page: of 3
Reviewer: 4
2nd Reviewer: W1

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	/			
VIII. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				
IX. Internal standards				
Were internal standard recoveries within the 40-135% criteria?				
Was the minimum S/N ratio of all internal standard peaks $\geq$ 10?				
X. Target compound identification				
For 2,3,7,8 substituted congeners with associated labeled standards, were the retention times of the two quantitation peaks within -1 to 3 sec. of the RT of the labeled standard?			/	
For 2,3,7,8 substituted congeners without associated labeled standards, were the relative retention times of the two quantitation peaks within 0.005 time units of the RRT measured in the routine calibration?				
For non-2,3,7,8 substituted congeners, were the retention times of the two quantitation peaks within RT established in the performance check solution?				
Did compound spectra contain all characteristic ions listed in the table attached?				
Was the Ion Abundance Ratio for the two quantitation ions within criteria?				
Was the signal to noise ratio for each target compound and labeled standard $\geq$ 2.5?				
Does the maximum intensity of each specified characteristic ion coincide within $\pm$ 2 seconds (includes labeled standards)?				
For PCDF identification, was any signal (S/N $\geq$ 2.5, at $\pm$ seconds RT) detected in the corresponding PCDPE channel?				
Was an acceptable lock mass recorded and monitored?			٧	
XI. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XII. System performance				
System performance was found to be acceptable.				
XIII: Overall assessment of data	· · · · · ·			
Overall assessment of data was found to be acceptable.				
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG,		/		

LDC #: 1589612 SDG #: ODWG 12754

#### **VALIDATION FINDINGS CHECKLIST**

Page: 3 of 3
Reviewer: 4
2nd Reviewer: 4

Validation Area	Yes	No	NA	Findings/Comments
Target compounds were detected in the field duplicates.				
XV: Field blanks				
Field blanks were identified in this SDG.				
Target compounds were detected in the field blanks.		•		

#### **VALIDATION FINDINGS WORKSHEET**

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA  $\frac{8W-846}{8W}$  Method  $\frac{8290}{16}$ 

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDO	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:			

LDC #:150	896A:	ر اح
SDG #: 12	DUS 2	2754

#### **VALIDATION FINDINGS WORKSHEET** Blanks

•	Page:_	of
Rev	iewer:_	7
2nd Rev	iewer:	hun

METHOD: GC/MS Dioxins/Dibenzofurans (EPA SW-846 Method 8280) 1613(3)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Were all samples associated with a method blank? M N/A

Was a method blank performed for each matrix and whenever a sample extraction was performed? Y N N/A

Was method blank contamination less < CRQL for all target compounds? Y/N N/A

Was the contaminant peak signal < 2% of the associated internal standard?

Blank extraction date: 10/18/06 Blank analysis date: 10/04/06

Conc. units: NS/19		_		Associ	alcal sa	uples:	<u> </u>	 	
Compound	Blank ID				s	sample Identific	ation		
Me	7336-10]		<b>4</b> □ >	<u>5</u> X					
[ <del>-</del>	0.057								
4	0.069								
1	0.050								_
Q	0.057		-						
И	0.057								
			-						
		_							
									_

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: All contaminants within five times the method blank concentration were qualified as not detected, "U".

	#:15				1
SDG	#:#	*	We	20	<del>54</del>

# VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLs

Page:	(of_/
Reviewer:	4
2nd Reviewer:	Mu

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Y N N/A

Were the correct internal standard (IS), quantitation ions and relative response factors (RRF) used to quantitate the compound? Compound quantitation and CRQLs were adjusted to reflect all sample dilutions and dry weight factors (if necessary).

#	Date	Sample ID	Finding		Associated Samples	Qualifications
		_u\	zithe usult	(K.	W	И
<b> </b>			flag;			
		<u> </u>	J			
ļ				-		
-						
	_					

Comments:	See sample calculation verification worksheet for recalculations			
•	·			
			<del>-</del>	
			_	

COMQUA90.21

LDC #: 1589662 SDG # DPW \$20754

# VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

	Page:	(of_ <i></i>
	Reviewer:	<u> </u>
2nd	Reviewer:	In

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW-846 Method 8290) 16 (3B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

YN N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		<u> </u>	H on OB-5	all	R/B
		<del></del>			
			·		
_					
		····			
	·				

Comments:	_		 		
			 	_	

#### VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

	Page:	_of	
	Reviewer:	7	
2nd	Reviewer:	$\sim$	_

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290) 16 (≥) )

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

 $RRF = (A_x)(C_b)/(A_a)(C_y)$ 

average RRF = sum of the RRFs/number of standards

%RSD = 100 \* (S/X)

 $A_x$  = Area of compound,

A<sub>k</sub> = Area of associated internal standard

 $C_x = Concentration of compound,$   $C_{is} = Concentration of internal standard$ 

S = Standard deviation of the RRFs, X = Mean of the RRFs

	,			Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
#_	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Average RRF (initial)	RRF	RRF	%RSD	%RSD
1	KAL	10/2//	2,3,7,8-TCDF (13C-2,3,7,8-TCDF)	ا ح. ا	1.21	7.22	1.22	2.58	2.77
		10/13/06	2,3,7,8-TCDD ( <sup>19</sup> C-2,3,7,8-TCDD)	1.00	1.00	0.95	0.95	4.49	4.43
			1,2,3,6,7,8-HxCDD ( <sup>19</sup> C-1,2,3,6,7,8-HxCDD)	0.92	0.92	0.93	0.93	3.60	3.61
			1,2,3,4,6,7,8-HpCDD ( <sup>13</sup> C-1,2,4,6,7,8,-HpCDD)	1.06	1.06	1.09	1.09	3,46	3 <b>3</b> 6
			OCBF (13C-OCDD)	1.54	1.54	1.55	1.55	6.09	5.90
2	ICAL		2,3,7,8-TCDF (1°C-2,3,7,8-TCDF)	0.91	0.91	0.90	0.90	5.15	5.11
		10/10/06	2,3,7,8-TCDD (1sC-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD ( <sup>13</sup> C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD ( <sup>13</sup> C-1,2,4,6,7,8,-HpCDD)						
			OCDF (13C-OCDD)						
3			2,3,7,8-TCDF ( <sup>13</sup> C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD ( <sup>13</sup> C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD ( <sup>13</sup> C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD ( <sup>13</sup> C-1,2,4,6,7,8,-HpCDD)						
			OCDF (13C-OCDD)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

#### **VALIDATION FINDINGS WORKSHEET** Routine Calibration Results Verification

	Page:	<u>~</u> ot <u>~</u>
	Reviewer:	
nd	Reviewer:	hu

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290) 16(ララ)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF

 $RRF = (A_x)(C_y)/(A_y)(C_y)$ 

Where: ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

 $A_x =$  Area of compound,  $C_x = Concentration of compound,$  A<sub>s</sub> = Area of associated internal standard

C<sub>s</sub> = Concentration of internal standard

					Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	ARFCONC (CC)	-ARF CONC (CC)	%D	%D
1	DX62419A	( - ( )	2,3,7,8-TCDF ( <sup>13</sup> C-2,3,7,8-TCDF)	1.21	10-2	10.2	not repair	fed
	S÷1	10/27/06	2,3,7,8-TCDD ( <sup>13</sup> C-2,3,7,8-TCDD)	1.00	10.8	10.8	<b>T</b>	
			1,2,3,6,7,8-HxCDD ( <sup>13</sup> C-1,2,3,6,7,8-HxCDD)	0.92	48.9	20.0		
			1,2,3,4,6,7,8-HpCDD ( <sup>13</sup> C-1,2,4,6,7,8,-HpCDD)	1.06	49.6	19.6		
			OCDF (13C-OCDD)	1.54	96.2	96.4		
2	DB63_22	10/24/06	2,3,7,8-TCDF ( <sup>13</sup> C-2,3,7,8-TCDF)	0.91	10.0	(0.0		
	5:2	10/ =2400	2,3,7,8-TCDD ( <sup>13</sup> C-2,3,7,8-TCDD)					
		′	1,2,3,6,7,8-HxCDD ( <sup>13</sup> C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD ( <sup>13</sup> C-1,2,4,6,7,8,-HpCDD)					
			OCDF (13C-OCDD)					
3			2,3,7,8-TCDF ( <sup>13</sup> C-2,3,7,8-TCDF)					
			2,3,7,8-TCDD ( <sup>13</sup> C-2,3,7,8-TCDD)					
			1,2,3,6,7,8-HxCDD ( <sup>13</sup> C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD ( <sup>13</sup> C-1,2,4,6,7,8,-HpCDD)					
			OCDF (1°C-OCDD)					

Comments: Refer to Routine Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

#### **VALIDATION FINDINGS WORKSHEET** Routine Calibration Results Verification

Page:_	of
Reviewer:	9
2nd Reviewer:	<u> </u>

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW-846 Method 8290)-16138)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF  $RRF = (A_x)(C_y)/(A_x)(C_x)$ 

Where: ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

 $A_x =$ Area of compound,

A<sub>s</sub> = Area of associated internal standard

C, = Concentration of compound,

C<sub>k</sub> = Concentration of internal standard

					Reported	Recalculated	Reported	Recalculated
#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	RRFAWL (CC)	RRESAUL (CC)	%D	%D
1	DX62-415		2,3,7,8-TCDF ( <sup>13</sup> C-2,3,7,8-TCDF)	احرا	10.2	10.2	not come	
	5=1	10/24/06	2,3,7,8-TCDD ( <sup>13</sup> C-2,3,7,8-TCDD)	1.00	10.5	10.5		
		, .	1,2,3,6,7,8-HxCDD ( <sup>13</sup> C-1,2,3,6,7,8-HxCDD)	0.92	50.4	50.4		
			1,2,3,4,6,7,8-HpCDD ( <sup>13</sup> C-1,2,4,6,7,8,-HpCDD)	1.06.	49.	49.2		
			OCDF (13C-OCDD)	1.54	99.3	95.4		
2	DX62-4181		2,3,7,8-TCDF ( <sup>13</sup> C-2,3,7,8-TCDF)	1.2/	(0.≥	10.		
	5:2	10/27/06	2,3,7,8-TCDD ( <sup>13</sup> C-2,3,7,8-TCDD)	1.00	10.6	10.6		
		/ /	1,2,3,6,7,8-HxCDD ( <sup>13</sup> C-1,2,3,6,7,8-HxCDD)	0.92	51.0	51.1		
			1,2,3,4,6,7,8-HpCDD ( <sup>19</sup> C-1,2,4,6,7,8,-HpCDD)	1.06.	49.6	49.6		
			OCDF (13C-OCDD)	1.54	95.5	95.7		
3	DB63_223		2,3,7,8-TCDF ( <sup>18</sup> C-2,3,7,8-TCDF)	0.91	10.2	(0. >		
	2:3		2,3,7,8-TCDD ( <sup>13</sup> C-2,3,7,8-TCDD)					
			1,2,3,6,7,8-HxCDD ( <sup>18</sup> C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD ( <sup>13</sup> C-1,2,4,6,7,8,-HpCDD)					
			OCDF (13C-OCDD)					

Comments: Refer to Routine Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

#### **VALIDATION FINDINGS WORKSHEET Laboratory Control Sample Results Verification**

Page:_	of
Reviewer:	9
2nd Reviewer:	سارما

METHOD: GC/MS Dioxins/Dibenzofurans (EPA SW 846 Method 8290) はらう

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* SSC/SA

Where: SSC = Spiked sample concentration

SA = Spike added

RPD = ILCS - LCSD | \* 2/(LCS + LCSD)

LCS = Laboraotry control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

Compound	Spike Added ( N		Spiked Sample Concentration (NSW)		LCS Percent Recovery		I CSD Percent Recovery		I CS/I CSD	
	LCS	ı dən	LCS	ı c⁄sp	Reported.	Recalc	Reported	Recalc	Reported	Recalculated
2,3,7,8-TCDD	10		10.4	/	104	10±				
1,2,3,7,8-PeCDD	50		27.8		955					
1,2,3,4,7,8-HxCDD			19.5		98.9	98.9				
1,2,3,4,7,8,9-HpCDF	<b>V</b>		49.T		994	99.4			_	
OCDF	100		98.1		98.1	98!				
	_									
	_								-	
_										
		<u> </u>	<u> </u>							-
		<u> </u>							<del>-</del>	_
				,						

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the	:he
recalculated results.	

V:\Validation Worksheets\Dioxin90\LC\$CLC90.21

### Ions Monitored for HRGC/HRMS Analysis of PCDDs/PCDFs

Descriptor	Accurate mass <sup>(a)</sup>	Ion ID	Elemental Composition	Analyte	Descriptor	Accurate Mass <sup>(a)</sup>	Ion ID	Elemental Composition	Analyte
1	303.9016 305.8987 315.9419 317.9389 319.8965 321.8936 331.9368 333.9338 375.8364 [354.9792]	M M+2 M M+2 M M+2 M-2 M+2 LOCK	C <sub>12</sub> H <sub>4</sub> **Cl <sub>4</sub> O C <sub>12</sub> H <sub>4</sub> **Cl <sub>3</sub> O*C10 <sup>13</sup> C <sub>12</sub> H <sub>4</sub> **Cl <sub>3</sub> O*C1O <sup>13</sup> C <sub>12</sub> H <sub>4</sub> **Cl <sub>3</sub> O*CIO C <sub>12</sub> H <sub>4</sub> **Cl <sub>4</sub> O <sub>2</sub> C <sub>12</sub> H <sub>4</sub> **Cl <sub>3</sub> O*C1O <sub>2</sub> <sup>13</sup> C <sub>12</sub> H <sub>4</sub> **Cl <sub>3</sub> O*ClO <sub>2</sub> C <sub>12</sub> H <sub>4</sub> **Cl <sub>3</sub> O*ClO <sub>2</sub> C <sub>12</sub> H <sub>4</sub> **Cl <sub>3</sub> O*ClO <sub>2</sub> C <sub>12</sub> H <sub>4</sub> **Cl <sub>5</sub> O*CIO	TCDF TCDF (S) TCDF (S) TCDD TCDD TCDD (S) TCDD (S) HXCDPE PFK	4	407.7818 409.7788 417.8250 419.8220 423.7767 425.7737 435.8169 437.8140 479.7165 [430.9728]	M+2 M+4 M M+2 M+2 M+4 M+4 M+4 M+4	C <sub>12</sub> H <sup>35</sup> Cl <sub>6</sub> <sup>37</sup> ClO C <sub>12</sub> H <sup>35</sup> Cl <sub>5</sub> <sup>3</sup> Cl <sub>2</sub> O <sup>13</sup> C <sub>12</sub> H <sup>35</sup> Cl <sub>5</sub> O <sup>12</sup> C <sub>12</sub> H <sup>35</sup> Cl <sub>6</sub> <sup>37</sup> ClO C <sub>12</sub> H <sup>35</sup> Cl <sub>6</sub> <sup>37</sup> ClO <sub>2</sub> C <sub>12</sub> H <sup>35</sup> Cl <sub>6</sub> <sup>37</sup> Cl <sub>2</sub> O <sub>2</sub> <sup>13</sup> C <sub>12</sub> H <sup>35</sup> Cl <sub>6</sub> <sup>37</sup> Cl <sub>2</sub> O <sub>2</sub> <sup>13</sup> C <sub>12</sub> H <sup>35</sup> Cl <sub>6</sub> <sup>37</sup> Cl <sub>2</sub> O <sub>2</sub> C <sub>12</sub> H <sup>35</sup> Cl <sub>7</sub> <sup>37</sup> Cl <sub>2</sub> O C <sub>12</sub> H <sup>35</sup> Cl <sub>7</sub> <sup>37</sup> Cl <sub>2</sub> O	HpCDF HpCDF (S) HpCDF HpCDD HpCDD HpCDD (S) HpCDD (S) NCDPE PFK
2	339.8597 341.8567 351.9000 353.8970 355.8546 357.8516 367.8949 369.8919 409.7974 [354.9792]	M+2 M+4 M+2 M+4 M+2 M+4 M+2 M+4 M+2 LOCK	C <sub>12</sub> H <sub>3</sub> 35Cl <sub>4</sub> 37ClO C <sub>12</sub> H <sub>3</sub> 35Cl <sub>3</sub> 37Cl <sub>2</sub> O <sup>13</sup> C <sub>12</sub> H <sub>3</sub> 35Cl <sub>3</sub> 37Cl <sub>2</sub> O <sup>13</sup> C <sub>12</sub> H <sub>3</sub> 35Cl <sub>3</sub> 37Cl <sub>2</sub> O C <sub>12</sub> H <sub>3</sub> 35Cl <sub>3</sub> 37Cl <sub>2</sub> O C <sub>12</sub> H <sub>3</sub> 35Cl <sub>3</sub> 37Cl <sub>2</sub> O <sup>13</sup> C <sub>12</sub> H <sub>3</sub> 35Cl <sub>3</sub> 37Cl <sub>2</sub> O <sup>13</sup> C <sub>12</sub> H <sub>3</sub> 35Cl <sub>3</sub> 37Cl <sub>2</sub> O C <sub>12</sub> H <sub>3</sub> 35Cl <sub>5</sub> 37ClO C <sub>3</sub> F <sub>13</sub>	PeCDF PeCDF (S) PeCDF (S) PeCDD PeCDD PeCDD (S) PeCDD (S) PeCDD (S) HpCDPE PFK	5	441.7428 443.7399 457.7377 459.7348 469.7780 471.7750 513.6775 [422.9278]	M+2 M+4 M+2 M+4 M+2 M+4 M+4 LOCK	C <sub>12</sub> <sup>24</sup> CI <sub>7</sub> <sup>37</sup> CIO C <sub>12</sub> <sup>24</sup> CI <sub>8</sub> <sup>37</sup> CI <sub>2</sub> O C <sub>12</sub> <sup>24</sup> CI <sub>7</sub> <sup>37</sup> CIO <sub>2</sub> C <sub>12</sub> <sup>24</sup> CI <sub>7</sub> <sup>37</sup> CIO <sub>2</sub> <sup>13</sup> C <sub>12</sub> <sup>24</sup> CI <sub>7</sub> <sup>37</sup> CIO <sub>2</sub> <sup>13</sup> C <sub>12</sub> <sup>24</sup> CI <sub>8</sub> <sup>37</sup> CI <sub>2</sub> O C <sub>12</sub> <sup>24</sup> CI <sub>8</sub> <sup>37</sup> CI <sub>2</sub> O C <sub>10</sub> F <sub>17</sub>	OCDF OCDF OCDD OCDD (S) OCDD (S) DCDPE PFK
3	373.8208 375.8178 383.8639 385.8610 389.8156 391.8127 401.8559 403.8529 445.7555 [430.9728]	M+2 M+4 M M+2 M+2 M+4 M+4 M+4 LOCK	C <sub>12</sub> H <sub>2</sub> <sup>35</sup> Cl <sub>5</sub> <sup>37</sup> ClO C <sub>12</sub> H <sub>2</sub> <sup>35</sup> Cl <sub>4</sub> <sup>37</sup> Cl <sub>2</sub> O <sup>13</sup> C <sub>12</sub> H <sub>2</sub> <sup>35</sup> Cl <sub>5</sub> O <sup>13</sup> C <sub>12</sub> H <sub>2</sub> <sup>35</sup> Cl <sub>5</sub> O C <sub>12</sub> H <sub>2</sub> <sup>35</sup> Cl <sub>5</sub> <sup>37</sup> ClO C <sub>12</sub> H <sub>2</sub> <sup>35</sup> Cl <sub>5</sub> <sup>37</sup> ClO <sub>2</sub> <sup>13</sup> C <sub>12</sub> H <sub>2</sub> <sup>35</sup> Cl <sub>5</sub> <sup>37</sup> ClO <sub>2</sub> <sup>13</sup> C <sub>12</sub> H <sub>2</sub> <sup>35</sup> Cl <sub>4</sub> <sup>37</sup> Cl <sub>2</sub> O <sub>2</sub> C <sub>12</sub> H <sub>2</sub> <sup>35</sup> Cl <sub>6</sub> <sup>37</sup> Cl <sub>2</sub> O C <sub>12</sub> H <sub>2</sub> <sup>35</sup> Cl <sub>6</sub> <sup>37</sup> Cl <sub>2</sub> O	HXCDF HXCDF (S) HXCDF (S) HXCDD HXCDD HXCDD (S) HXCDD (S) CCDPE PFK					

#### The following nuclidic masses were used: (a)

H = 1,007825C = 12.000000 $^{13}C = 13,003355$ 

O = 15,994915

35Cl = 34.968853  $^{37}CI = 36.965903$ 

F = 18.9984

S = internal/recovery standard

### LDC #: 15896A=1 SDG #: DDUG 20754

#### **VALIDATION FINDINGS WORKSHEET**

Sample Calculation Verification

Page:	<u>/_of_/</u>
Reviewer:	9-
nd reviewer:	100

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA <del>SW 848 M</del>ethod 8<del>290)</del> によるよう

Y N N/A Y N N/A

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration =  $(A_{\cdot})(I_{\cdot})(DF)$  $(A_k)(RRF)(V_s)(%S)$ Area of the characteristic ion (EICP) for the compound to be measured Area of the characteristic ion (EICP) for the specific internal standard Amount of internal standard added in nanograms ٧ Volume or weight of sample extract in milliliters (ml) or grams (g). Relative Response Factor (average) from the initial RRF calibration Dilution Factor. Df %S Percent solids, applicable to soil and solid matrices only.

Example:	
Sample I.D	
Conc. = $(66(2+07)(200)(3832+07)(1.06)(1.06)(1.06)$	)
,	
= 296.0 N8/Fg	

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification
	-				
,					